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# TOWARDS A TRANSATLANTIC INTELLECTUAL PROPERTY AREA?

## PATENTABILITY OF COMPUTER PROGRAMS: NORTH AMERICAN AND EUROPEAN PERSPECTIVES ON ONE OF THE MOST DEBATED IP INTERNATIONAL ISSUES

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*For Francesco, Gabriella, Umby, Francia, and Duke,*
*who always believed in me and made this possible.*

*For my Friends, and for Francesca,*
*who supported me during this journey.*

*For my grandfather Carlo,*
*who guides my path from the stars.*

*<< Non nobis solum nati sumus >> (Cicero, De Officiis, I, 22)*

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# INTRODUCTION

Today computer programs are an integral part of the daily life of people. When we write on our personal computer, we are using a software. When we scroll the screen of our smartphone, we are using a software. When we clean our dishes with a dishwasher, we are using a software. Computer programs are used for an increasing number of ordinary actions and, by now, we do not even notice that. Computer programs also have more sophisticated uses. Many complex medical instruments function by following the commands of a software. Industrial machineries are usually implemented with software as well.

In terms of business, the massive use of computer programs means possibilities, investments, and, above all, money. The software market is facing an endless growth and a computer program can be worth millions of dollars. Companies invest a lot in the development of computer programs, and due to the simplicity of software replication, they seek protection for their products. How can a computer program be protected? Law is put into place in order to establish a legal barrier which could prevent competitors from economically exploiting a software without the consent of the inventor (or the rightholder). The legal discipline which grants legal protection for inventions is Patent Law; it is considered an important tool for the incentive of the development of technology. However, computer programs have some peculiarities respect to other inventions. First of all they are abstract, unless they have physical implementation. In addition, they usually comprise mathematical algorithms and patents always pull out when math comes in. These particular characteristics opened a big debate on the following question: can computer programs be patented?

Patent systems all over the world have similar characteristics. They require for an invention to meet certain requirements (that are mainly similar everywhere) and once the fulfillment is determined, they grant a patent. This makes the inventor the only legally authorized person for the economic exploitation of the invention.

Nonetheless, patent systems have a variety of solutions for the question above, and they often do not have a specific answer at all.

The most relevant patent systems in the world are the two of the Transatlantic Area, which represent also the biggest markets in the world: U.S.A. and Europe. They are the most important producer and consumer of computer programs as well.

This analysis focuses on the North American and European perspectives on the software patentability issue. Such a comparative analysis has compelling causes for reflections. The two systems are generally referred to as having opposite positions on the software matter: the U.S.A. are considered open to software patentability, while Europe is deemed contrary to it. This starting point is particularly interesting because the Transatlantic Area is getting closer in regards to intellectual property regulation. Such a difference on the legal regime of software raises many questions. Another fascinating aspect is the diversity of the two areas' legal systems. In Europe there is a multilevel legal system formed by national legislations of the single states, European Union's regulations, and the European Patent Convention agreement. The legislative aspect has an important relevance, and even if it has an authoritative influence, case law from the European Patent Office is not binding on neither the EPO itself nor the national courts. On the other hand, the U.S.A. possesses a typical common law system. The legal regime in force follows the decision of the courts, particularly the Supreme Court Case law, consequently, has a fundamental role in directing the law applicable to a certain matter.

The thesis is addressed to both experts and persons interested in the topic. It provides all the basic notions of the patent law in the U.S.A. and in Europe under the EPC. It will be zooming in on the background of the topic, describing the notions of patents and computer programs, and analyzing the provision of the international patent treaties which operate at a supranational legal level. Subsequently, it turns to the specific legal regimes of the two areas, beginning with the basics of the two patent systems and then deepens onto their legal regime of the patentability of computer programs. The inquiry will be conducted following the historical evolution of the matter in the two patent systems mentioned above, for a matter of completeness and because taking a look at the past is always useful in better understanding the present.

Because of the existing differences, the analysis will be slightly varied in respect to the two patent systems. Regarding the U.S.A., it focuses almost exclusively on the evolution of case law, which has been rich of important decisions and overturns of the matter. On the other hand, Europe has faced an important debate among the EU *fora* on the issue. This led to some legislative initiatives of EU institutions which have tried to give clarity and uniformity to the regulation of software legal protection. In addition, it is important to inquire the case law of the EPO under the EPC. Except for the national courts, it is the only authority which currently rules on the matter of software patentability.

The analysis is not directed toward considerations on the best applicable regime, or on the economic impact of patent protection on computer programs for software industries and for the software market in general. It exclusively covers legal aspects of the in force regulation and its evolution.

The thesis has two main goals. The first one is to inquire the extent in which patent law provides legal protection for computer programs within the two areas. The software patentability issue is indeed an important evidence for a more general analysis of the problematic challenges that technology innovation is posing on patent law. The second is to determine the truthfulness of the assertions on the presumed considerable difference between applicable legal regimes in the two areas. It is an analysis of particular interest, because it can represent a further test on whether the Transatlantic Area is really getting closer for what regards intellectual property regulations or not.

# - CHAPTER I -

# PATENTS, SOFTWARE, AND INTERNATIONAL TREATIES: AN OVERVIEW

SUMMARY: 1. The Definition and the Evolution of the Concept of "Patent" – 1.1. Brief Digression on Patent History – 1.2. Theories on Patents – 1.3. Patent Definition and Purposes – 2. Computer Programs – 2.1. Definition of Computer Programs – 2.2. Possible Legal Protections for Software – 3. International Treaties – 3.1. The Paris Convention on the Protection of Industrial Property – 3.2. Patent Cooperation Treaty – 3.3. The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs).

The following chapter aims at providing the necessary background for a better understanding of the topic of this thesis, which is whether and to what extent a software can be patented under the North American and the European patent law.

If Aristotle was right arguing that "*verum scire est scire per causas*"[1], an analysis of any topic cannot start from the topic itself: the paint follows the frame. Consequently, before considering the main issue of this thesis, namely software patentability, the frame must be made clear. Software and patents are concepts which require some degree of explanation, before analyzing if and how they can be combined. In order to do it, information regarding the legal aspects of a patent and its purposes will be given. But first, these answers will need a brief historical digression: you cannot speak about the Roman Empire without speaking of Romolo. Subsequently it will be defined the concept of software. Any serious consideration about legal protection for computer programs cannot be made without knowing technically what software is and how it is beneficial. Clearly, this is not an engineering thesis, and what is necessary is a definition useful from a legal point of view. Another important topic concerns the legal alternatives for the protection of computer programs. It is necessary to describe the differences between patent protection and the one granted by copyright law, which is the alternative and complementary legal protection used for computer programs. In conclusion, a glance will be given to the main international treaties on patents, which may have some binding provisions on software patentability for state-parties.

[1] Aristotele, Fisica, I, 1, 184a, 10, in the Latin version.

# 1. The Definition and the Evolution of the Concept of "Patent"

The word patent, like many modern words, finds its origin in Latin. It indeed comes from the Latin word *patere* which precisely means: "be accessible, lie open, stand open"[2]. In particular it refers to the ancient *litterae patente* (letters patent), which were issued by medieval monarchs to grant rights and privileges.

## 1.1 Brief Digression on Patent History

During the time of ancient Greece and Rome useful arts were considered with contempt. Such new inventions were seen as trivialities without importance and appropriate only for philosophers. Nonetheless, the first case of legal protection on a sort of invention in the history of western society is found by many authors[3] in the ancient Greek society itself. In particular, they refer to a culinary competition narrated by both Atheneus, a Greek compiler of the third century A.D., and the Greek Historian Phylarchus. This culinary competition was held in the city of Sybaris, which was and is situated in the southern Italy, during the 5$^{th}$ century B.C.. The colony of Sybaris was famous for its luxury and its culinary arts. The winner of this culinary competition was granted an accolade, which gave him the right to cook his new dish in exclusive for one year. This monopoly was intended as a reward for the efforts put in to creating the new dish. However it is not clear whether the Sybarites had a real patent system, with an evaluation of new inventions and the protection of a temporary monopoly on them[4]. On the contrary there is no doubt that the origin of the modern patent system must be searched elsewhere[5].

[2] P.G.W.Glare, Oxford Latin Dictionary, Oxford University Press, 1982.

[3] Cfr. in particular: Ikechi Mgbeoji, The Juridical Origins of the International Patent System: Towards a Historiography of the Role of Patent in Industrialization, Journal of the History of International Law 5, 2003, pp. 403-422; Lieutenant Colonel George F. Westerman, An Introduction to the Law of Patent, 15 Military Law Review, 1962, pp. 103-121,; M. Frumkin, The Origin of Patents, Journal of the Patent Office Society, Vol. XXVII, No. 3, 1945, pp. 143-148.

[4] Mgbeoji (2003).

[5] Harold C. Wegner, Patent Harmonization, Sweet and Maxwell, 1993.

According to Frumkin[6], the first modern patent appeared in Italy during the 15th century. The famous architect Filippo Brunelleschi, who reached his immortal fame due to the construction of the cupola of the dome of Florence, was granted in 1421 with a monopoly for an invention. Specifically he invented a iron-clad ship called the "Badalone", which was considered to be able to carry heavy loads on the Arno and other rivers using less cost than the other ships. The main reason why the "Badalone" was built was to transport the marble necessary for the construction of the cupola. Fearing that the disclosure of his invention could make others copying it, Brunelleschi asked a privilege for its exploitation. Therefore on the 19th of June 1421 the Lords of Florence issued the following privilege, deliberating in particular that:

> "no person alive, wherever born and of whatever status, dignity, quality, and grade, shall dare or presume, within three years next following from the day when the present provision has been approved in the Council of Florence, to commit any of the following acts on the River Arno, any other river, stagnant water, swamp, or water running or existing in the territory of Florence; to have, hold, or use in any manner, be it newly invented or made new in form, a machine or ship or other instrument designed to import, ship, or transport on water any merchandise or any things or goods, except such ship or machine or instrument as they may have used until now for similar operations, or to ship or transport, or to have shipped and transported, any merchandise or goods on ships, machines, or instruments for water transport other than such as were familiar and usual until now, and further that any such or newly shaped machine, etc. shall be burned; provided however that the foregoing shall not be held to cover, and shall not apply to, any newly invented of newly shaped machine, etc. designed to ship, transport or travel on water, which may be made by Filippo Brunelleschi or with his will and consent; also, than any merchandise, things or goods which may be shipped with such newly invented ships, within three years following, shall be free from imposition, requirement, or levy of any new tax not previously imposed"[7].

This monopoly was not the first one issued in Florence. However it has been the first made in a modern way, with a privilege issued in return of an invention disclosure

[6] Frumkin (1945).

[7] Frank Prager, Brunelleschi's Patent, 28:2 Journal of The Patent Office Society 109, 1946.

contained in a single document. Unfortunately this commercial activity was a failure for Brunelleschi, and the Badalone evidentially sank on its first trip.

The first real apparatus for issuing patents appeared in the 15th century in Italy, in particular in Venice[8]. Here, some *ad hoc* patents had been granted for various inventions in 1443[9], but only 31 years later a system was created under the Venetian Senate's 1474 Act. It is considered the first Patent Statute, which contained all the important features of a modern patent system. It established that every individual:

> "who shall build any new and ingenious device in this City, not made in this Commonwealth, shall give notice of it to the office of our General Welfare Board when it has been reduced to perfection so that it can be used and operated. It being forbidden to every other person in any of our territories and towns to make any further device conforming with and similar to said one, without the consent and license of the author, for the term of 10 years. And if anybody builds it in violation hereof, the aforesaid author and inventor shall be entitled to have him summoned before any Magistrate of this City"[10].

This act created a register that recorded new inventions and was in charge of a special administrative agency, which also had the duty to control the fulfillment of all the requirement stated by the law. An interesting provision was also the one conferring the Republic the right to use the invention for public purposes without any form of compensation for the inventor. As a curiosity, even Galileo Galilei was granted in 1594 a patent under the Venetian Act of 1474[11].

During those years the commerce in Europe became more open, and as trades between countries increased even the Venetian concept of legal protection for new inventions spread, especially in France and Great Britain. Initially, patents were used to push foreign skilled men with new knowledge and technologies into immigration with the promise of a special privilege on their inventions. It can indeed be noted

[8] Robert P. Merges, Peter S. Menell, Mark A. Lemley, Intellectual Property in the New Technological Age, fifth edition, Wolters Kluwer Law & Business, Aspen Publishers, 2010, p. 125.
[9] G. Mandich, Venetian Patents (1450-1550), 30 Journal of Patent Office Society 166, 1948, p. 172.
[10] Mandich (1948), p. 177.
[11] H. Foster and Robert Shook, Patents, Copyrights & Trademarks , John Wiley & Sons, New York, 1989.

that many of the first patentees were Italian artisans[12]. This situation gave a fundamental incentive to the first Statute on patent in Great Britain, which was intended as a mercantilist instrument. Even in other countries, like Nederland and France[13], patent law had the same purpose. During the first period of the reign of James I, in the beginning of the 17th century, many issued patents were declared void by a special Committee of Grievance who were appointed by the parliament[14]. Then, after many protests against monopolies, a law on them passed in the parliament: the Statute of Monopolies of 1624. The Statute was mostly a reaffirmation of the rules regarding the monopolies created by the Common Law in England, which previously forbade them. However Section 6 of the Statute contained a provision which is considered the foundation of today English patent system[15]. It identified the lawful monopolies (so the patents issuable) establishing that:

> "any declaration before mentioned shall not extend to any letter patent and grants of privilege for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufactures within this realm, to the true and first inventor and inventors of such manufacture, which others at the time of making such letters patent shall not use, so as also they be not contrary to law, nor mischievous to the State . . ."[16].

Therefore under the Statute only privileges based on true inventions were lawful, while all others already granted should have been declared void. This Statute was one of the first instances of law regarding a specific topic that today is very relevant: the balance between competition and protection for new inventions. Under the Statute of Monopolies a patent in England was considered a bargain between the inventor and the Crown. It was indeed necessary to pay taxes in order to keep the patent alive, but moreover the patent was revocable by the King. This concepts have been expressed by English Courts many times[17]. Subsequently many principles on

[12] Frumkin (1945).
[13] See art. 3 of the French Patent Law of 1791.
[14] G. Ramsey, The Historical Background of Patents, 18:1 Journal of the Patent Office Society, 1936, pp. 6-21.
[15] Ramsey (1936).
[16] Great Britain, Statutes at Large, 21 Jac. I, ch. 3, 1624.
[17] E.g. see *Lord Seldon in Cartwright v. Arnott* (1880) and in *Harmer v. Payne*, in Ramsey (1936).

patent law have arisen, such as novelty (which was intended within the Kingdom), the necessity of a specification of the invention, and the demand of registration.

The concept of patent was introduced to the American colonies between the 17th and 18th centuries. Even if it is not clear the relation between them, it is interesting to note that the introduction of a patent law in United States and France followed a revolutionary event: the Declaration of Independence for the former, and the French revolution for the latter. More than with the revolutions, Frumkin[18] finds a link with some revolutionary inventions which have followed those events, such as the lighting rod created by Franklin in the United States and the aircraft designed by the Montgolfier brothers, which is now known with their surname. Whatever that may have been, in 1789 the American Constitutional Convention rooted the patent system in the Constitution itself: it provided indeed at Article I, Section 8 the possibility for the Congress to grant temporary exclusive right to inventors for their discoveries. The first U.S. patent system has been established in 1790[19], and it has been modified in the years 1793 and 1836. In France patent law was established in 1791. Here the absolute concept of private property got its relevance even regarding inventions: it was considered that there was a natural property right for the inventors on their inventions. This concept had a great influence for the patent law systems of other European states and of the states of Latin America.

As society was becoming more industrialized and inventions were getting more prevalent, patent laws started to become more important. This was because of their ability to grant legal protection for them. This idea has been called into question by some States at the end of the 19th century. In particular, with the rising of the *laissez-faire* doctrine many economists and industrials criticized the patent system[20]. These ideas led to the abolition of the patent system in Switzerland, Nederland, North German Federation and Japan. Even in the United States a bill for the abolition of patent law was proposed, but ultimately it failed to reach the consent in Senate for few votes. The situation changed radically with the economic crisis of 1873 and

[18] Frumkin (1945).
[19] Patent Act of 1790, Ch. 7, 1 Stat. 109-12 (Apr. 10, 1790).
[20] Fritz Machlup and Edith Penrose, The Patent Controversy in the 19th Century, 10 Journal of Economic History, pp. 1-29, 1950.

the following protectionist policy brought forward by all states. In these years the States which had previously abolished their patent system, reconstructed it. From this moment patents have been widely accepted by states in both domestic and international legislation.

## 1.2 Theories on Patents

The considerations about patents efficiency in terms of incentive for innovation does not directly pertain with the topic faced with this thesis, which takes for granted the presence of a patent system and studies the implication for a specific object: computer programs. Anyway just as a matter of completeness, below are briefly indicated the main theories behind it.

The relationship between innovation and patents is not clear and there is not a final answer to whether it is preferable to have a patent system or not. One of the main theories supporting patent systems is the "historical necessity" argument, according to which "the patent system is not the result of inspired thinking but is a dictate of historical necessity"[21]. This argument, however, fails to find supporting evidence in the history of modern industrialization and in European States practice[22]. Academics[23] met many difficulties in studying the relationship between innovation and patents, but a common conclusion is that probably there is not a direct link with the industrialization. Under the studies of Anderfelt[24] it appears that patent systems seem to follow the industrialization rather than anticipating it. Among the others, Anderfelt used the Venetian case, by showing that the Venetian Act of 1474 was issued when Venice was already at its maximum development. A result that can seem strange just at a first glance, considering that patents are naturally birth in order to legally protect innovations rather than incentivize their creations. Today, as

[21] H.G. Fox, Monopolies and Patents: A Study of the History and Future of the Patent Monopoly, Toronto: University of Toronto Studies, Legal Series, Extra Vol., 1947, p. 190.
[22] Mgbeoji (2003).
[23] *Ex plurimis* W.H. Price, English Patents Of Monopoly, Boston, 1906, p. 62; T.S Ashton, The Industrial Revolution, 1760-1830, Oxford University Press, Oxford, 1948; Phyllis Deane, The First Industrial Revolution, Cambridge University Press, Cambridge, 1965; Peter Mathias, The First Industrial Nation: An Economic History of Britain, Charles Scribner's Son, New York, 1969.
[24] Ulf Anderfelt, International Patent Legislation And Developing Countries, Martinus Nijhoff, The Hague, 1971, p. 6.

reminded above, patent law is implemented by all developed countries, and its provisions are used particularly as a tool for economic policy. This is particularly true for the issue pertaining to software patentability, in which special considerations is given to the benefit that it could have for both software companies and consumers.

In defense of patent systems, it is beneficial to quote some words from Judge Simon Rifkind that express support for the utility of a patent system. Rifkind was Co-Chairman of the United States President's Commission on the Patent System of 1966. In the final report of the commission he gave his opinion on the topic, which appears to be both interesting and quite convincing:

> "[T]he really great, creative geniuses of this world would have contributed their inventions even if there were a jail penalty for doing so. But that in itself would not have been sufficient. The patent system is more essential to getting together the risk capital which is required to exploit and to develop and to apply the contributions of the genius inventor than to provide a stimulus for the actual mental contribution. It is to the former that the economic incentive is indispensable. The money will not be risked unless there is some sense of assurance that a benefit will be obtained"[25].

In conclusion, the utility of a patent system and patents in general was, is and probably will be controversial. Some authors and movements still claim for its abolition, but the majority of academics and professionals support its existence.

## 1.3 Patent Definition and Purposes

Turning to the present, the question which finally arises is: what in conclusion is a patent? Bearing in mind that each State has its own patent system with its specific rules and peculiarities, it is possible to find a broad definition which covers all patents. Following the very simple but precise definition provided by the WIPO

[25] Report Of The President's Commission on the Patent System, reproduced in Hearings Before Subcommittee No. 3 of the Committee on the Judiciary House of Representatives, 90th Congress on H.R. 5924, H.R. 13951, and related Bills for the General Revision of the Patent Laws, Title 35 of the United States Code, and For Other Purposes, Serial No. 11, Part 1, U.S. Government Printing Office, Washington, 1968, p. 170.

(World Intellectual Property Organization) website[26], patents can be defined as "an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. In order to be patentable, the invention must fulfill certain conditions". These conditions that must are listed by every national patent system, and specific information for the North American and the European patent systems will be provided in the relative chapters. However, even if there are some differences, in general at least three conditions are commonly required worldwide: novelty, practical use and subject matter.

The condition of novelty is a very basic one, and constitute one of the essence of patent systems. Novelty means that the invention must consist in something new, that is not already known in the relative technical field. The previous knowledge is called "prior art" or "state of the art". Consequently any invention in order to be patentable must not be referable to "prior art". The European Patent Convention provides it in article 54[27], while the U.S. Patent Act includes it in Section 102[28].

The requirement of practical use for the invention refers to the necessity felt by the society of a legal protection on it. It is actually quite easy to determine. In U.S. it is usually called the requirement of "utility"[29], and it comes from the word "useful" used in Section 101 of the U.S. Patent Act[30]. On the other hand, in Europe art. 52 of the EPC refers to it as the condition of "industrial application"[31].

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[26] <http://www.wipo.int/patentscope/en/patents_faq.html#patent>.

[27] European Patent Convention (1973), Art. 54 (1): "An invention shall be considered to be new if it does not form part of the state of the art".

[28] U.S. Patent Act, Section 102. Conditions for patentability; novelty and loss of right to patent.
"A person shall be entitled to a patent unless:
(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States".

[29] Merges *et al.* (2010), p. 166.

[30] U.S. Patent Act, Section 101. Inventions patentable:
"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter […]".

[31] European Patent Convention (1973) art. 52 (1): "European patents shall be granted for any inventions which are susceptible of industrial application […]".

The subject matter condition represents the categories of inventions which are considered patentable under a certain patent system. The are two main approaches. The North American one is a positive approach, and the patentable subject matter is a description of the category of patentable inventions. On the contrary, in Europe there is not a definition of subject matter, but rather a list of exclusions and exceptions which are not considered inventions under the meaning of the patent system. There can be an invention non patentable because, even if it fulfills all the conditions for receiving legal protection by patents, it does not fall within the categories of patentable subject matter (in U.S.A.) or it falls within a category for which the patentability is expressly excluded (in Europe). The reasons for excluding some inventions from the subject matter can be various, and the extent of such exclusions is usually uncertain. They are present even in the international framework for patent law made by the TRIPs Agreement[32]. In Europe these exclusions have a particular relevance. They are provided by article 52 of the EPC, which will be deeply analyzed because it includes among the others an express exclusion from the patentable subject matter for "programs for computer".

For what concerns the purposes of patents, there is one main theory[33]. This theory states that the main purpose of the patent system is to protect and incentivize inventors. In fact, while creating inventions has a cost, it is almost impossible to have a complete control after releasing them. The economic reward behind the patent is consequently seen as an incentive to invest in innovation for inventors. On the other hand, the public advantage will be the complete disclosure of the invention which will be totally free on the market after the period of time of the patent. The protection obtained with a patent is a broad one. It grants a full economic right on the invention, whatever could be the process by which it is reached by others. As it was even in the oldest patent system, as in Venice and in Great Britain, this right can have some exceptions usually because of public reasons.

[32] The Agreement on Trade Related Aspects of Intellectual Property Rights, art. 27 (2) and (3).
[33] Merges *et al.* (2010), p. 133.

# 2. Computer Programs

The extent to which computer programs constitute a complex issue for patent systems of all around the world can be clearly understood with a quick glance at the FAQ section of the WIPO website. One of the question is indeed the following: "Can I obtain a patent for my software related invention?"[34] In the first and relevant part of the answer the WIPO responds that:

> "Procedural and substantive requirements for the grant of patents are different from one country/region to the other. In particular, practices and case law regarding the patentability of software-related inventions vary significantly in different countries. For example, in some countries, inventions within the meaning of patent law must have a technical character and software as such is not considered a patentable invention, while in others, such requirements do not exist, so that software is generally patentable subject matter"[35].

The answer omits that the issue not only is dealt divergently in different countries, but it is also at the center of constant re-examination within those same countries to the point that it becomes difficult to obtain certain answers even in regards to them. This study will focus on the problematic case that computer programs patentability represent for both the U.S. patent system and the patent system under the European Patent Convention. However, before doing so, it will try to provide a clear definition of "computer program" from a legal point of view.

The other important and introductory theme regards the ways computer programs can be legally protected. There are two typical legal means that are used for software, patents and copyrights law.

## 2.1. Definition of Computer Programs

As for any abstract concept, it is not easy to give a clear definition of the concept of "software" or "computer program", intended as the same idea, in contrast with the one of "hardware". The words themselves suggest a difference. A software

[34] <http://www.wipo.int/patentscope/en/patents_faq.html#patent>.
[35] <http://www.wipo.int/patentscope/en/patents_faq.html#patent>.

is intangible, and is usually referred to as an abstract idea or a mental process. On the contrary a hardware is the physical component of a computer, formed by a processor, a memory and all the other physical features.

If we were to look the definition of a software on a dictionary, it would say that "software is a set of instructions [directed] to […] a computer written in a programming language" (The Penguin Dictionary of Physics). More in general, a software is a programming command made up by immaterial elements, and it generally includes any kind of instructions, commands, algorithms, and procedures that are able to direct hardware to perform the desired operations. The concepts of software and hardware are indeed complementary. They are useless by themselves but if combined they can carry out endless different actions, which increase with the technology development. A software can be written in human language, more precisely that of symbols and signs. In this case they referred to as the source program, or source code. However, the source program is not immediately readable by a hardware. It has to be translated into machine language which is made up of electromagnetic elements that physically direct the hardware to operate the required actions[36]. This is called the object program and makes it possible for hardware and software to interact. A software can be written on paper, stored in the memory of a computer, or carried by a computer readable medium such a DVD. When a computer program is permanently stored in a hardware it is referred to as firmware.

In the United States of America there is a legislative definition of the concept of computer program. The Copyright Act of 1976 in Section 101 (Definitions) uses the following words in order to define the concept of computer program:

> "A computer program is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result"[37].

This definition is very generic and it is similar to a dictionary definition. However, considering the fast evolution of technology, a more specific definition would have been restrictive and could have been outdated soon. For this very reason, in Europe a definition of computer programs is totally absent. The Directive 91/250/EEC on the

[36] Ricardo Rojas Gaona, Omar Tuvi Helguera, Juan Carlos Andrade Davila, Software Patentability, pp. 1-29, p. 5. Text available online.

[37] 17 U.S.C., Copyright Act of 1976, Section 101.

copyright protection of computer programs, only provide the following guideline in Recital 7:

> "For the purpose of this Directive, the term computer program shall include programs in any form, including those which are incorporated into hardware. This term also includes preparatory design work leading to the development of a computer program provided that the nature of the preparatory work is such that a computer program can result from it at a later stage".

This provision shows the difficulties that EU institutions had encountered in framing the concept of software. Rather than providing a definition, it was decided to broaden the range of action of copyright protection directed to computer programs in order to avoid any possible lack of protection for new software inventions.

When in 2002 the European Commission presented the Proposal for a Directive on the patent protection for computer programs, it provided a definition of computer implemented invention at art. 2 (a):

> "computer-implemented invention means any invention the performance of which involves the use of a computer, computer network or other programmable apparatus and having one or more prima facie novel features which are realised wholly or partly by means of a computer program or computer programs"[38].

The Proposal was subsequently rejected by the European Parliament. The proposed definition was very generic and did not add anything noteworthy to the matter. In 2009 the directive on copyright protection for computer programs has been replaced by Directive 2009/24/EC. The new directive did not try to give a definition of computer programs, but it merely repeated the prior provision mentioned above (Recital 7 of the Directive 91/250/EEC) in its new Recital 6.

In conclusion, it is not possible to provide a specific definition of software that would not be too restrictive by itself. This reason pushed both the U.S. and the European Legislators to act very carefully in this respect. The mere fact that in the U.S.A. we are provided with a legislative definition and in Europe we are not does not necessarily imply a substantial difference between the two patent systems in this respect.

[38] COM(2002) 92 final, art. 2 (a).

## 2.2. Possible Legal Protections for Software

Some decades ago the extent of legal protection available for computer program was not clear. During those years (which approximately ended during the 1980s') trade secret law represented an important tool for software developers in order to protect their inventions[39]. Today, on the other hand, the legal means available to protect a computer program are quite definite. Copyright law protection is available in both the U.S.A. (from Copyright Act of 1976) and in all of Europe (at least in the EU Member States from the Directive 91/250/EEC). Even the TRIPs Agreement expressly provided copyright protection for software inventions. On the other hand, patent law protection is available as well, but its applicability is still uncertain and a software claim could be rejected if it does not comply with the approach used by the USPTO or the EPO.

Copyright law and patent protection cover different objects, and they can be considered complementary rather than alternative legal means. Some insight on their coverage can help to better understand the topic.

Copyright law is the traditional legal mean used to protect literary works. At the beginning, until the late 1970s', its applicability to computer software was a big question mark for both academics and copyright offices because of the utilitarian scope of computer programs[40]. In 1974 in the U.S.A., where the software industry was developing fast, Congress decided to solve the problem by establishing the Commission on New Technological Uses of Copyrighted Works in order to definitely determine whether copyright law was applicable to computer programs or not. The outcome of the works of the Commission provided a positive response to the question. However, the report clearly stated that "any idea, procedure, process, system, method of operation, concept, principle, or discovery" was not covered by copyright protection even in regards to computer programs. The same solution, with the same limitation was subsequently adopted by some European countries, and finally by the European Union in 1991.

[39] Mark A. Lemley, Peter S. Menell, Robert P. Merges and Pamela Samuelson, Software and Internet Law, Aspen Publishers, 2004, p. 4.
[40] Lemley *et alia* (2004), p. 34.

Therefore, the protection granted by copyright law covers only the expression of a computer program. Software companies in order to have a full legal protection for their inventions started to seek also patent protection. This is when the computer programs patentability issue arose. Patents cover the underlying content of an invention, exactly what copyright law does not.

The two protections from this point of view are extremely complementary for a computer program invention. Together they guarantee the protection of the whole software: its expression and its content. Not surprisingly, the Directive 91/250/EEC establishing copyright protection for computer programs in the European Union took into consideration this matter. It expressly stated that copyright protection covered only the expression of computer programs and that the directive did not represent an obstacle for further legal protection. On the contrary, it suggested a new legislative intervention with the purposes of providing legal protection precisely for the programming language that copyright law did not cover[41].

On the other hand, many critics of software patent protection claim that it produced an over protection that creates barriers for the development and the innovation of the industry. These reasons crashed the proposed directive on patent protection for computer implemented inventions.

So, in summary, regardless of economic considerations that do not pertain to the legal research of this thesis, today there are two possible legal means for protecting a software invention. The former is copyright law, which is expressly provided in both the U.S.A. and in Europe and is applied to the expression of a computer program. The latter is patent protection, whose applicability in the two patent systems is uncertain and represents the topic of this thesis. Patent protection would cover the underlying content of a software invention (such as the programming language), and therefore would constitute a complementary tool rather than an alternative to copyright law for the legal protection of computer programs.

[41] This topic is analyzed in depth by Chapter III, at. 2.2.1.

# 3. International Treaties

With the phenomenon of globalization, the dynamics of national legislation are now highly influenced by the foreign happenings and decisions. Even with regards to intellectual property and in particular patent law, today states are bound by many international treaties. Seeking protection abroad for inventions of nationals and aiming at a rules harmonization worldwide are just two of the many purposes which have pushed states to set up international agreements on this topic. Consequently, an analysis on any kind of legal issue in this subject must start here. After having checked the most important international provisions, in particular the ones relating with software patentability, the lens will zoom where the real game is played: the national legal systems.

## 3.1. The Paris Convention on the Protection of Industrial Property

Patents have always been subjected to the principle of territoriality under which they are only valid within the territory of the granting state. This started to be recognized as a problem with the increase of international trade during the 18th century. A particularly meaningful episode in this respect happened during the International Exhibition of Inventions in Vienna during 1873, when exhibitors did not want to show their inventions because they feared that their inventions could have been stolen and economically exploited in other countries[42].

From here was born the idea of creating a multilateral treaty for helping inventors to get legal protection for their industrial creations even abroad. On the 20th of March 1883 the Paris Convention for the Protection of Industrial Property was established. The Convention has been revised 7 times (the last review was on the 28th of September 1979). Under art. 1, it creates "a Union for the protection of industrial property"[43], which included within its scope, among the other objects, patents. Thus,

[42] <http://www.wipo.int/treaties/en/general>.

[43] Paris Convention on the Protection of Industrial Property of March 20th, 1883, art. 1.

rather than creating a common international patent (the domestic nature of patents was taken for granted), it provided a framework of basic rules, which guaranteed a sort of minimum protection for international traders and inventors. The two main principles established by the Convention are the national treatment and the priority right. The former can be found in articles 2 and 3 of the Convention, which in particular established in article 2 that "nationals of any country of the Union shall, as regards the protection of industrial property, enjoy in all the other countries of the Union the advantages that their respective laws now grant, or may hereinafter grant, to nationals"[44]. The latter is affirmed by article 4 and provides any person who has successfully filed a patent application in a state-party the right to priority for the request of the same patent in another state-party. The second request must be done within twelve months from the first one. This Convention did not say anything about computer programs, neither in its first version, which was written long before the invention of computers, nor after its revisions. One of the criticism it has received that over the years concerns the absence of an express recognition for some new products, including computer programs, that were getting an increasing importance in term of economic value[45]. The World Intellectual Property Organization (WIPO), founded in 1967, which today is one of the seventeen specialized agencies of the United Nations, is in charge of the administration of this Convention.

## 3.2. Patent Cooperation Treaty

The WIPO carries out the procedures of another important treaty affecting patents: the Patent Cooperation Treaty (PCT) signed in Washington, D.C. in 1970. This treaty has the purpose of simplifying the international patent system, in particular providing a filing system which enables a single application in a single language to have effect in every states party to the treaty designated by the applicant[46]. Even if it does not deal with the matter of what is patentable and what is

[44] Paris Convention on the Protection of Industrial Property of March 20th, 1883, art. 2.

[45] See Kunz-Hellstein and Katzenberger, as cited in Giuseppe Morgese, L'accordo sugli aspetti dei diritti di proprietà intellettuale attinenti al commercio (TRIPs), Cacucci Editore, 2009, note 86 p. 28.

[46] Jon O. Nelson, International Patent Treaties with commentary, Oceana, Oxford University Press, 2007, p. 23.

not, the Regulations under the Patent Cooperation Treaty have two interesting provisions concerning computer programs: rule 39 and rule 67.

Rule 39 is related with article 17, which deals with a particular procedure that must be done before the International Searching Authority (ISA). The treaty creates under art. 15 an International Search, that must be applied to every patent application and has the objective of discovering "prior art". Under art. 16 the authority in charge of carrying out the research above is the International Searching Authority. Coming back to art. 17, it states that under the Regulations the ISA in not always required to do the search. The rule which provides the subject matters excluded by the International Search is indeed rule 39 which establishes that "No International Searching Authority shall be required to search an international application if, and to the extent to which, its subject matter is any of the following: […] (vi) computer programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs"[47]. On the other hand, rule 67 is the equivalent of rule 39 but relating with art. 34. Art. 34 indeed set up the procedure which must be followed in doing the International Preliminary Examination before the relative Authority, whose objective under art. 33 is to "formulate a preliminary and non-binding opinion on the questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), and to be industrially applicable"[48]. As art. 17 does for the international search, art. 34 states that the regulations provide the subject matter on which the examination is not required. In doing so, rule 67 repeats the words used by rule 39, including in the subject matter excluded "computer programs to the extent that the International Preliminary Examining Authority is not equipped to carry out an international preliminary examination concerning such programs"[49]. This exclusion should apply only in case of absence of equipment for doing a search or examination on the topic. However the two authorities have "diverging practices with respect to determinations of exclusions as to computer programs"[50].

[47] Regulations under the Patent Cooperation Treaty, rule 39.
[48] Patent Cooperation Treaty, art. 33.
[49] Regulations under the Patent Cooperation Treaty, rule 67.
[50] World Intellectual Property Organization, PCT International Search and Preliminary Examination Guidelines (PCT/GL/ISPE/1), Geneva, March 11, 2004, p. 65, 9.15.

These provisions do not have any impact on the patentability of computer programs. Art. 27 (5) clearly states that the provisions of the PCT have the exclusive scope of the international procedure and do not limit in an way the freedom of domestic patent systems on the patentable subject matter. However, they could be an interesting starting point for analyzing the reasons behind the exclusion of computer programs patentability in some legal systems, in particular the European one. It seems that the first provisions on software legal protection could have been affected by technical problems rather than decisions of legal or economic policy.

## 3.3. The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs)

The Agreement on Trade Related Aspects of Intellectual Property Rights, commonly called TRIPs, is an international agreement dealing with intellectual property protection, established with the purpose of incentivizing investments in innovation and research of new ideas and technology[51]. It is commonly considered one of the most controversial agreements included in the World Trade Organization (WTO) Agreement[52]. Its negotiations, which featured a major conflict between developed and developing countries, started during the Uruguay Round (1986-1994) under the General Agreement on Tariffs and Trades (GATT). Finally, it was promulgated on the 15th of April 1994. Today, this agreement applies to all WTO (which has substituted the GATT) members and provides the minimum standards for intellectual property protection. It can be considered the most exhaustive international agreement on intellectual property with a strong enforcement mechanism[53]. Violations of TRIPs' provisions fall into the WTO's dispute settlement mechanism, which is able to inflict trade sanctions.

The TRIPs Agreement includes seven parts. The first two parts contain the substantive provisions: in particular Part 1 is a sort of introduction with principles and

[51] Hiroko Yamane, Interpreting TRIPS Globalisation of Intellectual Property Rights and Acess to Medicine, Hart Publishing, Oxford and Portland, Oregon, 2011, p. 1.
[52] Simon Lester and Bryan Mercurio, World Trade Law Text, Materials and Commentary, Hart Publishing, Oxford and Portland, Oregon, 2008, p. 705.
[53] Nelson (2007), p. 19.

general rules, while Part 2 sets the minimum standards for each intellectual property right. Patents are regulated in its Section 5.

Computer programs are expressly taken into consideration within the copyright's provisions, in Section 1 of Part 2. On the other hand, there is not an express reference to them in the section dedicated to patents. Consequently, TRIPs does not deal directly with the software patentability issue, leaving the final decision whether computer programs can be protected by patents to single states for their domestic legislation. There may be many reasons why this route was chosen, but they are of little practical relevance. It was probably too difficult to come to an agreement on this specific point, especially because the two main players and backers in the TRIPs negotiations, namely the U.S.A. and the EU, had two different views on it. Above all, there were issues more debated and important, such as the access to medicines. Going back to computer programs, what is possible and necessary to do is to look at what TRIPs indirectly says on software patentability rather than at what TRIPs does not say on it at all.

One of the main purposes of the TRIPs agreement in facing patent law was to harmonize the global patent regulations[54]. Harmonization here refers to the level of protection and to what is to be protected. This second point is regulated by art. 27, named "Patentable Subject Matter", which significantly affirms that "patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application"[55]. Some exceptions based on public order, morality, and other specific elements are provided in paragraphs 2 and 3. The provision of art. 27 neither expressly excludes nor includes computer programs. Consequently, whether they are included or not is a matter of interpretation, and the meaning given to the words used in the article has much importance. As it has been pointed out[56], the question

[54] Aaron D. Charfoos, How Far Have We Come, And Where Do We Go From Here: The Status Of Global Computer Software Protection Under The TRIPS Agreement, 22 Northwestern Journal of International Law & Business, pp. 261-290, 2001-2002.

[55] TRIPs, art. 27 (1).

[56] Charles R. McManis, Symposium: Article: Taking TRIPS on the Information Superhighway: International Intellectual Property Protection and Emerging Computer Technology, 41 VILL. L. Rev. 207, 1996.

is: what exactly do the words "capable of industrial application"[57] used in art. 27 mean? The Agreement itself gives a further element for answering this question: a footnote in art. 27 of the Agreement clarifies that "the terms […] 'capable of industrial application' may be deemed by a Member to be synonymous with the terms [… ] 'useful'"[58]. The note seems to make a link with the American utility requirement. The real point is related to what Charfoos[59] called the "pure software controversy": is a computer program lacking of any kind of physical element within the scope of the provision of art. 27?

The rules for interpreting an international treaty are established by the Vienna Convention on the Law of Treaties of 1969, with the exception of treaties which are either in a non-written form or signed before its entry into force[60]. Consequently the TRIPs agreement falls within its scope. In particular, article 31 of the Vienna Convention establishes that "a treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose"[61]. Using the literal interpretation, it is first clear that there is no prohibition against software patentability. The exceptions laid down by paragraphs 2 and 3 of art. 27 in TRIPs, which are in any case discretionary, indeed do not expressly include computer programs. Moreover, even looking at the *ratio* under these exceptions, no relation can be found with a computer program. Regarding paragraph 2, a piece of software could clearly be against public order or morality, but so could any other invention. On the other hand, concerning the elements listed in paragraph 3, these are essentially medical treatments and biological processes: something far from a computer program at all. Consequently, in respect to the question of whether states do have an obligation of making computer programs patentable or not, it can be affirmed that there is not a prohibition on that.

On the other side of the coin, computer programs are not expressly mentioned even in the first paragraph of art. 27. As said above, computer programs are naturally

[57] TRIPs, art. 27 (1).
[58] TRIPs, art. 27, note 5.
[59] Charfoos (2001-2002).
[60] Under the provisions of art. 1, 2 and 4 of the Vienna Convention.
[61] Vienna Convention on the Law of the Treaties, art. 31 (1) "General Rule of Interpretation".

included in the category of "any field of technology"[62], even if there is some evidence that this expression was drafted in order to include all kind of medicines within the subject matters covered by patent protection[63], especially after the redundant prohibition of discrimination against the field of technology affirmed at the end of the same paragraph. More problematic, on the other hand, is whether a piece of software satisfies the industrial application (or utility) condition or not. There is much confusion among commentators on this interpretative aspect, and the truth seems to be that the norm is open to different interpretations. Some authors[64] cite the adoption of the Paris Convention made by art. 2 of the TRIPs, finding as a natural consequence the expansive interpretation that must be given to the concept of intellectual property as stated by art. 1 of the Paris Convention. Others[65] think that the industrial application can be a limit for software patentability. Particularly strong is the position of Schiuma[66], who claims the violation of art. 27 (1) TRIPs made by art. 52 of the European Patent Convention. Indeed, he considers the patentability of computer programs compulsory under the TRIPs provision, arguing that only those exceptions provided by paragraphs 2 and 3 of art. 27 can be excluded by states from legal patent protection. On the other hand, some European offices and courts have expressly rejected this view. In particular Paul Hartnack in 1998, when he was General Comptroller of the UK Patent Office, said that the final decision on the patentability of computer programs should be made according to economic policy reasons, considering his opinion that in interpreting the words of art. 27 many experts would deny that a pure software is either an invention, a technology, or something capable of industrial application[67]. Along these lines, the German Federal Patent Court[68] has stated that art. 27 of TRIPs does not require the patentability of computer programs. The TRIPs provision is seen by the Court as confirming the

[62] TRIPs, art. 27 (1).

[63] J. J. Gorlin, An analysis of the Pharmaceutical-related Provisions of the WTO TRIPS(IP) Agreement, Washington DC, IP Institute, 1999, p. 21.

[64] Charfoos (2001-2002).

[65] McManis (1996).

[66] Daniele Schiuma, TRIPs and exclusion of software "as such" from patentability, 1 International Review of Industrial Property and Copyright Law (IIC), Vol. 31, pp. 36-51, 2000-2001.

[67]<http://web.archive.org/web/20010608115154/http://www.patent.gov.uk/about/ippd/softpat/1000.htm>

[68] <http://eupat.ffii.org/papers/bpatg17-suche00/index.de.html>.

previous prevalent German jurisprudence, which considered the concept of technology ("*Technik*") the precondition for granting patent protection to an invention. Under this view, the Court stated also that art. 52 of the EPC cannot be considered against art. 27 of the TRIPs, as it uses the same criterion for its exclusion: the lack of technicality.

Having the possibility of examining the norm after some years, an additional point of view can be suggested. As previously mentioned, the Vienna Convention has established the rules that must be used in the interpretation process. Art. 31 of the Vienna Convention affirms in paragraph 3: "There shall be taken into account, together with the context: […] (b) any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation"[69]. Under this provision, relevance must be attributed to how state parties to the TRIPs Agreement have behaved with regard to the provision under discussion. For what concerns the pure software issue there is no consensus among states on the right approach that must be taken. There are states which grant patent protection for computer programs and states which do not grant it. The different approach is not related to whether the state is a developed country or a developing one. Among developed countries themselves there are two different approaches, and a deep analysis on the most important cases will be done in the next chapters. For now it can be noticed how states have informed the WTO about some aspects of their implementation of the TRIPs Agreement. This information is included in documents (one for each country) named "Review of legislation in the fields of patents, layout-designs (topographies) of integrated circuits, protection of undisclosed information and control of anti-competitive practices in contractual licences", in which questions on particular issues are posed on the states. The different approaches on the software patentability issue can be seen by the responses given to the question on the computer program patentability implementation in the "replies to questions posed by . . ." sections[70].

[69] Vienna Convention on the Law of the Treaties, art. 31 (3).

[70] It is possible to access all these documents on the World Trade Organization Website. In order to do so, go to the webpage <https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S001.aspx> and just type in the "document symbol" space: "ip/q3/". Then the list of all the document relative to each state will appear.

Another element that must be taken into account when considering state practice is whether or not there have been disputes between states on the implementation of article 27 regarding the patentability of computer program. The list of all the dispute settlement procedures between states related to the TRIPs provisions is contained within the WTO website, and no dispute on the patentability of computer programs can be found. This means that no state has officially claimed for the implementation of art. 27 made by another state in relation of this issue. In light of what was said above, state practice brings to the conclusion that the preferable interpretation is the one which gives flexibility to the norm of art. 27 regarding the patentability of computer programs.

In conclusion, few words must be spent on the copyright law protection of software provided by art. 10 of the TRIPs. As previously stated, this is the only part of the agreement where computer programs are expressly mentioned[71] . Someone could argue from this provision that, granted a legal protection for computer programs, a limit for patentability should stand. This position could not be embraced, since even in the European Union, which represents the most important case of a legal system with an express prohibition for software patentability, the cumulative legal protections (the so called *Kumulationsprinzip)* is accepted[72] and even suggested[73].

[71] TRIPs, art. 10 (1): "Computer programs, whether in source or object code, shall be protected as literary works under the Berne Convention (1971)."

[72] Stefano Sandri, La nuova disciplina della proprietà industriale dopo i GATT-TRIPs, Seconda edizione, Cedam, Casa Editrice Dott. Antonio Milani, 1999, p. 128.

[73] See considerations on the 91/250/EEC Directive in Chapter III at 2.2.1.

# - CHAPTER II -

# SOFTWARE PATENTABILITY IN THE UNITED STATES OF AMERICA

SUMMARY: 1. Introduction to North American Patent Law – 1.1. Historical Background – 1.2. Overview of the U.S. Patent System – 2. Software Non-Patentability History – 2.1. The General Prohibition on "Mental Processes" and the Software Prohibition before Gottshalk v. Benson – 2.2. The Closure of the Supreme Court on Software Patentability and the Struggles of the C.C.P.A. – 2.3. The Openness to Software Patent including Physical Steps – 3. Embracement of Software Patentability and Recent Developments – 3.1. The Revolution of In re Alappat and the "new machine" Doctrine – 3.2. Further Openness to Software Patents – 3.3. Recent Developments and Nowadays Situation after Bilski – 4. Empirical Analysis of Software Patents – 4.1. How to get Data on Software Patents – 4.2. Software Patents' trend – 4.3. Law in Action v. Law in Books / Courts.

This chapter is dedicated to the topic of patentability of software in the legal system of the United States of America. There are many reasons why the U.S. patent system is the very first one to face dealing with software patent. First, the U.S.A. is the birthplace of the software industry and holds its biggest market. The most profound software producer companies, such as Microsoft Corporation, Google, and many others, are North American born. The presence of big players is one typical North American feature in this sector. The "promise land" for the technology addicted is located in California (Silicon Valley). The U.S.A., as well as Japan and South Korea, are generally referred to as having a legal system that is open to software patents. On the other hand, there are other legal systems considered generally closed in this respect: above all Europe with the prohibition of art. 52 of the EPC. Evidently, these statements need some specifications. Today, this topic seems a bit old-fashioned in the U.S.A. because society do not doubts anymore that the doors of patentability have been opened to computer programs. For this reason, rather than answering a question, this chapter directs an explanation of this drawn conclusion and describes how it was reached. Before dealing with the core argument of the chapter, a frame of the North American patent system will be drawn. The analysis on software patentability, which is mostly based on case law study, will be divided between a historical period and the most recent developments. At the end, a brief empirical analysis on software patents will be carried out.

# 1. Introduction to North American Patent Law

## 1.1 Historical Background

In the North American legal system, patents find their legitimacy directly from the highest source of law: the Constitution. Article 1 of the U.S. Constitution (legislative branch) within Section 8, which deals with the powers given to the Congress, provides that "the Congress shall have the power […] to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries"[74].

This provision was thought and written in order to create a national patent system. Originally, since the concept of patent was introduced into the American colonies from the British legal system, most states started granting patents by themselves. This situation lasted for more than a century, from the first patent granted by Massachusetts in 1641 to the establishment of the Constitution itself. It can be clearly deducted that a situation in which patents were issued by every single states separately brought to many conflicts between states, especially when an identical patent was issued in favor to two different inventors in two different states[75]. Thus, the creation of a national patent system was necessary, especially to overcome these conflicts and to grant certainty.

The first federal statute on patent law was established in 1790, with the signature of President George Washington. It was one of the initial measures taken by the first Congress. The statute was titled "An Act to promote the Progress of Useful Arts"[76]. It only had seven sections, making it seemingly synthetic. It granted an exclusive fourteen years' privilege for the invention or discovery of "any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used", with the condition that it deemed "sufficiently useful and important" to be deserving of patent legal protection.

[74] The Constitution of the United States, Art. 1, Par. 8, Clause 8.
[75] Merges *et alia*, p. 127.
[76] Patent Act of 1970, Chapter 7, 1 Statute 109-112 (April 10, 1790).

This statute was substituted few years later by the Patent Act of 1793[77]. It was made by twelve sections. Its most important innovation, compared to the previous one, concerned the application procedure. This was much simpler because the new act established in Section 3 that the petition had to be sent only to the Secretary of State. In the Statute of 1790 it had to be submitted to the Secretary of War and to the Attorney General as well. The obtaining of a patent was further facilitated by eliminating the "sufficiently useful and important" clause, and with that drop, a registration system similar to the one which was in place at that time in England was introduced. The procedure, as extremely rigid as it was, turned to the opposite direction and a requirement of examination lacked at all. This opened the doors to many patents which were merely fraudulent or duplicative[78]. The effect of the new procedure are given by the numbers: under the Statute of 1790, in its three years of life (from 1790 to 1793), only 55 patents had been issued[79], while in the 43 years of the 1793 Statute the patents granted were nearly 10,000, a significant number of which were invalid[80].

This system lasted until 1836 when a new statute was enacted: the Patent Act of 1836[81]. The new statute had 21 sections and is considered by some scholars[82] the first stone of the modern North American patent system. Section 1 of the statute finally made the Patent Office a distinct one within the Department of State. The same section created the position of the Commissioner of Patents, who under the direction of the Secretary of State had the role of superintending, executing and performing all the acts related to the assignment of the office. Another important provision was the possibility for the applicants to appeal a refusal from the Patent Office under section 7 and 8. The appeal had to be heard by three functionaries who

[77] Patent Act of 1793, Chapter 11, 1 Statute 318-323 (February 21, 1793).

[78] Edward C. Walterscheid, To Promote the Progress of Useful Arts: American Patent Law and Administration, 1787-1836 (Part I), 79 J. PAT & TRAD. OFF. SOC'Y 61, 1997, pp. 73-73.

[79] Sheldon W. Halpern, Craig Allen Nard, Kenneth L. Port, Fundamentals of United States Intellectual Property Law: Copyright, Patent, Trademark, Third Edition, Kluwer Law International, 2011, p. 192, note 6.

[80] According to Walterscheid, as cited by: John M. Golden, "Patent Trolls" and Patent Remedies, Texas Law Review, Vol. 85, pp. 2111-2161, 2007, p. 2118, note 33.

[81] Patent Act of 1836, Chapter 357, 5 Statute 117 (July 4, 1836).

[82] See for example: Bruce Brugbee, Genesis of Modern American Patent and Copyright Law, Public Affairs Press, Washington DC, 1967, p. 152.

were appointed by the Secretary of State. The most important innovation, however, was the one concerning the application procedure. The Senate itself, indeed, highlighting one of the most urgent problems that the new Statute aimed to solve, in a report accompanying the 1836 statute referred to fraudulent and duplicative patents as one of the "evils" happened under the Patent Act of 1793[83]. In order to overcome this problem section 7 reintroduced the examination of novelty and utility for patent applications before granting the patent.

The subsequent revision was made in 1870. The new statute was aimed to "to revise, consolidate, and amend the Statutes relating to Patents and Copyrights"[84]. The prior regulation was almost completely confirmed by the new act. Amongst the few modifications, the most relevant was probably the stress given to the role of patent claims and of the invention description.

During the following years, and before the Patent Act of 1952, the orientation of the courts in respect to patents rapidly changed. At the beginning of the 20th century until the 1920s and 1930s, the Supreme Court had a positive attitude toward patents and they were well accepted. In these last decades an increasing number of people started negatively considering the position of some large companies who had a significant number of patents in their portfolio. Those positions, which in some cases were real monopolies, were a threat for a competitive market. In light of the consensus collected by these theories, the Court started being really strict in issuing patents[85]. It is not probably a case that this orientation rose at about the same time of the great depression, as all the periods of crisis were accompanied by strong criticism to patents benefits and to the patent system in general[86]. With the war efforts of the Second World War, a more positive orientation prevailed. At the end of it, the Congress reached a big consensus for enacting an act aimed at creating a strong patent system.

[83] See Senate Report Accompanying Senate Bill No. 239, 24th Congress, 1st Session (April 1836).
[84] Patent Act of 1870, Ch. 230, 16 Stat. 198-217 (July 8, 1870).
[85] Merges *et alia*, p. 129; Sheldon *et alia*, p. 194.
[86] Remaining in the United States, it can be reminded the 1890 depression which led to the Sherman Antitrust Act, or more recently the modern crisis gave voice to all the theories about the benefit that an abolition to the patent system could have for our society, as for instance: Michele Boldrin, David K. Levine, Against Intellectual Monopoly, Cambridge University Press, 2008.

After the events mentioned above, the 1952 Patent Act was finally enacted. Even if it has been modified by some important amendments, this statute, which has been codified in the U.S. Code at Title 35, is still in force and represents the regulation related to patents in the United States. In regards to the most important amendments it had, three must be reminded.

Firstly, in 1982, the Congress enacted the Federal Courts Improvement Act, which established the Court of Appeal for the Federal Circuit. The Court, which was created to contrast the lack of uniformity and the high rate of invalidity among issued patents, has exclusive jurisdiction over any "appeal from a final decision of a district court of the United States, […], in any civil action arising under, or any civil action in which a party has asserted a compulsory counterclaim arising under, any act of Congress relating to patents […]"[87]. With the creation of the Court of Appeal for the Federal Circuit, this act abolished the previous Court of Customs and Patent Appeals, which had worked for 70 years[88].

A second important amendment occurred because of the signature of the TRIP's Agreement in 1995. This agreement set that the term of validity for a patent was 20 years: previously in the U.S. the duration of a patent was 17 years. In addition, the TRIP's has made possible to use an inventive activity occurred even outside the country as an evidence to prove the date of invention.

A last important development of the North American patent law that arose recently was the revolutionary[89] introduction of the *first-to-file* system. Before it, the U.S.A. was the only important country which still adopted the *first-to-invent* system, which, even if it could be considered a fairer system under certain points of view, had many problems for what concerns the individuation of the rightful applicant. With the Leahy-Smith American Invents Act, enacted in 2011 and entered into force on the

[87] 28 U.S.C. §1295.

[88] The Court of Customs and Patent Appeals was, indeed, created in 1909 by the Pain-Aldrich Tariff (ch. 6, 36 Stat. 11) with the name of Court of Customs Appeals. In 1929 it changed name in Court of Customs and Patent Appeals, when the Congress conferred it the power to hear appeal from the Patent Office.

[89] The adoption of the first-to-file system is commonly considered the most important change in the American patent law since many years; see Wendy H. Schacht, John R. Thomas, The Leahy-Smith American Invents Act: Innovation Issues, Congressional Research Service (January 15th, 2013), p. 1, at <https://www.fas.org/sgp/crs/misc/R42014.pdf>.

16th March 2013[90], the U.S.A. has officially adopted the first-to-file system. As the names of the two systems clearly indicate, they respectively use the filing date and the invention date for the individuation of the rightful applicant for a patent in the case of controversy.

## 1.2 Overview of the U.S. Patent System

The North American patent system is now regulated by Title 35 of the United States Code, titled indeed "Patents". The Title is divided in 5 parts[91]:

- Part I: United States Patent and Trademark Office (§§ 1–42);
- Part II: Patentability of Inventions and Grant of Patents (§§ 100–212);
- Part III: Patents and Protection of Patent Rights (§§ 251–329);
- Part IV: Patent Cooperation Treaty (§§ 351–376);
- Part V: the Hague Agreement concerning International Registration of Industrial Designs (§§ 381-390).

In regards to the topic of this thesis, it is important to give at least some general notions on the procedure for obtaining a patent[92] and on the elements of patentability, in particular the patentable subject matter.

### 1.2.1. Patent Application Procedure

The patent application procedure is usually called "prosecution"[93]. It starts with the deposit of a patent application. First, a particular importance must be given to the examination of the application that is regulated by Chapter 12[94]. After the patent application is filed to the U.S. Patent and Trademark Office, under §131 it is put under an examination after which there are two possible outcomes. If the

[90] After two technical corrections, both made in December 2012, the act was finally signed by the President on the 14th of January 2013.
[91] 35 U.S.C..
[92] The procedure related to infringement is not relevant for the topic of this thesis: the analysis is on the patentability of software, not on the possible controversies on a software patent.
[93] John R. Thomas, On Preparatory Texts and Proprietary Technologies: The Place of Prosecution Histories in Patent Claim Interpretation, 47 UCLA Law Review, 1999, p. 183.
[94] 35 U.S.C. §§ 131 - 135.

examination has a positive result, the patent is issued by the Director[95]. On the other hand, if the result is not positive, there can be a rejection, and in parallel an objection or a request can be made. The Director shall notify the applicant the results of the examination, alleging the related reasons and the useful information. The application can be easily amended during the procedure, and the Director's instructions are one of the most common reasons for doing modifications. If the applicant wants to continue in his claims for a patent, a reexamination is provided[96], otherwise he simply acquiesces in it.

In case of a second rejection at the end of the reexamination, the applicant has the possibility of appealing before the Patent Trial and Appeal Board[97], which is established and regulated by §6. If the rejection is upheld, the decision is the final refusal of the related claims by the U.S. Patent and Trademark Office[98].

At this point there can be a progression to a judicial court. The matter is regulated by Chapter 13, titled "Review of Patent and Trademark Office Decisions"[99]. In particular Section 141 establishes that an applicant who wants to contest a decision of the Patent Trial and Appeal Board can appeal it before the United States Appeal Court for Federal Circuit. Furthermore, this is confirmed by 28 U.S.C. Section 1295 (4) letter (a), which gives it the exclusive jurisdiction to hear appeals from decisions of the Patent Trial and Appeal Board related to a patent application. There is an exception provided by Section 145 for cases in which the applicant is eligible for remedy by civil action.

The decisions of the Court of Appeal for the Federal Circuit can be made by a panel or by the whole court sitting in banc[100]. The in banc procedure is regulated by the Federal Rules for Appellate Procedures at rule 35. It can be ordered by a judge when either is important to "maintain uniformity of the court's decisions" or when the question asked in the case has an "exceptional importance". It can be petitioned by a

[95] 35 U.S.C. §131.
[96] 35 U.S.C. §132.
[97] 35 U.S.C. §134.
[98] 35 U.S.C. §135, letter (d).
[99] 35 U.S.C. Chapter 13 §§ 141-146.
[100] This expression comes from the French *"en banc"* and means that a case is heard by all the active judges of a court instead of a sole panel of it.

party as well, but there is not a right to have an en banc decision. The court itself decides on whether giving the permission for such procedure. The court sitting in banc can overrule a precedent decision of the same court, while a panel cannot do it.

At the head of the U.S. judiciary there is the Supreme Court, which is the only court with the power to review a decision of the Federal Circuit. In order to command a lower court to review a decision, the Supreme Court uses a writ of *certiorari*, which from the Judiciary Act of 1925[101] is not a anymore right. It must be asked by the petitioner and subsequently the Court decides on whether to grant the *certiorari*. A *certiorari* request can be permitted by just four judges on the nine of the Court.

### 1.2.2. Elements of Patentability

North American patent law has five principal requirements which must be met in order to obtain patent protection: patentable subject matter, novelty, utility, non-obviousness and enablement. Below some basics on them are given.

#### A) PATENTABLE SUBJECT MATTER

Foremost, in order for an invention to obtain patent protection it must fall within the categories of patentable subject matter. Only after having verified that the invention has fulfilled this condition, the examination can go forward to the analysis of the other requirements. Section 101 of the patent code have a general definition of what is patentable: "any […] process, machine, manufacture, […] composition of matter, or […] improvement thereof"[102].

The definition given by the U.S.C. is seemingly broad. The Supreme Court in interpreting it has often made a historical analysis of its evolution[103], arguing that such an interpretation is confirmed by the legislative history of the matter. The subject matter patentable, indeed, knew this definition first in 1793. At that time the new statute partially changed the previous definition (see par. 1.1) in Section 1,

[101] Ch. 229, 43 Stat. 936 (1925).
[102] 35 U.S.C. §101.
[103] See for example two important cases: *Graham et. al. v. John Deere co. of Kansas City et al.*, 383 U.S. 1 (1966); *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

stating that "any new and useful art, machine manufacture, or composition of matter, or any new or useful improvement [thereof]"[104] was patentable. This statute was made by Thomas Jefferson, who included his strong pro-patent thought in it[105]. These words survived all the following patent acts, and only in 1952 there was a little change: the word "art" was replaced with the word "process". For the rest, the subject matter's definition has remained the same. As a further confirmation that Jefferson's philosophy regarding North American patent law is still valid, the Committee Reports of the Patent Act of 1952 demonstrated that Congress had the intention to "include anything under the sun that is made by man"[106] within the subject matter. Various authors have argued that in some cases this quote has been misused by courts in order to expand the patentable subject matter[107].

Case law has been particularly important in stating whether new particular inventions fall within the category of patentable subject matter or not. One of the main issues faced by courts has been the one about patentability of abstract ideas. This is particularly interesting for us, as it encompasses also the pure software patentability issue. In the following pages, this topic will be thoroughly described and analyzed.

### B) UTILITY

In describing what is patentable, Section 101 affirms that it must be "useful", establishing the utility requirement. It appears a simple requirement, and a proof of that could be that it is rarely in issue before the Patent Office[108]. On the other hand, it can have a big importance, especially for the chemistry sector. In this sector companies often apply for patent protection for inventions even before knowing their possible uses. They act like this in order to secure an invention from possible

[104] Patent Act of 1793, § 1.

[105] A famous citation of Jefferson which clarifies his philosophy and has been over-quoted by the Supreme Court is the following: "Certainly an inventor ought to be allowed a right to the benefit of his invention for some certain time. [...] Nobody wishes more than I do that ingenuity should receive a liberal encouragement", Letter to Oliver Evans (May 1807), V Writings of Thomas Jefferson, at 75-76 (Washington ed.).

[106] Senate Report No. 1979, 82d Congress, 2d Session, 5 (1952); House of Representatives Report No. 1923, 82d Congress, 2d Session, 6 (1952).

[107] In relation to *Diamond v. Chakrabarty*, see Merges *et alia* (2010), pp. 141-142.

[108] Merge *et alia*, p. 167.

exploitations made by other companies. Such behavior is not admissible, because the utility requirement must be fulfilled at the moment of the application.

In order to clarify this requirement and to help the operators, the Patent and Trademark Office in 2001 has promulgated guidelines[109] for the interpretation of the utility condition. These guidelines have established that the utility must be "specific, credible and substantial". While the lack of credibility had been already used before for rejecting a patent, specificity and substantiality are an innovation introduced by the guidelines.

An interesting topic pertaining the utility requirement is the "moral utility" doctrine. This stakes that a patent should not be granted if the invention only possesses an unlawful (or immoral) use.

### C) ENABLEMENT

As it has been said in chapter 1, a patent can be seen as an exchange between the inventor and the community. The inventor is granted with an exclusive right for the exploitation of his invention for a limited period of time, but in exchange he must disclose the invention itself, making it a common patrimony for the whole community.

This rule has been codified in Section 112, which at letter (a) and (b) establishes:

> "(a) In General — The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.
> (b) Conclusion — The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention."[110]

[109] See Utility Examination Guidelines, Federal Register 1092, Vol. 66 No. 4, January 5, 2001; available at <http://www.uspto.gov/web/offices/com/sol/notices/utilexmguide.pdf>.
[110] 35 U.S.C. § 112.

This condition is considered divided into two requirements, which are partially different and have been developed during these years. The first one is the "enablement". Its founding case is the famous *Incandescent Lamp Patent* case[111]. The condition is satisfied if the description is sufficient to enable experts in the related art to create and use the claimed invention without "undue experimentation".

The second requirement developed much later[112] and has been called the "doctrine of the written form". This doctrine is more restrictive than the first one. It requires the applicant to show in his description that the invention contained in the claims is in his possession at the filing date. The aim of this doctrine is to prevent applicants from claiming for subject matters beyond their inventions, whose existence could even be ignored at the filing.

D) NOVELTY

This condition is established by Section 101 when it affirms that an invention, in order to be patentable, must be new. The novelty is subsequently explained and regulated by Section 102. As for the enablement, it is divided in two different requirements: novelty and statutory bars.

Novelty means that the invention must not be included in what is called the "prior art". This concept includes what is already "patented, described in a printed publication, or in public use, on sale, or otherwise available to the public"[113]. As described above, it is important to remember that after the Leahy-Smith American Invents Act the relevant date for determining whether an invention in already included in the prior art or not, is the filing date (*first-to-file*) instead of the one of the invention (*first-to-invent*).

Statutory bars is dealt at letter (b) of Section 102, named "exceptions". It is defined as a loss of the right to patent for the inventor due to his long delay in applying for obtaining the patent. More specifically, it means that if an inventor has disclosed his invention before the application for patent protection, after a year the invention is

[111] 159 U.S. 465 (1895).
[112] The history of this doctrine is well explained by Salima Merani, Written Description: *Hyatt v. Boone,* Vol. 14 Berkeley Technology Law Journal, pp. 137-151, 1999.
[113] 35 U.S.C. § 102.

considered included within the prior art. Consequently, if the inventor does not apply for the patent within the year, the invention will lack of novelty and will not be patentable.

E) NON-OBVIOUSNESS

This requirement was introduced by the Supreme Court in 1850 in the foundation case *Hotchkiss v. Greenwood*[114]. At that time it was considered an additional requirement[115]. With the 1952 Patent Act it was codified in Section 103, which establishes that:

> "A patent for a claimed invention may not be obtained, […], if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made."[116]

The words used in the section are quite clear. The Supreme Court, in the case *Graham v. John Deere Co.*[117], has established some instructions that must be followed for the obviousness test. The scope of the prior art must be determined, and then this must be compared with the claims of the patent application. The level of the ordinary skills in the pertinent art is particularly important and must be defined by the court as well. These elements, in addition to the evidence of secondary considerations (such as the failures of other inventors in solving a problem), allow the examination on whether the non-obviousness condition is fulfilled or not[118].

[114] 52 U.S. 248 (1850).
[115] Donald S. Chisum *et al*, Principles of Patent Law: Cases and Materials, New York: Foundation Press, 1998, p. 20.
[116] 35 U.S.C. § 103.
[117] 383 U.S. 1 (1966).
[118] James Skelley, Teaching-Suggestion-Motivation under Review: Developments in *KSW International Co. v. Telefex*, Inc., Vol. 13:1 Boston University Journal of Science and Technology Law, 2007.

# 2. Software Non-Patentability History

During the last decades, the eligibility of software for patent protection in the U.S.A. has created an impressive amount of articles among academics. Recently, this debate has been shifted to particular focuses and problems of computer program patents rather than on their mere patentability[119]. Landmark cases and orientations have directed the issue of software patentability to the present situation. Clearly, the debate pertained to the question of whether a computer program could be ascribed to the type of inventions that are included in the category of patentable subject matter under Section 101 or not. In particular, among the four types of patentable inventions listed there[120], the debate regarded the term process.

Although the data that will be showed in the last paragraph of this chapter from the USPTO website seems to testify the contrary, the road to the acceptance of software (in particular pure software) as a patentable subject matter included in Section 101 has been long and tormented. Many times the Supreme Court, the C.C.P.A. (and from 1982 the Court of Appeals for the Federal Circuit), and the Patent Office have faced the question on whether a software was patentable or not. The initial period was characterized for a hard dispute between the C.C.P.A. and the Patent Office, with the Supreme Court partially endorsing the latter in negating the patentability of software. Subsequently, their answers gradually moved from a negation of such possibility to an embracement of it.

There are two crucial cases that can be particularly useful for a division of the significant periods which have characterized this issue: the former is *Gottschalk v. Benson*[121] (1972), which was the first case facing the topic and established a prohibition on software patentability. The latter is *In re Alappat*[122] (1994), which overruled the previous case law, a new era for software patentability began.

[119] Some authors have regretted the high attention that has been given to the patentability issue by academics, rather than focusing on other topics. See for example: Julie E. Cohen and Mark A. Lemley, Patent Scope and Innovation in the Software Industry, California Law Review, Vol. 89:1, 2001, p. 4.
[120] Once again, they are: processes, manufactures, machines, and composition of matters.
[121] *Gottschalk v. Benson*, 409 U.S. 63 (1972).
[122] *In re Alappat,* 33 F.3d 1526 (Fed. Cir. 1994).

This thesis has been structured considering two periods. The former is the one in which software was considered a non-patentable subject matter, and even if the C.C.P.A. was struggling to change this orientation, the Supreme Court seemed to endorse it. I have called it "Software Non-Patentability History", because today computer programs patentability is no longer under debate in the U.S., thus this period can be considered history. The latter period is the current one: its beginning can be found in *Alapatt*, while the most recent development has been the decision of the Supreme Court in 2010 in *Bilski*. It describes the decisive steps for the entrance of computer programs into the American patent system through the main door. What was previously said on computer programs patentability, which was also partially embraced before by the Supreme Court[123], lost its current validity and became a topic for history books.

## 2.1. The General Prohibition on "Mental Processes" and the Software Prohibition before *Gottshalk v. Benson*

Although the definition of the patentable subject matter is seemingly broad, and has been considered broad by the Supreme Court itself in many occasions[124], mathematical formulae and mental processes were not considered patentable by a strong and long standing judicial doctrine.

An initial consideration must be done regarding the term "processes", as used by Section 101. The word "process" cannot be considered by its common meaning. A "process" can represent any action made by a human being, and clearly not all of them are eligible for patent protection. The term interpretation is subordinated to the constitutional postulate that the eligibility for patent protection can be given to "useful arts"[125], which are interpreted as being the reign of industrial and technological improvements.[126] Consequently, the question under debate was to which extent the ordinary meaning of the word "process" has to be limited. This

[123] *Diamond v. Diehr*, 450 U.S. 175 (1981).
[124] See the section dedicated to the subject matter (1.2.2.).
[125] The Constitution of the United States, Art. 1, Par. 8, Clause 8.
[126] Pamela Samuelson, Benson Rivisited: the Case against Patent Protection for Algorithms and other Computer Program-Related Inventions, 39 Emory Law Journal, pp. 1025-1153, 1990, p. 1033.

issue began long before the emergence of software as an important topic regarding patent law and in this respect it was developed the "mental process" doctrine.

### 2.1.1. Mental Process Doctrine

From the first years of the 20th century, the Patent Office Board of Appeals and the Court of Customs and Patent Appeals[127] established that mental processes were not patentable, intending for those processes which were completely, or almost, formed by mental steps. According to Chisum[128], the first case arose in 1907: *Ex parte Meinhardt*[129].

The 1940s' and the 1950s' were particularly rich with important cases, and set up a general ban on the patentability of mental processes and mathematical formulae. In 1947, the Supreme Court established that "patents cannot be issued for the discovery of the phenomena of nature […] these are part of the store house of knowledge of all men"[130]. Specifically concerning mental processes, there has been a huge number of cases. The decisions on these cases had the common characteristic of rejecting claims on processes consisting in taking measurements for calculations which were used for solving a technological problem. Among the others[131], *In re* Abrams[132] gained a particular importance. The claim was based on the method of prospecting for oil deposits, and the patent was rejected because the advance in the prior art of the invention was only in its mental steps. The most interesting detail of this case was that Abrams' counsel proposed a set of rules for deciding on a process. It involved mental steps that the court seemed to endorse. He designed three possible categories of process: the first was a pure mental process, and the other two were processes which also involved a physical step. While the first category was judged non-patentable, the others had to be checked on whether the novelty could

[127] As already explained, the C.C.P.A. has been the court of appeal for patent application till 1982, see 1.1..

[128] Donald S. Chisum, Chisum on Patents, 1990, § 1.03[6], at 1-78.1.

[129] *Ex parte Meinhardt,* 1907 C.D. 237.

[130] *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1947).

[131] See for example: *In re Heritage*, 150 F.2d 554 (C.C.P.A. 1945); *Halliburton Oil Well Cementing Co. v.* Walker, 146 F.2d 817 (9th Cir. 1944), rev'd on other grounds, 329 U.S. 1 (1946); In *re Shao Wen Yan*, 188 F.2d 377 (C.C.P.A. 1951).

[132] *In re Abrams,* 188 F.2d 165 (C.C.P.A. 1951).

be found in just the mental step or in the physical one as well. Only for the last category following Abrams' counsel view, a patent had to be granted. Even if in following cases[133] the Court of Customs and Patent Appeals denied this doctrine, it is evidently that the three *Abrams* rules seem to be consistent with important decisions on software patentability, such as *Benson.* These decisions consolidated the doctrine against the patentability of mental processes, which, thus, was well established before software appeared as a legal issue for the patent system.

### 2.1.2. The Johnson Commission's Report and the Dispute between the Patent Office and the C.C.P.A.

In order to solve the doubts on the capacity of the patent law, as well as the challenges posed by the rapid rise of new form of technologies, in 1965 President Johnson established[134] a special commission. It focused on the studying of the matter and giving advices on it. One year and 13 meetings later, the commission made a report[135], which declared that following its findings, a patent protection for computer programs should have been avoided. The report also gave a panoramic view on the patentability of programs under the law of that time:

> "Uncertainty now exists as to whether the statute permits a valid patent to be granted on programs. Direct attempts to patent programs have been rejected on the ground of nonstatutory subject matter. Indirect attempts to obtain patents and avoid the rejection, by drafting claims as a process, or a machine or component thereof programmed in a given manner, rather than as a program itself, have confused the issue further and should not be permitted."[136]

As a final suggestion, the commission proposed a proper legislation with an express exclusion of software eligibility for patent protection.

This legislation has never come to life. There are multiple opinions on the reasons behind the final decision of Congress no to enact a legislative provision on the

[133] As *In re Chatfield*, 545 F.2d 152 (C.C.P.A. 1976).
[134] Executive Order No. 11,215, 30 Fed. Reg. 4661 (1965).
[135] Report of the President's Commission on the Patent System, "To Promote the Progress of … Useful Arts" in an Age of Exploding Technology 13 (1966).
[136] Report (1966), at 12-13.

matter. According to Samuelson[137], it hasn't been enacted probably because the Congress considered sufficient the guidelines issued by the patent office the same year[138]. In any case, this decision of the Congress (not to enact) has re-routed the destiny of this matter. The guidelines did indeed ban the patentability of software either claimed as "machines" or as "processes", but left a glimmer open. In fact, they provided that a computer program:

> "may […] form a part of a patentable invention if it is combined in an unobvious manner with physical steps of the character…"[139].

This rule seems to have left an open window for the patentability of computer programs, and was actually based on the mental processes doctrine. It can be referenced in the third category of the *Abrams* set of rules.

Although after the guidelines both the Patent Office and the Patent Office Board of Appeals acquired an attitude toward rejecting software patents, they did not have the same effect on the C.C.P.A., which never mentioned in one of its decisions these guidelines. As an evidence of that, Samuelson reported eight cases, that happened in the four years before *Benson*, in which after a double rejection from the patent office and the Patent Board of Appeals, the C.C.P.A. has granted a patent to computer programs deciding on the ground of the subject matter[140]. These cases called into question the doctrine of mental process. All of them had claims on processes (not on programs implementation as considered valid by the patent office guidelines), and the C.C.P.A. arrived to deny the mental process doctrine in *Musgrave*[141]. It was at this point that the Supreme Court, in order to clarify the situation, intervened by establishing the non-patentability of computer programs in the *Benson* case.

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[137] Samuelson (1990), at note 41, p. 1039.

[138] The guidelines were first proposed by 829 OFF. GAZ. PAT. OFFICE, Aug. 16, 1966, at 865. They became effective in 1968 with 33 Fed. Reg. 15,609 (1968).

[139] 33 Fed. Reg. 15,610.

[140] Samuelson (1990), p. 1042: *In re Prater*, 415 F.2d 1378 (C.C.P.A. 1968); *In re Bernhart*, 417 F.2d 1395 (C.C.P.A. 1969); *In re Mahoy*, 421 F.2d 742 (C.C.P.A. 1970); *In re Musgrave*, 431 F.2d 882 (C.C.P.A. 1970); *In re Foster*, 438 F.2d 1011 (C.C.P.A. 1971); *In re Benson*, 441 F.2d 682 (C.C.P.A. 1971); *In re McIlroy*, 442 F.2d 1397 (C.C.P.A. 1971); *In re Waldbaum*, 457 F.2d 997 (C.C.P.A. 1972).

[141] Using the words of the C.C.P.A.: "the statutory language contains nothing whatever which would either include or exclude claims containing "mental steps" and whatever law there may be on the subject cannot be attributed to Congress", *In re Musgrave*, 431 F.2d at 890.

## 2.2. The Closure of the Supreme Court on Software Patentability and the Struggles of the C.C.P.A.

During this period the Supreme Court stated on multiple occasions that computer program related inventions were not a patentable subject matter under Section 101 of the 35 U.S. Code. Its decisions, however, did not have the effect of completely banning software patents. Such a result was not achieved prevalently because of the efforts that the C.C.P.A. put forward in affirming that computer program patents were not generally prohibited. Indeed, the C.C.P.A. reversed many rejections of computer programs claims of the Patent Office, which had a strict approach in regards to software patentability. The C.C.P.A.'s action was partially possible because the decisions of the Supreme Court held rejections for the specific software related inventions claimed in the single cases, rather than establishing a clear and general rule for the prohibition of software patents.

### 2.2.1. The Prohibition Established by the Supreme Court in Gottschalk v. Benson (1972)

Benson was an employee at AT&T Bell-Laboratories (now Bell Laboratories), a subsidiary for research and development of Alcatel-Lucent. The company has been a leader in technological innovation (winning many Nobel prizes) and was strongly involved in computer innovations. With the help of Arthur Abbott, Benson invented a new process for converting binary coded decimals to pure binary forms. In the patent application, two claims were relevant for the examination: Claim 8 and Claim 13. The former pertained to the conversion of "signals", while the latter to the conversion of "representations"[142]. The big difference between the two claims was that while Claim 8 referred to a machine implementation for the process, Claim 13 did not have such a reference. Nevertheless, Benson claimed that it was patentable as well because it fulfilled the requirements previously established by the C.C.P.A. in the *Musgrave* case.

[142] *In re Benson*, 441 F.2d at 683-684.

At first, the patent application received a rejection from both the patent office and the Patent Board of Appeals. In confirming the rejection, the Patent Board of Appeals affirmed that:

> "Claims 8 and 13 stand rejected as for subject matter not embraced by 35 U.S.C. Section 101 in that they set forth "mental processes" and "mathematical steps", neither being an "art" as construed by long line of decisions"[143]

The C.C.P.A. did not uphold the rejection and decided that both the claims were patentable[144]. Regarding Claim 8, it was said that it was not directed towards a mental process because there was the fundamental implication of a hardware component ("reentrant shift registers") in the process description. On the other hand, concerning Claim 13, the C.C.P.A. thought that, even if the claim did not refer to any physical implementation, the implementation with a digital computer (which were described as important technology) was necessary in order to have a practical utilization of the process. Because of this particular feature, the court affirmed that a Claim 13 also was patentable.

After the C.C.P.A.'s decision, the case went before the Supreme Court, which unanimously overturned it. It was decided that there was not any difference between Claim 8 and Claim 13. The briefs that the Court received from 14 *amici* testified that it was evident that this case would have been fundamental for the solution of the software patentability issue.

The Supreme Court referred to Benson's inventions as algorithms[145], while that was not done by the previous decisions on the case. This is a very important aspect because before this decision, the courts' attention for this subject was focused on other issues. After it, the patentability of algorithms became the exclusive object of their analysis[146]. The Court treated algorithms as mathematical innovations, which were considered pertaining to the category of scientific laws that, following the Court, contained discoveries rather than inventions. The Court established, indeed,

[143] The words of the Board were quoted in: *In re Benson*, 441 F.2d at 684.
[144] *In re Benson*, 441 F.2d at 687-688.
[145] *Benson*, 409 U.S. at 65. The argument was proposed by an *amicus* brief: Brief *Amicus Curiae* for Borroughs Corp. at 2, *Gottschalk v. Benson*, 409 U.S. 63 (1972) (No. 71-485).
[146] Samuelson (1990), p. 1059.

that scientific laws were not patentable subject matters. In order to confirm its conclusion, it quoted many precedents supporting the non-patentability of such discoveries[147].

Another important argument made by the Court was on the meaning of the word "process". It indeed focused on the historical meaning of "process", which under many precedents[148] needed a transformation of matter in order to be patentable. Under the thought of the Court, granting a patent to Benson would have meant opening the doors to the patentability of abstract ideas, which was not admissible.

Despite the final decision to definitively reject Benson's patent application, the Supreme Court affirmed that this case would not have created a conclusive preclusion for any software patent application, because it was specifically deciding on Benson's application rather than giving a general answer to the patentability of computer programs issue[149]. On the other hand, it called for urgent intervention of the Congress to solve definitively the debate on the matter, also referring to the considerations made by the Presidential Commission's Report of 1966[150].

The arguments used by the Supreme Court are full of ambiguity and have been rashly criticized by many authors[151]. Although the Court opted for the non-patentability of computer programs, it did not have the courage to make a decisive step toward that conclusion. Significantly, Samuelson[152] noted that no one of the previous eight C.C.P.A. decisions, in which it granted a patent for a computer programs overturning the rejection of the Patent Office, was mentioned by the Court except for the one on *Benson*. Clearly, this gave the C.C.P.A. the possibility of escaping from the Court's arguments in *Benson*, when it had to decide following cases.

[147] *Benson*, 409 U.S. at 67.

[148] Particularly important is *Cochrane v. Deener*, 94 U.S. 780 (1877), that the Patent Office tried to use more than once to support the mental process doctrine.

[149] *Benson*, 409 U.S. at 71.

[150] *Benson*, 409 U.S. at 73.

[151] Above all Professor Chisum, who affirmed that the thinking of the Court was "monstrously bad". In Chisum, The Patentability of Algorithms, 47 University of Pittsburgh Law Review 959, 1986, pp. 977-978.

[152] Samuelson (1990), p. 1060.

### 2.2.2. The Struggles of the C.C.P.A. to limit *Benson* Decision

In *Benson* the Supreme Court had affirmed that software was not a patentable subject matter. After this decision, one could think that software was not effectively patentable. In actuality it was not like this. Maybe it was the weak arguments used by the Court, or other reasons, but the C.C.P.A. did always not follow *Benson* rule properly. At the end, it seems that the Supreme Court adapted itself to the C.C.P.A. rather than the other way around. Clearly, this is a provocation. However, the pushes made by the C.C.P.A., as well as its behavior, held a great importance in the resolution of this dispute in favor to the computer programs patentability.

In the nine year period from *Benson* to *Diehr*[153], the C.C.P.A. continued its dispute with the Patent Office for the patentability of computer programs. Among the twenty decisions on patentability of software related inventions considered in this period, it reversed the rejections of the Patent Office twelve times[154]. This number seems even bigger because all of these cases were immediate and successive to the *Benson* decision. Rejections were often made on the basis that, under the C.C.P.A. opinion, the Patent Office was interpreting *Benson* too extensively[155].

In the first software patent case after *Benson* the C.C.P.A. unanimously upheld a Patent Office rejection[156]. In this decision, the C.C.P.A. created the "point of novelty" test[157], that was used many times by the Patent Office for its rejections. Under this test, if the only new element in the program-related invention claim was an algorithm, the patent application has to be rejected under *Benson.* Nevertheless, three years later during the decision on *In re Chatfield*[158]*,* the C.C.P.A. denied the validity of this test. The Supreme Court made consistent decisions with this test in *Parker v. Flook*[159], but abandoned it in *Diehr*.

During this period the C.C.P.A. put its efforts in limiting as much as it could the

[153] *Diamond v. Diehr*, 450 U.S. 175 (1981).
[154] Samuelson (1990), p. 1062.
[155] For example *In re Toma*, 575 F.2d 872 (C.C.P.A. 1978).
[156] *In re Christensen*, 478 F.2d 1392 (C.C.P.A. 1973).
[157] *In re Christensen*, 478 F.2d at 1394.
[158] *In re Chatfield*, 545 F.2d 152, at 158 (C.C.P.A. 1976).
[159] *Parker v. Flook*, 347 U.S. 584 (1978).

influence of *Benson*. While initially it changed its interpretations and arguments in many occasions, in *In re Freeman*[160] it developed a doctrine which has been subsequently used several times. It acquired great importance at a later stage. The test was articulated in two steps. The former was to inquire whether the claim was on a mathematical algorithm or not. The C.C.P.A. pushed to not enlarge *Benson* interpretation on algorithms, affirming that "a refusal to recognize that Benson was only concerned with mathematical algorithms leads to the absurd view that the Court was reading the word "process" out of the statute"[161]. The latter was to check if such a patent on a mathematical algorithm could have the effect of completely pre-empting its use[162]. Under this test, in order to obtain a patent on a software, it was sufficient to avoid any reference to mathematics, or to put limitations on the claim.

### 2.2.3. The Supreme Court Decision in *Flook* (1978) and the new Approach of the C.C.P.A.

The same year the C.C.P.A. judged *Freeman*, the Supreme Court decided on another important case after *Benson*, *Parker v. Flook*. In this case there had been a conflict between the Patent Office and the C.C.P.A. on the "point of novelty" test. The applicant was claiming for a process whose function was to update alarm limits for catalytic converters. The Patent Office in deciding on the application, used the "point of novelty" test. It rejected the claim because the process differed from prior art only by the use of an equation, and consequently the claim resulted to be on the equation itself, which was non-patentable under *Benson*. The rejection was upheld by the Patent Board of Appeals[163] and, once again, the C.C.P.A. disagreed with them. First of all, the C.C.P.A. repudiated the "point of novelty" test, which, ironically, was introduced by the C.C.P.A. itself in *Christensen*. It considered that the case had to be solved under another point of view and it particularly argued that the question under debate was "whether a claim to a process which uses an algorithm to modify a

[160] *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978).
[161] *In re Freeman*, 573 F.2d at 1246.
[162] *In re Freeman*, 573 F.2d at 1245.
[163] *In re Flook*, 559 F.2d at 22 (C.C.P.A. 1977).

conventional manufacturing system is statutory subject matter"[164]. For the C.C.P.A. in order for a claim to be acceptable under *Benson,* it needed a limit to its scope and this limit in *Flook* was well represented by the post solution activity of the process[165]. The C.C.P.A. decided to issue the patent as a result of this argument.

The Supreme Court intervened in 1978. Even if with *Benson* it had decided a similar case and tried to give some principles to both the Patent Office and the C.C.P.A., six years later a big conflict between the two of them seemed to linger. As for Benson, the Court opted to overturn the C.C.P.A.'s decision, but embraced some of its arguments. It affirmed, even if with some dissentions[166], that the limitation of the claim to a specific post solution (or some) application of an algorithm cannot make the algorithm patentable, exactly as a specific application of a law of nature could not make the law of nature patentable[167]. According to the Court, in order to be patentable, "the process itself, not merely the mathematical algorithm, must be new and useful"[168]. As mentioned above, this argument is consistent with the "point of novelty" test, even if no reference has been made to it. As previously was stated in *Benson*, it was established that algorithms are not patentable. On the other hand, the Court agreed with some of the C.C.P.A.'s interpretations. In particular, it accepted that an algorithm has to be considered as a mathematical formula, and that *Benson* did not represent a general prohibition for software patents[169]. In conclusion the Supreme Court showed its difficulty in dealing with the matter by renewing the exhortation to the Congress for a legislative intervention[170].

This decision was not conclusive in deciding whether the Patent Office or the C.C.P.A. had the right approach on the matter. The Court seemed to criticize the both of them, taking an intermediate position between the two currents. Such a position gave both the Patent Office and the C.C.P.A. the possibility of pulling *Flook* toward their arguments. Their dispute on the matter went on in the following years.

[164] *In re Flook*, 559 F.2d at 22.
[165] *In re Flook*, 559 F.2d at 23.
[166] A dissenting opinion was written by Justice Stewart, and other two judges from the Court joined it.
[167] *Flook*, 347 U.S. at 590.
[168] *Flook*, 347 U.S. at 591.
[169] *Flook*, 347 U.S. at 585.
[170] *Flook*, 347 U.S. at 596.

Samuelson reported[171] that in the three year period between *Flook* and *Diehr* (1978-1981), the C.C.P.A. did five overturnings[172] and four upholdings[173] of the Patent Office's rejections. In all these cases, the C.C.P.A. has been very rigid in pointing out its position that a patentability of a process can be put in doubt on a subject matter basis unless it can be included in a category already excluded from patentability, such as mathematical algorithms[174].

It is worth to spend a couple of words on the developments that the C.C.P.A.'s approach had after the *Flook* decision. Firstly, in this period some important changes were made to the *Freeman* test. Even if the Supreme Court had declared in *Flook* that the test was inconsistent with *Benson*, the C.C.P.A. had continued to use it in its original version until *In re Walker*. In this case, it finally decided to put some modifications to the test. The first step of the test still consisted in the presence of a mathematical algorithm in the claims, while the second step was modified in a manner that can be well described using C.C.P.A.'s own words:

> "If it appears that the mathematical algorithm is implemented in a specific manner to define structural relationships between the physical elements of the claim (in apparatus claims) or to refine or limit claim steps (in process claims), the claim being otherwise statutory, the claim passes under muster under § 101."[175]

In addition to this doctrine, the C.C.P.A. started having more attention for the industrial character of the claims on computer programs under its review. This tendency seemed to better fit the Supreme Court's instructions on how to deal with such cases. It is perhaps surprising that one of the first decisions following this new way was *Diehr* itself, namely the first case on software subject matter in which the Supreme Court upheld a C.C.P.A.'s decision and judged a process involving a computer program patentable subject matter.

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[171] Samuelson (1990), p. 1083.

[172] *In re Johnson*, 589 F.2d 1070 (C.C.P.A. 1979); *In re Bradley*, 600 F.2d 807 (C.C.P.A. 1979); *In re Diehr*, 602 F.2d 982 (C.C.P.A. 1979); *In re Philips*, 608 F.2d 879 (C.C.P.A. 1979); *In re Sherwood*, 613 F.2d 809 (C.C.P.A. 1980).

[173] *In re Sarkar*, 588 F.2d 1330 (C.C.P.A. 1978); *In re Gelnovatch*, 595 F.2d 32 (C.C.P.A. 1979); *In re Maucorps*, 609 F.2d 481 (C.C.P.A. 1979); *In re Walker*, 618 F.2d 758 (C.C.P.A. 1980).

[174] For example in *In re Sarkar*, 588 F.2d at 1332.

[175] *In re Walker*, 618 F.2d at 767.

## 2.3. The Openness to Software Patents including Physical Steps

With the decision of the Supreme Court in *Diehr*, the approach toward software patents did acquire its first important change. Initially before the Patent Office was strict in applying *Benson*, and, after, it did not have the same closure. It is not a case that after 1982 no Court of Appeals decision were issued until 1989[176] on the software patentability issue. During this period, which lasted in 1994 with *Appalat*, there was first a semi-official adoption of the *Freeman-Walter-Abele* test, then it appeared what Cohen and Lemley[177] named "the doctrine of the magic words". Under it, the mere pretense to be claiming for something different from a software (in particular something physical) was sufficient enough to obtain a patent also covering a computer program. During this period academics did not agree on whether software was already a patentable subject matter or not[178]. Under these terms, the debate was then wiped out by *Alappat*.

### 2.3.1. *Diamond v. Diehr*: the first breach of the Supreme Court toward Software Patentability

In August 1975 Diehr filed a patent application for his invention. It was a process for curing synthetic molded rubber products. A computer program was involved in steps of the invention's process. The software was used for the calculation of the cure time, which was done by using a mathematical formula known as the Arrhenius equation[179]. In particular, the core idea of the process was that the computer program's calculation of the cure time was done by using the temperature of the rubber which was measured every ten seconds. The application was first

[176] That year the Court of Appeal for the Federal Circuit handled its first two cases on the matter. *In re Grams*, 888 F.2d 835 (Fed. Cir. 1989); *In re Iwahashi*, 888 F.2d 1370 (Fed. Cir. 1989). The Patent Office's rejection was upheld in the former and reversed in the latter.
[177] Cohen and Lemley (2001), p. 9.
[178] See the responses to Professor Chisum written by Professor Samuelson (in Samuelson (1990), from p. 1104) and Professor Newell (in Newell, Response: The Models Are Broken! The Models Are Broken!, 47 U. Pitt. Law Review, pp. 1023-1031, 1986).
[179] *Diehr*, 450 U.S. at 179.

rejected by the Patent Office on the basis of non-patentable subject matter under *Benson*. Following the arguments of the examiner, this rejection was confirmed by the Board of Appeals[180]. In 1979, the C.C.P.A. reversed the rejection arguing that a process patentable under § 101, did not become non-patentable for the mere involvement in it of a computer program[181]. At this point a *certiorari* was petitioned by the government against the C.C.P.A.'s decision, and the Supreme Court decided to grant it.

The Supreme Court's decision on the case was issued in 1981, and, even if with a very narrow majority[182], it upheld the C.C.P.A.'s decision. The Court started with an interpretation of the Patent Act of 1952 history, which then established a broad subject matter. It started a historical interpretation of the word "process". The Court re-called a case in 1876 that was used many times by the Patent Office in the previous years[183], *Cochrane v. Deener*[184], which stressed the importance of a transformation action in the evaluation of the patentability of a process. This concept was used in *Benson* as well, and under it the Court affirmed

> "that a physical and chemical process for molding precision synthetic rubber products falls within the § 101 categories of possibly patentable subject matter"[185].

After this assertion, the Court faced a question of whether the presence of a mathematical formula and a computer program in the process could impact its patentability. The answer was no. Claims in *Diehr* were considered fundamentally different from those in *Benson* and *Flook* even to the extent that *Diehr*'s ones were on a process for curing rubber rather than on a mathematical formula. The patent, consequently, covered the algorithm only for its use in conjunction with all the other steps described in the claims[186]. This conclusion was reached through a reasoning which started with the assumption that laws of nature and algorithms are not

[180] *Diehr*, 450 U.S. at 181.
[181] *In re Diehr*, 602 F.2d at 987.
[182] The Supreme Court was split, and decided with a majority of 5 against 4.
[183] See what said about the Patent Office's use of this precedent in 2.1.1.
[184] *Cochrane v. Deener*, 94 U.S. 780 (1877).
[185] *Diehr*, 450 U.S. at 184.
[186] *Diehr*, 450 U.S. at 187.

patentable by themselves. As a partial explanation for this ban, the Court affirmed its view that they are discoveries rather than creations of something new[187].

The solution, however, was considered different if the law of nature / mathematical formula was applied to a process or structure. In this case, the claim was on the process and the Court affirmed that "a novel and useful structure created with the aid of knowledge of scientific truth" can be patentable[188].

An important issue faced by the Court in *Diehr* was the one on the "point of novelty" test, which was used by the petitioner for asserting the non-patentability of the claims. The Court rejected the test, considering it not appropriate to the legislative history of the Patent Act and outside the scope of § 101[189]. As affirmed by the petitioner, it also denied that the test was compulsory under *Flook*. In doing it, the Court states that:

> "[it] did not hold in *Flook* that the mathematical algorithm could not be considered at all when making the §101 determination […] [such statement would have made] all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious."[190]

Rather, the Court endorsed the approach of the C.C.P.A., which affirmed that the claims have to be analyzed and examined as a whole when determining if they fulfill the novelty requirement.

### 2.3.2. *Diehr*'s Implications and the *Freeman-Walter-Abele* Test

The position of the Supreme Court in *Diehr* raised a big debate on its possible implications among academics[191]. Even with its narrow majority, the decision of the

[187] *Diehr*, 450 U.S. at 186.
[188] *Diehr*, 450 U.S. at 188.
[189] *Diehr*, 450 U.S. at 191.
[190] *Diehr*, 450 U.S. at 189 n.12.
[191] Many authors have dedicated articles on this specific case, wondering if it represented the beginning of a new era for software patents. See for example: R.O. Nimtz, *Diamond v. Dierh*: A Turning Point, 8 Rutgers Computer & Tech. Law Journal, pp. 267-271, 1980-1981; Lawrence D. Gott, *Diamond v. Diehr*: The Patentability of Processes and Incorporated Algorithms, 8 Ohio N.U. Law

Supreme Court represented a change of route for the Court approach. In fact, even if the Court tried to explain the reasons for the different approaches used in *Diehr* and *Flook* claiming their diversities, in particular for what regards the post-solution activity in which *Flook* seemed insignificant[192], it is difficult to not feel that *Diehr* somehow overturned some of the arguments used in *Flook*. As proof of this, Justice Stevens' dissenting opinion many times stressed that the two cases are very similar and deserved to be judged identically[193]. Significantly, he affirmed that:

> "the most significant distinction between the invention at issue in *Flook* and the at issue in this case lies not in the characteristics of the inventions themselves, but rather in the drafting of the claims"[194]

After *Diehr*, it was clear that the inclusion of a software in a patentable process did not automatically make the process unpatentable[195]. Furthermore, it can be said that under *Diehr*, software could be patented if included in a patentable process.

In reaching this conclusion some authors[196] also used another important case that was decided by the Supreme Court one year before *Diehr*: *Diamond v. Chakrabarty*[197]. In its decision the Court established that man-made micro-organisms were patentable. Even if the case does not concern a patent application including a software, they stressed a statement of the judgment in which the Court affirmed that "anything under the sun that is made by man" is patentable. There are two reasons why this argument withstands rejection. The former is the use made by the Court of that quotation. It came from a report of the House of Representatives on the Patent Act of 1952, in which the full statement was:

> "Section 101 sets forth the subject matter that can be patented, "subject to the conditions and requirements of this title". He conditions under which a patent

Review, pp. 535-542, 1981; Roland A. III Fuller, Algorithm Patentability after *Diamond v. Diehr*, Indiana Law Review, Vol. 15, Issue 3, pp. 712-732, 1982.

[192] Justice Rehnquist tried to give this explanation in a footnote, *Diehr*, 450 U.S. at 192 n.14.

[193] *Diehr*, 450 U.S. at 209.

[194] *Diehr*, 450 U.S. at 210 n.32.

[195] Gott (1981), p. 542.

[196] Georgios I. Zekos, Software Patenting, The Journal of World Intellectual Property, Vol. 9, no. 4, pp. 426-444, 2006, p. 433; Christoph Laub, Software Patenting: Legal Standards in Europe and the US in view of Strategic Limitations of the IP Systems, The Journal of World Intellectual Property, Vol. 9, no. 3, pp. 344-372, 2006, p. 352.

[197] *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

> may be obtained follow, and section 102 covers the conditions related to novelty. A person may have "invented" a machine or a manufacture, which may include *anything under the sun that is made by man,* but it is not necessarily patentable under section 101 unless the conditions of the title are fulfilled." [198]

As previously pointed out[199], the Court misuses the words of the Congress, and, furthermore, it did not say anything about the fact that the report omitted the categories of "processes" and "composition of matter" in this phrase. The latter reason for rejecting the use of *Chakrabarty* lies in its consideration of abstract ideas. The Court itself, after the quotation above, specified that its considerations did not insinuate that section 101 had no limits. On the contrary, the Courts noted that it was held that abstract ideas could not be considered patentable[200].

In 1982, when deciding in *In re Abele[201],* the C.C.P.A. made some modifications to the second step of the *Freeman-Walter* test. The newer version started to be known as the *Freeman-Walter-Abele* test. The invention claimed by Abele was a computer x-ray technique for showing off the image of a traverse part of a patient's body. By rotating an x-ray source and a sensor placed at the two sides of the body's part, the sensor could get data from the x-ray's signals[202]. The C.C.P.A. found the presence of a mathematical algorithms in the expression "calculating the difference"[203] in Claim 5. It argued that due to the fulfillment of step one of *Freeman-Walter* test, this claim and Claim 6[204], which was related to it, had to be subjected to its second step. In analyzing the second step, as developed in *Walter*, the C.C.P.A. found that its definition, of what was a patentable subject matter and what was not, was made in terms too broad. Therefore such definition did not give useful information for the

[198] H.R. Rep. No. 1923, 82d Cong., 2d Sess., at 6 (1952).
[199] Merges *et alia* (2010), p. 141.
[200] *Chakrabarty*, 447 U.S. 316.
[201] *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982).
[202] *Abele*, 684 F.2d 903
[203] *Abele*, 684 F.2d 908. The expression was within Claim 5: "A method of displaying data in a field comprising the steps of calculating the difference between the local value of the data at a data point in the field and the average value of the data in a region of the field which surrounds said point for each point in said field, and displaying the value of said difference as a signed gray scale at a point in a picture which corresponds to said data point."
[204] *Abele*, 684 F.2d 908. Claim 6 affirmed: "The method of claim 5 wherein said data is X-ray attenuation data produced in a two dimensional field by a computed tomography scanner".

analysis of the grey area between the two sides. Consequently, it needed a clarification, and the C.C.P.A. did it by affirming the following:

> "Rather, *Walter* should be read as requiring no more than that the algorithm be "applied in any manner to physical elements or process steps," provided that its application is circumscribed by more than a field of use limitation or nonessential post-solution activity. Thus, if the claim would be "otherwise statutory," albeit inoperative or less useful without the algorithm, the claim likewise presents statutory subject matter when the algorithm is included."[205]

The C.C.P.A., thus, affirmed that it had to be analyzed if the claim without the algorithm was "otherwise statutory", or, in other words, still subject matter. This solution seems consistent with what established by the Supreme Court in *Diehr*, and in fact someone argued that this test derived from it[206].

In conclusion, after *Abele* the test could be summarized as follows. The first step was still the determination on whether a mathematical algorithm within is within a claim or not. It must be borne in mind that a mathematical can be presented in either in mathematical form (like an equation), as in *Diehr,* or in prose form, as in *Abele*[207]. If the mathematical algorithm is found, the test would pass to step two, otherwise the inquiry could be considered finished. Regarding the second step, it must be determined if the claim spoiled of the algorithm is still a patentable subject matter. This can be difficult to differ, and in doing so, it is important to apply all the principles established by the previous relevant case law in the matter.

### 2.3.3. The PTO Guidelines of 1989 and their Application

The Patent Office in 1989, after[208] having received critics[209] on its approach toward software patentability, issued an analysis[210] on the approach that must be taken for

[205] *Abele*, 684 F.2d 907.
[206] Cohen and Lemley (2001), p.9, at note 21.
[207] Stephen G. Kunin, Patentability of Computer Program Related Inventions in the United States Patent and Trademark Office, 76 Journal of the Patent & Trademark Office Society, pp. 149-156, 1994, p. 152.
[208] Gable and Leaheey argued that such analysis was a direct response to the criticisms. In R. Lewis Gable and J. Bradford Leaheey, The Strength Of Patent Protection For Computer Products: The Federal Circuit and the Patent Office Refine the Test for Determining which Computer Related

computer program patentability. The analysis was often referred to as a sort of guidelines for operators dealing with this issue. It initially affirmed that there was not a general preclusion on software patent. In distinguishing which software was patentable, the Patent Office adopted the *Freeman-Walker-Abele* test, whose history was fully described[211]. The first step, which was prejudicial to the applicability of the test, was fully adopted. The guidelines reminded that it consisted of a determination on whether a "algorithm is applied in any manner to physical elements or process steps"[212].

Concerning the second step, the PTO decided to clarify it and described how it had to be carried out. Just as a matter of completeness, even if it had not any sort of relevance, it can be noted that some authors[213] referred to this step as being divided into two and transformed the test into a three step one. In the meantime, others[214] continued to maintain its traditional two steps. In any case, firstly the mathematical algorithms must be removed from the claims, and at the end it must be determined if the remaining was "otherwise statutory". This part of the test was precisely considered by the PTO as the most problematic and therefore it was the one most explained. It gave five guidelines which had to be followed in the analysis: (1) post-solution activity; (2) field-of-use limitations; (3) data-gathering steps; (4) transformation of something physical; and (5) structural limitations in process claims[215].

The same year of the PTO guidelines, the Federal Court decided on two cases related

Inventions Constitute Patentable Subject Matter, 17 Rutgers Computer & Technology L. J., pp. 87-138, 1991, p. 91.

[209] As for example, from Gable and Leaheey (1991), p. 91, note 12: Andrews, Patents on Equations: Some See a Danger, N.Y. Times, Feb. 15, 1989, at D1, col. 4; Fisher, Software Industry in Uproar over Recent Rush of Patents, N.Y. Times, May 12, 1989, at Al, col. 5; Kolata, Mathematicians Are Troubled by Claims on Their Recipes, N.Y. Times, Mar. 12, 1989, § 4, at 26, col. 1.

[210] Barrett, Patentable Subject Matter: Mathematical Algorithms and Computer Programs, 1106 Official Gaz. Pat. Off. 5 (1989).

[211] Barrett (1989), at 6-7.

[212] Barrett (1989), at 8 (quoting without citation *Walter*, 618 F.2d 767).

[213] Gable and Leaheey (1991), p. 106.

[214] Stephen A. Becker, Drafting Patent Applications on Computer-Implemented Inventions, Harvard Journal of Law & Technology, Vol. 4, pp. 237-256, 1991, p. 239.

[215] Garrett (1989), at 9.

to software patents. In the first one, *In re Grams*[216], the Federal Circuit upheld a rejection for a patent on a process which had a data-gathering step and a mathematical algorithm. In its arguments the Federal Court set the differences between *Walker* and *Abele*, finding the former more strict than the latter. It affirmed that while a fulfillment of the *Walker*'s second step meant that a claim is undoubtably statutory. On the contrary, a failure to fulfill it did not bring a certain rejection of the claim[217]. All the efforts of the Federal Court were put in while trying to stress the differences between *Abele* and *Grams,* which could enable a rejection without violating *Abele*. It conclusively argued that the main difference was that in *Grams* the first step of the claim rotated only on the collection of data for the algorithm, while in *Abele* the process was much more significant[218]. In order to strengthen its arguments at the end of the judgment, the Federal Court concentrated on the specification matter, which in *Grams* was too focused on the algorithm and was too broad as well[219].

The second case faced by the Federal Court was *In re Iwahashi*[220], in which the rejection of the Patent Office was overturned and the patent was granted. In this decision, however, rather than on the *Freeman-Walker-Abele* test, the arguments of the Federal Court were mostly related to the specification issue.

Summing up the analysis on this historical period, it is worth to spend few words on the considerations made by Cohen and Lemley[221] about the approach in force at that time. They argued that the "otherwise statutory process or apparatus" limitation, even if adopted by both courts and the Patent Office, did not represent a real limit. In fact, patent attorneys, in order to obtain a patent covering a computer program, started pretending that the claims were about something else, in particular hard devices. They called this approach "the doctrine of the magic words", intending for them the words used by applicants in their pretense to seek a patent for something other than a software.

[216] *In re Grams*, 888 F.2d 835 (Fed. Cir. 1989).
[217] *Grams*, 888 F.2d 839.
[218] *Grams*, 888 F.2d 839.
[219] *Grams*, 888 F.2d 840.
[220] *In re Iwahashi*, 888 F.2d 1370.
[221] Cohen and Lemley (2001), p. 9.

# 3. Embracement of Software Patentability and Recent Developments

In the last two decades the issue of software patentability had new important developments. During the 1990s', the Federal Circuit broadened the scope of software patentability with its decision in *Alappat* and *Street Bank*. This period can be considered the one in which software patentability had its maximum embracement. Under the machine doctrine first, and useful, concrete and tangible result test after, software claims were usually granted. However, this attitude of the USPTO and of the Court of Appeal for the Federal Circuit to routinely grant software patents raised many criticisms from both academics and organizations. Subsequently, after almost thirty years of silence on the matter, the Supreme Court in 2010 took an important decision in the *Bilski* case that changed the current approach of North American courts in respect to computer programs patentability.

## 3.1. The Revolution of In re Alappat and the "new machine" Doctrine

In 1994 the Court of Appeals for the Federal Circuit, sitting in banc[222], decided a case that changed the perspective of software patentability: *In re Alappat*[223]*.* In this decision the court established the new machine doctrine, which represented a decisive step for the patentability of computer programs in the United States. The same year the Court of Appeals decided two other cases, *In re Warmerdan*[224] and *In re Lowry*[225], which indirectly confirmed the conclusion of *Alappat*. The decision of the Federal Circuit in *Alappat* is considered one of the turning point in the history of computer programs patentability in the United States of America.

[222] As explained above (1.1.1.), en banc decision of the Court of Appeal for the Federal Circuit can overrule previous decision of the same court.
[223] *In re Alappat*, 33 F.3d 1525 (Fed. Cir. 1994) (en banc).
[224] *In re Warmerdan*, 33 F.3d 1354 (Fed. Cir. 1994).
[225] *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994).

### 3.1.1. The decision in *In re Alappat*

Alappat and the other inventors[226] sought patent protection for "means for creating a smooth waveform display in a digital oscilloscope."[227] In the prior art, such methods had several problems[228]. There were three main problems. First, the cathode-way tube screen of oscilloscopes had a limited number of pixels, which could affect its capability of showing waveforms when they rapidly fall or rise. Secondly, oscillations of part of a waveform could be caused by the presence of noise in an input signal. The last bug regarded the vertical resolution of the screen, which could have problems for its limited number of rows and pixels. All these matters were known as aliasing. Alappat's invention indeed was an anti-aliasing system[229]. It was a "rasterizer", which was capable of transforming the input signals into pixel illumination intensity data through mathematical calculations. Consequently, this method improved oscilloscopes' displays because it eliminated any discontinuity or oscillation from the waveform, and made them smooth and continuous curves[230].

The application was first partially rejected by the Patent Office. The rejection was for Claim 15 (an independent claim reciting a mathematical formula) and for claims 16 to 19, which were claims dependent to Claim 15. The case was then subjected to the PTO Board of Appeals twice. The first time the board reversed the decision of the Patent Office. Afterwards an eight member Board reconsidered the decision, and upheld the rejection of the Patent Office[231].

Alappat appealed the last decision of the board to the Court of Appeals for the Federal Circuit, which, due to the importance of the question, took its decision sitting in banc. Initially, as it was argued in the first decision of the board, the Court of

[226] The full names of all the inventors were: Kuriappan P. Alappat, Edward E. Averil, and James G. Larson.
[227] *Alappat,* 33 F.3d 1537.
[228] Maria T. Arriola, *In re Alappat* and Beyon: A New Approach to the Patentability of Mathematical Algorithms and Computer Programs in the United States?, 5 Federal Circuit Bar Journal, pp. 294-315, 1995, p. 301.
[229] *Alappat,* 33 F.3d 1537.
[230] *Alappat,* 33 F.3d 1538.
[231] *Alappat,* 33 F.3d 1539-1540.

Appeals built, interpreting section 112 paragraph 6[232], the means-plus-function expression for the independent claim in the light of the specifications. Under this view, the claim was not on a process, but rather on an apparatus created combining electronic circuitry elements and therefore it apparently fell within one of the four categories of patentable subject matter under § 101[233]. After this assertion, which was the only one with unanimity among judges[234], the Court of Appeals passed to the question on whether the mathematical algorithm made the claim non-patentable under § 101 or not. The inquiry started with a review of all the previous relevant cases from *Benson*, in particular *Benson*, *Flook* and *Diehr.* Under this analysis, it established that an invention was not patentable subject matter when, considered as a whole, it was a "disembodied mathematical concept", either represented by a mathematical formula, equation, algorithms and so on[235]. The conclusion was reached through a reasoning on the limitations held by case law to patentable subject matter under § 101. The Federal Circuit supported the view that leading precedents did not establish a general limitation to the subject matter of § 101, but rather stated that mathematical formulae standing alone were just abstract ideas, non-patentable as discoveries and laws of nature[236].

Alappat's invention was considered patentable by the Federal Circuit. The court affirmed that the invention was not a disembodied mathematical concept but "a specific machine to produce a useful, concrete, and tangible result."[237] Consequently, it did not have the effect of "wholly-preempting" any use of such mathematical formula in another machine. It explained that:

> "Claim 15 is limited to the use of a particularly claimed combination of elements performing the particularly claimed combination of calculations to transform, i.e.,

[232] 35 U.S.C. § 112 (f): "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."
[233] *Alappat,* 33 F.3d 1542.
[234] Paul M. Janicke, The Crisis in Patent Coverage: Defining Scope of an Invention by Function, 8 Harvard Journal of Law & Technology, pp. 155-192, 1994-1995, p. 174.
[235] *Alappat,* 33 F.3d 1543.
[236] *Alappat,* 33 F.3d 1543.
[237] *Alappat,* 33 F.3d 1544.

> rasterize, digitized waveforms (data) into anti-aliased, pixel illumination data to produce a smooth waveform."[238]

Granted that, the Court started a new argument which became a real core of the judgment. It established that a program implemented in a computer created a new machine, which was patentable. Quoting its words:

> "such programming creates a new machine, because a general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software."[239]

This rule opened the doors of patent protection for computer programs. After this decision, in order to have patent protection on software related inventions it was sufficient to draft claims in terms of a machine implemented computer program. This conclusion found both consensus[240] and concerns[241] among academics. The pretense of applying for something different and the *Freeman-Walter-Abele* test were not required anymore[242]. After *Alappat* claims had to be analyzed as a whole in order to determine if they represented a disembodied mathematical concept. This new view of the mathematical algorithm exception replaced the two steps test built by the *Freeman-Walter-Abele* line of cases.

### 3.1.2. Cases Beyond *Alappat*

In 1994 the Federal Circuit decided two other cases involving software claims. In both the decisions the court followed the path built in *Alappat.*

The first case was *In re Warmerdan*. The invention involved a "method and apparatus for controlling the motion of objects and machines, such as robotic

[238] *Alappat,* 33 F.3d 1545.
[239] *Alappat,* 33 F.3d 1545.
[240] As in: James R. Goodman, Todd E. Marlette, and Peter K. Trzyna, The Alappat Standard for Determining that Programmed Computers are Patentable Subject Matter, 76 Journal of the Patent & Trademark Office Society, pp. 771-786, 1994, p. 786; Arriola (1995), p. 315.
[241] An invite to take this conclusion with "extreme cautions" was done in Sang Hui Michael Kim, In re Alappat: a Strict Statutory Interpretation Determining Patentable Subject Matter Relating to Computer Software?, 13 J. Marshall J. Computer & Info L., pp. 635-665, 1994-1995, p. 664.
[242] Cohen and Lemley (2001), p. 10.

machines, to avoid collision with other moving or fixed objects"[243]. In prior art the method for avoiding collisions consisted in creating an imaginary bubble around the object assuming that a collision occurred anytime something touched the bubble. The improvement of the invention was a new organization of the bubble system. Instead of a single surrounding bubble, smaller and more refined bubbles[244] were provided. Warmerdan applied for 6 claims. Claims 1 to 4 were method claims on the generation of data structures for the organization of the bubbles, Claim 5 was directed to an apparatus claim, and Claim 6 was on a data structure[245].

The Patent Office rejected all the claims. Warmerdan appealed to the PTO Board of Appeals which upheld all the rejections. In particular claims 1 to 4 and Claim 6 were rejected on the ground of statutory subject matter. Under the view of the board, claims 1 to 4 "recited no more than a mathematical algorithm in the abstract", while claim 6 had to be rejected because "data structure [was] not within one of the categories of patentable subject matters listed in § 101"[246]. Claim 5 was rejected by the board due to its indefiniteness under § 112 para. 2.

Warmerdan appealed the board's decision to the Court of Appeals for the Federal Circuit. The court confirmed all the rejections with the exception of the one regarding Claim 5. As in *Alappat,* the court affirmed that instead of using the *Walker-Freeman-Abele* test it opted to "return to the language of the statute and the Supreme Court's basic principles as enunciated in *Diehr,* and eschew efforts to describe nonstatutory subject matter in other terms"[247]. Regarding claims 1 to 4, the court analyzed them as a whole, and upheld the rejection because they just solved mathematical formulae. It asserted that "these steps describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic abstract idea"[248]. A similar consideration brought the rejection of Claim 6 as well. On the other hand, Claim 5 was considered patentable, with an overturning of the rejection of the PTO Board of Appeal. The Federal Circuit established that Claim 5 was directed toward a machine,

[243] *Warmerdan*, 33 F.3d 1355.
[244] *Warmerdan*, 33 F.3d 1356.
[245] *Warmerdan*, 33 F.3d 1357-1358.
[246] *Warmerdan*, 33 F.3d 1358.
[247] *Warmerdan*, 33 F.3d 1359.
[248] *Warmerdan*, 33 F.3d 1360.

in particular to a programmed machine, and therefore it was patentable subject matter[249]. The way the court argued its decision in *Warmerdan* is interesting. It used the same arguments of *Alappat* for both the rejections and for the granting. The rejections had the reason that, differently from *Alappat*, the methods claimed in *Warmerdan* did not have tangible or concrete results. On the other hand, granting the fifth claim the court upheld that software implemented machine were patentable subject matter.

The second case decided by the Court of Appeals after *Alappat* in 1994 was *In re Lowry*. The invention regarded "the storage, use, and management of information residing in a memory"[250]. The inventive step was the creation of a new data structure which was able to improve data models' expression. The Patent Office's examiner rejected all Lowry's claims on the ground of obviousness under § 103, and added that claims on memory with stored data structure were non-patentable subject matter under § 101[251]. After Lowry's appeal, the PTO Board of Appeals confirmed the rejections for obviousness on all claims, but reversed the argument on statutory subject matter. It stated that claims directed to memory including data structure, considered as a whole, represented a machinery which fell into statutory subject matter under § 101[252].

After the board's rejections, Lowry appealed to the Court of Appeals for the Federal Circuit. The court in overturning all the rejections established that all claims were patentable[253]. Even if the issue was related to the non-obviousness requirement, the court clarified its view regarding memory including data structure and patentable subject matter. It did it quoting a case decided in 1969, *Bernhart*:

> "if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without the program; its memory elements are differently arranged."[254]

[249] *Warmerdan*, 33 F.3d 1361.
[250] *Lowry*, 32 F.3d 1580.
[251] *Lowry*, 32 F.3d 1582.
[252] *Lowry*, 32 F.3d 1582.
[253] *Lowry*, 32 F.3d 1583.
[254] *Bernhart*, 417 F.2d 1400.

The court affirmed that Lowry's data structures present in the memory, instead of something abstract, were a form of "electronic or magnetic" structure[255]. These structures were physical elements that enabled the memory to have better performance in terms of accessibility, erasability, and storage. The decision stressed two points of *Alappat*. First, it enlarged the new machine doctrine stating that not only a software implementation can create a new machine, but also electronic memory elements can do the same. In addition, it made clear that the presence of tangible or concrete results was fundamental in determining the patentability of a computer program-related invention.

## 3.2. Further Openness to Software Patents

The decision of the Court of Appeals for Federal Circuit in *Alappat* and its new machine doctrine gave an important push to software patenting. Nevertheless, it did not include pure software claims but only computer programs running on a machine. This limitation on software patents rapidly fell during the years following *Alappat*. A new decisions of the Federal Circuit embraced more and more software patentability, setting up new rules for its interpretations. It appeared that after these new case law line software patentability could not be considered under debate anymore.

### 3.2.1. *Beauregard* and the new Patent Office Guidelines: Manufacture Software Claims are Patentable

International Business Machine (IBM) is a company that had always fought the Patent Office in order to obtain the acceptance of software patentability. It used even to do test applications with the purpose of enlarging patent protection for software[256]. A final act of this battle occurred in 1995, when the Court of Appeals for the Federal Circuit decided one of those test applications in *In re Beauregard*[257]. In its application IBM described its invention as an article of manufacture format,

[255] *Lowry*, 32 F.3d 1583.
[256] Jeffrey R. Kuester, Scott A. Horstemeyer, Daniel J. Santos, A New Frontier in Patents: Patent Claims to Propagated Signals, 17 J. Marshall J. Computer & Info. L., pp. 75-88, 1998-1999, p. 76.
[257] *In re Beauregard*, 53 F.3d 1583 (Fed. Cir. 1995).

drafting claims directed toward an article "composed of a computer usable medium in which a program code is embodied" or, in other words, toward "computer programs embodied in a tangible medium, such as floppy diskettes"[258]. The question on whether this invention was patentable subject matter or not, seemed to be a step over after *Lowry* decision, which had established that memory including data structure readable by a computer machine was patentable under § 101[259]. IBM evaluated that, although a pure software was not patentable yet, the relevant previous case law's rules had to be interpreted as allowing computer programs patentability if they were stored in an article of manufacture, as a CD-ROM. Software industry strongly supported the IBM's application. Indeed, 10 *Amicus Curiae* briefs regarding the case were filed, and most of them supported the claims of the applicant[260].

The Patent Office rejected the claims, and the PTO Board of Appeals confirmed the rejection with 4 votes on 7, under a variant of the "printed matter" exceptions seen in *Lowry*[261]. IBM appealed the board's rejection to the Court of Appeal for the Federal Circuit, but the court did never really heard the case. While the appeal was pending the Patent Office decided (for the very first time on a case involving a software application) to withdraw its opposition to the claims. It acquiesced in the view "that computer software programs embodied in a tangible medium such as floppy diskettes, are patentable subject matter under [§ 101].[262]" The Patent Office added that it would have soon issued new guidelines giving instruction to grant patents for such inventions. The Federal Circuit, noticed the withdraw of the Patent Office, dismissed the appeal eliminating the rejection of the Board of Appeals and "remanded for further proceedings in accordance with the Commissioner's concessions"[263].

[258] *Beauregard*, 53 F.3d 1584.
[259] Vincent Chiappetta, Patentability of Computer Software Instruction as an "Article of Manufacture": Software as such as the Right Stuff, 17 J. Marshall J. Computer & Info. L., pp. 89-181, 1998-1999, p. 120.
[260] Robert C. Laurenson, Computer Software "Article of Manufacture" Patents, 77 J. Pat. & Trademark Off. Soc'y, pp. 811-824, 1995, p. 817.
[261] *Beauregard*, 53 F.3d 1584.
[262] *Beauregard*, 53 F.3d 1584.
[263] *Beauregard*, 53 F.3d 1584.

The same year of *Beauregard* the Patent Office issued a proposal of guidelines[264]. The proposed guidelines were antecedent to the decision of withdrawing from the appeal in *Beauregard*, and consequently the Patent Office after few months (October) had to issue a specific legal analysis endorsing the patentability of the claims in *Beauregard*[265], modifying meaningfully the proposed guidelines[266].

One year later, in 1996, the Patent Office issued new revised guidelines[267] which substituted the initial proposal and the related legal analysis.

The revised guidelines distinguished between data structure and computer programs as such, and data structure and computer programs implemented in a readable medium. Under the guidelines, the first type of inventions could not be considered neither a physical object nor a patentable process. Consequently, the revised guidelines affirmed that:

> "[they] do not define any structural and functional interrelationships between [themselves] and other claimed aspects of the invention which permit [their] functionality to be realized"[268].

On the other hand, the revised guidelines considered a readable medium containing a data structure or a computer program patentable because:

> "[it] defines structural and functional interrelationships between the computer program [or data structure] and the medium which permit [their] functionality to be realized"[269]

In tracing this distinction, the Patent Office introduced the concepts of functionality and non-functionality related to descriptive materials that had an important role in inquiring the patentability issue. It described these two concepts as follows:

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[264] Request for Comments on Proposed Examination Guidelines for Computer-Implemented Inventions, 60 Fed. Reg. 28,778 (proposed June 2, 1995).

[265] Patent And Trademark Office, U.S. Dep't Of Commerce, Legal Analysis To Support Proposed Examination Guidelines For Computer-Implemented Inventions (1995).

[266] Mark A. Lemley, David W. O'Brien, Encouraging Software Reuse, 49 Stanford Law Review, pp. 255-304, 1996-1997, p. 282.

[267] Examination Guidelines for Computer-Related Inventions, 61 Fed. Reg. 7478 (Published February 28th, 1996) [hereinafter Revised Guidelines].

[268] Revised Guidelines, at 7481-7482.

[269] Revised Guidelines, at 7482.

> "functional descriptive material consists of data structures and computer programs which impart functionality when encoded on a computer-readable medium [while] Non-functional descriptive material includes but is not limited to music, literary works and a compilation or mere arrangement of data."[270]

Both functional descriptive materials and non-functional descriptive materials were not patentable when claimed for themselves. The difference came out when they were included in a readable medium which created a interrelationship with a computer machine. Functional descriptive materials implemented in such mediums, as the invention claimed in *Beauregard*, were patentable. The interpretation on claims directed to this type of inventions was the main reason for the revision of the guidelines by the Patent Office. On the other hand, the Patent Office argued that non-functional descriptive materials were not patentable neither if implemented on a computer readable medium. The reason for this exclusion was that, even if implemented in a medium, a non-functional descriptive material could not perform any structural or functional interrelation with a computer machine.

Summing up, the revised guidelines seemed to find the key element for inquiring computer programs patentability case by case in the relationship between a software and its physical implementation. The result was a new and more favorable approach of the Patent Office toward software patentability. At that time it was already clear that after the Revised Guidelines software patents' granting would have increased[271].

### 3.2.2. *State Street Bank & Trust Co. v. Signature Financial Group. Inc.*

In 1998 the Court of Appeals for the Federal Circuit decided *State Street Bank & Trust Co. v. Signature Financial Group. Inc.*[272]. This decision assumed a great importance, breaking the physical limit for software patentability and clarifying that "software patents are here to stay"[273].

[270] Revised Guidelines, at 7481.

[271] Lemley and O'Brien (1996-1997), p. 284; Keith Stephens and John P. Sumner, Patenting Software Objects and Other Aspects of Object-Oriented Programs Under the New PTO Guidelines, 23 AIPLA Q.J. 221, 1995.

[272] *State Street Bank & Trust Co. v. Signature Financial Group. Inc.*, 149 F.3d 1368 (Fed. Cir. 1998), *cert.* Denied, 525 U.S. 1093 (1999).

[273] Wesley L. Austin, Software Patents, 7 Tex. Intell. Prop. L. J., pp. 225-304, 1998-1999, p. 250.

The case regarded the validity of a patent of Signature Financial Group. Inc. (Signature Financial), namely U.S. Patent No. 5,194,056. The invention claimed was a data processing system "for monitoring and recording the information flow and data, and making all calculations, necessary for maintaining a partnership portfolio and partner fund (Hub and Spoke) financial services configuration"[274]. The Federal Circuit in its decision summarized the invention as follows:

> "[i]n essence, the system [...] facilitates a structure whereby mutual funds (Spokes) pool their assets in an investment portfolio (Hub) organized as a partnership. This investment configuration provides the administrator of a mutual fund with the advantageous combination of economies of scale in administering investments coupled with the tax advantages of a partnership"[275].

The plaintiff (Street Bank) and the defendant (Signature Financial) before going to trial were negotiating a license contract on the invention at issue. In fact, the both of them were agents who performed financial services dealing which multi-tiered partnership fund. When negotiations crashed, Street Bank decided to act for invalidating the patent. It suited Signature Financial before the District Court of Massachusetts with a declaratory judgment action claiming that the patent was invalid and unenforceable[276].

The District Court granted the claimant's request and held the patent invalid because it did not fulfill the requirement of statutory subject matter under § 101[277]. In arguing why the patent had to be declared invalid, the court used a test referred to as "the best clue to patentability"[278], which was nothing more than a close variant of the *Freeman-Walter-Abele* test. After having determined that the claims were intended for solving mathematical calculations, the District Court inquired on whether the invention had a physical limitation / application or not. The result of such analysis led the court to affirm that the invention, differently from *Alappat,* did not perform any physical transformation but just operated set of numbers' changes[279]. In

[274] See U.S. Patent No. 5,194,056, abstract.
[275] *State Street*, 149 F.3d 1370.
[276] *State Street*, 149 F.3d 1370.
[277] *State Street Bank & Trust Co. v. Signature Fin. Group, Inc.,* 927 F.Supp. 502 (D. Mass. 1996).
[278] *State Street*, 927 F.Supp. 511.
[279] *State Street*, 927 F.Supp. 514.

addition, the court stated that the patent had to be declared invalid even for the "business methods exception", because the invention could be viewed also as a method of doing business, which under many precedents was not patentable[280].

Signature Financial decided to appeal the invalidation to the Court of Appeals for the Federal Circuit. The Federal Circuit, following *Alappat* majority's opinion, overturned the invalidation. The court started its reasoning by affirming that the claims were clearly directed to machine implemented invention. Due to the complexity of the calculations, they could indeed be performed only by a computer or similar devices[281], which were included in one of the categories of patentable subject matter under § 101. The court, therefore, pointed out that for the Supreme Court mathematical algorithms were not patentable only when they represented abstract ideas. It continued stating that an algorithm can be considered an abstract idea only when it is an embodied concept without any utility[282]. On the other way around, a software with practical utility had to be considered as patentable. Thus, a physical structure was not required anymore, but the necessity of practical results was particularly stressed by the Federal Circuit, which established that:

> "Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces 'a useful, concrete and tangible result' - a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades"[283].

The court continued stating that the Freeman-*Walter-Abele* test did not have any applicability for determining statutory subject matter. Instead, it had to be determined if a software had a "useful, concrete and tangible result" using the Claims-as-a-Whole test[284]. At the end, the court established that also the business methods exception was not applicable anymore[285].

[280] *State Street*, 927 F.Supp. 515.
[281] *State Street*, 149 F.3d 1371.
[282] *State Street*, 149 F.3d 1373.
[283] *State Street*, 149 F.3d 1373.
[284] *State Street*, 149 F.3d 1374.

This decision, breaking also the physical limit, did really make academics believe that from that moment software were completely patentable[286]. Even if with expedients, pure software under *State Street* interpretation were patentable subject matter. This decision was criticized as well, because in order to reach its conclusion the Federal Circuit seemed to misinterpret or ignore some positions taken by the Supreme Court in *Flook and Diehr*[287].

One year later, the Federal Circuit, deciding *AT&T Corp. v. Excel Communications*[288], upheld this position. As in *State Street*, the Federal Circuit reversed a District Court's decision, which had invalidated a patent because its claims did not fulfill the requirement of statutory subject matter under § 101[289]. The claims were on a system that generated message records for interexchange calls, recording the consumer that had to be billed. The system had an indicated primary interexchange carrier which enabled to create different bills for subscribers, based on the distance from the caller to the person called[290]. In establishing the patentability of the invention, the Federal Circuit relied on the reasoning made in *State Street*. It used the "useful, concrete and tangible result" test, pointing out that physical transformation was not necessary for making an invention patentable, but a useful result was sufficient[291]. The new approach held by the Federal Circuit had two main consequences. The former was that software did not need a physical structure for being patentable. The latter was that mathematical algorithms had to be interpreted as non-patentable only when claiming abstract ideas, while when "applied in a practical manner to produce a useful result" they had to be considered patentable subject matter[292].

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[285] *State Street*, 149 F.3d 1375.

[286] See Michael J. Schallop, Software Patents Are Now Really In Business, 17 A.B.A. Intell. Prop. Law Newsl., 18, 1998, p. 21; Scott M. Alter, The Rest of the Wall Comes Down: Federal Circuit Holds Software Is Freely Patentable, Intell. Prop. Today, Sept., 1998, p. 32; Robert J. Brown, Software Patent Dynamics: Software as Patentable Subject Matter after State Street Bank & Trust Co., 25 Okla. City U. L. Rev., pp. 639-666, 2000, p. 653.

[287] Robert A. Kreiss, Patent Protection for Computer Programs and Mathematical Algorithms: The Constitutional Limitations on Patentable Subject Matter, 29 New Mexico Law Review, pp. 31-88, 1999, p. 53.

[288] *AT&T Corp. v. Excel Communications,* 172 F.3d 1352 (Fed. Cir. 1999).

[289] *AT&T Corp. v. Excel Communications*, 52 U.S.P.Q.2d 1865 (D. Del. 1999).

[290] *AT&T Corp.,* 172 F.3d 1354.

[291] *AT&T Corp.,* 172 F.3d 1361.

[292] *AT&T Corp.,* 172 F.3d 1360.

## 3.3. Recent Developments and Nowadays Situation after *Bilski*

As underlined by Lemley[293], the question on whether software are statutory subject matter under Section 101 was not effectively dealt by courts for almost a decade from 1999. Except for few and not relevant cases, only with the decision of the Federal Circuit in *in re Bilski*[294] in 2008 the issue of software patentability was re-opened. This case had an exceptional importance even because, after the decision of the Federal Circuit, the Supreme Court granted a *certiorari*. After almost 30 years from *Diehr*, the Supreme Court finally took a decision another case dealing directly with the patentability of computer programs[295]. The analysis of such this decision of the Supreme Court and of its reasoning will lead us to the final considerations on software patentability today in the United States of America.

### 3.3.1. The Silent decade before *Bilski*

From 1999 to 2008 the statutory subject matter issue related to software relied on the arguments reasoned by the Federal Circuit in *Alappat*, *Beauregard* and *Street Bank*. In particular, the "useful, tangible, and concrete results" test affirmed in *Street Bank* replaced the *Freeman-Walter-Abele* test for the determination on whether a software claim was patentable or not. The absence of cases on this issue testified that it was well accepted. Some criticisms emerged because, under the new orientation, any kind of process manipulating information could be patented if running on a computer. It produced an increasing number of patent application for any kind of software and business methods[296]. Only during the final part of this period two cases on the issue arose before the Court of Appeals for the Federal Circuit: *In re Comiskey*[297] and *In re Nuijten*[298].

[293] Mark A. Lemley, Michael Risch, Ted Sichelman, and R. Polk Wagner, Life After Bilski, 63 Stanford Law Review, pp. 1315-1347, 2011, p. 1318.
[294] *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc).
[295] *Bilski v. Kappos*, 130 S. Ct. 1318 (2010).
[296] Andrei Iancu, Peter Gratzinger, Machines and Transormations: The Past, Present, and Future Patentability of Software, 8 Nw. J. Tech. & Intell. Prop., pp. 247-274, 2009-2010, p. 270.
[297] *In re Comiskey*, 499 F.3d 1365 (Fed. Cir. 2007).
[298] *In re Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007).

In *Comiskey* the claims were directed to "a method for mandatory arbitration resolution regarding one or more unilateral [legal] documents" involving various steps[299]. In order to work, some of the claims needed a device such as a computer, while others could work without it. The Federal Circuit in deciding on whether the claims were patentable under § 101 upheld *State Street.* It stated that if the steps involved in a claim had a practical application and could be performed by a device, as a computer, the claim had to be considered patentable. On the other hand, the court affirmed that an abstract idea was not patentable when either it did not have any practical application or, even in presence of a possible practical application, it could not be "embodied in, operates on, transforms, or otherwise involves another class of statutory subject matter, i.e., a machine, manufacture, or composition of matter"[300]. These arguments led the court to held as non-patentable the method claims and Claim 32. Although they had a practical application, they involved only mental processes, and the appellant himself admitted that they did "not require a machine, and these claims evidently do not describe a process of manufacture or a process for the alteration of a composition of matter"[301]. By contrast, the Federal Circuit found that the other claims involved modules[302] in their application, and therefore established that they were patentable. This decision was seen as the one in which the Federal Circuit had the most expansive approach on the statutory subject matter[303], even if someone argued that it represented a step toward a physical approach[304].

Immediately after *Comiskey*, the Court of Appeals for the Federal Circuit decided *In re Nuijten*. The application had different claims, and while those on processes and apparatus were granted, a claim on a signal was rejected by the Patent Office and

[299] *Comiskey*, 499 F.3d 1369.
[300] *Comiskey*, 499 F.3d 1376.
[301] *Comiskey*, 499 F.3d 1379.
[302] They involved for example: "a registration module for enrolling" a person, "an arbitration module for incorporating arbitration language" and "an arbitration resolution module for requiring a complainant [or party] to submit a request for arbitration resolution to the mandatory arbitration system", *Comiskey*, 499 F.3d 1379.
[303] Iancu and Gratzinger (2009-2010), p. 271.
[304] Kevin Afghani and Duke W. Yee, Keeping it Physical: Convergence on a Physicality Requirement for Patentability of Software-Related Inventions under the European Patent Convention and United States Law, 15 J. Intell. Prop., pp. 239-280, 2007-2008, p. 270.

then appealed to the Federal Circuit. The claim rejected was on an algorithm embedded in a signal with the aim of reducing distortions. The court described it as "transitory electrical and electromagnetic signals propagating through some medium, such as wires, air, or a vacuum"[305]. In its decision the court was very strict in analyzing the claim under the four categories of patentable subject matter under § 101. The categories were analyzed one by one, in order to inquiry if the claim fell within one of them. Once determined that it did not fall within any of the four categories the Federal Circuit held the claim non-patentable subject matter[306], without any reference on its possible practical utility. The analysis of the court in *Nuijten* has been considered extremely rigid in its adherence to the words of § 101[307], but its impact was considerably reduced by *Bilski*, which attracted on it all the attention.

### 3.3.2. The decision in *Bilski*

The "useful, concrete or tangible results" test endorsed in *Street Bank* created a situation in which almost everything was patentable. An increasing concern surrounded the patent system[308]. The Federal Court itself overturned *Street Bank*'s test in *In re Bilski*, and the Supreme Court upheld then the decision.

The invention in claimed by Bilski and Warsaw (the applicants) was "a method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price"[309]. The application had 11 claims. Only Claim 4 expressly included a mathematical formula, and it was not directly dealt by the Federal Circuit nor the Supreme Court. The other claims did not have such reference to a mathematical formula, but they implied some calculations. Although the claims did not cover a software invention (even if they could have been drafted including a software), its solution impacts on the principles that must be followed in dealing with computer programs patentability.

[305] *Nuijten,* 500 F.3d 1352.
[306] *Nuijten,* 500 F.3d 1357.
[307] Andrei Iancu and Jeremiah Helm, Code on Disks and Hat Tricks – Is Computer Software on a Medium really Patentable?, 90 J. Pat. & Trademark Off. Soc'y, pp. 97-124, 2008, p. 111.
[308] Anton Hughes, Case Brief: *Bilski v. Kappos*, 20 J. L. Inf. & Sci., pp. 206-213, 2009-2010, p. 207.
[309] *In re Bilski*, 545 F.3d 943.

The application was rejected by the Patent Office and the PTO Board of Appeal on the ground that all 11 claims were not directed to a patentable subject matter under § 101[310]. The applicants appealed to the Federal Circuit. As in *Alappat*, the court decided the case sitting in banc. The decision was taken with a majority of eleven on twelve, and it upheld the rejection of all the claims due to their non-patentability under § 101. The reasoning of the court started with digression on the relevant precedents, in particular *Benson* and *Diehr*. It affirmed that under *Diehr* a process can be patentable only if it covers a specific application of a fundamental principle, without wholly pre-empting it. Consequently it had to determine whether the application's claims did it or not[311]. For such an inquire a new test was created, the so-called machine-or-transformation test. Under the new test, the Federal Circuit held that a process fulfills the subject matter requirement if "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing"[312]. In addition, if the machine or transformation is simply an accidental post-solution activity, the process it is not patentable even if it has passed the test[313]. Under the new test the claims of Bilski were not patentable. The claims did not have any reference to a computer or a machine, and the Federal Circuit affirmed that:

> "Purported transformations or manipulations simply of public or private legal obligations or relationships, business risks, or other such abstractions cannot meet the test because they are not physical objects or substances, and they are not representative of physical objects or substances"[314]

The Federal Circuit affirmed that the new test substituted all the previous tests, being the only one applicable for determining a process's patentability. It added that any general exclusion on process categories, like the business methods exception, had to be rejected[315]. Any decision on the fulfillment of the statutory subject matter condition by a process had to be decided only on the basis of the new test.

[310] *Ex parte Bilski,* No.2002-2057, 2006 WL 5738364 (B.P.A.I. Sept. 26, 2006).
[311] *In re Bilski*, 545 F.3d 954.
[312] *In re Bilski*, 545 F.3d 954.
[313] *In re Bilski*, 545 F.3d 957.
[314] *In re Bilski*, 545 F.3d 963.
[315] *In re Bilski*, 545 F.3d 959-961.

During the following year, the test was applied to some cases. In *In re Ferguson*[316] (2009) the Federal Circuit upheld a patent rejection of the Patent Office because the invention (a marketing paradigm) failed the machine or transformation test[317].

In 2010, the Supreme Court granted a certiorari and upheld the rejection stating that the invention was not patentable because it was an abstract idea not included within the categories of patentable subject matters under § 101[318]. The Court also agreed with the Federal Circuit that § 101 even if drafted with a broad language could not be considered limitless. It affirmed that phenomena in nature, abstract ideas and mental process were not patentable because such patents would wholly pre-empt the use of these fundamental principles. Although all this point of agreement, the Supreme Court did not endorse the machine or transformation test as the sole test for determining processes patentability[319]. The Court stated that the test was an important clue, but it added that rigid categorical rules were not acceptable in determining the subject matter issue[320]. It argued that, because of the fast development of technologies, it was necessary a flexible test for that could better inquire their potential eligibility to patent protection. In order to such an achievement, the Supreme Court preferred a case by case analysis based on its previous decisions (*Benson, Flook,* and *Diehr*). Lying on them, the Court established that existed three specific exceptions to § 101, laws of nature, physical phenomena and abstract ideas. This rule was enough, according to the Court, to affirm the Bilski's invention was an abstract idea non patentable.

### 3.3.3. Cases after Bilski

After *Bilski* the Federal Circuit ruled three times on claims involving a computer program invention. An analysis of these cases can be useful to inquire how *Bilski* has been applied.

316 *In re Ferguson*, 558 F.3d 1359 (Fed. Cir. 2009).
317 Other cases decided by using the machine or transformation test during this period are listed by: Merges *et alia* (2010), p. 161.
318 *Bilski*, 130 S. Ct. 3229-3230.
319 *Bilski*, 130 S. Ct. 3227.
320 *Bilski*, 130 S. Ct. 3229.

The first case was ruled by the Federal Circuit in 2011, *CyberSource Corp. v. Retail Decisions, Inc.*[321]. CyberSource Corporation had a patent[322] covering a method for detecting fraud in internet purchases paid by credit card[323]. The invention aimed at identifying the purchasers of downloadable contents, and represented an improvement in the previous fraud detecting systems because it combined the internet information of the specific purchase (such as the IP address) with the internet information of all the previous transaction carried out by the credit card. In 2004 CyberSource Corporation sued Retail Decisions, Inc. claiming the infringement of its patent. The defendant answered moving for summary judgment, asking the invalidation of the patent because the invention was not patentable subject matter under § 101. The District Court granted the summary judgment and invalidated the patent[324]. In particular Claim 3 (on the process of identification) and Claim 2 (containing a computer-readable medium with the instruction for the identification process execution) were declared non-patentable subject matter using the machine or transformation test. The Federal Circuit upheld the decision stating that both the claims were not patentable under § 101. The court started reminding that in *Bilski* the Supreme Court had established that the machine or transformation test was not the sole test for inquiring processes patentability but an important clue. According to this assertation, the court felt free to use "other limiting criteria that further the purposes of the Patent Act and are not inconsistent with its text"[325]. Regarding Claim 3, the court asserted that it did not meet the machine or transformation test, because it considered data gathering and organization neither transformative nor requiring a machine. Granted that, it continued its reasoning by arguing that all *Benson, Flook* and *Bilski* held that processes which could be performed mentally (in *Flook* by a pencil and a paper) by the application of human intelligence are abstract ideas non patentable. Therefore, the court stated that Claim 3 was a non-patentable mental process as "[a]ll of [its] method steps [could] be performed in the human

[321] *CyberSource Corp. v. Retail Decisions, Inc.,* 654 F.3d 1366 (Fed. Cir. 2011).
[322] U.S. Patent No. 6,029,154.
[323] *CyberSource,* 654 F.3d 1367.
[324] *CyberSource Corp. v. Retail Decisions, Inc.,* 620 F. Supp. 2d 1068 (N.D. Cal. 2009).
[325] *CyberSource,* 654 F.3d 1370.

mind, or by a human using a pen and paper"[326]. Then the Federal Circuit addressed Claim 2, affirming that it was equivalent to the process of Claim 3. The court found irrelevant that the claim contained a computer machine (it called it *Beauregard* claim format), because in order to make the claim patentable the presence of a computer was not sufficient, the computer had to be required for the claim's operation[327]. Thus, Claim 2 was declared unpatentable as well.

Few weeks after *CyberSource*, the Federal Circuit ruled on *Ultramercial, LLC v. Hulu, LLC*[328]. The case arose after that Ultramercial sued Hulu for a patent infringement and Hulu moved for dismissing the case asking for the invalidation of the patent. The patent in issue[329] covered a system for distributing over internet contents protected by copyright requiring users to watch an advertisement beforehand. The District Court invalidated the patent on the subject matter ground, arguing that the invention failed the machine or transformation test and that in any case it was abstract[330].

The Federal Circuit unanimously overturned the decision[331]. The court rejected the argument that the invention was too abstract and represented a basic idea. It considered that "inventions with specific applications […] to technologies in the marketplace are not likely to be so abstract" and, regarding the basic idea argument, it affirmed that the invention covered by the patent was rather "a particular method for monetizing copyrighted products"[332]. In order to justify the patentability of the process, the Federal Circuit added two new factors that had to be considered in the patentability test. The first was that "mainly of the steps [had to be] likely to require intricate and complex computer programming", and the second one was the some steps of the method had to "require specific application to Internet and a cyber-market environment"[333]. Although it used these factors in order to declare the patent's validity, the Federal Circuit affirmed that neither of them were either necessary or sufficient to determine processes patentability in every case.

[326] *CyberSource,* 654 F.3d 1372.
[327] *CyberSource,* 654 F.3d 1375.
[328] *Ultramercial, LLC v. Hulu, LLC*, 657 F.3d 1323 (Fed. Cir. 2011).
[329] U.S. Patent No. 7,346,545.
[330] *Ultramercial, LLC v. Hulu, LLC*, No. CV 09-06918 RGK (C.D. Cal. Aug. 13, 2010).
[331] *Ultramercial*, 657 F.3d 1330.
[332] *Ultramercial*, 657 F.3d 1328.
[333] *Ultramercial*, 657 F.3d 1328.

The last ruling of the Federal Circuit on the matter was taken in 2012 in *Bancorp Services, LLC v. Sun Life Assurance Co. of Canada (U.S.)*[334]. The case arose after Bancorp Services sued Sun Life Assurance for infringement of two patents[335] that it owned. The patents covered systems providing "computerized means for tracking the book value and market value of the policies" and expressing equations useful to "calculate the credits representing the amount the [third party] must guarantee and pay should the policy be paid out prematurely"[336]. After being sued, Sun Life Assurance moved for summary judgment, asking the invalidation of both the patents for non-patentability under § 101. The District Court granted the motion, and asserted by using the machine or transformation test that the claims were non statutory subject matter, and consequently the patent was invalid[337].

The Federal Circuit unanimously upheld the invalidation of the patents considering the claims too abstract[338]. It distinguished between independent method claims on the general systems that managed the stable value protected insurance plans, and dependent claims which required a computer implementation. The independent claims did not need the use of a computer, while the dependents had to be performed with a computer[339]. Focusing on the subject matter issue under § 101, the Federal Circuit stated that the claims covered only abstract ideas, and their computer implementation did "not impose meaningful limits on the scope of those claims"[340]. The court affirmed that a computer implementation makes an abstract process patentable only when it "is integral to the claimed invention", and this was not the case[341]. However, the court did not explain how to inquire on whether a computer implementation is integral to an invention or not.

[334] *Bancorp Services, LLC v. Sun Life Assurance Co. of Canada (U.S.),* 687 F.3d 1266 (Fed. Cir. 2012).
[335] U.S. Patent No. 5,926,792 and U.S. Patent No. 7,249,037.
[336] *Bancorp Services*, 687 F.3d 1270.
[337] *Bancorp Service, LLC v. Sun Life Assurance Co. of Canada (U.S.*), 771 F. Supp. 2d 1054 (E.D. Mo. 2011).
[338] *Bancorp Services*, 687 F.3d 1281.
[339] *Bancorp Services*, 687 F.3d 1275.
[340] *Bancorp Services*, 687 F.3d 1278.
[341] *Bancorp Services*, 687 F.3d 1278.

## 3.3.4. Final Considerations on Software Patentability in the United States Today

Once again, the Supreme Court instead of definitively clarifying the matter, added uncertainty to the software patentability issue, and more in general to the method for determining a process' eligibility of patent protection. The Court stated that, even if it is not the sole test for patentability, the machine or transformation test was still valid. It is agreeable the interpretation of some academics, who sustained that this assertion meant that if a claim satisfies the test it is patentable, but in some cases a claim could be patentable even when failing the test[342]. The problem is how to deal with claims which fail the test. The Court suggested a case by case inquiry based on the trio *Benson-Flook-Diehr*, but they have some degree of inconsistency between themselves. The Court also observed that a claim should be rejected when representing an abstract idea, but did not give any guidance on how to determine whether a claim is an application of an abstract idea (patentable) or an abstract idea itself (non-patentable). The cases decided by the Federal Circuit after *Bilski*, introduced new considerations into the matter. The Federal Circuit in all the cases has struggled to find a new and more appropriate approach for dealing with the matter. In *CyberSource* the court stated that a process drawn to a computer is patentable only if it could not be performed without the computer. This test is not consistent with the assertion of the Supreme Court in *Bilski*. While the Supreme Court said that a flexible approach was necessary, this test operates categorical exclusion of all processes not requiring a machine. In addition, by considering patentable only processes with a level of complexity that need a computer to be implemented the Federal Circuit was arbitrary and contrasted the patent system's purposes[343]. A further problem is that while accepting the complexity requirement, the court did not clarify which degree of complexity should be required.

[342] Jeff Thruston, Echoes from the Past: How the Federal Circuit Continues to Struggle with Patentability Subject Matter Post-Bilski, 77 Mol. L. Rev., pp. 591-611, 2012, p. 591-592.

[343] Patent Law - Patentable Subject Matter – Federal Circuit Holds that Mental Processes that do not, as a Practical Matter, Require a Computer to be Performed are Unpatentable - *Cybersource Corp. V. Retail Decisions, Inc., 654 F.3d 1366 (Fed. Cir. 2011)*, 125 Harvard Law Review, pp. 851-858, 2011-2012, p.857.

In *Ultramercial* the Federal Circuit used two factors for the decision on the patentability: the complexity of the computer program and the programs' use of the internet and of the cybermarket environment. The reasons of this choice are not clear and the court did not explain it. These two factors could have been useful for the specific case, but fail to draw a clear line between abstract and nonabstract programs. Complexity is not directly related to the abstract nature of a program, and in addition software complexity changes with the evolution of the technology and is difficult to define[344]. Moreover, as noted above, the Federal Circuit itself affirmed that the two new factors were neither sufficient nor enough in every case[345].

In the last and most recent case, *Bancorp Services*, the Federal Circuit used another test. It inquired on whether computer limitations were integral part of a process claim or not. If they are integral part of it, a process claim that otherwise would be an abstract non patentable subject matter becomes eligible for patent protection. Even this last test is not satisfying. As it has been pointed out[346], it is very vague and could lead to different and contrasting results in similar cases. Indeed, few weeks before its decision in *Bancorp Services*, the Federal Circuit in deciding a similar case established that a computer which implemented an application of an abstract idea was patentable justifying its conclusion only generally affirming that "the claim limitations can be characterized as being integral to the method"[347].

In conclusion, it appears that even the Supreme Court met some difficulties in dealing with the matter. It did not set clear principles and left the Federal Circuit without a clear guidance on how to solve the software patentability issue. The Federal Circuit has many difficulties as well. It continually changed its test and its approach is highly indeterminate. Operators cannot foresee the decisions of the court on a software claim. The Federal Circuit itself eloquently affirmed in *In re Bilski* that:

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[344] Patent Law – Patentable Subject Matter – Federal Circuit Applies new Factors in Deciding Patentability of a Computer Program – *Ultramercial, LLC v. Hulu, LLC,* 657 F.3d 1323 (Fed. Cir. 2011), *reh'g and reh'g en banc denied*, No. 2010-1544, 2011 U.S. App. LEXIS 25055 (Fed. Cir. Nov. 18, 2011), 125 Harvard Law Review, pp. 2167-2176, 2011-2012, p. 2170.

[345] *Ultramercial*, 657 F.3d 1328.

[346] Patent Law - Patentable Subject Matter – Federal Circuit Holds that Certain Software Method Claims are Patent Ineligible - *Bancorp Services, L.L.C. V. Sun Life Assurance Co. Of Canada (U.S.),* 687 F.3d 1266 (Fed. Cir. 2012), 126 Harvard Law Review, pp. 810-817, 2012-2013, p. 813.

[347] *CLS Bank International v. Alice Corp.,* 685 F.3d 1341 (Fed. Cir. 2012), at 1355.

> "future developments in technology and the sciences may present difficult challenges to the machine-or-transformation test, just as the widespread use of computers and the advent of the Internet has begun to challenge it in the past decade. Thus, we recognize that the Supreme Court may ultimately decide to alter or perhaps even set aside this test to accommodate emerging technologies. And we certainly do not rule out the possibility that this court may in the future refine or augment the test or how it is applied"[348].

A flexible approach that could change to "accommodate emerging technologies" is surely a right one. On the contrary, a flexible approach which leads to different answers in deciding on the same technologies is not acceptable. It is nearly impossible to keep up to date with the evolution of technologies and it is normal for examiners and courts to find difficulties when dealing with them. The necessity for operators to run after the indecision of courts, is neither admissible nor efficient for the patent system.

[348] *In re Bilski,* 545 F.3d 956.

# 4. Empirical Analysis of Software Patents

After describing software patentability's long road and recent developments, an empirical analysis on software patents can give an intriguing perspective on the topic. As stated at the commencement of this chapter, the issue of software patentability is a bit old fashioned in the United States. A look at the number of software patents issued and at their general trend can help to better understand why. Such an analysis allows us to deal with this topic from a different point of view as well. Sometimes what academics dispute and debate does not correspond to the so called law in action. Following, and adapting, an important lesson given by an Italian academic more than one century ago, a jurist always has to look at the "law which comes from things"[349]. For what concerns this issue, some authors[350] have argued that even the law within the courts seem to have been different from the granting practice at the USPTO. This divergence could be largely referred as to some lack of the USPTO, rather than to different and more attractive reasons. Below, the analysis and description of the general trend of software patens could partially clarify the reasons behind such a difference.

## 4.1 How to get Data on Software Patents

All the information on issued patents and patent applications are officially published and kept by the United States Patent and Trademark Office. In distinguishing between the different categories of inventions, the PTO has a classification system for patents. Patent classifications around the world have been harmonized by the by the Strasbourg Agreement Concerning the International Patent Classification of 1971. The United States are a contracting state, and the agreement is in force in the U.S. since the 7th of October 1975[351].

[349] Cesare Vivante, Trattato di Diritto Commerciale, 5th edition, Vallardi Editore, 1929. Vivante in the introduction of his treatise, whose first edition has been written in 1893, used the much more exhaustive expression of "*diritto che vien su dalle cose*", which I tried to translate properly. He was referring to the law in action which, from his point of view, had to be the starting point for the creation of a new Italian business law.

[350] Cohen and Lemley (2001), p. 7.

[351] See <http://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=11>.

The classification is based upon the division of the variety of technologies in different classes, each of which contains many sub-classes. The system is huge, with around 475 classes and 165,000 subclasses. All classes and subclasses can be found on its website[352]. The purpose of the classification is to make it easy to find the state of the prior art. Even if it is very detailed, it does not contain a determined class for computer programs nor a specification on whether the technology behind a class is indeed software. Consequently academics have to conduct their research with their own parameters in order to determine what exactly is a software patent. This is the reason why, the definitional issue has been considered one of the biggest challenges for any reasoning on software patents[353].

According to Griliches[354], researchers have followed two different ways for the attribution of patents to a specific technology field. The first is to use the patent office classification system seen above, which implies the creation of their own definitions by researchers. The second and alternative system is to work on individual patents, classifying them.

The number of software patents issued during the years strongly depends on what definition you use for software. Many authors have attempted to carry out this task[355]. In this thesis I follow the method used by Bessen in his works. Initially, in an article published in 2007[356], he used the second system I described above, with some modifications: it was created as a search algorithm from a classification of samples for the identification of software patents. Later[357] he changed the system by

[352] <http://www.uspto.gov/web/patents/classification/selectnumwithtitle.htm>.
[353] Colleen V. Chien, Reforming Software Patents, 50 Houston Law Review, pp. 325-390, 2012, p. 354.
[354] Zvi Griliches, Patent Statistics as Economic Indicators: a Survey, pp. 292-295; it is a chapter from the volume: Zvi Griliches, R&D and Productivity: The Econometric Evidence, University of Chicago Press, 1998, pp.287-343.
[355] Just to give some examples: Colleen V. Chien, Of Trolls, Davids, Goliaths, and Kings: Narratives and Evidence in the Litigation of High-Tech Patents, 87 North Caroline Law Review 1571, 2009, p. 1595; Arti K. Rai, John R. Allison & Bhaven N. Sampat, University Software Ownership and Litigation: A First Examination, 87 North Caroline Law Review 1519, 2009, p. 1532; Stuart J.H. Graham & David C. Mowery, Software Patents: Good News or Bad News?, 13-14 Ga. Inst. Tech., Working Paper Series, 2004, available at <http://tiger.gatech.edulfiles/gttiger-software.pdf>.
[356] James Bessen and Robert M. Hunt, An Empirical Look at Software Patents, Journal of Economics & Management Strategy, Vol. 16 No. 1, Blackwell Publishing, pp. 157-189, 2007.
[357] James Bessen, A Generation of Software Patents, Boston University Journal of Science and Technology Law, Vol. 18, Issue 2, pp. 241-261, 2012.

using a selection of classes from the patent office classification, which are based on software or in which software companies usually obtain patents. I will follow the second system used by Bessen. For the identification of a patent software, he used these particular classes:

- Data processing: classes 700-707 and 715-717;
- Coded data generation or conversion: class 345;
- Computer graphics processing: class 345;
- Multiplex communication: class 370;
- Digital communication: class 375;
- Cryptography: class 380;
- Audio Signal Processing: class 381;
- Image analysis: class 382;
- Information security: class 726;
- Electronic funds transfer: class 902. [358]

Once identifying the classes that will be used, through the U.S. Patent and Trademark Office website, it is possible to find either the number of software patents issued in total or for a particular year, by using the advanced search engine[359].

Using the query for the classes above with the advanced search engine, the PTO website's database gives usable data on software patents only starting from 1980. This is a pity, because, as stressed during the historical analysis on software patentability, it would have been extremely interesting to see the trend of software patents during the 1970s, and particularly after the *Benson* period.

In regards to the number of total patents issued, instead of the advanced search engine[360], I used a table from the PTO's website which shows this data year by

[358] Bessen (2012), p. 253.

[359] I used instructions that professor Bessen gave me with an email. First, it is necessary to go to the website <http://patft.uspto.gov/netahtml/PTO/search-adv.htm>. Then the following query must be typed: "(apt/1 or apt/2) and (isd/1/1/2009->12/31/2009) and (ccl/341/$ or ccl/345/$ or ccl/370/$ or ccl/375/$ or ccl/380/$ or ccl/381/$ or ccl/382/$ or ccl/700/$ or ccl/701/$ or ccl/702/$ or ccl/703/$ or ccl/704/$ or ccl/705/$ or ccl/706/$ or ccl/707/$ or ccl/714/$ or ccl/715/$ or ccl/716/$ or ccl/717/$ or ccl/726/$ or ccl/902/$ )". In this case will come out the patents issued during the 2009 of the identified classes, for another year (or any period of time) it is sufficient to change the starting and ending dates in the query.

[360] It would be possible to use it including in the query all the classes.

year[361]. When I refer to total patents, I make reference to what the table specifies as utility patents. The table shows the number of patent applications as well. Unfortunately, through the advanced search engine, it was not possible to have precise data on software patents' applications. Therefore, I could not collect information for an in depth analysis on the relation between software patent applications and software patents issued and the one regarding total patents[362].

## 4.2. Software Patents' trend

Using the data and the method described above, I have decided to carry out the analysis that focuses on the trend of software patents' issuing and its comparison with the trend of total patents. In order to do this, I will use graphs, which are particularly indicated for such an analysis. At the end, a table is shown which contains all the data used for the graphs.

The first graph focuses on software patents, specifically showing the number of software patents issued year by year from 1980 to 2012.

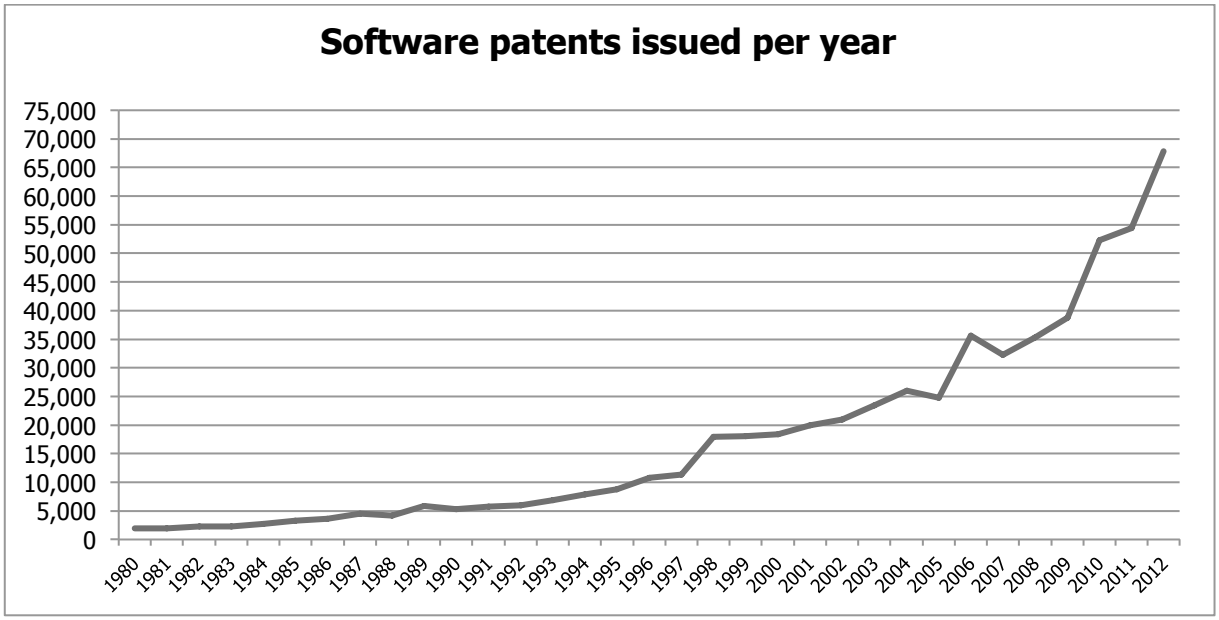


Fig. 1: Software patents issued per year from 1980 to 2012

[361] The table is available at <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm>. The results using the advanced search engine for the total number of patents issued would have differed from the ones of table of around 10 patents each year, which have an irrelevant impact on the analysis.

[362] The web address to accede the advanced search engine of the PTO for patent applications is <http://appft.uspto.gov/netahtml/PTO/search-adv.html>.

What is evident from the graph is a constant and growing increase in the number of software patents issued. This trend seems to roughly differ throughout three periods. The first one lasts in 1997 ad is characterized for a constant but restrained growth. Then, the software patents' number starts quickly increasing until 2005. The last trend begins in 2006 and, except for one year, the growth of this period seems dramatically rapid. At the end of this considered 32 year span, the number of software patents' issued grew from 1,936 to 67,845. The number is quite impressive, as recently the growth seems consistent and uncontrollable. Unsurprisingly the necessity of software patentability is now highly debated, and the movement for their abolition is getting an increasing amount of approvals.

In order to have a better understanding of the meaning of this growth, it can be compared with the growth of all patents. The next graph shows, for the same period of time considered in the first graph, the number of software patents issued on the number of total patents issued in percentage terms and per year.

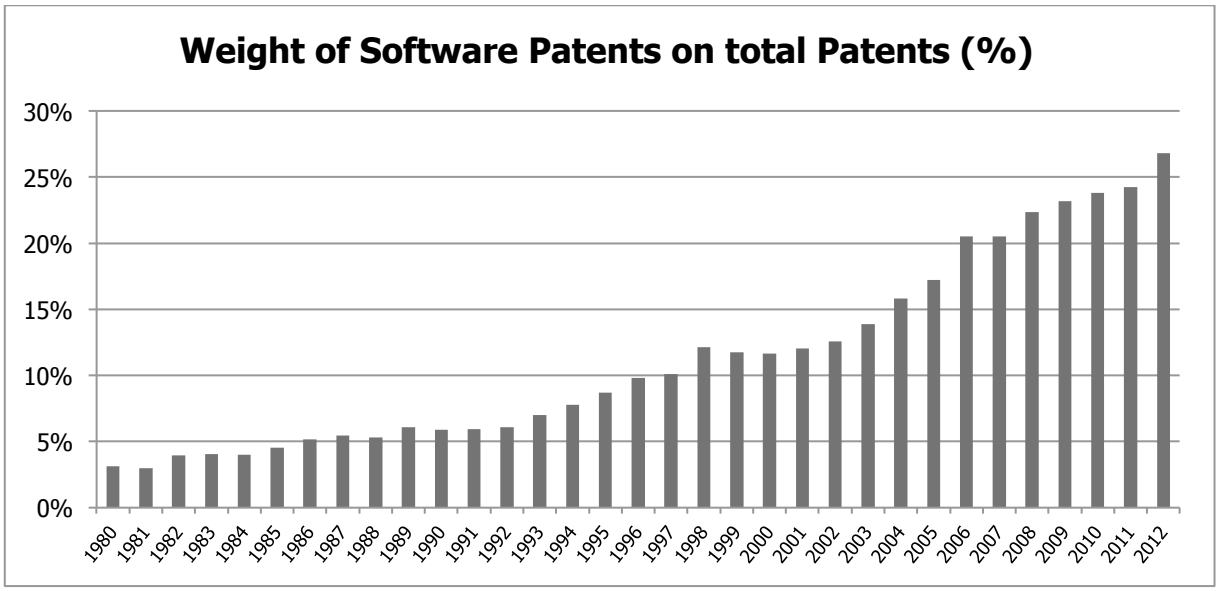


Fig. 2: Software Patents issued on Total Patents issued per year and in %

Within the patents category, the weight of software patents has grown during the years. Even if a few of the years have a different trend, it is still a more constant proportion than that of a decrease in software patent's weight. The histogram clearly shows that the general trend is a growth of software patents' weight on total patents. Last year they represented the 26.80% of all patents issued, while in 1980 software patents were only the 3.13% of the total patents. Such proportions solidify

the importance that software patents have nowadays in the U.S. patent system . For every four patents issued, one is a software patent.

The next graph explains the growing weight of software patents on total patents. It shows the general trend of growing grants of both software patents and total patents.

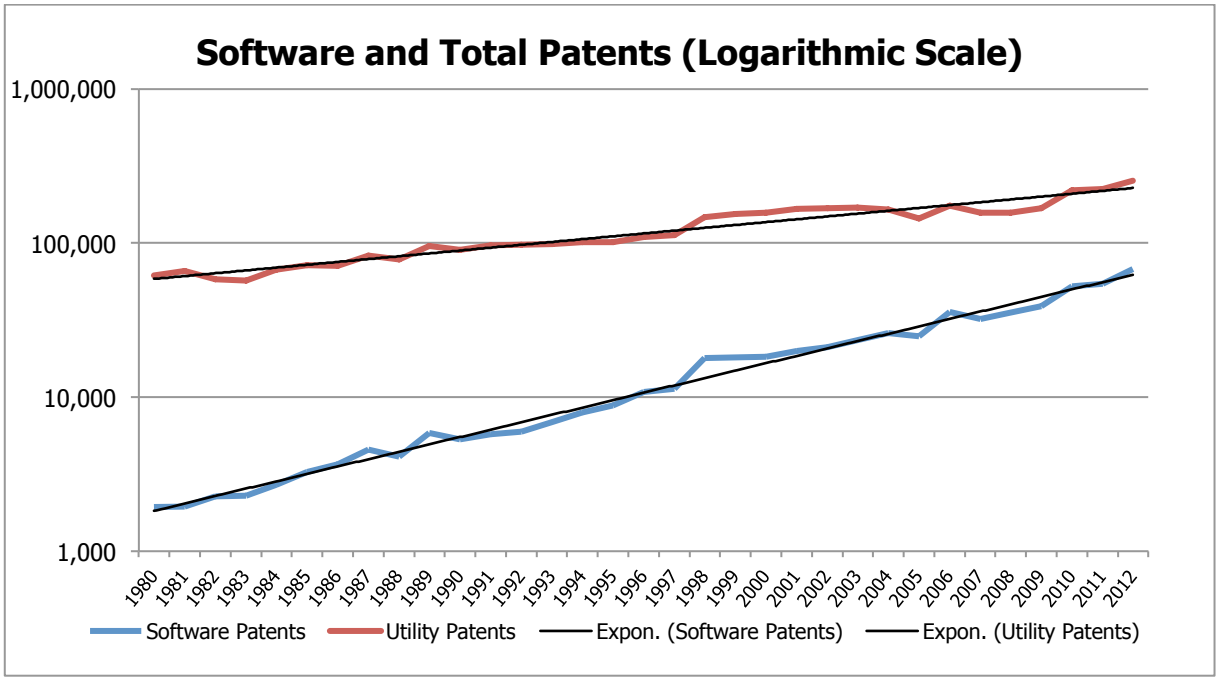


Fig. 3: Annual Grants of Software Patents and Total Patents with their Exponential Tendency Lines in Logarithmic Scale (1:10)

The graph is done in a logarithmic scale in order to show the proportional growth of the two variables. Both of them have a constant growing trend, which also look similar in what regards to the single years' trends. Comparing them, in proportional, not absolute terms, grants of software patents grow faster than the total patents' one. It explains why software patents' weight is increasing year by year within the total patents.

Overall, the graphs above reach the same conclusion. Patent's grants is growing every year in the United States. Now, the patent system has massive dimensions, and it is gaining more importance. In this context, software patents are growing even faster, coming from a negligible slice of total patents, to now being roughly one fourth of their total.

The same considerations can be done by looking at the numbers instead of the graphs. The table below contains the data used for making the graphs, and in addition, the annual percentage growth of both software patents and total patents.

| Year | Software Patents | Software Patents Year Growth (%) | Total Patents | Total Patents Year Growth (%) | Weight of Software Patents on Total Patents (%) |
|---|---|---|---|---|---|
| **1980** | 1,936 | | 61,819 | | *3.13%* |
| **1981** | 1,953 | 0.9% | 65,771 | 6.4% | *2.97%* |
| **1982** | 2,280 | 16.7% | 57,888 | -12.0% | *3.94%* |
| **1983** | 2,301 | 0.9% | 56,860 | -1.8% | *4.05%* |
| **1984** | 2,700 | 17.3% | 67,200 | 18.2% | *4.02%* |
| **1985** | 3,257 | 20.6% | 71,661 | 6.6% | *4.55%* |
| **1986** | 3,657 | 12.3% | 70,860 | -1.1% | *5.16%* |
| **1987** | 4,542 | 24.2% | 82,952 | 17.1% | *5.48%* |
| **1988** | 4,127 | -9.1% | 77,924 | -6.1% | *5.30%* |
| **1989** | 5,830 | 41.3% | 95,537 | 22.6% | *6.10%* |
| **1990** | 5,326 | -8.6% | 90,365 | -5.4% | *5.89%* |
| **1991** | 5,730 | 7.6% | 96,511 | 6.8% | *5.94%* |
| **1992** | 5,946 | 3.8% | 97,444 | 1.0% | *6.10%* |
| **1993** | 6,871 | 15.6% | 98,342 | 0.9% | *6.99%* |
| **1994** | 7,917 | 15.2% | 101,676 | 3.4% | *7.79%* |
| **1995** | 8,820 | 11.4% | 101,419 | -0.3% | *8.70%* |
| **1996** | 10,745 | 21.8% | 109,645 | 8.1% | *9.80%* |
| **1997** | 11,305 | 5.2% | 111,984 | 2.1% | *10.10%* |
| **1998** | 17,927 | 58.6% | 147,517 | 31.7% | *12.15%* |
| **1999** | 18,008 | 0.5% | 153,485 | 4.0% | *11.73%* |
| **2000** | 18,342 | 1.9% | 157,494 | 2.6% | *11.65%* |
| **2001** | 19,981 | 8.9% | 166,035 | 5.4% | *12.03%* |
| **2002** | 20,994 | 5.1% | 167,331 | 0.8% | *12.55%* |
| **2003** | 23,440 | 11.7% | 169,023 | 1.0% | *13.87%* |
| **2004** | 26,021 | 11.0% | 164,290 | -2.8% | *15.84%* |
| **2005** | 24,765 | -4.8% | 143,806 | -12.5% | *17.22%* |
| **2006** | 35,624 | 43.8% | 173,772 | 20.8% | *20.50%* |
| **2007** | 32,233 | -9.5% | 157,282 | -9.5% | *20.49%* |
| **2008** | 35,258 | 9.4% | 157,772 | 0.3% | *22.35%* |
| **2009** | 38,761 | 9.9% | 167,349 | 6.1% | *23.16%* |
| **2010** | 52,239 | 34.8% | 219,614 | 31.2% | *23.79%* |
| **2011** | 54,452 | 4.2% | 224,505 | 2.2% | *24.25%* |
| **2012** | 67,845 | 24.6% | 253,155 | 12.8% | *26.80%* |

Table 1: Total Data on Software Patents and Total Patents Issued per year[363]

[363] Negative numbers have been typed in red.

It must be noted that due to the delay of the Patent Office's answers to the applications, the data does not accurately reflect the trend of each year. However, it is unavoidably noticeable that the patent system's growing percentage is considerable, and the one of software patents is almost alarming.

## 4.3 Law in Action v. Law in Books / Courts

In concluding this empirical analysis it is essential to bring forward some considerations on the granting of software patents. Did the numbers of software patents issued reflect the way the issue of software patentability was dealt in the academics' debate, and, above all, in the courts? Years ago, some authors[364] claimed that software patenting was a routine practice even before that academics and courts recognized that they were statutory subject matter under § 101. The numbers showed above are not completely in accordance with such statement. The discordance is prevalently based on the consistency of software patents' granting and the relevant case law.

Before starting the analysis, it must be reminded that the Patent Office was severely criticized for its lack of technical knowledge[365]. It is only during the last two decades that the Patent Office has hired many examiners with a computer science background. Its incapability to deal with this matter was one of the reason that triggered the 1965 Presidential Commission's suggestion to exclude patent protection for computer programs. At this regard, Judge Stevens in its dissenting opinion in *Diehr* (1981) affirmed:

> "Concern with the patent system's ability to deal with rapidly changing technology in the computer and other fields led to the formation in 1965 of the President's Commission on the Patent System. After studying the question of computer program patentability, the Commission recommended that computer programs be expressly excluded from the coverage of the patent laws; this

[364] Cohen and Lemley (2001), p. 7.

[365] For an analysis in-depth on the technical problems of the Patent Office related to the subject of software patent see: Ralph D. Clifford, Thomas G. Field, Jr., & Jon R. Cavicchi, A Statistical Analysis of the Patent Bar: Where are the Software-Savvy Patent Attorneys?, 11 N.C. J.L. & Tech., pp. 223-268, 2009-2010.

> recommendation was based primarily upon the Patent Office's inability to deal with the administrative burden of examining program applications"[366]

The difficulties the Patent Office went through when dealing with new technologies is common to patent offices in every country because the natural role of patent protection is to cover inventions which add something new to the prior art, and consequently unknown before their disclosure. Nevertheless, it is without a doubt that computer science skills have been underestimated by the U.S. Patent Office for many years. An additional problem for examiners when dealing with software patentability were the contrasting and unclear messages coming from the C.C.P.A. (and then the Federal Circuit) and the Supreme Court on how to interpret them. These two factors certainly had a negative impact on the capability of the Patent Office in managing the computer program applications received.

The consistency between the number of software patents granted and the case law solutions for the issue was misinterpreted by those who claimed its contradiction. Many authors agreed by saying that the C.C.P.A. was not correctly following the Supreme Court's instructions, or even that the Supreme Court had to be clearer in its decisions. Although these considerations have to be accepted, we rather have to take a look at what courts were actually stating. It is not a matter of whether courts were correctly deciding on software patents claimed or not. The matter is whether the number of software patents issued by the Patent Office in a certain period of time is consistent with the case law position during the same period.

The collected data began in 1980, the year before the decision in *Diehr*. That year, the number of software patents issued was almost 2,000. This represented roughly the 3% of the total amount of patents. In *Diehr*, the Supreme Court upheld a decision of the C.C.P.A. of granting a software patent. It established that no general prohibition was set on software patentability. After the Supreme Court's decision, the number of software patents issued steadily increased. This trend seems totally consistent with the case law, even because the C.C.P.A. (and then the Federal Circuit) was supporting software patentability since many years.

[366] *Diehr*, 450 U.S. 197.

As noted above, there is a second period in which the growing of software patents started to rise. This period began in 1998, which not casually is the same year of the Federal Circuit decision in *State Street.* In this decision, the patentability of software reached its widest acceptance. The necessary test for determining the patentability of a computer related inventions was the "useful, tangible and concrete results", which eliminated any physical requirement for software patentability. Therefore, also the granting trend of this period is completely consistent with the prevailing case law of that time. The acceptance of State *Street*'s argument continued until the decision of the Federal Circuit in *Bilski*.

Only the third period trend (beginning in 2009 and highlighted by the graphs and the table) does not reflect the law in the courts. In 2008, the Federal Circuit held the "machine or transformation" test, in which it was then partially confirmed by the Supreme Court. The new test is much more strict than the previous "useful, tangible and concrete results" test held in *Street Bank*. It should had a limiting effect on the number of software patents issued rather than increasing it. However during the last three years software patents granting had a huge growth. Few reasons (such as an increasing number of software applications, or a better capability of patent attorneys to draft claims in a proper manner) could explain this divergence. In any case, a three year period is not suffice time for an accurate analysis. In order to make a valuable analysis on this period, it would be necessary to track the evolution of the trend for a durations of years.

# - CHAPTER III -

# SOFTWARE PATENTABILITY IN EUROPE

SUMMARY: 1. Introduction to the European Patent Convention – 1.1. Historical Background and Attempts to Create a Community Patent – 1.2. Overview on the Law under the EPC – 2. Statutory Provisions and the EU Proposal on Software Patentability – 2.1. The Prohibition on the Patentability of Software in the EPC and in EPC Members Patent Law – 2.2. The EU Directive on the Protection of Computer Programs by Copyright Law – 2.3. The EU Proposed Directive on Computer Programs Patentability – 3. Software Patentability under the EPC – 3.1. The Evolution from a Stance of Prohibition to the Allowing of Computer Related Inventions under the "technical contribution" approach – 3.2. The Emergence of the Technical Character Approach – 3.3. Recent Cases and the Referral to the Enlarged Board of Appeal.

European countries have been experiencing an integrated patent system, born with the signature of the European Patent Convention in 1973. The treaty binds state-parties to adapt their patent laws to the one established by the convention. It did not create an unitary European patent but it provides a procedure system which enables applicants to apply for an European patent which can be validated in every EPC Contracting States. Once granted and validated within the designated states, the patents are bound by the national legislations and jurisdictions.

Under such a system the validity of a patent could be decided both during the application procedure by the EPO and the appeal courts and during an infringement procedure before the national courts. The thesis focus on the former, which is the same for every state-parties. The approach of national courts could then lead in some countries to a higher rate of invalidation, but the issuing phase is always before the EPO. The EPC, contrary to the American patent law, contains an expressed prohibition on the patentability of programs for computer "as such" at art. 52. The expression "as such" has opened a big debate on its implications and in particular on whether software related invention are eligible for patent protection.

This chapter, after a general overview on the European patent system, primarily inquires the approach of the EPO on the software patentability issue and its interpretation of the prohibition established by art. 52 of the EPC. In addition, the main legislative proposals and the following debate within European Union institutions will be described.

# 1. Introduction to the European Patent Convention

With the signature of the European Patent Convention in 1973, European countries created a highly integrated patent system with the same rules and the same application procedure. The purpose was to make the market more competitive and efficient, incentivizing industries and inventions.

The EPC is administered by the European Patent Office, established on October the 7th, 1977. Currently, there are 38 contracting states and members of the EPO: Albania, Austria, Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Former Yugoslav Republic of Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Sweden, Slovenia, Slovakia, San Marino, and Turkey[367].

Because of its peculiarities, it is particularly important to draw a picture of its main characteristics, before entering into the issue of software patentability. As for the U.S.A., it will consist in a description of the history of the EPC, the patentability requirements, and the application procedure.

## 1.1 Historical Background and Attempts to Create a Community Patent

After the Second World War, in 1949 in Europe was created the Council of Europe, an international organization which had the aim of "safeguarding and realizing the ideals and principles which are their common heritage and facilitating their economic and social progress[368]". Among its initiatives, it attempted to harmonize patent law throughout Europe. In 1963, indeed, it provided a forum for discussion in Strasburg which gave rise to the Convention on the Unification of

[367] It is possible to find all the information on the contracting states, as the signature date, on the EPO website at: <http://www.epo.org/about-us/organisation/member-states.html>.

[368] Statute of the Council of Europe, art. 1, May 5th, 1949, ETS 1.

Certain Points of Substantive Law on Patents for Invention ("Strasbourg Treaty")[369]. The purpose of the treaty was to unify both the substantive and procedural patent law of the European countries[370]. It was formed by preamble and 14 articles. Art. 1 defined the patentable subject matter as "any invention that has industrial application, is new, and involves an inventive step"[371]. Then, the concepts of novelty, prior art, industrial application and inventive step were explained by art. 4, 5, and 6. Another relevant provision was the prescription of some compulsory formalities for a patent application by art. 8. The Strasbourg Treaty did not have a big success, it entered into force only in 1980 when it was ratified by 8 countries[372]. Nevertheless, it had a great importance not only because it was the first European attempt to create a harmonized patent system, but especially because it provided the "blueprint for the substantive European patent law that is embodied in the 1973 [EPC]"[373]

Ten years after the Strasbourg Treaty, between the 10th of September and the 5th of October 1973[374], it took place the negotiations for the next and most relevant step for an unitary European patent system, the European Patent Convention. Its official name was "The Convention on the Grants of European Patents", and after the signature of 1973 in Munich (it is indeed also known as "Munich Convention"), it entered into force and created the European Patent Organization on the 7th of October 1977[375]. The following year the first European patent application was filed and accepted (by the EPO)[376].

The EPO was established by art. 4 of the EPC which affirmed that it is formed by the European Patent Office (which has the authority to issue patents) and the Administrative Council. It is an independent body, unrelated to the European Union

[369] Convention on the Unification of Certain Points of Substantive Law on Patents for Invention (Strasbourg Treaty), entered into force Aug. 1, 1980, C.E.T.S. No. 047.
[370] Gerald Paterson, The European Patent System: The Law And Practice of The European Patent Convention, Sweet & Maxwell, 1992, p.15.
[371] Strasbourg Treaty, art. 1.
[372] After the ratification of Belgium in 1999, the treaty has now 13 contracting states. See <http://conventions.coe.int/Treaty/Commun/ChercheSig.asp?NT=047&CM=4&DF=&CL=ENG>.
[373] Wegner (1993), p. 22.
[374] Michael LaFlame, Jr., The European Patent System: an Overview and Critique, Houston Journal of International Law, pp. 605-635, 2009-2010, p. 612.
[375] At the moment it became effective in 1977, the EPC had seven members (Belgium, France, Luxembourg, Netherlands, Switzerland, United Kingdom, and West Germany).
[376] See <http://www.epo.org/about-us/office/history.html>.

institutions, with administrative and financial autonomy[377]. Today it comprises all the 27 EU members as well as other 11 countries which are not parties of the EU. It is regulated by most of the Part I of the EPC.

The EPC has created an articulated system. An inventor can file his application either at a national patent office or at the EPO[378]. The difference is just that under art. 2 of the EPC, an applicant who is filing at the EPO can request an European patent that can be validated in every EPC Members' territory, and all Contracting States designated by the applicant have the duty to recognize the patent and give to it the same effects of a national patent. The EPC also provides procedures related to patent prosecutions, oppositions, and for the appeals of EPO decisions[379]. Chapter I of Part II (which deals with the substantive patent law) regulates the patentability of inventions. It contains and defines all the patentability requirements: patentable inventions (art. 52), exceptions to patentability (art. 53), novelty (art. 54), non-prejudicial disclosures (art. 55), inventive step (art. 56), and industrial application (art. 57). The European patent[380] has a 20 years term validity[381]. It is important to stress that the EPO did not substitute national patent offices and the EPC did not replace national patent statutes. EPC Member States did not even have the duty to modify their domestic patent law in accordance with the EPC. It only created an multinational system, with its own rules and procedures, which facilitates the achievement of patent protection on an invention in more than one country simultaneously. An inventor can still decide to apply at a national patent office to obtain just the relative national patent. In addition, once issued, European patents are subjected to national legislations which regulate post grant infringements, damages, and enforceability[382]. These aspects can lead to some divergences between the effective legal regimes applied in the EPC Member States. Nevertheless, the EPC had a great importance for the harmonization of patent laws of each

[377] EPC, art. 4.
[378] EPC, art. 75.
[379] They are regulated respectively in Part IV, Part V, and Part VI of the EPC.
[380] The EPC uses this expression under art. 2 to indicate patents issued by the EPO, even if they merely are bundles of national patents.
[381] EPC, art. 63.
[382] EPC, art. 64 (3).

contracting states, which today are mostly equal and in accordance to EPC's provisions.

The EPC constituted the first step towards an unitary patent system throughout Europe. The agreement on such an unitary system, however, has been only partially reached in recent years (but it is not in force yet) within the European Union, where negotiations are still running. The first attempt in this direction was done in 1975 in Luxemburg with the signature by nine EEC members[383] of the Community Patent Convention (CPC)[384]. It aimed to create an unitary European patent for EEC States, but for constitutional and political problems it was subsequently ratified only by 7 states. One of the main obstacles, which still persists today, was the translation matter[385]. Ten years later, a new conference was held in Luxemburg with the purpose of overcoming the problems which had blocked the ratification, but it did only little progress for the resolution of the main issues[386].

The attempts to create a Community patent continued during the following years. In 1989, again in Luxemburg, a new treaty was drafted, the Agreement Relating to Community Patents[387]. The 1989 Community Patent Agreement made some amendments to the CPC, especially regarding the litigation system. It provided the creation of Community patent courts of first and second instance (which had to be national courts) and a Common Appeal Court. Even this attempt failed, ant the treaty did not enter into force. The biggest concerns related to the high costs for translating the applications in the languages of all Member States and to the reluctance of some states to accept that the effects of an invalidation made by a national judge of another country could affects their territory[388].

[383] Belgium, Denmark, France, Ireland, Italy, Luxembourg, Netherlands, United Kingdom, and West Germany.

[384] Convention for the European Patent for the Common Market, 1976. The full text is available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:41989A0695(01):EN:HTML>.

[385] Kevin P. Mahne, A Unitary Patent and Unified Patent Court for the European Union: An Analysis of Europe's Long Standing Attempt to Create a Supranational Patent System, 94 J. Pat. Off. Society, pp. 162-191, 2012, p. 176.

[386] Amiram Benyamini, Patent Infringement in the European Community, 13 ILC Studies, Wiley, 1993, p. 17.

[387] Agreement Relating to Community Patents (1989 Community Patent Agreement) Dec. 30, 1989. See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:41989A0695(01):EN:HTML>.

[388] Mahne (2012), p. 179.

The efforts for a Community patent persisted, and in 1997 the European Commission intervened by publishing a Green Paper[389] with the aim of giving a new impulse to the negotiations. It analyzed the problems of previous Community patent attempts and the weaknesses of the current patent system. The topic was discussed also at an European Council meeting held in March 2000 in Lisbon, where it was affirmed that the creation of a Community patent was necessary to enhance the competitiveness of the European economy[390]. Few months after the council, the European Commission decided to try the way of EU-regulations instead of the treaty process in order to pursue a Community Patent, and proposed an EU Community Patent regulation[391] based on the CPC and the 1989 Community Patent Agreement. Even this new attempt failed, once again for the translation issue, and in 2004 was definitively abandoned[392]. During the same period also the EPO made a proposal for an unitary patent litigation system, the 2003 Draft Patent Litigation Agreement (EPLA)[393]. However, before the end of the year, it stopped the works on the project because of the parallel attempts that the EU was carrying out.

In 2007 the European Commission began a new strategy with the Communication Enhancing the Patent System in Europe[394]. The idea behind the communication was to set up a system in two phases. The former consisted in the creation of a unitary EU patent, while in the latter a patent judiciary, inspired by the EPLA but adapted to the EU courts system, had to be established.

Regarding the creation of an unitary EU patent, while on the substantive provisions there was consensus among the countries, the translation regime was still controversial. In 2010 the European Commission proposed the use of three official

[389] European Commission Promoting Innovation Through Patents Green Paper on the Community Patent and the Patent System in Europe, Jun. 1997 (1997 Green Paper). Full text is available at <http://europa.eu/documents/comm/green_papers/pdf/com97_314_en.pdf>.

[390] Lisbon European Council 23 and 24 March 2000, Presidency Conclusions, European Parliament. Full text available at <http://www.europarl.europa.eu/summits/lis1_en.htm>.

[391] Commission of the European Union Proposal or a Council Regulation on the Community Patent, COM 2000, Aug. 2000 (2000 EU Community Patent Regulation). Full text is available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52000PC0412:EN:NOT>.

[392] Mahne (2012), p. 181.

[393] EPLA-European Patent Litigation Agreement, European Patent Office, Apr. 2009.

[394] Commission of the European Communities Communication from the Commission to the European Parliament and the Council: Enhancing the Patent System in Europe, COM 2007, Apr. 2007. Full text available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0165:FIN:en:PDF>.

languages: English, French, German[395]. The proposal was highly supported, but due to the objections of Italy and Spain it did not reach the unanimity. In order to overcome these rejections, the European Commission proposed[396] the utilization of the EU enhanced cooperation legislative procedure[397]. The enhanced cooperation was requested by 12 Member States, but other 13 immediately joined, making Italy and Spain the only EU members not involved in the procedure. In March 2011 the Council of the EU allowed the requesting states to establish the procedure[398]. The response of Italy and Spain filed complaints to the ECJ asking the annulment of the decision of the Council of the EU for being contrary to the provisions of the EU treaties. The ECJ dismissed the action rejecting all the arguments brought forward by Italy and Spain on the 16th of April 2013[399]. Due to two new actions taken by Spain[400] the implementation of the unitary EU patent could face a further delay.

The other direction of the European Commission's strategy was the creation of a unitary patent judiciary. In 2009, it first asked the Council of the EU for the authorization to open negotiations with EU Members and the other EPC Contracting States for the adoption of the European Unified Patent Litigation System (UPLS)[401]. The Council of the EU requested the opinion of the ECJ, which in 2011 stated that the UPLS was not consistent with the EU treaties. The ECJ justified its decision by affirming that the UPLS would have given to an

> "international court which is outside the institutional and judicial framework of the EU, exclusive jurisdiction to hear a significant number of actions brought by

[395] European Commission Proposal for a Council Regulation (EU) on the Translation Arrangements for the European Union Patent, COM 2010, Jun. 2010.
[396] European Commission Proposal for a Regulation of the European Parliament and of the Council Implementing Enhanced Cooperation in the Area of the Creation of Unitary Patent Protection, COM 2011, Apr. 2011.
[397] It is a special procedure regulated by art. 326-334 of the Treaty on the Functioning of EU which allows a minimum of 9 Member States to cooperate on a specific matter without involving the others.
[398] Council Decision No. 167/2011 of 10 Mar 2011, Authorizing Enhanced Cooperation in the Area of the Creation of Unitary Patent Protection, 2011.
[399] For those interested in reading the CJEU's arguments, the full text of the judgment is available at <http://curia.europa.eu/juris/document/document.jsf?text=&docid=136302&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=1394938>.
[400] Cases C-146/13 and C-147/13.
[401] Commission of the European Communities, Recommendation from the Commission to the Council: To Authorize the Commission to Open Negotiations for the Adoption of an Agreement Creating Unified Patent Litigation System, SEC 2009, Mar. 2009.

> individuals in the field of the patent [and would have] altered the essential character of the powers which the EU treaties confer on the institutions of the EU and on the Member States"[402].

A few months later the Council of the EU proposed a new Draft Agreement for the Unified Patent Court[403], which had all the necessary modifications to the UPLS in order to be consistent with the EU treaties. The agreement in the following months was subjected to many revisions before it reached its final version at the end of 2011. It finally provided at art. 4 the creation of a Court of First Instance (divided in regional divisions and a central division), a Court of Appeal, and a Registry. Only the central division will rule on patents' disputes. The negotiations went on and resolved all the remaining issues, among which the most controversial one was where to place the central court. A compromise was reached in June 2012, with the decision to place the central division in Paris, and to create two specialized divisions in both Munich and London[404]. The Agreement on a Unified Patent Court[405] was finally signed by all the EU Member States (with the exceptions of Spain and Poland) on the 19th of February 2013 (Bulgaria on the 5th of March)[406]. The agreement is not in force yet, and the ratifications are waited for not before 2014. In order to enter into force it has to be ratified by at least 13 states which have to include France, Germany and the United Kingdom.

If the new Unitary Patent and United Patent Court will enter into force (it is likely that it will not happen before 2015), they will definitely and substantially change the European patent system. Nevertheless, until that moment, EPC remains the main subject of every analysis of the European patent system.

[402] Draft Agreement - Creation of a Unified Patent Litigation System, Opinion, 2011 E.C.J. 1/09, at 89. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62009V0001:EN:NOT>.
[403] Council of the European Union Draft Agreement on a Unified Patent Court and Draft Statute 13751/11, Sep. 2011. See <http://register.consilium.europa.eu/pdf/en/11/st13/st13751.en11.pdf>.
[403] Mahne (2012), p. 188.
[404] Mahne (2012), p. 188.
[405] Text available at <http://register.consilium.europa.eu/pdf/en/12/st16/st16351.en12.pdf>.
[406] See <http://ec.europa.eu/internal_market/indprop/patent/ratification/index_en.htm>.

## 1.2 Overview on the Law under the EPC

The main characteristics of the EPC have already been briefly listed in the historical section (1.1.). Among its regulations, the application procedure and the patentability requirements are particularly important when analyzing the computer programs patentability issue. As it was already mentioned, the ruling on infringement lawsuits is still under the jurisdiction of domestic courts. In addition, software patent applications can be filed at the EPO as well as at domestic patent offices. Thus, the legal regime can be sensibly different between EPC Contracting States. The thesis mainly focuses on EPO's decisions, which in any case give a thorough view on the European legal regime on this matter.

### 1.2.1. Patent Application Procedure at the EPO

The EPC enables inventors to seek an European patent that can be validated in every designated EPC Contracting States, by filing a single patent application at the European Patent Office[407]. This procedure saves operators from applying to every national patent office, which, if the inventor intends to apply for many national patents, would be a waste of money and time.

The European patent application is regulated by Part III of the EPC. It is full of formal complexities, which are of little interest for our investigation. On the other hand, it is important to see how the substantive examination and the appeal system work. Applications can be either filed at the European Patent Office in Munich, at the branch office at the Hague or at the sub-office in Berlin[408]. Art. 78 of the EPC lists the formal requirements that European patent applications must contain[409]. Other formal requirements are provided by the regulations of the EPO. Under art. 90, the

[407] EPC, art. 2 and 3.

[408] For detailed information on the competent offices for applications and other documents see Ian Muir, Matthias Brandi-Dohrn and Stephan Gruber, European Patent Law. Law and Procedure under the EPC and PCT, Second Edition, Oxford University Press, 2002, p. 55.

[409] EPC, art. 78 (1): "A European patent application shall contain: (a) a request for the grant of a European patent; (b) a description of the invention; (c) one or more claims; (d) any drawings referred to in the description or the claims; (e) an abstract, and satisfy the requirements laid down in the Implementing Regulations."

accomplishment of these formalities is examined by a receiving section of the EPO[410]. In case of the presence of deficiencies, after having given the applicant the opportunity of a correction, it shall refuse the patent application[411]. The patent application is published within 18 months from the filing date (or the priority date)[412] and a search report related to the application is drawn and published as well[413].

The substantive examination is made by an Examining Division[414], and starts with the request of the applicant[415]. The Examining Division has to determine whether the application meets the legal requirements of the EPC. Under art. 97, the examination can lead to the grant of the patent or to a refusal, which must be preceded by an invite to the applicant to file its observations and to modify the application.

Under art. 97 (3), a patent takes effect on the date on which the mention of the grant is published in the European Patent Bulletin. Within 9 months from the publication of the mention of the grant, any person can file an opposition against the patent[416]. An opposition can be proposed only on the grounds listed by art. 100, among which there is the patentable subject matter. The opposition is decided by an Opposition Division[417], which rules following the regulation provided by art. 101. If the opposition is admissible the Opposition Division starts the procedure. With this, both the opponent and the proprietor of the European patent are parties. Then, the Opposition Division has to determine whether one of the grounds of art. 100 affects the validity of the patent or not. During the proceedings the proprietor can make amendments to its patent. At the end, the Opposition Division in accordance with its findings either revoke the patent or reject the opposition[418].

The last possible step of the European patent application is the appeals procedure, regulated by Part VI (art. 106-112a) of the EPC. The EPC system lacks of an authority who can rule on an appeal's decision (the Enlarged Board of Appeal,

[410] The receiving sections are established by art. 16 of the EPC.
[411] EPC, art. 90 (3).
[412] EPC, art. 93.
[413] EPC, art. 92.
[414] EPC, art. 18.
[415] EPC, art. 94.
[416] EPC, art. 99 (1).
[417] EPC, art. 19.
[418] EPC, art. 101 (2).

indeed, does not properly have this power), such as the Supreme Court in the United States of America. All first instance decisions of the EPO can be appealed. In particular, art. 106 establishes that "decisions of the Receiving Section, Examining Divisions, Opposition Divisions and the Legal Division" are appealable. The authority who has the power to hear appeals is the Board of Appeal[419], which is based in the headquarters of the EPO in Munich. If the appeal is admissible the board proceeds to determine whether it is allowable or not. The outcome of an appeal proceedings is regulated by art. 111, which establishes that:

> "(1) Following the examination as to the allowability of the appeal, the Board of Appeal shall decide on the appeal. The Board of Appeal may either exercise any power within the competence of the department which was responsible for the decision appealed or remit the case to that department for further prosecution.
> (2) If the Board of Appeal remits the case for further prosecution to the department whose decision was appealed, that department shall be bound by the ratio *decidendi* of the Board of Appeal, in so far as the facts are the same. If the decision under appeal was taken by the Receiving Section, the Examining Division shall also be bound by the *ratio decidendi* of the Board of Appeal."

Therefore, the Board of Appeal can either reject the appeal, revoke the patent, grant the patent, etc., depending on the specific case under appeal.

The EPC provides also an Enlarged Board of Appeals. As noted above, it does not constitute a further level of jurisdiction. It has three functions, listed by art. 22:

> "(a) deciding on points of law referred to it by Boards of Appeal under Article 112; (b) giving opinions on points of law referred to it by the President of the European Patent Office under Article 112; (c) deciding on petitions for review of decisions of the Boards of Appeal under Article 112a".

While the first two functions are related to a previous referral and aim at reaching an opinion or a decision of the Enlarged Board of Appeal on an integral point of law, the third one seems to represent a third level of jurisdiction. However, it cannot be considered an additional appeal, because under art. 112 (a) (which introduced this new power in 2007) the reviews can be requested only for procedural violations or if

[419] EPC, art. 21.

the board's decision was affected by a criminal act[420]. In any case, the Enlarged Board can decide on the substantive aspects of a case only under a referral of the Board of Appeal as provided by the procedure established by art. 112 of the EPC.

A last but essential consideration must be done on the judiciary system implemented by the EPC regarding the binding effect of the decisions. Contrary to the U.S.A. and the Common Law countries, in the EPC there are not principles establishing that case law is binding out of the specific case in which the decision is issued. Art. 112 affirms that one of the purpose of the first two functions of the Enlarged Board of Appeal is "to ensure uniform application of the law", but this statement is far weaker than providing the binding effect of the case law. Two decisions of the Board of Appeals have confirmed the non-binding effect of case law under the EPC. In the first the board affirmed that "the legal system established under the EPC does not treat either the Guidelines or established jurisprudence as binding"[421], and in the second it sustained it again stating that "the binding effect of Board of Appeal decisions is extremely limited. In the legal system established under the EPC there is no principle of binding case-law"[422]. Clearly, the binding effect of the Board of Appeal's decisions is not present neither towards the national courts of the EPC Member States. Nevertheless, even if not binding, the decisions of the Board of Appeals and of the Enlarged Board of Appeal have a persuasive authority for following cases. In a recent decision the Enlarged board of Appeal confirmed this influence, by affirming that within the EPC system the Board of Appeal have "interpretative supremacy"[423].

### 1.2.2. Elements of Patentability under the EPC

The EPC provides four elements of patentability, which are slightly different from the North Americans. They are defined in Chapter I (Patentability) of Part II (Substantive Patent Law) of the EPC, from art. 52 to art. 57. As it has been carried out in Chapter 2, it is worth to do a brief overview on their notions.

[420] EPC, art. 112a.
[421] Case T 0740/98-3.3.1. (Tech. Bd. App. Nov. 9th, 2004), at 2.3.
[422] Case T 1099/06-3.3.08 (Tech Bd. App. Jan 30th, 2008), at 1.
[423] Case G 3/08, Programs for Computers, O.J.E.P.O. 10 (Enlarged Bd. Appeal, May 12, 2010), at. 7.2.2. and 7.2.3.

### A) PATENTABLE SUBJECT MATTER

The patentable subject matter is regulated by art. 52 and 53 of the EPC. Art. 52 provides the definition of patentable invention at paragraph 1 and lists the exclusion at paragraph 2 and 3. On the other hand, art. 53 established three exceptions to the patentable subject matter. Originally, the provision of art. 53 was included in art. 52 at its fourth paragraph. With the amendment of 2000, it was transferred to the new art. 53. The division is justified because there is a fundamental difference between the exceptions and the exclusions: while the exceptions are considered by the legislator patentable subject matters that he decided to make non patentable, with the provision on the exclusion the legislator gives an authentic interpretation of the definition of patentable subject matter, clarifying what it does not include. The definition of patentable subject matter contained in art. 52 is the following:

> "European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application"[424].

The expression "in all fields of technology" has been added with the amendment of 2000, in accordance with the language of art. 27.1 of the TRIPs Agreement[425]. The words of the EPC do not create a positive definition of patentable categories of inventions, such as the ones stated by § 101 of the U.S. Patent Act. It rather makes a negative definition, which includes every invention fulfilling the other requirement, except for the exclusions and the exceptions.

Art. 52 (2) lists the inventions excluded from the patentable subject matter. It divided it in four sort of categories:

> "(a) discoveries, scientific theories and mathematical methods; (b) aesthetic creations; (c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers; (d) presentations of information"[426].

[424] EPC, art. 52 (1).
[425] Dr. Stacey, J. Farmer, and Dr. Martin Grund, Revision of the European Patent Convention & Potential Impact on European Patent Practice, 36 AIPLA Q. J., pp. 419-453, 2008, p. 425.
[426] EPC, art. 52 (2).

The subsequent paragraph 3 of art. 52 specifies that the exclusions cover "such subject-matter or activities as such". This specification is very important and particularly relevant for the software patentability issue.

The exceptions established by art. 53 are three, and relate to inventions that are contrary to the public order or the morality, plant or animal varieties, and methods for treatment of the human and animal body[427]. These exceptions are justified by public health and related policy reasons.

B) NOVELTY

Novelty is a common requirement to all patent systems in the world. EPC established such a requirement in art. 54, which clarifies that an invention is new if it is not included in the prior art. The concept of prior art is then defined by art. 54 (2), which affirmed that it is included in the prior art "everything made available to the public by means of a written or oral description, by use, or in any other way" before the filing of the patent application. Even earlier published patent applications' inventions are considered part of the prior art by art. 53 (3), but only for the purposes of evaluating novelty, and not for determining the fulfillment of the inventive step requirement[428]. Before the 2000 amendment, the prior art effect of earlier published patent applications was limited to those EPC Contracting States, which were designated by the applicants of both the earlier and the later applications. The amendment has removed this limitations, and the prior art effect affects all the EPC Contracting States without regard to the designation of the applicant[429].

In order to protect inventors from possible abuses and to enable them to show the invention in an official international exhibition before having obtained the patent, art. 55 provides that in these two cases the disclosure of the invention, happened not earlier than 6 months before the patent application is filed, is not prejudicial to its patentability.

[427] EPC, art. 53.

[428] Art. 56 and Guidelines for Examination in the European Patent Office, Part G Ch. IV, Jun. 2012. See <http://documents.epo.org/projects/babylon/eponet.nsf/0/6c9c0ec38c2d48dfc1257a21004930f4/$FILE/guidelines_for_examination_2012_en.pdf>.

[429] Stacey *et alia* (2012), p. 428-429.

C) INVENTIVE STEP

Under art. 52 (1), in order for an invention to be patentable it must involve an inventive step regarding the state of the art. Art. 56 specifies this requirement by stating that an invention includes an inventive step if its innovation is not obvious for a man skilled in the art. This requirement is parallel to the non-obviousness requirement of the U.S. patent system. As noted above, inventions made available by a published patent application do not have to be considered while inquiring the fulfillment of the inventive step requirement.

In order to determine the fulfillment of this requirement, the Board of Appeal has developed a three step test that is generally applied by both the divisions and the board: the problem-solution approach[430].

D) INDUSTRIAL APPLICATION

The last requirement listed in art. 52 is the industrial application. This requirement set a distinction with the North American patent system, that does not have a symmetrical patentability condition (it has the utility requirement, but they have some differences). The definition of industrial application is provided by art. 57 of the EPC:

> "An invention shall be considered as susceptible of industrial application if it can be made or used in any kind of industry, including agriculture"[431].

The concept of industry is not defined and is particularly broad, including also agriculture. This requirement was generally taken for granted by the EPO until a decision was made by the Board of Appeal in 2005[432]. At paragraph 4 of its ruling, the board introduced the concept of "profitable use", stating that the mere eligibility of a substance to be produced in some ways did not mean that it met the industrial application requirement, unless some profitable use was possible.

[430] Case T 0024/81-3.3.01 (Tech. Bd. App. October 13th, 1982).
[431] EPC, art. 57.
[432] Case T 0870/04-3.3.8 (Tech. Bd. App. May 11th, 2005).

# 2. Statutory Provisions and the EU Proposal on Software Patentability

The European Patent Convention set up an apparently clear rule on software patentability. According to paragraphs 2 and 3 of art. 52, a software "as such" shall not be considered an invention included in the patentable subject matter. In other words, pure software is included in the expressed exclusions from the patentable subject matter that the EPC has established. The U.S. patent system is lacking of such an expressed provision, and consequently the software patentability issue is mainly a matter of case law rather than of legislative provisions. In Europe, the situation is different: the first bar to software patentability is set by the legislator. This is the reason why it is so important to face the legislative evolutions, even in terms of proposals, of the software patentability issue within the European *fora*.

## 2.1. The Prohibition on the Patentability Software in the EPC and in EPC Members Patent Law

The first prohibition on the patentability of computer programs appeared in France in 1968. French Patent Law has historically been an influent benchmark for the patent regulation of the other continental European countries. Art. 7 of the French Law 68-1[433] in listing the inventions which were not considered industrial (and consequently eligible to patent protection), included software:

> "Ne costituent pas, en particulier, des inventiones industrielles: 1° […]; 2° […]; 3° Les méthodes financières ou comptables, les règles de jeux et tous autres systèmes de caractère abstrait, et notamment les programmes ou séries d'instructions pour le déroulement des opérations d'une machine calculatrice".

It is notable that this provision did not have any reference to the characterization "as such". Therefore, it banned software patents for any kind of software. The reason

[433] Loi n° 68-1 du 2 janvier 1968 tendant à valoriser l'activitè inventive et à modifier le règime des brevets d'invention. Journal Official de la Rèpublique Française.

behind this provision was that European patent laws originally considered the concept of materiality as a necessary element for the patentability of an invention[434].

This same reason pushed the legislator of the EPC to establish the prohibition on software patentability, and the additional "as such" specification could be an evidence of that. The practical utilizations of computer programs were still unknown and the European legislator was probably worried that their patentability would have covered all their possible applications, with a big damage for technology innovation. Another two reasons are claimed by some authors as being the justification for the provision of software exclusion from the patentable subject matter. The first is brought forward by academics who argued that also the need of certainty (which is particularly important in a complicated system such as the EPC's one) led to an expressed provision on the matter[435]. The latter was related to the incapability of the EPO examiners in dealing with software inventions, because of the lack of prior art archives and of skilled examiner in the field[436]. As noted in chapter 1, the concerns on the possible difficulties of patent offices in dealing with software were pointed out also in the Patent Cooperation Treaty, which was signed during that period (1970).

The exclusion of software "as such" from the patentable subject matter was then acknowledged by the EPC Contracting Members, which, even if not bound by the EPC to do it, reformed their patent statutes to make them according to the EPC provisions. Although seemingly unimportant, it was very important in order to have the same substantial regulation on patentability under both the EPC and the domestic jurisdiction of EPC Member States (as noted above they have jurisdictions over many post granting activities such as the infringement procedures). Listed below are the implementations made by the most important EPC Members.

The provision in Italy was introduced by the DPR n. 338/1979, which in art. 12 implemented art. 52 of the EPC by reproducing the same words:

[434] See Giovanni De Santis, La tutela giuridica del software tra brevetto e diritto d'autore, Giuffrè Editore, 2000, p. 56; Giovanni Guglielmetti, L'invenzione di software. Brevetto e diritto d'autore, Giuffrè Editore, 1997, p.143.

[435] M. Ammendola, La brevettabilità nella Convenzione di Monaco, Giuffrè Editore, 1981.

[436] Arnoud Engelfriet, The Mess That is the European Software Patent, 14 Journal of Internet Banking & Commerce, 2009.

> "Non sono considerate come invenzioni ai sensi del precedente comma in particolare: […] I programmi per elaboratore; […] Le disposizioni del comma che precede escludono la brevettabilità di ciò che in esse è nominato solo nella misura in cui la domanda di brevetto o il brevetto concerna […] programmi considerati in quanto tali"[437].

France reformed its patent law in 1992, enacting the Code de la Propriété Intellectuelle[438]. The new statute confirmed the prior prohibition on software patents, but adding the "tant que tel" condition, in accordance with the EPC. Art. L611-10 of the new statute, indeed, implemented art. 52 of the EPC stating that:

> "Ne son pas considérées comme des inventions au sens du premier alinéa du present article notamment: […] les programmes d'ordinateurs; […] Les dispositions du 2 du présent article n'excluent la brevetabilité des éléments énumérés auxdites dispositions que dans la mesure où la demande de brevet ou le brevet ne concerne que l'un de ces éléments considéré en tant que tel."

In Germany the text of art. 52 of the EPC was substantially restated as well, including the exclusion of computer programs "als solche". Art. 1 of the German Patent Law[439] establishes in paragraph 3 and 4:

> "Als Erfindungen im Sinne des Absatzes 1 werden insbesondere nicht angesehen: […] Programme für Datenverarbeitungsanlagen […] Absatz 3 steht der Patentfähigkeit nur insoweit entgegen, als für die genannten Gegenstände oder Tätigkeiten als solche Schutz begehrt wird".

In the United Kingdom, patents are regulated by the 1977 Patents Act. The exclusion of software from the patentable subject matter is established by art. 1, subsection 2:

> "It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of […] a program for a computer […] but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such"[440].

[437] Decreto del Presidente della Repubblica, 22 giugno 1979 n. 338, art. 12 (2) and (3).
[438] Loi no 92-597 du 1er juillet 1992 relative au code de la propriété intellectuelle.
[439] Patentgesetz in der Fassung der Bekanntmachung vom 16. Dezember 1980 (BGBl. 1981 I S. 1).
[440] UK Patents Act 1977, Chapter 37, art. 1 (2).

In the same article, found in subsection 5, the provision grants some authoritative discretion on the matter to the UK government, stating that "the Secretary of State may by order vary the provisions of subsection (2) above for the purpose of maintaining them in conformity with developments in science and technology".

Lastly, a glance must be taken on Spain. Spanish Patent Law was enacted in 1986[441]. The patentable subject matter is defined by art. 4, which restated EPC's art. 52 and 53. The exclusion of software is provided by art. 4 (2) and (3):

> "No se considerarán invenciones en el sentido del apartado anterior, en particular: […] los programas de ordenadores. […] Lo dispuesto en el apartado anterior excluye la patentabili-dad de las invenciones mencionadas en el mismo solamente en la medida en que el objeto para el que la patente se solicita comprenda una de ellas".

As expected (but it did not have to be taken for granted), EPC Members' domestic patent law restates almost exactly the EPC's provisions on the exclusion of pure software from the patentable subject matter. These exclusions, as it will be explained in the part dedicated to the EPO's approach, leave some space for the patentability of computer implemented inventions.

## 2.2. The EU Directive on the Protection of Computer Programs by Copyright Law

Within the European Union countries, the legal protection of computer programs was originally devolved to Copyright law. The EC Commission (now European Commission) in June 1988 issued a Green Paper dealing with the new challenges that technology was posing on copyright, and claiming for immediate actions in response of them[442]. A few months later, it drafted a proposal directive related specifically to computer programs[443], which was then amended in 1990[444].

[441] Ley Nº 11/1986, de 20 de marzo de 1986, de Patentes.
[442] Commission Of The European Community, Green Paper On Copyright And The Challenge Of Technology-Copyright Issues Requiring Immediate Action 170 (June 7, 1988).
[443] Proposal for a Council Directive on the Legal Protection Of Computer Programs (1988).
[444] Amended Proposal for a Council Directive on the Legal Protection of Computer Programs, Official J. Eur. Comm. (11 July 1990).

The requests of a legislation on the topic was embraced in 1991 by the Council of the European Communities (now European Union), which enacted a directive on copyright protection for software with the aim of harmonizing the legislations in force in the territories of the EEC (now EU) members[445]. The directive was felt also necessary because at that time only three countries in the European Union (France, Germany, and the UK) provided a clear legal protection for computer programs, while in the others it was fragmentary and not specific[446]. The directive was then amended by another directive in 2009[447].

Although the topic of this thesis specifically regards computer programs patentability, and not generally the legal protection of software, this directive and its implications deserve to be analyzed. The decision of enacting this directive made some authors affirm that EU authorities had made a clear choice toward the copyright protection of computer programs instead of the other possible legal protections such as the one provided by patents[448].

### 2.2.1. The Directive 91/250/EEC

The Directive 91/250/EEC was enacted on the 14th of May 1991, and subsequently implemented by all EU Member States. It provided a specific regulation on software legal protection by copyright. The directive was formed by 11 articles, preceded by 28 recitals in which the Council of the EC explained the reasons for its intervention.

The recitals from 1 to 5 explained the economic and political reasons which conclusively pushed the European legislator to intervene on the matter. The list included the increasing importance of computer programs, the notable difference

[445] Council Directive of 14 May 1991 on the legal protection of computer programs (91/250/EEC). See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1991:122:0042:0046:EN:PDF>.

[446] E. Brendan Magrab, Computer Software Protection in Europe and the EC Parliamentary Directive On Copyright for Computer Software, 23 Law and Pol'y int'l Bus., pp. 709-723, 1992, p. 718.

[447] Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs. The full text of the new directive is available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:111:0016:0022:EN:PDF>.

[448] *Ex Plurimis* Leo J. Raskind, Protecting Computer Software in the European Economic Community: the Innovative New Directive, 18 Brook. J. Int'l L., pp. 729-750, 1992, p. 732.

between the high investments necessary for their development and the easiness with which they can be copied, and the fragmentation of their protection in the European territory, which prevented a common software market from growing properly. A specific definition of software was avoided because the Council of the EC thought that the fast development of such a technology would have made any specific definition become old soon. Rather, some generic information on what had to be considered included within the term "computer program" were provided. The sixth recital was crucial for interpreting the purposes and the implications of the directive, and it will be analyzed below. Recitals 14 and 15 clarified the object of the protection (subsequently regulated by art. 1), stating that in accordance with the international conventions the legal protection did not cover the ideas and principles comprised by computer programs, but only the expression of such ideas and principles.

Art. 1 of the directive defines the object of the protection. It stated the duty of Member States to protect software with copyright and the extent of such protection. Its first two paragraphs recited that:

> "(1) In accordance with the provisions of this Directive, Member States shall protect computer programs, by copyright, as literary works within the meaning of the Berne Convention for the Protection of Literary and Artistic Works. For the purposes of this Directive, the term 'computer programs` shall include their preparatory design material. (2) Protection in accordance with this Directive shall apply to the expression in any form of a computer program. Ideas and principles which underlie any element of a computer program, including those which underlie its interfaces, are not protected by copyright under this Directive"[449]

The third paragraph of art. 3 affirmed, that in order to determine whether a software was protectable by copyright or not, no criteria except for originality had to be applied. This provision was necessary to prevent EU Members from frustrating the harmonization of the regulations by adding some additional or more strict criteria (in Germany for example, the Federal Supreme Court required high standard of originality for the application of copyright protection to computer programs[450]).

[449] Directive 91/250/EEC, art. 1 (1) and (2).

[450] Paul G. Hidalgo, Copyright Protection of Computer Software in the European Community: Current Protection and the Effect of the Adopted Directive, 27 Int'l L., pp. 113-144, 1993, p. 121.

Art. 4 thru 6 established the activities under the exclusive reserved to the rightholder. They were slightly different from what was typically provided by normal copyright regulation, because of the peculiarities of software in respect to ordinary literary and artistic works protected by copyright. After all, the directive aimed at contrasting the internet piracy phenomenon[451]. Art. 4 listed the reserved activities, while art. 5 and 6 listed the exceptions. Art. 5 was related to software user's rights, and art. 6 ruled on the highly controversial matter of the reverse engineering by establishing a waiver from the rightholder's authorization (it worked in some specific cases such as when the decompilation was necessary for the interoperability).

Art. 7 dealt with piracy crimes, requiring appropriate remedies by Member States' national legislations. Art. 8 governed the length of the protection, stating that it had to be granted until fifty years from the death of the author or for fifty years if the author is a legal person. This length was strongly criticized due to the fact that software technology developed quickly and a software could be considered obsolete after few years[452]. Art. 9 is very important because it established that the provisions of the directive did not have any prejudice to any other legal protections accorded to computer programs. Further considerations on this point will be done below. The last two articles, art. 10 and 11, contained formalities regarding the adoption of the directive and its recipients.

### 2.2.2. Evolution of the Directive 91/250/EEC and its Implications on the Patentability of Software

The Directive 91/250/EEC finally provided a uniform and specific legal protection for computer programs in the whole territory of the EU. A few years later, in 1993, the TRIPs Agreement[453] confirmed that computer programs had to be covered by the copyright legal protection, as established by the directive 91/250. In particular, art. 10 (1) of the TRIPs stated that:

[451] Patrizia Dal Poggetto, La questione della brevettabilità del software fra esigenze di sviluppo tecnologico e vincoli giuridici, in Informatica e Diritto, 1996, p. 236.

[452] Giustino Fumagalli, La tutela del software nell'Unione Europea. Brevetto e diritto d'autore, II edizione, Nyberg Edizioni, 2005, p. 54.

[453] See Chapter I, 3.3.

> "Computer programs, whether in source or object code, shall be protected as literary works under the Berne Convention (1971)"[454].

After its entrance into force, the European Commission monitored its implementation by Member States. It also tracked its effects on the software industry in order to be able to draft a report with its consideration on the Directive. The report was published in 2000[455]. The report described objectives achieved by the directive, the good influence on the development of the software market, and the decreasing of piracy[456]. The European Commission was satisfied for the directive's implementation, and proudly highlighted that it was taken as a model by East Europe Countries, Hong Kong, Philippines, and Australia for their legislations[457]. The directive 91/250 was amended and substituted in 2009 by the directive 2009/24. Under recital 1, it explained the reasons of the intervention, which was done "in the interest of clarity and rationality". The modifications were a few and the core regulations remained substantially the same.

An important point is whether the directive and the provision of a copyright protection could have excluded the regulation on software patentability or not. Many evidences suggested a negative answer.

The discipline on software copyright protection led the EU regulation on the matter toward North American standards. The U.S.A. indeed had the most sophisticated system on this matter[458]. The two regulations had some differences[459], but only on specific aspects of the legal protection. It would not be sensible for such similar provisions to have different effects in relation to the patentability of software.

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[454] TRIPs, art. 10 (1).

[455] COM(2000) 199 Final, April the 10th, 2000, Report from the Commission to the Council, the European Parliament and the Economic and Social Committee. On the Implementation and Effects of Directive 91/250/EEC on the Legal Protection of Computer Programs. Full text is available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2000:0199:FIN:EN:PDF>.

[456] COM (2000), 1999, VI, at 2, p. 16.

[457] COM (2000), 1999, VI, at 3, p. 16.

[458] Keith A. Styrcula, The Adequacy of Copyright Protection for Computer Software in the European Community 1992: a Critical Analysis of the EC's Draft Directive, 31 Jurimetrics J., pp. 329-348, 1990-1991, p. 332.

[459] For an exhaustive analysis of such differences see Pamela Samuelson, Comparing U.S. and EC Copyright Protection for Computer Programs: are they more different than they seem?, 13 J.L. & Com., pp. 279-300, 1993-1994.

More incisively the directive itself and the European Commission in the report COM (2000), 1999, not only never mentioned any kind of bar that copyright protection could represent for software patentability, but also expressly stated the contrary by suggesting new interventions for an integrated legal protection on computer programs. The directive 91/250 provided this suggestion twice. The first time in recital 6, in which it affirmed:

> "The Community's legal framework on the protection of computer programs can accordingly in the first instance be limited to establishing that Member States should accord protection to computer programs under copyright law as literary works"[460].

Granted that recitals are declaratory of the intentions of the EU Legislator, the expression "in the first instance" evidenced the willingness of a further intervention on the legal protection of software. According to the directive, the protection provided by copyright covered the "expression in any form of a computer program"[461] but not "ideas and principles which underlie any element of a computer programs"[462]. Consequently, a new intervention should be directed toward the protection of these ideas and principles, and the proper legal means for that protection is provided by patent law. This view is also supported by another provision of the directive. Recital 21 stated that "protection of computer programs under copyright laws should be without prejudice to the application, in appropriate cases, of other forms of protection". The other forms of protection are then enunciated by art. 9 which, following a non-alphabetical order, put "patent rights" at the top of the list. It is without a doubt that these provisions went towards the same direction: to make the system open (and maybe to suggest) to a new legislative intervention aimed at establishing patent protection for computer programs.

The report COM (2000) 1999 of the European Commission specifically dealt with the possibility of the EC on the patentability of computer programs[463]. The commission once again clarified that copyright did not exclude other legal protection for

[460] Directive 91/250/EEC, recital 6.
[461] Directive 91/250/EEC, recital 15 and art. 1 (2).
[462] Directive 91/250/EEC, recital 14 and art. 1 (2).
[463] COM (2000), 1999, VIII, at 1, p. 19.

computer programs, and underlined the necessity of clarity for the software patentability issue. For this purpose, the European Commission declared that it was going to soon present a draft directive regulating the patentability of computer programs. It also anticipated that EPC Members should have proceed to the necessary modifications of art. 52 of the EPC in order to make it compatible with the provisions of the new directive. The European Commission conclusively argued that a patent protection on software would not have affected the copyright one. Patent protection, indeed, would have covered only ideas and principles, which under the directive 91/250 where not included in the copyright protection. Therefore, the European Commission corroborated the reasoning above.

The new directive 2009/24 confirmed all the provisions which allowed a possible further intervention on the legal protection of computer programs. Intervention that was attempted by the European Commission before the new directive on copyright protection for computer programs was enacted in 2009.

## 2.3. The EU Proposed Directive on Computer Programs Patentability

On the 6th of July 2005 the European Parliament rejected with 648 votes to 14 the European Commission's proposal for a directive on the patentability of computer-implemented inventions (hereinafter CII Directive)[464]. The legislative initiative of the European Commission on a directive regulating software patentability began with the consultations called in 1999. In 2002, it was presented a proposal, which during the legislative procedure was subjected to hard struggles. Indeed, the Council of the EU and the European Parliament had different view on the matter, but moreover pro-software patents and anti-software patents coalitions toughly fought in order to achieve their respective interests. The proposal aimed at providing the whole territory of the European Union with a clear and uniform legal regime on the

[464] Commission of the European Communities, COM(2002) 92 final, Proposal for a Directive of the European Parliament and of the Council on the patentability of computer-implemented inventions, Brussels, February 20th, 2002. The full text of the proposed directive is available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2002:0092:FIN:EN:PDF>.

patentability of computer programs. The matter was (and still is) regulated by the EPC and the EPO, but national courts had some different interpretation on the scope which had to be accorded to software patentability. The proposal originated a big debate among institutions, stakeholders, and academics, and its rejection represented a political failure.

The vote of the European Parliament prevented the proposal from having any legal practical effects, and the inquiry on software patentability still has to be done by studying the practice of the European Patent Office. Nevertheless, it is particularly important to analyze the evolution of this initiative and the reasons of its rejection.

### 2.3.1. The Intentions of the European Commission in the Communication COM(1999) 42 final

In 1999, the European Commission issued a follow-up[465] to the Green Paper of 1997[466], which analyzed the main challenges for the European patent systems and mentioned the actions that it considered urgent at a Community level. Immediately after reading the communication it becomes clear that software patentability was considered an issue of great importance: the European Commission identified three priority issues on which rapid action was required, and the patentability of computer programs was included on this list[467].

The matter was specifically approached in section 3.2 of the communication, which dealt with the needed complementary harmonization of national legislations in specific fields of intellectual property law. The commission first analyzed the current situation at the time by underlining all the problems and the difficulties that it caused. In particular, it pointed out that the legal regime in force in Europe lacked transparency and, despite the adoption of the same legislation under the EPC, there

[465] Communication from the Commission to the Council, the European Parliament and the Economic and Social Committee - Promoting innovation through patents - The follow-up to the Green Paper on the Community patent and the patent system in Europe, COM(1999) 42 final, 5 February 1999. Full text available at <http://ec.europa.eu/internal_market/indprop/docs/patent/docs/8682_en.pdf>.

[466] Promoting innovation through patents: Green Paper on the Community patent and the patent system in Europe COM(1997) 314 final, 24 June 1997.

[467] COM(1999) 42 final, at 1.3, p. 8.

were different opinions about the extent of the prohibition of art. 52 (the EPO and German courts on one side, and British courts on the other). As a consequence, EU Countries held sensibly diverging positions on the legal protection accorded to computer programs, damaging, this way, the internal software market. The commission affirmed that there were around 13,000 software patents in Europe, which, because of the ignorance of European operators in the matter, were held for the 75% by big non-European companies[468]. The communication contained an approximate number which revealed the value of the software industry in Europe: it estimated that every year about 40 billion of euros (more than 4 times the PIL of Cyprus in 1999) of investments in IT and computer programming were done. The analysis continued with a comparative description of the legal regime in force in the U.S.A. and in Japan, which were considered open to software patentability by the commission, and apparently as some sort of model to be followed. The conclusion was that two actions were particularly urgent: a legal intervention for the harmonization of the matter throughout Europe and an information campaign to provide information and knowledge of the patent system for software companies.

The commission then focused on the actions that it was planning on taking in respect of this issue. It started with a manifesto of the position of the EU institutions on the right legal regime for computer programs, affirming that:

> "The European Parliament supported the patentability of computer programs, on condition that the product in question meets the conditions of novelty and industrial application of a technical invention, as is the case with our economic partners at international level"[469].

In order to achieve such a result, it suggested on acting towards two directions. The former was the draft of a directive which the European Commission aimed to present "as soon as possible". The directive had to guarantee a uniform interpretation and application of the law on software patentability, which had to be parallel with the copyright protection. The latter was addressed to EU Member States, which needed to start negotiations in order to remove computer programs from the exclusion of

[468] COM(1999) 42 final, at 3.2.1., p. 12.
[469] COM(1999) 42 final, at 3.2.2., p. 13.

art. 52 (2) of the EPC. This step had to be accomplished in order to ensure the compatibility of the new EU legislation with the EPC[470].

In concluding its considerations on the software patentability issue, the European Commission again stressed that an information campaign was fundamental in making operators aware of the benefits of a patent protection for software. This intervention had to be carried out regardless of the outcomes of the directive proposal.

### 2.3.2. The Proposal of the European Commission: Reasons and Solutions

After the 1999 follow-up to the Green Paper of 1997, the European Commission started working on the drafting of a directive on the patentability of computer programs. It took exactly three years to finish the proposed directive. During this period of time the European Commission accomplished a series of consultations. On the 19th of October 2000 a consultation paper which invited the public to make comments and to answer surveys on the matter within a two months period of time (until the 19th December, 2000) was launched[471]. The consultation received 1447 responses, which were analyzed in a report made by a third contractor[472]. The report identified two factions, the software patents' supporters on one hand, and those against software patentability on the other. The former category had a liberal approach in respect to software patentability, and its members were prevalently government agencies, lawyers, and established industry players. The other side had a restrictive approach, being contrary to most software patents. It was composed by engineers, start-up companies, students, and academics.

In addition to the consultations, two studies were commissioned. The first one was a general study on the economic impacts that software patentability could have generated[473], while the second was specifically addressed to small and medium size

[470] COM(1999) 42 final, at 3.2.2., p. 14.

[471] The patentability of computer-implemented inventions: consultation paper by the services of the Directorate-General for the Internal Market, 19 October 2000. Full text of the paper is available at <http://ec.europa.eu/internal_market/indprop/docs/comp/soft_en.pdf>.

[472] Report available at <http://ec.europa.eu/internal_market/indprop/docs/comp/softanalyse_en.pdf>.

[473] The Economic Impact of Patentability of Computer Programs, Report to the European Commission, 2001. Text available at <http://ec.europa.eu/internal_market/indprop/docs/comp/study_en.pdf>.

enterprises[474], which represented an important and key category among European companies and whose interests have always been taken in high consideration by the European Commission.

The CII Directive was finally presented on the 20th of February, 2002. It was accompanied by a 16 page explanatory memorandum. The memorandum initially explained the objectives of the initiative, and described the consultations carried out by the commission. Then it focuses on the legal regimes applicable in U.S.A., in Japan, and on the one in force in Europe under the EPC. The analysis of art. 52 of the EPC and its interpretation by the EPO was particularly accurate, and resulted into a reasoning on the necessity of harmonization on the matter because of the lack of a uniform interpretation on the prohibition of software "as such" patentability by national courts. The interpretation had strong divergences especially between German and British courts. Subsequently, the European Commission explained the approach it adopted in drafting the proposed directive. It mainly resorted to the practice and the guidelines of the EPO, which used the technical contribution condition to determine whether a software was patentable or not. Once again the importance of an informational campaign directed above all to small and medium size enterprises was underlined. Under the view of the commission SME could receive high benefits from the effects of the CII Directive. At the end, the memorandum concluded with an article by articled explanation.

The CII Directive was formed by 11 articles which were preceded by 19 recitals. The recitals mostly repeated what the European Commission had affirmed in several other occasions: the lack of uniformity, the importance of the sector, the consistency of a patent protection with the copyright legislation under the directive 91/250, and the necessity of an intervention at a Community level. Recital 6 referred to the provision of art. 27 (1) of the TRIPs which established that patent rights should be available "without discrimination to any field of technology". The commission, forcing the real meaning of the text, interpreted it as if it indirectly stated that computer

[474] Patent protection of computer programmes (Contract no. INNO-99-04), Final Report Submitted to European Commission, Directorate-General Enterprise. Full text of the final report is available at <http://eupat.ffii.org/papri/tangadpa00/tangadpa00.pdf>.

implemented inventions should be patentable[475]. Recitals 10 to 13 clarified that under the CII Directive a fundamental point for the evaluation of the patentability of a computer program was whether it had a technical character and made a technical contribution to the state of art.

As anticipated by recital 15, the discipline laid down by the 11 articles of the CII Directive was limited to the fundamental principles that had to regulate the matter. The substantive provisions prevalently concentrated on two issues: the definition of computer implemented inventions and the criteria for the evaluation of their patentability. The rules on these aspects, however, were criticized on the ground that they did not make any self-contribution but rather just complied with the EPO guidelines[476]. The definition of the concept of computer implemented invention was provided by art. 2 (1), which described it as:

> "any invention the performance of which involves the use of a computer, computer network or other programmable apparatus and having one or more prima facie novel features which are realised wholly or partly by means of a computer program or computer programs".

This definition was evidently inspired by the notions contained in subsection 2.3.5. ("schemes, rules and methods for performing mental acts, playing games or doing business") and 2.3.6. ("programs for computers"), Chapter IV, Part C of the EPO guidelines[477]. The use of the expression "*prima facie"* for the qualifications of novel elements was hardly criticized. Indeed, following the article by article explanation section of the directive, the expression meant that actual novelty was not necessary anymore. As a consequence of this interpretation, the expression emptied the significance of the novelty requirement. These criticisms pushed the European Parliament to intervene with an amendment which eliminated the provision.

[475] See Chapter 1, at 3.3. for a specific analysis of the principles set by the TRIPs agreement in respect to the software patentability issue.

[476] Asunción Esteve, Patent Protection of Computer-Implemented Inventions Vis-À-Vis Open Source Software, 9 The Journal of World Intellectual Property, pp. 276-300, 2006, p. 291.

[477] From the EPO website is not possible to retrieve the text of the Guidelines' versions anterior to the 2005, which however had the same provisions on this specific point. The 2005 full text is available at <http://documents.epo.org/projects/babylon/eponet.nsf/0/3ececc3cf7e9c4c9c12572580036d691/$FILE/part_c_en.pdf>.

The technical contribution was dealt at both art. 2 and 4. Art 2 (2) defined it as "a contribution to the state of the art in a technical field which is not obvious to a person skilled in the art". This definition was not coordinated with the one of computer implemented invention given at art. 2 (1), because it did not explain their relationship. In light of the recitals and the article by article explanation, the technical contribution had to be considered a further requirement linked to the inventive step for the evaluation of the patentability of computer implemented inventions. On the other hand, art. 4 dealt with the technical contribution from the point of view of the conditions of patentability. It stated that, in order to be patentable, a computer implemented invention had to make a technical contribution to the state of the art, and that in the inquiry on the fulfillment of this requirement the invention had to be considered "as a whole". In drafting this provision, the European Commission referred to some provisions related to the examination of computer implemented inventions already implemented by the EPO guidelines[478]. Indeed, two decisions of the EPO Board of Appeals were cited in the article explanation. However, while in the EPO guidelines the technical requirement was included in the concept of invention, the CII Directive made it a new patentability requirement. This approach was criticized as well for lacking of a clear specification of the differences between this new condition and the ordinary requirements of novelty and inventive step[479]. Actually, the directive's articles explanations illustrated that the technical contribution had to be considered a feature of the inventive step requirement, but it was slightly confusing when applied to the EPO case law.

The other provisions of the CII Directive had less relevance than art. 2 and 4. Article 1 clarified the scope of the directive, which was addressed to the regulation of the patentability of computer implemented invention. Art. 3 stated that computer implemented invention had to be considered a field of technology in accordance to the provision of art. 27 (1) of the TRIPs Agreement. Art. 6 regulated the relation between the new directive and the copyright legislation under Directive 91/250. It

[478] Subsection 2.3.5. (Chapter IV, Part C) of the 2005 Guidelines recited: "the claimed subject-matter […] have to be examined as a whole".
[479] Esteve (2006), p. 193.

affirmed that the provisions concerning interoperability and decompilation of the copyright protection would have not been affected by the CII Directive.

Art. 5 regarded the form of the claim. It established that an invention could be claimed as either a product or a process. Consequently, a computer program could be claimed as either a programmed computer or a process carried out by an apparatus. In the directive's articles explanations, the commission stressed that the Directive did not allow claims on computer programs on their own or on a carrier, contrary to the practice of the EPO. It appeared clear here how the commission made an effort not to broaden too much the scope of software patentability.

Article 7 and 8 introduced some duties upon the European Commission itself, which had to monitor the impact of the CII Directive on competition and innovation and draft a report on its effects within three years from its implementation. The last three articles (9-11) had formal provisions on the implementation and the entry into force of the directive.

Some arguments in defense of the CII Directive from the criticisms mentioned above regarding the fact that it largely followed the EPO can be brought forward. It can be considered that the main goal of the European Commission was to give an uniform regulation of the matter throughout Europe, rather than to create new rules and new solutions for the issue. The concerns of the European Commission on the legal regime in force at that time did not strictly regard the rules provided by the EPC or the EPO practice. They were rather related to the lack of uniformity, caused by the articulated system created by the EPC and the different views of national courts on the computer programs patentability issue. Consequently, it was little surprising that the European Commission decided to embrace many of the interpretations availed by the EPO. In addition, the CII Directive diverged from EPO's approach on some specific aspects, in particular regarding the form of the claim (art. 5). This evidenced that the decision of going along with EPO practice was done with awareness of the situation rather than for a mere absence of alternatives.

### 2.3.3. The Legislative History of the CII Directive and its Final Rejection

The CII Directive lied within the subject matter jurisdiction of the EU co-decision procedure, which was regulated by art. 251 of the TEC. The co-decision procedure, also referred as the Community method, was one of the typical legislative procedure of the European Union introduced by the Maastricht Treaty[480]. Under the co-decision process, the European Commission had to draft a proposal and to submit it to both the European Parliament and the Council. Then there was a procedure in which the act passed from an institution to the other until they reached a consensus on the same text. Both the European Parliament and the Council were allowed to make amendments to the text.

The legislative history of CII Directive was tormented and plenty of amendments[481]. It was approved with amendments by the European Parliament on the 24th of September, 2003. The Council did not accept the amended act, and after an advisory vote sent back a revised version to the European Parliament on the 18th of May, 2004. The Council officially adopted the common position on the 9th of March, 2005. The procedure concluded on the 6th of July, 2005, when the European Parliament decided to reject the Council's common position and definitively terminated the legislative procedure of the CII Directive.

During the 1st reading debate at the European Parliament, more than 250 amendments were proposed[482]. At the end, the text approved by the European Parliament was heavily modified compared to the original proposal of the European Commission[483]. The European Parliament modified 9 recitals and 7 articles, and added 6 new recitals and 4 new articles. The new version had a total of 25 recitals

[480] The Lisbon Treaty renamed it Ordinary Legislative Procedure, and now it is the most used procedure within the EU legislative process. Its regulation is today provided by art. 294 of the Treaty on the Functioning of the European Union.

[481] The full legislative history of the CII Directive, with dates and links to all the relative documents, is available at <http://ec.europa.eu/prelex/detail_dossier_real.cfm?CL=en&DosId=172020>.

[482] See <http://eupat.ffii.org/papers/eubsa-swpat0202/prop/index.en.html>.

[483] European Parliament legislative resolution on the proposal for a directive of the European Parliament and of the Council on the patentability of computer-implemented inventions (COM(2002) 92, 24th September, 2003. The full text of the amended version proposed by the EP is available at <http://www.europarl.europa.eu/sides/getDoc.do?type=TA&language=EN&reference=P5-TA-2003-402>.

and 15 articles. The only articles not amended were the ones on the scope, the implementation, the entry into force, and the addressees.

The lobbying actions of the groups against software patentability produced a great effect. The modifications carried out by the European Parliament aimed at reducing the space for software patentability. The amended text was in fact more a computer implemented inventions non-patentability proposal rather than the contrary. Nonetheless, according to some opinions[484], in the chaos of the debate many approved amendments were counterproductive, by enlarging the possibilities of obtaining patent protections for some types of software. The most relevant amendments anyway regarded the concept of technical contribution, the conditions of patentability, and three important restrictions to the patentable subject matter.

The technical contribution was included within the concept of invention by the provision of the new art. 2[485]. In the new art. 4, however, the technical contribution was confused with the inventive step, by stating that "in order to involve an inventive step, a computer-implemented invention must make a technical contribution". Consequently, the new presented technical contribution was moved from the concept of inventive step to the one of invention, but with also some reflections on the other patentability requirements. In addition the new art. 4 (4) provided a test for inquiring the presence of the technical contribution:

> "whether it constitutes a new teaching on cause-effect relations in the use of controllable forces of nature and has an industrial application in the strict sense of the expression, in terms of both method and result".

It seems as if the test was drafted as strictly as possible, with a confusing wording. In addition to these modifications, the amendments posed three new restrictions. First, the new art. 3 forbade patent protection for any kind of invention involving data processing. This provision menaced many patent rightholders, because it would have made invalid many patents issued by the EPO during the previous years[486]. The

[484] E. Szattler, Patentability of Computer Programs, 1 Masaryk U. J.L. & Tech., pp. 97-108, 2007, p. 108.
[485] Art. 2 of the amended version recited at letter b): "technical contribution, also called invention …".
[486] Arnoud Engelfriet, The Mess That is the European Software Patent, 14 Journal of Internet Banking & Commerce, Issue 2, pp. 1-3, Aug. 2009, p. 2.

second restriction was provided by the new art. 5 which stated that the involvement of a computer or of any programmable apparatus did not automatically mean that the computer implemented invention was making a technical contribution. On the contrary, if an apparatus, which implemented business, mathematical or other methods by a computer program, merely accomplished the normal physical interactions between them, it had to be considered not patentable. The last further restriction was established by the new art. 6, which stated that the mere efficiency improvement in the "use of resources within the data processing system" did not make an invention patentable. The amended directive clearly showed the anxiousness of the European Parliament to close the doors to software patentability. Many prohibitions were uselessly repeated, such as the one on data processing. Even the safeguard of interoperability from the effects of patent protection, which was already established by the provision on the relation between the CII Directive and the directive 91/250, was repeated by the new art. 9. The effect of the adoption of this text would have been to narrow the scope of patent protection for a computer implemented inventions, because the new provisions were much more strict than the practice of the EPO at the current time.

The Council did not embrace the amended directive and adopted a common position. A compromise version of the proposal was submitted to the European Parliament on the 18th of May, 2004. The resolution, however, was formally approved only one year later. The Council overturned most of the amendments, maintaining only few of the modifications made by the European Parliament to the original proposal[487]. It reduced the recitals to 23 and the articles to 11. The final text was very close to the original proposal, except for the definition of computer implemented invention[488] and the new art. 4 on the exclusions from patentability. The exclusions included the one introduced by art. 5 of the parliament's version, and a new provision restating the prohibition on the patentability of software "as such", like the one of art. 52 of the EPC. Ironically, after that the European Commission had suggested in many

[487] Council of the European Union, Common position adopted by the Council with a view to the adoption of a Directive of the European Parliament and of the Council on the patentability of computer implemented inventions, November 18th, 2004. Full text of the common position is available at <http://register.consilium.europa.eu/pdf/en/04/st11/st11979.en04.pdf>.

[488] It was maintained the elimination of the expression *"prima facie"* made by the EP.

occasions to make modifications to the prohibition of art. 52 of the EPC, the prohibition itself was included in the last version of the CII Directive. The Council was evidently trying to reassure the anti-software patent groups of the parliament and to find a compromise in order to reach a final agreement.

Subsequently, the lobbying actions and the pressure of groups against software patentability started again pushing very hard in order to obtain the rejection of the text. One month before the European Parliament's vote, a big Software Patent Conference was organized in Brussels. During the conference many eminent academics, members of the EP, and professionals presented their arguments against software patentability[489]. Surprisingly, the Committee on Legal Affairs, whose rapporteur was the former French Prime Minister Michel Rocard, proposed the adoption of the Council's common position without amendments[490]. However, before the vote, Rocard himself, who was a tough opponent of software patents, asked the European Parliament to reject the common position of the Council[491].

When it was evident that the European Parliament was not inclined to adopt the act, the pro-software patent groups, feared that the EP could have amended again the directive. They preferred to maintain the *status quo* of the EPO practice instead of risking the adoption of an act such as the first one proposed by the EP. Shortly after they decided to join anti-software patent coalition and to vote for the directive definitive rejection[492]. The vote took place on the 6th of July, 2005. With a nearly unanimous vote (678 votes to 14 with 18 abstentions[493]) the European Parliament rejected the common position and declared the legislative procedure terminated[494].

The rejection of the CII Directive represented a political failure of the European Commission, whose first purpose rather than enlarging the scope of patent protection for software was to harmonize its legal regime throughout Europe and to

[489] Roy J. Rosser, European Software Patents When a Rejection Is Not a Rejection, 24 IPL Newsl., pp. 25-28, 2005-2006, p. 27.
[490] Full text of the report is available at <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A6-2005-0207+0+DOC+PDF+V0//EN>.
[491] Szattler (2007), p. 105.
[492] Rosser (2005-2006), p. 27.
[493] See <http://www.europarl.europa.eu/oeil/popups/summary.do?id=908650&t=e&l=en>.
[494] Full text of the decision is available at <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P6-TA-2005-0275+0+DOC+PDF+V0//EN>.

bring it under the Community's sphere. It will be probably necessary to wait for a Community Patent in order to have a uniform regulation on computer programs patentability in the whole European territory. In the meantime, the European Patent Convention is still the most important enforceable legislative provision regulating the matter. The analysis has thus to be moved to the European Patent Office practice in order to inquire the current scope of software patent protection in Europe.

# 3. Software Patentability under the EPC

The definitive rejection of the CII Directive has maintained the *status quo* in the legal regime applicable to computer programs patentability in Europe. Therefore, as long as no legislative interventions will be carried on, the regulation on the matter is provided by the EPC and the national statutes. Granted that national legislations on the patentable subject matter are mostly, if not completely, repeating the words of the EPC[495], the interpretation and application of the EPC by the competent judicial authorities represent the substantive law on computer programs patentability in Europe. At the current time, national courts have not reached an unanimous consent on the matter. One of the reasons which pushed the European Commission to propose a directive on software patentability was precisely the divergences between national courts' interpretations. In particular, Germans and English courts were referred many times by the commission itself for having opposite interpretations (Germans broader and English more strict) on the scope of software patentability[496].

Despite these problems, an exhaustive analysis on the software patentability issue in Europe can still be done without studying the behavior of each national court of EPC Contracting States. Under the EPC, indeed, most of the patents in Europe are granted by the EPO, and even if the they can afterwards be revoked by national courts, EPO's practice represents the common legal basis for the Europe as a whole.

The EPO judiciary system has already been described above[497]. Among the Boards of Appeal, the one in charge of the cases involving computer implemented inventions is the Technical Board of Appeal 3.5.01[498]. The analysis will focus on the its most important decisions, on the evolution of the relevant approaches and tests implemented, and on the EPO guidelines.

[495] The point is analyzed at 2.1. of Chapter III.

[496] See *supra*.

[497] See Chapter III, at. 1.2.1.

[498] The Technical Board of Appeal 3.5.01 has jurisdiction over classes G06Q and G06F17 of the International Patent Classification (see <http://www.epo.org/law-practice/case-law-appeals/business-distribution/technical.html>). Such classes cover data processing, digital computer methods and other methods for business purposes. The list of the inventions covered by these classes is available at <http://www.wipo.int/ipc/itos4ipc/ITSupport_and_download_area/20100101/pdf/scheme/advanced/en/g06.pdf>.

# 3.1. The Evolution from a Stance of Prohibition to the Allowing of Computer Related Inventions under the "technical contribution" approach

The issue of computer programs patentability as carried by the EPO met a rapid development during the first years of its functioning. Two periods can be drawn up from the entry into force of the EPC in late 1977 to the end on the 1980s'.

During the first one the EPO examiners did not have any guide on how to deal with software related claims except for the exclusion for art. 52. In that situation, such an exclusion had been considered very strict and computer related invention claims were routinely rejected. The second period started with the issuing of the 1985 guidelines and the first decisions of the Technical Board of Appeal, which established and developed the "technical contribution" approach.

## 3.1.1. The Original Approach on Software Patentability and the 1985 EPO Guidelines

The original attitude of the EPO toward computer program inventions was to consider the prohibition established by art. 52 as an absolute obstacle for their patentability[499]. This view was corroborated by the *status quo* present in Europe at that time. The provision of art. 52 of the European Patent Convention, indeed, derived from the general trend among European countries at the signature of the EPC. Even if only France had expressed a definite prohibition on the patentability computer programs in its legislation, some early decisions of European courts on the matter testified a general aversion toward the patentability of software related inventions. In the 1960s, some software patent applications were rejected in UK and Austria[500], while there are some records of rejections during the 1970s in Germany[501]

[499] Alfred P. Meijboom, Software Protection in "Europe 1992", 16 Rutgers Computer & Tech. L.J., pp. 407-445, 1990, p. 412.

[500] Slee & Harris Applications (U.K. – [1966] R.P.C. 194), "Zinszahlen-Rechnenprogramm" (Austria – GRUR Int. 1968.211), and "Algoritmus" (Austria – GRUR Int. 1969.142). These cases are quoted from

and in the Netherlands[502]. The hostile attitude towards software patentability was probably influenced by the legal regime of the other side of the Atlantic which has always been a model for European countries. In those years the North American case law was against software patentability, and in 1972, the year before the signature of the EPC, the U.S. Supreme Court upheld the prohibition on software patentability with its decision in *Benson[503].*

As a consequence of the above attitude, from its foundation to the new guidelines of 1985, EPO examiners used to reject regularly any application on an invention involving a computer program under the examination guidelines applicable at that time[504]. In 1984, the increasing importance and complexity of the topic led the President of the EPO (Dr. Johannes Bob van Benthem) to establish a Working Group, formed by members of national patent offices, experts from industries and patent professionals in order to discuss on the problem of software related inventions patentability[505]. The Working Group met twice, and its reasoning were then used in drafting the amendments to the examination guidelines in 1985.

On the 6th of March, 1985 the President of the EPO approved the new guidelines[506]. The most relevant modifications regarded Part C-IV from § 2.1 to 2.2of the previous guidelines. The guidelines did not provide specific rules but rather general principles that had to be applied when evaluating an application. They limited the prohibition on computer programs patentability of art. 52 by stating that a decision on a computer related invention application did not have to be rejected only because the data processing operations were carried out by a software[507]. The decisive aspect was constituted by the new provision which affirmed that claims had to be

Kim G. Hansen, Software Patents in Europe, Stockholm Institute for Scandianvian Law 1957-2010, p. 177. Text available at <http://www.scandinavianlaw.se/pdf/47-9.pdf>.

[501] The German Disposition Program, 8:6 11C (1977),558 quoted in Andreas Grosche, Software Patents - Boon or Bane for Europe?, 14 Int'l J.L. & Info. Tech., pp. 257-309, 2006, p. 272, note 117.

[502] The Dutch Board of Appeal of the Patent Office denied a patent in 1970 in the "Telephone Connecting System" decision. Cited in Meijboom (1990), p. 412, note 21.

[503] See Chapter 3, at. 2.2.

[504] Philip Leith, Software and Patents in Europe, Cambridge University Press, 2007, p. 11.

[505] N.W.P. Wallace, The Patentability of Software Related Inventions under the European Patent Convention, 1 Software L.J., pp. 249-257, 1985-1987, p. 249.

[506] Guidelines for Examination in the European Patent Office (1985 & Supp. 1989).

[507] Wallace (1985-1987), p. 251.

considered as a whole. Under the new rule the presence of a computer program in the invention was not a bar to its patentability anymore. The new guidelines stated that:

> "If […] the subject matter as claimed makes a technical contribution to the known art, patentability should not be denied merely on the ground that a computer program is involved in its implementation"[508].

The guidelines introduced the concept of technicality as a fundamental requirement for the eligibility to patent protection. Section 2.1. of the new guidelines, indeed, established that in order to meet the subject matter requirement, an invention had to be technical and concrete (not abstract like a mathematical formula). The EPO did not provide an exhaustive explanation of the meaning of technical. However, in forbidding patents on software carried on a medium, the guidelines partially traced a boundary on what is technical and what is not:

> "If a computer program is claimed in the form of a physical record, e.g., on a conventional tape or disc, the contribution to the art is still no more than a computer program. In these instances the claim relates to excluded subject-matter as such and is therefore not allowable. If, on the other hand, a computer program in combination with a computer causes the computer to operate in a different way from a technical point of view, the combination might be patentable"[509].

The concept of technicality was then deeply developed by the board in its decisions, and became a fundamental element for the analysis on software related inventions.

### 3.1.2. The First Decision of the EPO Technical Board of Appeal on a Computer Related Invention

One year after the issuing of the new guidelines, the EPO Technical Board of Appeal 3.5.01 took its first decision on a case involving a computer programs, Decision T 208/84 *Vicom/Computer related invention*[510]*.* The claims covered a

[508] 1985 EPO Guidelines Part. C-IV § 2.3.
[509] 1985 EPO Guidelines Part. C-IV § 2.3.
[510] Case T 208/84, Computer-Related Invention/VICOM, [1987] OJ.E.P.O. 14 (Technical Bd. Appeal 3.5.1, July 15, 1986). See <http://www.epo.org/law-practice/case-law-appeals/pdf/t840208ep1.pdf>.

method which digitally processed images through a mathematical algorithm and an apparatus for carrying out such a method. The EPO Examining Division had rejected the application arguing that the method was a mathematical method excluded from the patentable subject matter by art. 52 and that the apparatus lacked of novelty.

The Technical Board of Appeal disagreed with the examiners' conclusions. The board drew a difference between a mathematical method as such and a mathematical method used in a technical process. The former, according to the board, was an abstract concept carried out on numbers and did not produce any technical result. On the contrary on the latter the board stated:

> "if a mathematical method is used in a technical process, that process is carried out on a physical entity (which may be a material object but equally an image stored as an electric signal) by some technical means implementing the method and provides as its result a certain change in that entity. The technical means might include a computer comprising suitable hardware or an appropriately programmed general purpose computer"[511].

According to it, even if a technical process involved a mathematical method, a claim on the technical process did not violate the prohibition of art. 52 because it was not directed toward the mathematical method as such. The board affirmed that the same conclusion was valid even if the technical process used a computer program instead of a mathematical formula. The Technical Board of Appeal overturned also the argument on the rejection of the apparatus. Again, it repeated that the involvement of a computer implementing a software could not be considered a computer program as such:

> "Generally speaking, an invention which would be patentable in accordance with conventional patentability criteria should not be excluded from protection by the mere fact that for its implementation modern technical means in the form of a computer program are used. Decisive is what technical contribution the invention as defined in the claim when considered as a whole makes to the known art"[512].

The board stressed the importance of the technical contribution, which was considered the decisive aspect for determining the patentability of a computer

[511] T 208/84 Computer-related invention/VICOM, Reasons at 5.
[512] T 208/84 Computer-related invention/VICOM, Reasons at 16.

related invention. In *Vicom* the technical contribution to the state of art had to be inquired taking in consideration the invention "as a whole". The case was afterwards remitted to the Examining Division and the patent (after some amendments to the claims accorded between the board and the applicant) was finally granted.

This case, the very first case involving a computer program decided by the EPO Board of Appeal, created a breach into the patentable subject matter by limiting considerably the exclusion of art. 52 of the EPC. Nevertheless, it was subjected to some criticisms, because it did not provide sufficient explanations for some concepts it brought forward. Firstly, it was pointed out that although the board used sixteen times the word "technical", it never once provided a definition of such concept[513]. At the same time the board distinguished between claims directed to computer programs as such and to "a computer set up to operate in accordance with a computer program", but did not explain what it exactly intended for it[514]. In addition, after having stressed so strongly the importance of the technical contribution, the board failed ironically to describe in what way the invention in *Vicom* performed a technical contribution. Because of this short falling and the absence of a certain definition, the meaning of technical contribution remained unresolved.

### 3.1.3. Further Cases Confirming and Refining the "technical contribution" approach

The Technical Board of Appeal on the 21st of May, 1987, decided another case involving a computer program: *Koch & Sterzel*[515]. The claims were directed toward an X-Ray machine implemented with a software (a data processing unit) which was used in order to guarantee an optimum exposure without overloading the X-Ray

[513] Susanj Marsnik and Robert E. Thomas, Drawing a Line in the Patent Subject Matter Sands: Does Europe Provide a Solution to the Software and Business Method Patent Problem?, 34 B.C. Int'l & Comp. L. Rev., pp. 227-327, 2011, p. 281.

[514] Sigrid Sterckx and Julian Cockbain, The Patentability of Computer Programs in Europe: An Improved Interpretation of Article 52(2) and (3) of the European Patent Convention, 13 The Journal of World Intellectual Property, pp. 366-402, 2010, p. 378, in which the authors propose three possible formats of the computer and the claim.

[515] Case T 26/86, X-ray Apparatus/KOCH & STERZEL, O.J.E.P.O. 19 (Technical Bd. Appeal 3.4.1, May 21, 1987). See <http://www.epo.org/law-practice/case-law-appeals/recent/t860026ep1.html>.

tube. Siemens and Philips made opposition to the patent's claims, but the Opposition Division rejected their arguments. Subsequently they decided to appeal to the Technical Board of Appeal. The opposition was based on the assertion that only the computer program had some differences with the state of art, while the apparatus was already known. The opponents claimed that the software and the apparatus had to be analyzed separately for the determination on the patentability. They argued that because the computer programs was the essence of the invention and lacked of technical character, the exclusion of art. 52 should have been applied. In support of this argument a decision of the German Federal Court of Justice was cited.

The Technical Board of Appeal rejected such an argument and dismissed the appeal. The board first affirmed that when the control of a software on an apparatus has the effect of technically altering its functioning, the invention (formed by both the program and the machine) could be patentable. In regards to the modes of analysis implemented when considering a claim, the board upheld *Vicom by* affirming that the invention had to be considered as a whole and that an invention could be patentable even if it consisted of a combination of technical and non-technical elements[516]. In addition, it was not considered relevant how and when the technical effect occurred as long as it effectively occurred. In concluding its decision, the board expressly rejected the argument of the German Federal Court of Justice under which it had to be inquired which element was essential for the invention. The board affirmed that such an argument led to the result that an invention in its entirety had to be considered non-patentable when its greater part was constituted by non-technical elements even if its technical aspects fulfilled all the patentability requirements. That solution was not acceptable for the BoA, which on the other hand stated that the elements did not need to be weighted. The reasoning of the board in this decision seemed to be influenced by some echoes coming from the other side of the Atlantic. The U.S. Supreme Court in *Diehr*[517] made some arguments that are similar to those brought forward by the board in *Koch & Sterzel*, such as those of the rejection of the point of novelty test and the affirmation that it was not relevant whether the new

[516] T 26/86, X-ray Apparatus/KOCH & STERZEL, Reasons at 3.4.
[517] See Chapter II, at 2.3.1.

step from the state of the art was made by the apparatus or the computer program, as long as the invention as a whole brought an improvement to the prior art[518].

The Technical Board of Appeal few years later limited a bit the scope of the "technical contribution" approach in its decision T 0038/86 *Text Processing / IBM.*[519] The succession of a new Chairman in the Technical Board of Appeal 3.5.01 (the position in 1989 was performed by Van den Berg) could partially explain some differences between the reasoning of the board in this case and the previous decisions. The claims were directed to a text processing system implemented in a processor which automatically replaced some words exceeding a preset understandability level with synonyms. IBM first filed its application in 1983, but it was rejected by the EPO Examining Division in September 1985, on the ground that the claims were partially directed to a non-technical algorithm excluded from the patentable subject matter by art. 52, and that they did not involve an inventive step under art. 56. IBM decided to appeal the rejection claiming that the patent had to be granted because the invention had to be considered as a whole. Regarding the invention, IBM asserted that it was constituted by a combination of steps performed by the user and by the system, which had been considered patentable in previous decisions of the board and which made some inventive step compared with the prior art.

The appeal was dismissed by the Technical Board of Appeal which upheld the rejection. As it has been pointed out[520], the rejection of the appeal was not surprising because even considering the claims as a whole the technical contribution lacked as the invention was limited to the manipulation of linguistic expressions. The board, however, rejected the claims using a different approach. It analyzed the claims separately and stated that they were not patentable on the ground that they did not perform any inventive steps. In paragraph 11 of the reasons, the board explained step by step how the same results of the invention could be achieved by a person with a pencil and a paper. The decision limited the possibility of patenting computer

[518] The same opinion was presented in Marsnik and Thomas (2011), p. 283.

[519] Case T 0038/86, Text processing/IBM, O.J.E.P.O. (Technical Bd. Appeal 3.5.01, February 14th, 1989). See <http://www.epo.org/law-practice/case-law-appeals/recent/t860038ep1.html>.

[520] Alfred P. Meijboom, New Developments Regarding the Patentability of Software-Related Inventions in Europe, 72 J. Pat. & Trademark Off. Soc'y, pp. 583-585, 1990, p. 584.

programs compared with *Vicom* and *Koch & Sterzel*, because instead of considering the claims as a whole it preferred to inquire if the kernel of the invention was patentable. This approach was the one used in Germany, that the board had refused just two years before. The board therefore seemed to align itself to the position of the German Court. At paragraph 17, it tried to explain the reasons which distinguished the *IBM* case from the two precedents, by affirming that, contrary to the former, the latter made a contribution "in a field not excluded from patentability".

The decision of the Technical Board of Appeal in the *Text Processing IBM* case put some limitations to the scope of computer program patentability and was closer to the German practice. On the other hand, as claimed by Meijboom[521], it represented a step back compared to the practice in the U.S.A. and in Japan. Interestingly, in its reasoning the board used some arguments brought forward by the U.S. Supreme Court in its decision in *Flook*[522], while in its previous decisions it was following the reasoning made by the Supreme Court in the *Diehr* decision.

## 3.2. The Emergence of the Technical Character Approach

The approach of the EPO Technical Board of Appeal had an important development during the 1990s'. The "technical contribution" approach, the very first approach established by the board in its earlier decisions, proved to be inadequate in some cases and was subjected to some criticism[523]. Gradually the board started moving from it to the new technical character approach. The landmark decision which definitively established the new approach was decision T 1173/97, *Computer Program Product/IBM* [524]. The new approach appeared to be more in line with the positions of both the USPTO and the JPTO during those years[525].

[521] In both his two articles quoted (in the first at p. 417, and in the second at p. 585).

[522] In particular the use of the example of a man using pencil and paper could seem a clear reference to *Flook*. See Chapter II, at 2.2.3.

[523] Stefan Steinbrenner, The European Patent Convention (Supp. 3 Aug. 2009), in 1 Software Patents Worldwide (Gregory A. Stobbs ed., 2008), p. 37.

[524] Case T 1173/97, Computer Program Product/IBM, O.J.E.P.O. 609 (Technical Bd. Appeal 3.5.01, Jul. 1st, 1998). See <http://www.epo.org/law-practice/case-law-appeals/recent/t971173ep1.html>.

[525] Gillian Davies, Recent Developments in the European Patent Office and in the Case Law of the Boards of Appeal, 6 Int'l Intell. Prop. L. & Pol'y, chapter 10, pp. 1– 14, 2001, p. 5.

### 3.2.1. From the Technical Contribution to the first signs of the Technical Character

After the three important decisions examined above which instituted the "technical contribution" approach, the EPO Technical Board of Appeal decided many cases involving computer related inventions using such an approach[526]. Between 1988 and 1990, the board took other five decisions[527] related to patent applications filed by IBM. In all the appeals, the board rejected the claims because they were directed to non-technical elements which, if lacking of any patentable features, were not patentable. In 1990 other two rejections under the "technical contribution" approach were held by the board[528]. In all these decisions, the reasoning used by the Technical Board of Appeal was always in line with the "technical contribution" approach and confirmed its utilization. However, during the following years, in the 1990s', the Technical Board of Appeal took some decisions which testified that although the dominant approach for the inquire on the patentability of computer related inventions was still the technical contribution one, new argumentations were arising. New developments were visible in these decisions that evolved into the new technical character approach, which was then definitively established in 1998.

One of the first decisions testifying to this new direction was held by the Technical Board of Appeal in 1993, in the case T 833/91 *IBM*[529]*.* The application, which was rejected in first instance by the EPO Examining Division, was directed to an interactive system "for dynamically designing external interfaces for a simulated computer application program". The board upheld the rejection under the "technical contribution" approach, but indirectly made same reflections which seemed to move

[526] For an in depth analysis of all these cases see Robert J. Hart, Patentability of Software at the European Patent Office, 2 Int'l Intell. Prop. L. & Pol'y, chapter 49, pp. 1-16, 1998.

[527] Case T 0022/85, Document abstracting and retrieving/IBM, 0.J. EPO 12 (Tech. Bd. Appeal 3.5.01, October 5th, 1988); Case T 0121/85, IBM, unpublished (Tech. Bd. Appeal 3.5.01, March 14th, 1989); Case T 0052/85, IBM, unpublished (Tech. Bd. Appeal 3.5.01, March 16th, 1989); Case T 0065/86, IBM, unpublished (Tech. Bd. Appeal 3.5.01, June 22nd, 1989); Case T 0095/86, IBM, unpublished (Tech. Bd. Appeal 3.5.01, October 23rd, 1990).

[528] Case T 0158/88, Character form/Siemens O.J. EPO (Tech. Bd. Appeal 3.4.01, December 12th, 1989); Case T 603/89, Marker/Beattie, O.J. EPO (Tech. Bd. Appeal 3.4.01, July 3rd, 1990).

[529] Case T 0833/91, IBM, unpublished (Tech. Bd. Appeal 3.5.01, April 16th, 1993). Text available at <http://www.epo.org/law-practice/case-law-appeals/recent/t910833eu1.html>.

toward a new approach. Indeed, in paragraph 3.1 of the reasons, the board during an argumentation on the exclusions of art. 52 and the criteria for solving such an issue, interestingly pointed out that:

> "the consideration on the basis of these criteria is, first, that all the different matters or activities listed in Article 52(2) would seem to have in common that they imply something non-technical".

Such a consideration moved beyond the "technical contribution" approach, and seemed a sort of limited anticipation of the new technical character approach. However, in the continuation of the decision, the board decisively used the "technical contribution" approach for confirming the rejection.

A few months later, the Technical Board of Appeal upheld its consideration on the non-technical character of the exclusions established by art. 52 in the decision T 204/93 AMERICAN TELEPHONE AND TELEGRAPH COMPANY[530]. The claims were directed to a method which generated concrete computer programs from supplied generic specifications. The Examining Division rejected the application on the ground that the invention was comprised within the exclusion of art. 52 (2) and (3), and consequently could not be considered patentable subject matter. The Technical Board of Appeal confirmed the rejection and the arguments brought forward by the examiner. In paragraph 3.12 its confirmed its view on art. 52, by affirming that "the exclusions of Article 52(2)(3) are generally understood as having in common that the excluded matters lack technicality". Subsequently, referring directly to computer programs it stated:

> "That computer programs may be useful, or applicable to practical ends, is also not disputed. For instance, a computer may control, under control of a program, a technical process and, in accordance with the Board's case law, such a technical process may be patentable. However, computer programs as such, independent of such an application, are not patentable irrespective of their content, i.e. even if that content happened to be such as to make it useful, when run, for controlling a technical process".

[530] Case T 204/93, AMERICAN TELEPHONE AND TELEGRAPH COMPANY, unpublished (Tech. Bd. Appeal 3.5.01, October 29th, 1993). Text available at <http://www.epo.org/law-practice/case-law-appeals/recent/t930204eu1.html>.

Such decisions gave just a little glimpse of the new approach that the Technical Board of Appeal finally established 5 years later.

### 3.2.2. The Decision in Case T 1173/97 Computer program products/IBM and the Further Technical Effect

In 1998 the Technical Board of Appeal took a landmark decision, which opened new possibilities to the patentability of computer programs. The claims of the application were directed towards a method aimed at retrieving resource in a computer system, a computer program which was directly loadable to the internal memory of a computer (claim 20), and software stored on a computer readable medium carrier(claim 21). The EPO Examining Division stated that the method fulfilled the patentability requirements, but rejected claim 20 and 21 on the ground of the exclusion of art. 52 (2) and (3). This was because according to the examination guidelines in place at that time, "a computer program claimed by itself or as a record on a carrier, [was] not patentable irrespective of its contents"[531].

IBM decided to appeal the decision before the Technical Board of Appeal, which opted for overturning the rejection. The reasoning of the board was probably influenced by the principles established a few years before by the TRIPs Agreement, in particular by the "all field of technology" provision of article 27. The board started its decision by commenting on the suggestion of the appellant on the applicability of the TRIPs Agreement. The board admitted that even if the EPO was not bound by the TRIPs, it was appropriate to take it into consideration, because it represented evidence of the current trends. In regards to the principle provided by article 27 of the TRIPs, the board affirmed:

> This general principle […] can be correctly interpreted, in the Board's opinion, as meaning that it is the clear intention of TRIPS not to exclude from patentability any inventions, whatever field of technology they belong to, and therefore, in particular, not to exclude programs for computers as mentioned in and excluded under Article 52(2)(c) EPC"[532].

[531] T 1173/97 Computer program products/IBM, summary of facts at paragraph IV.
[532] T 1173/97 Computer program products/IBM, reasons at paragraph 2.3.

The board also referred to the evolution of software claims examination by the USPTO and the JPO, commenting that they were a useful indicator of modern trends as well. However, it was stressed that the Japanese and the U.S. patent systems were very different from the one under the EPC, because they did not have any exclusion such as the one provided by art. 52 (2) and (3). Turning to the analysis of substantive law, the board followed a logic reasoning by giving its interpretation to the important concepts related to the patentability issue. First, it defined and delimited the exclusions provided by art. 52. Under the view of the board the prohibition of software patentability could not be considered absolute, but rather regarding very specific objects, because:

> The combination of the two provisions (Article 52(2) and (3) EPC) demonstrates that the legislators did not want to exclude from patentability all programs for computers"[533].

Consequently, the board focuses on the meaning of the expression "as such", finding that in order to determine its extension the concept of technical character was crucial[534]. The board argued that the exclusion of computer programs as such could be constructed to mean that they were deemed to be abstract inventions, lacking technical character. The same argument led to the conclusion that when software had technical character it was patentable[535]. The board affirmed that in order to have technical character it was not sufficient for a computer program to cause common physical modifications (as electrical current). On the other hand, the presence of the technical character could be found:

> "in the further effects deriving from the execution (by the hardware) of the instructions given by the computer program. Where said further effects have a technical character or where they cause the software to solve a technical problem, an invention which brings about such an effect may be considered an invention, which can, in principle, be the subject-matter of a patent"[536].

[533] T 1173/97 Computer program products/IBM, reasons at paragraph 4.1.

[534] The importance given by to the technical character was criticized for being contrary to the evidence of the *travaux préparatoires* of the EPC by Justine Pila, Article 52(2) of the Convention on the Grant of European Patents: What did the Framers Intend? A Study of the travaux preparatoires, 36 International Review of Intellectual Property and Competition Law, pp. 755-787, 2005.

[535] Sterckx and Cockbain (2010) at 383 did not agree on this interpretation of the board on the reasons supporting the exclusion of computer programs.

[536] T 1173/97 Computer program products/IBM, reasons at paragraph 6.4.

Therefore, the board stated that any time software was necessary in order to obtain such a technical effect they had to be considered patentable. However, no clarifications or examples of a case in which a software was necessary to obtain technical effects was given. The conclusion of the board on the point was that:

> "on condition that they are able to produce a technical effect in the above sense, all computer programs must be considered as inventions within the meaning of Article 52(1) EPC, and may be the subject-matter of a patent if the other requirements provided for by the EPC are satisfied"[537].

The board affirmed that such a reasoning was totally consistent with its previous decisions on the matter. In particular, it quoted some arguments brought forward in *Vicom.* They were used as support for stating that it would have been illogical to issue a patent for claims directed towards a method and the apparatus accomplishing it, but not for the software which included all the elements making possible the implementation of the method and enabling the machinery to perform such a method. At the very end of the decision (paragraph 13), the board made a step further by concluding that "it does not make any difference whether a computer program is claimed by itself or as a record on a carrier".

The Technical Board of Appeal's decision in *Computer program product/IBM* represented a turning point in the board's approach on the computer programs patentability issue. With the utilization of the new technical character requirement, characterized by the further technical effect, the board narrowed the scope of the exclusion of art. 52 (2) of the EPC. The board, however, was not able to clarify the exact extent of the prohibition on computer programs "as such". Its reasoning appeared circular in asserting that computer programs as such were not patentable because they lacked technical character, and computer programs with technical character were patentable because they were not software as such[538]. Although the board affirmed the contrary, it is quite evident that the U.S. Board of Appeal for the Federal Circuit's practice[539] had some kind of influence on the board's reasoning.

[537] T 1173/97 Computer program products/IBM, reasons at paragraph 6.5.
[538] Marsnik and Thomas (2011), p. 286.
[539] During those years in the U.S.A. the Federal Circuit opened new possibilities for software patentability. See Chapter II, at. 3.2.

### 3.2.3. Cases beyond Computer program products/IBM and new Developments

A couple of years after the decision made on the *Computer program products/IBM* case, the Technical Board of Appeal decided on the *Controlling Pension Benefit Systems Partnership/PBS Partnership* case[540]. In this decision the board made further developments to the technical character approach. The claims were directed towards a system which utilized data processing to manage pension benefit programs and an apparatus which was programmed in order to run the system. The EPO Examining Division in 1995 rejected the application on the ground that it was related to a business method without any technical character and therefore excluded by patentable subject matter by art. 52 of the EPC. Subsequently the applicant decided to appeal the rejection.

The Technical Board of Appeal upheld the rejection and dismissed the appeal. The decision on the method claim was totally in line with the approach held in the previous cases. The claim was rejected because it covered a method of doing business excluded by art. 52 from the patentable subject matter. The board affirmed that such a system performing all of its functions did not have a technical character but rather an "administrative, actuarial and/or financial character"[541]. The argument of the appellant which asserted that the referral to computing means and data processing in the claim gave technical character to the method was not accepted. The board concluded the reasoning on the method claim by stating that:

> "a feature of a method which concerns the use of technical means for a purely non-technical purpose and/or for processing purely non-technical information does not necessarily confer a technical character to such a method"[542].

On the other hand, the reasoning of the board in regard to the apparatus claim represented a new development of the board's approach. In particular, the board argued that an apparatus programmed to work in a particular field was patentable

[540] Case T 0931/95, Controlling Pension Benefit Systems Partnership/PBS PARTNERSHIP, OJ.E.P.O. 441 (Technical Bd. Appeal 3.5.01, Sept. 8, 2000). See <http://www.epo.org/law-practice/case-law-appeals/recent/t950931ep1.html>.

[541] T 0931/95, PBS PARTNERSHIP, reasons at paragraph 3.

[542] T 0931/95, PBS PARTNERSHIP, reasons at paragraph 3.

even if the field was business. The reason for its patentability was that the apparatus conferred the technical character on the claims. In other words, the implication of any physical entity to an invention was sufficient to give it the technical character and thus able to bar the applicability of the exclusions of art. 52 (2) and (3). This approach seemed very formalistic, because it only literally interpreted article 52, as excluding "methods" but not "apparatus"[543]. Nevertheless, the claim was considered non-patentable as well, because it failed to meet the requirement of the inventive step. The improvements brought forward by the invention was considered obvious. The arguments of the board including the apparatus to the patentable subject matter, however, were very interesting. This new approach exalted the concept of physicality. For this reason it was subsequently named by same authors as the physicality requirement[544], but the most used expression was coined by Lord Justice Jacob in the *Aerotel* case, when he referred to it as the "any hardware" approach[545]. The "any hardware" approach was further developed in other cases decided by the board during the following years.

As seen above, these new decisions of the Technical Board of Appeal brought important developments into the approach of the board in examining software related claims. In particular the decision on the *Computer program products/IBM* case was considered so important that the EPO decided to amend its Examination Guidelines in order to accord them to the new practice of the Board of Appeal[546]. The amendments were carried out in respect of the provisions on the examination of computer related inventions and business methods. The approach of the board in *Computer program products/IBM* was translated into the guidelines. These guidelines established that a software either claimed recorded on a medium or by itself could be considered patentable if it produced further technical effects beyond normal physical interactions[547].

[543] Marsnik and Thomas (2011), p. 288.
[544] Afghani and Yee (2008).
[545] Aerotel Ltd. . Telco Holdings Ltd., [2006] EWCA (Civ) 1371.
[546] The amendments dated 31.08.2001.
[547] Jinseok Park, Has Patentable Subject Matter Been Expanded? A Comparative Study on Software Patent Practices in the European Patent Office, the United States Patent and Trademark Office and the Japanese Patent Office, 13 Int'l J.L. & Info. Tech., pp. 336-377, 2005, p. 347.

## 3.3. Recent Cases and the Referral to the Enlarged Board of Appeal

During the decade of the 2000s', the EPO Technical Board of Appeal continued to refine its approach in different cases. However, it seemed to still be problematic to draw a clear line between computer programs that were patentable and not. The development of the "any hardware" approach created a dramatic conflict with the English courts and the UK Patent Office. The English Court of Appeal itself stressed this interpretative contrast, criticizing the approach held by the Technical Board of Appeal in deciding software related claims. In order to solve this contrast and to provide new solutions but above all harmonization for the computer programs patentability issue, the EPO President of that time, Alison Brimelow (which ended her mandate on the 30th of June 2010), referred to the Enlarged Board of Appeal four questions. The Enlarged Board of Appeal ruled on the referral in May 2010, but its decision was quite disappointing for those who hoped for a turning point in the approach of the EPO towards computer related inventions. In conclusion the "any hardware" approach was indirectly endorsed by the Enlarged Board of Appeal and implemented by the EPO Examination Guidelines.

### 3.3.1. The Decision in *Hitachi* and the "any hardware" approach

The Technical Board of Appeal confirmed the "any hardware" approach in 2004, when it decided on the case *Auction method/HITACHI*[548]. The board had to consider if an automated auction method, which was executable on a computer, was patentable or not. The claims indeed were directed towards a method for the automated auction system (claim 1), an apparatus that had the function of performing the automated auction via a network (claim 3), and a computer program which was necessary to carry out the method (claim 4)[549].

[548] Case T 0258/03, Auction Method/HITACHI, [2004] OJ.E.P.O. 575 (Technical Bd. Appeal 3.5.01, Apr. 21, 2004). See <http://www.epo.org/law-practice/case-law-appeals/recent/t030258ep1.html>.
[549] T 0258/03, Auction Method/HITACHI, Summary of Facts at paragraph V.

The application was first rejected by the EPO Examining Division because it considered an auction method as a business method "as such" excluded from the patentable subject matter by art. 52 (2) and (3). The applicant decided to appeal, but the Technical Board of Appeal confirmed the rejection and dismissed the appeal. The reasoning of the board, however, was particularly interesting and brought forward new developments to the approach implemented by the EPO. The rejection, indeed, did not pertain the patentable subject matter (on this point the board overturned the arguments of the Examining Division), but instead was held on the ground that the invention did not fulfill the inventive step requirement.

The reasoning of the board started with a definitive rejection of the "technical contribution" approach for the inquiry on the patentable subject matter. The board, agreeing with its previous decision on the *PBS* case, affirmed that the "technical contribution" approach was not useful for the analysis on the patentable subject matter but rather on the novelty and the inventive step conditions. Consequently, the board pointed out that:

> "taking into account both that a mix of technical and non-technical features may be regarded as an invention within the meaning of Article 52(1) EPC and that prior art should not be considered when deciding whether claimed subject-matter is such an invention"[550].

The board also addressed the patentable subject matter issue, by inquiring whether the claims covered an invention under the meaning of art. 52 of the EPC. In regard to the apparatus claim, the board stated that it had technical character, being formed by a client and a service computer, and a network. In determining that the apparatus claims fell within the patentable subject matter, the board followed its reasoning in the *PBS* case. By quoting its own words, the board concluded that "an apparatus constituting a physical entity or concrete product, suitable for performing or supporting an economic activity is an invention within the meaning of Article 52(1) EPC."[551]. This reasoning set forth in both *PBS* and *Hitachi* was considerably different from the previous "technical contribution" approach: with this new course the technical character was considered achieved with a mere implementation on a

[550] T 0258/03, Auction Method/HITACHI, Reasons at paragraph 3.5.
[551] T 0258/03, Auction Method/HITACHI, Reasons at paragraph 3.8.

physical entity. The "technical contribution" approach, on the contrary, required some improvements in terms of a better or faster performance of the computer.

Regarding the method claim, the board said that it was in disagreement with its reasoning in the *PBS* case. In particular, in paragraph 4.2 and 4.3 the board rejected its previous reasoning in which it was stated that the utilization of a technical mean for performing mere non-technical functions did not necessarily confer technical character to a method. The board stated that such an argument could not be accepted because it implied the involvement of considerations on the novelty and the inventive step, which were not allowed for the analysis of the requirement under art. 52. In this respect, the method claim had to be treated with the same manner as the apparatus claim. Therefore, the presence of physical feature was enough to confer the claim a technical character. The board was aware that this reasoning would have enlarged the concept of inventions also including "activities which are so familiar that their technical character tends to be overlooked, such as the act of writing using pen and paper"[552]. This statement clearly showed the big difference between the new and the old approach the board had, in particular with the one held in *Text processing IBM* in 1989, in which the example of the paper and the pencil itself was used to intend a non-patentability activity[553].

The board subsequently affirmed that in any case a claim also had to meet the inventive step requirement. It stated that in order to fulfill the requirement under art. 56, the invention had to give a technical solution to a technical problem not obvious for a man skilled in the relative field of technology. The invention failed on this point. Indeed the board asserted that it could "be regarded as a mere automation of the non-technical activity of performing a Dutch auction in the absence of bidders"[554]. The board also admitted that some specific steps of the method might constitute a technical solution, but it added that they would have been obvious for a person skilled in the art. In conclusion, the appeal was dismissed and the application rejected on the ground that it failed to meet the inventive step condition.

[552] T 0258/03, Auction Method/HITACHI, Reasons at paragraph 4.6.
[553] See Chapter III, at 3.1.3.
[554] T 0258/03, Auction Method/HITACHI, Reasons at paragraph 5.7.

The impact of *Hitachi* on the patentable subject matter of software inventions was considerable. The "any hardware" approach found its maximum expression in this decision, making it very easy to draft a claim in accordance to the new interpretation of the patentable subject matter. For this reason it was argued that probably the new ground for rejecting computer implemented inventions would have been the novelty or inventive step requirement rather than the patentable subject matter[555].

### 3.3.2. Further Refinements of the EPO Approach

During the period between *HITACHI* (2004) and the referral to the Enlarged Board of Appeal (2008), the Technical Board of Appeal took some decisions in which it further refined its approach and that are worth to be analyzed.

In February 2006 the board ruled on *Clipboard format I/MICROSOFT*[556]*.* The case involved a method and a computer program which performed data transfer operations in multiple clipboard formats. The board first dealt with the subject matter issue. Following the "any hardware" approach set in its previous decisions, the board established that both the method and the computer program were patentable. In regards to the method claim the board individuated in the clipboard the physical feature which conferred the method a technical character. The board wanted to stress the distinction between a computer implemented method and a computer program as such which is excluded by art. 52 (2) and (3). In this respect the board affirmed that:

> "a method implemented in a computer system represents a sequence of steps actually performed and achieving an effect, and not a sequence of computer-executable instructions (i.e. a computer program) which just have the potential of achieving such an effect when loaded into, and run on, a computer. Thus, the Board holds that the claim category of a computer-implemented method is distinguished from that of a computer program. [...] Hence, present claim 1 cannot relate to a computer program as such"[557].

[555] Laub (2006), p. 350.
[556] Case T 0424/03, Clipboard Formats I/MICROSOFT, Unpublished (Technical Bd. Appeal 3.5.01, Feb. 23, 2006). See <http://www.epo.org/law-practice/case-law-appeals/recent/t030424eu1.html>.
[557] T 0424/03, Clipboard Formats I/MICROSOFT, Reasons at paragraph 5.1.

The computer program claim was considered patentable as well. In this case the board found that the computer readable medium in which the software was carried constituted the physical feature, testifying the technical character of the claim. As additional evidence of the technical character of the claim, the board affirmed that the computer program produced further technical effect. The board quoted its previous decision in the *Computer program products/IBM* case, but the main argument still pertained to its approach established in the *HITACHI* case.

The reasoning on the patentable subject matter therefore was completely in line with the previous cases and in particular with the "any hardware" approach. At the same time, in regards to the inventive step analysis, the board seemed to take another direction. The method claim was considered a technical non-obvious solution to a technical problem, and therefore fulfilled the inventive step condition. The divergence between the decision in *HITACHI* and in *PBS* in due to the different approach towards the computer program claim. In fact the board to this respect only affirmed that "the computer-readable medium according to claim 5 is regarded as non-obvious by virtue of its reference to one of the method claims"[558], without any further explanation. Clearly, in the analysis of the inventive step, the board showed a much more favorable approach towards computer programs than the one used towards business methods in the previous decisions[559]. In conclusion, the board, according to its reasoning, overturned the rejection of the EPC Examining Division and granted the patent to Microsoft.

Few months later the Technical Board of Appeal faced another case: *Estimating sales activity/DUNS LICENSING ASSOCIATES*[560]*.* The invention constituted "a system and a method suitable for estimating sales or product distribution at a non-reporting sales outlet, based on sample sales data from reporting outlets"[561]. The EPO Examining Division rejected the application on the ground that the claims were directed to a

[558] T 0424/03, Clipboard Formats I/MICROSOFT, Reasons at paragraph 7.7.

[559] Rosa Maria Ballardini, Software Patents in Europe: The Technical Requirement Dilemma, 3 J. Intell. Prop. L. & Prac., pp. 565-573, 2008, p. 567.

[560] Case T 0154/04, Estimating sales activity/DUNS LICENSING ASSOCIATES, O.J.EPO 46 (Technical Bd. Appeal 3.5.01, Nov. 15, 2006). Text available at <http://www.epo.org/law-practice/case-law-appeals/recent/t040154ex1.html>.

[561] T 0154/04, Estimating sales activity/DUNS LICENSING ASSOCIATES, Summary of Facts at paragraph VII.

business method which was excluded from the patentable subject matter by art. 52. The board reconstructed the approach taken by the EPO in determining whether a claim falls within the category of patentable subject matter. The technical character was indirectly found in the provision of art. 52. Even if the board admitted that there was some controversy on the exact meaning of invention under art. 52 (1), it considered that art. 52 (3) was introduced in order to constitute a bar against any attempt to give a broad interpretation to the exclusions established by art. 52 (2). In addition, it argued that the amendment occurred in 2000 (the addition of the expression "in any field of technology" in art. 52) further confirmed the board's technical character approach. The board subsequently addressed the relationship between the patentable subject matter condition and the other three requirements. It confirmed its previous decisions, by affirming that the patentable subject matter was an independent requirement that had to be inquired independently from the other:

> "The examination whether there is an invention within the meaning of Article 52(1) to (3) EPC should hence be strictly separated from and not mixed up with the other three patentability requirements referred to in Article 52(1) EPC"[562].

In regards to the novelty and the inventive step conditions, the board at paragraph 14 stated that the contrary was not true. Such an analysis strictly depended on a previous determination of the patentable subject matter because only technical innovations were considered relevant for the fulfillment of inventive step and novelty. Consequently if a claim lacked of technical character it was not possible to meet the inventive step and the novelty conditions. Turning to the claims of the application, the board stated that the claims failed to reach the inventive step requirement, because it did not solve any technical problem. In particular it affirmed:

> "creating information about sales activities […] using mathematical […] is a business research activity, which like other research methods does not serve to solve a technical problem relevant to any technical field. […] Interacting with and exploiting information about the physical world belongs to the very nature of any business-related activity. Accepting such features as sufficient for establishing

[562] T 0154/04, Estimating sales activity/DUNS LICENSING ASSOCIATES, Reasons at paragraph 10.

> patentability would render the exclusion of business methods under Article 52(2)(c) EPC meaningless"[563].

In conclusion the board stated that even if the claims under its prevalent approach had technical character and could therefore be considered an invention under the meaning of art. 52 (1), they failed to reach the inventive step requirement. Consequently the decision of the EPO Examining Division was upheld, and the application was rejected. This decision confirmed the approach of the board in respect of the patentability subject matter examination. In addition, it testified that the board was more strict in requiring the inventive step when the claim was directed towards a business method rather than when it related to a software claim.

### 3.3.3. The Referral to the Enlarged Board of Appeal

The "any hardware" approach held by the Technical Board of Appeal raised some criticisms for its restrictive interpretation of the exclusions under art. 52. Following such an approach, in order to obtain patent protection for a computer program, it is sufficient to add a physical feature into the claim. In the seminal case *Aerotel* decided by the England and Wales Court of Appeal in 2006, Lord Justice Jacob rejected such an approach and claimed that it was necessary to give some degree of clarification on the matter. In this respect, he suggested a referral to the EPO Enlarged Board of Appeal, in particular for an explanation on the business methods exclusion. The EPO did not agree with Lord Justice Jacob's observations. The President of the EPO in place at that time, Alain Pompidou, indeed dismissed the request of Lord Justice Jacob with a letter dated 22 February, 2007. Pompidou affirmed that the referral was not necessary because the EPO Board of Appeal had a constant and consistent approach. The EPO Technical Board of Appeal rejected the observations made in the *Aerotel* case as well. In its decision in the *Duns Licensing* case the board addressed the issue at paragraph 12, 13 and 15. It did not agree with Lord Justice Jacob's arguments and it claimed the consistency and validity of its reasoning. In regards to a possible referral, the Board of Appeal expressed its disagreement by affirming that:

[563] T 0154/04, Estimating sales activity/DUNS LICENSING ASSOCIATES, Reasons at paragraph 19 and 20.

> "A decision deviating from an opinion given in another decision of a board of appeal, a diverging opinion expressed in decisions of different boards, or a deviation from some national jurisprudence -- for example, from the UK case law of the Court of Appeal to which the appellant referred in support of its case -- are not per se valid reasons for referral" […] "the legal system of the European Patent Convention gives room for evolution of the jurisprudence (which is thus not "case law" in the strict Anglo-Saxon meaning of the term) and leaves it to the discretion of the boards whether to give reasons in any decision deviating from other decisions or to refer a point of law to the Enlarged Board"[564].

The position of the EPO totally changed with the beginning of the office of Alison Brimelow as President of the EPO in July 2007. The new President was more susceptible to the questions brought forward by Lord Justice Jacob in *Aerotel*. Finally she decided to carry out the referral and on the 22nd of October 2008 she referred four questions to the Enlarged Board of Appeal under art. 112 (1) (b) of the EPC[565]. The referral was seen as a possibility for a decisive solution of the issue and the set of a clear guidance on computer programs exclusion[566]. The high interest raised by the referral was testified by the more than 90 *amicus brief*. The attention on the matter came from different entities: the *amicus brief* were by filed academic, private citizens, governments, and multinational corporations[567].

Brimelow believed that the questions of the Referral had a fundamental importance, because "they related to the definition of the limits of patentability in the field of computing". Below a brief analysis of each question is carried out.

> *"Question 1:*
> *Can a computer program only be excluded as a computer program as such if it is explicitly claimed as a computer program?"*

[564] T 0154/04, Estimating sales activity/DUNS LICENSING ASSOCIATES, Reasons at paragraph 2.
[565] Alison Brimelow, Referral under art. 112(1)(b) of the EPC (October 22nd, 2008) Text available at <http://documents.epo.org/projects/babylon/eponet.nsf/0/B89D95BB305AAA8DC12574EC002C7CF6/$File/G3-08_en.pdf>.
[566] James Nurton and Stephen Mulrenan, Software patents under scrutiny in Europe, Managing Intellectual Properti, Issue 184, pp. 10-12, Nov. 2008.
[567] Fabian Edlund, Software Related Inventions at the Enlarged Board of Appeals, 92 J. Pat. & Trademark Off. Soc'y, pp. 131-134, 2010, p. 131.

The first question related to an apparent divergence between the reasoning of the board in the *Computer program product/IBM* case and in the *MICROSOFT* case. While in the former case the board stated that it was not relevant whether the claim was directed to a computer program or to a computer implemented invention, in the latter it affirmed the contrary.

> *"Question 2:*
> *a) Can a claim in the area of computer programs avoid exclusion under art. 52(2)(c) and (3) merely by explicitly mentioning the use of a computer or a computer-readable data storage medium?*
> *b) If question 2 (a) is answered in the negative, is a further technical effect necessary to avoid exclusion, said effect going beyond those effects inherent in the use of a computer or data storage medium to respectively execute or store a computer program?"*

The second question is referred to the difference between the further technical effect approach endorsed by the board in *Computer program product/IBM* and the "any hardware" approach that was first established in *HITACHI*. Under the second approach the inclusion of any physical feature conferred technical character to the whole claim and was therefore sufficient to meet the patentable subject matter condition. This question was probably the most important one, as it directly dealt with the issues raised by Lord Justice Jacob[568].

> *"Question 3:*
> *a) Must a claimed feature cause a technical effect on a physical entity in the real world in order to contribute to the technical character of the claim?*
> *b) If question 3 (a) is answered in the positive, is it sufficient that the physical entity be an unspecified computer?*
> *c) If question 3 (a) is answered in the negative, can features contribute to the technical character of the claim if the only effects to which they contribute are independent of any particular hardware that may be used?"*

[568] Ewan Nettleton, Software patentability ruling from the European Patent Office's Enlarged Board, 17 Database Marketing & Customer Strategy Management, pp. 267-270, 2010, p. 168.

The third question referred to a contradiction in the reasoning of the court on the technical effect necessary to meet the patentable subject matter condition. In some old decisions the board required that the technical effect involved a physical entity in the real world. On the other hand, in a more recent set of decision (including the one on the *MICROSOFT* case) the board affirmed that the technical effect could be merely delimited to the computer software.

> *"Question 4:*
> *a) Does the activity of programming a computer necessarily involve technical considerations?*
> *b) If question 4 (a) is answered in the positive, do all features resulting from programming thus contribute to the technical character of a claim?*
> *c) If question 4 (a) is answered in the negative, can features resulting from programming contribute to the technical character of a claim only when they contribute to a further technical effect when the program is executed?"*

Even the fourth and last question pertained to an issue on which the Technical Board of Appeal had two different approaches. In some decision, among which the *T 833/91 IBM* case and the *AMERICAN TELEPHONE AND TELEGRAPH COMPANY* case, the board argued that writing computer program was subject to the exclusion of art. 52 (2)(c). The contrary solution was approved by the board in other and more recent decisions.

## 3.3.4. The Decision of the Enlarged Board of Appeal and its Implications

The Enlarged Board of Appeal took its decision on the referral on the 12th of May, 2010[569]. Rather than a decision it was a non-decision because the referral was dismissed on the ground that there was not a legal basis under art. 112 of the EPC for it. Art. 112 required two conditions in order to make a referral to the Enlarged Board of Appeal[570]. The Enlarged Board affirmed that first requirement was met by the referral because computer programs patentability was an issue of "fundamental

[569] Case G 3/08, Programs for Computers, O.J.E.P.O. 10 (Enlarged Bd. Appeal, May 12, 2010). See <http://documents.epo.org/projects/babylon/eponet.nsf/0/DC6171F182D8B65AC125772100426656/$File/G3_08_opinion_en.pdf>.
[570] See Chapter III, at 1.2.1.

importance" for the patent system. In paragraph 4 the Enlarged Board made a brief digression on the failed attempt of the European Union to harmonize the matter and at the end pointed out that many cases decided in different patent systems (in Germany, in the UK, and in the U.S.A.) were leading to convergent solutions for the issue. However, the substance of the worldwide debate on the topic was not dealt in depth as it was considered not relevant for the resolution of the referral.

On the other hand, it was argued that the referral did not meet the second condition, pertaining to the contradictory decisions taken by the Board of Appeal. The words used by the board towards the President of the EPO appeared quite severe:

> "Given its object and purpose, the right of referral does not extend to allowing the President, for whatever reason, to use an Enlarged Board referral as a means of replacing Board of Appeal rulings on CII patentability with the decision of a putatively higher instance. For example, a presidential referral is not admissible merely because the European Parliament and Council have failed to adopt a directive on CII patenting or because consistent Board rulings are called into question by a vocal lobby"[571].

The Enlarged Board did not give its opinion on the issue of computer programs patentability, but only argued that the decisions taken by the Board of Appeal applied a consistent approach. The Enlarged Board affirmed that different decisions meant a dissonance that would have made impossible for the Examining Divisions to decide in accordance with the practice of the Board of Appeal. In particular, it was affirmed that it was necessary to take in consideration:

> "whether the divergent decisions might not be part of a constant development, possibility still ongoing, in jurisprudence on recent patent law issues, in the course of which older decisions have lost their significance and so can no longer be considered in connection with newer decisions. Such putative differences do not justify presidential referrals, legal development being one of the principal duties of the Boards of Appeal, in particular in new territory"[572].

The Enlarged Board examined the relevant case law of the Board of Appeal in regards to the four questions raised by the EPO President. The only point of

[571] G 3/08, Programs for Computers, Reasons at paragraph 7.2.7.
[572] G 3/08, Programs for Computers, Reasons at paragraph 7.3.8.

inconsistency was found in relation to "question 1" between the decisions in *Computer program product/IBM* and *MICROSOFT*. The Enlarged Board reconstructed the evolution of the approach applied by the Board of Appeal in the examination of computer programs claims.

It started analyzing the *Computer program product/IBM* case. Following the reasoning of the Enlarged Board, in this decision the previous technical contribution approach was abandoned, and was replaced with the further technical effect approach under which a computer program is patentable if it produces further technical effects. The concept of further technical effect as defined by the board did not include any point of novelty, and consequently it did not have to be analyzed in relation to the prior art. The Enlarged Board noted that this shift had never been subject to criticisms by the Board of Appeal.

The analysis then turned to the later decisions taken by the Board of Appeal. It was pointed out that in both the *HITACHI* and the *PBS* decisions the board did not deal with computer readable medium claims, and did not make any considerations on the topic as well,. On the other hand, the Enlarged Board affirmed that the decision in the *MICROSOFT* case developed the "any hardware" approach endorsed in *HITACHI* by stating that the computer readable medium included in the claims conferred them the technical character. Even if the Enlarged Board admitted that the reasoning in *MICROSOFT* was not consistent with the decision in *Computer program product/IBM,* it affirmed that it represented a normal development of the case law in a seven year period. In addition, it was noted that neither the apparent inconsistency between the two decisions, nor the new argument brought forward in *MICROSOFT* were ever contrasted by the Board of Appeal in one of its subsequent decisions. Once argued that the inconsistencies present in Court of Appeal decisions were a mere and normal development of the EPO case law, the Enlarged Board concluded that the second requirement for a referral under art. 112 (1) (b) was not met and the referral was declared inadmissible.

The opinion (or non-opinion) expressed by the Enlarged Board of Appeal was highly disappointing for those who hoped in a definitive clarification on the matter. The Enlarged Board did not deal with any of the controversial issues regarding computer

programs patentability except for those necessary to prove the consistency of the approach of the Board of Appeal, which was indirectly endorsed. The words used to explain the meaning of "technicality" are quite meaningful:

> "we do not attempt to define the term technical. Apart from using this term in citing the case law […]"[573].

The Enlarged Board's opinion was criticized for the lack of any explanation of the matter in its opinion. Its dismissal was indeed symptomatic of a rigid interpretation of the conditions established by art. 112 for the referral. However, it must be noted that such a position wanted to stress the role of the Board of Appeal which has "interpretative supremacy" within the EPO. The silence of the Enlarged Board made the reasoning of the Board of Appeal lauder. With such an interpretation, the absence of any opinion of the Enlarged Board on the aspects related to the questions referred could be read as a reflected and aware decision. In addition, the "any hardware" approach, as resulted from the analysis of the most important cases decided by the board in the last decade, has been applied with consistency, with the only exception of the different treatment between business methods and software programs in relation to the inventive step examination (which was not addressed by the questions referred to the Enlarged Board). The Referral, rather than seeking clarifications, probably aimed at modifying the approach of the board.

As a consequence of the opinion given by the Enlarged Board, the "any hardware" approach results strengthened. It appears probable that the Technical Board of Appeal will continue to grant patents for any computer program claim including a physical feature following its prevalent approach.

A further confirmation of the official position of the EPO in regards to computer programs patentability is offered by the new EPO Examination Guidelines issued in June 2012. They totally endorse the Board of Appeal practice, and in particular the "any hardware" approach. The computer programs patentability issue is addressed by the guidelines in Part G, Chapter II, at paragraph 3.6. They established that a computer program is considered an invention under the meaning of art. 52 (1) if it has technical character. The analysis of the patentable subject matter has to be

[573] G 3/08, Programs for Computers, Reasons at paragraph 9.2.

assessed without regards to the prior state of the art, and the claims have to be considered "as a whole". Also the further technical effect approach is included in the guidelines, which state that meeting such a test excludes the applicability of the exclusion from patentability under art. 52 (2). The most significant provision on the topic is perhaps one of the last provided by the guidelines. It affirmed that:

> "Any claimed subject-matter defining or using technical means is an invention within the meaning of Art. 52(1) (see T 424/03 and T 258/03, and confirmed in G 3/08). Therefore the mere inclusion of a computer, a computer network, a readable medium carrying a program, etc. in a claim lends technical character to the claimed subject-matter"[574].

This provision directly answers Question 2 (a) of the Referral. If the EPO Examining Division will strictly apply this rule, the exclusion of art. 52 (2) will be easily circumvented and the ground on which to reject a software claim will be the inventive step requirement rather than patentable subject matter.

[574] EPO Examination Guidelines (June 2012), Part G, Chapter II-3.

# CONCLUSIONS

The analysis brought forward by this thesis concerned the issue of computer programs patentability within the North American and the European patent systems. The matter has been examined starting with an introduction on the background and on the main concepts involved in the topic, and has subsequently developed into the analysis of the legal regime applicable in the U.S.A. and in Europe.

In regards to the U.S.A., the inquiry has focused on the prevalent case law, which has progressively established the rules that must be applied in the examination of software patentability. The evolution of the approach of the U.S. Supreme Court and the Court of Customs and Patent Appeal before, and the Court of Appeal for the Federal Circuit after, has been described and analyzed in depth. From the exclusion of algorithms from the patentable subject matter established in *Benson* (1972) by the Supreme Court, the position of North American courts has gradually shifted towards a more open position. During this first period, the C.C.P.A. struggled to broaden the scope of computer programs patentability. The strict interpretation that it gave to the decisions of the Supreme Court against software patentability was able to leave some space for computer programs patent protection until the Supreme Court itself recognized in *Diehr* (1981) that the mere involvement of a software into an invention did not make it unpatentable. The solution to the issue of computer programs patentability progressively moved towards an increasing acceptance of its granting. The maximum embracement of computer programs eligibility for patent protection occurred during the 1990s' with the decisions took by the Federal Circuit in *Alappat* (1994) and in *State Street* (1998). In the former case, the Federal Circuit established the "new machine" doctrine, that allowed any claim directed to a software implemented in a machinery. In the latter, the decision eliminated even the necessity of a physical feature, with the endorsement of the "useful, concrete and tangible result" test by the court. The test set forth in *State Street* was unanimously accepted and applied by the USPTO for almost one decade. Subsequently, this

approach was overturned by the *Bilki* case, that was first decided in 2008 by the Federal Circuit and then in 2010 by the Supreme Court. The Federal Circuit rejected its previous "useful, concrete and tangible result" test and established the more rigid "machine or transformation" test. The Supreme Court, revising the case, stated that the new "machine or transformation" test was an important clue but not the only test for the examination of software patentability. Rather than endorsing any specific test, the Supreme Court prescribed the USPTO and the Federal Circuit to avoid any rigid categorization of the applicable tests and to use flexibility in the future examinations and decisions.

The study of the European legal regime has been conducted using a different approach. The analysis has expanded into two directions: from one side the legislative provisions and proposals within the European Union and the European Patent Convention, from the other the practice of the European Patent Office in relation to computer program claims. Software patents were originally not allowed in European countries, and the expressed prohibition of the patentability of computer programs "as such" established by art. 52 (2) and (3) of the EPC was a clear evidence of that attitude. Combining the examinations on legislations and EPO practice, however, it resulted that even if the European Union was not able to enact a legislation on software patentability and the EPC Member States provided their national legislations with the exclusion from the patentable subject matter of computer programs "as such", the practice before the EPO has provided patent protection for software since the 1980s'. The Board of Appeal started allowing software claims from its first decision on the matter, the *Vicom* case in 1986. In such a decision, the board brought forward the "technical contribution" approach for the analysis of computer programs patentability. This approach was then replaced in 1998 by the *Computer program product/IBM* decision, in which a new test based on the examination of the technical further effect ("further technical effect" approach) performed by the computer program was applied by the board. Subsequently, with a series of decision taken during the 2000s', among which the *HITACHI* case (2004), the *MICROSOFT* case (2004), and the *DUNS LICENSING* cases (2006), the Board of Appeal has applied a new approach which stressed the concept of physicality. The new approach, called "any hardware" approach, provided that any physical feature

involved in a claim was able to confer technical character to a computer program, making it patentable subject matter. This approach was subject to some criticisms, in particular by the British Courts, because it considerably narrowed the scope of the prohibition of art. 52 (2). In order to have clarifications on the matter, in 2008 the EPO President made a referral to the Enlarged Board of Appeal, asking 4 specific questions. The referral, however, was dismissed as inadmissible by the Enlarged Board, which indirectly endorsed the "any hardware" approach of the Board of Appeal. In conclusion, today such an approach is also implemented by the EPO Examination Guidelines of 2012 and represents a solid practice of the EPO.

The outcomes of this research have been quite surprising. The analysis started from the premises of two antithetical systems, one that was supposed to be generally closed (Europe) and the other mostly opened (U.S.A.) to software patentability. This examination, however, showed discordant findings. Although in Europe there is a legislative prohibition of the patentability of computer programs "as such", software patenting is today more than a routine. The "any hardware" approach applied by the EPO has broadened the scope of patent protection for software so much that, paradoxically, the enactment of the Computer Implemented Invention Directive of 2002 would have narrowed the availability of patent protection for them. On the other hand, in the U.S.A,. after a period of considerable openness towards computer programs patentability with the application of the "useful, concrete and tangible result" test established in *State Street*, the recent decision of the Supreme Court has limited such a broad approach that was previously applied by the Federal Circuit.

A further significant outcome regards the clarity of the approach applied on the issue. While in the U.S.A. the recent developments of the case law brought forward many interrogatives on the prevalent (if there is one) approach applied by the USPTO and the Federal Circuit, in Europe it has been set a constant practice that has been further strengthened by the recent decision of the EPO Enlarged Board of Appeal.

The analysis of the case law gave two additional and interesting results. Firstly, most of the software patent applications in Europe are filed by North American companies. The main reasons behind this fact are two. The former is that the Software Industry

is prevalently based in the United States of America. Software companies in Europe are fewer and, mostly important, smaller. The latter regards the knowledge of operators about the legal means available for the protection of their inventions. In Europe there is a tremendous lack of information to this respect, and indeed this point was one of the most stressed by the European Commission in its attempt to create an EU legislation on software patentability. Not casually, while North American academics have written a massive number of papers, journal articles, and treatises on the matter, in Europe even academics have underestimated this topic, with the notable exception of some excitements caused by the Directive Proposal of 2002.

Secondly, the case law study also showed a sort of intellectual submission of Europe in regards to the North American legislation and reasoning. The legislative proposals and the case law of the EPO often referred to the U.S.A., which became a model that has to be followed. This attitude might be analyzed taking into consideration the specificity of the Software Industry, which had in the U.S.A. its earlier birth and development. In this respect, the U.S.A. could be deemed as an important proving ground for this matter. On the other hand, this attitude appeared to be a specific instance of a more general cultural phenomenon started with the end of World War II, which has overwhelmingly pushed Europe to continuously look at the other side of the Atlantic.

In conclusion, new frontiers are still opened for research and study on this matter. The complex relation between Law and Technology brings to new interrogatives. Some fields of technology are abandoning physicality, moving to abstract inventions. A study of the role that patent law must have in this respect appears both urgent and necessary. If from one side the multiple criticisms for the presumed restraints to innovation and the overbroad protection accorded by patent law must be taken with cautions, on the other a patent cannot be considered a legal mean available for any kind of invention. The problem is further complicated by the high difficulty to find an inclusive definition of such abstract inventions, and in relation of this issue computer programs represent a clear evidence. From this point of view, the prescription of the U.S. Supreme Court in *Bilski* was wise and knowledgeable. By arguing that it was necessary to avoid any categorized and rigid test for the examination of software patentability, but on the contrary that it was preferable to apply approaches suitable

for the specific cases, the Supreme Court became aware of the indefinite boundaries of the concept of computer program.

The relationship between the North American and the European patent systems is another important field of study. To coordinate solutions for technology related issues is necessary for the international commerce and for incentivizing innovation. International treaties, legislative initiatives, and patent offices practice have already achieved great results for the harmonization of the patent laws, but more outcomes must be accomplished. In Europe the patent system is now facing a very significant period, with the negotiations for the creation of a Community Patent. A EU patent system would be likely to represent an epochal change for patent law which, even if has similar provisions all over the world, has always been deep rooted in the national territories.

Specifically regarding the topic of computer program patentability, the question on whether patent protection is suitable for them is still open. Patent protection is a tool of economic policy, and therefore economic considerations must be carried out in this respect. Any definitive solution of the matter would find criticisms, but it is known that *nulla lex satis commoda omnibus est*. From a legal point of view, it is not further possible to keep trying to transform the reality in order to make it in accordance with our legal preconceptions. The essence of the concept of invention (in the meaning of patentable subject matter) needs a legal but also philosophical reinterpretation, which could enable a development and an evolution necessary to adequate it to modern technology. The Law is a fundamental achievement of our society, which has the essential role of preserving and regulating our relations and our life, and in order to accomplish this onerous task, it must be continuously adapted to the new realities of the modern world.

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