**Date and Time:** Wednesday, 8 February 2023 12:47:00PM HKT

**Job Number:** 189789991

## Document (1)

1. *Intellectual Property Rights Protection of Softwares: The Indian Perspective [2013] 4 MLJ xxxviii*

   **Client/Matter:** -None-

   **Search Terms:** chemical patent

   **Search Type:** Natural Language

# *Intellectual Property Rights Protection of Softwares: The Indian Perspective [2013] 4 MLJ xxxviii*

Malayan Law Journal Articles

INTELLECTUAL PROPERTY RIGHTS PROTECTION OF SOFTWARES: THE INDIAN PERSPECTIVE

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## INTRODUCTION

The rapid development of information and communication technologies over the past decades has replaced the material-based society by a knowledge-based society in which generating, protecting and preserving new knowledge has acquired enormous importance as an integral part of the national economy. That the knowledge is power is not a new revelation. What is new is the commodification of the knowledge and its recognition as a private right to be protected by law. The recognition of intellectual property rights as an integral part of the international trading system under the World Trade Organisation ('WTO') regime and the actual or potential contribution that these rights are capable to make to the world economy have made the protection of these rights a legitimate concern of the international community.[2] Little wonder, intellectual property is now viewed as a 'valuable and costly asset that must be created, protected and controlled as other assets like people, women, material, machine, facilities etc.' Professor Robert M Sherwood in his famous book entitled *Intellectual Property and Economic Development* (1990) has gone further and argued that the intellectual property system is a valuable part of a country's infrastructure.

Intellectual property is the result and creation of the human intelligence and includes copyright, patents, designs, geographical indications, integrated circuits and confidential information. All forms of intellectual property are different kinds of monopoly rights conferred by statute. These monopoly rights are granted for a limited period subject to certain conditions.

The software technology has revolutionised the world and there is hardly any aspect of human activity which has not gone affected by it. It not only benefits its users in various and varied ways but also has enormous potentiality to contribute to the national economy. Software refers to a set of instructions which when incorporated in a machine readable form is capable of causing a computer to perform a particular task. According to the World Intellectual Property Organisation ('WIPO') Draft Model Provisions for the Protection of Computer Software, 'software' comprises of the following three components: (a) computer programme; (b) program descriptions; and (c) supporting materials. 'Software' is a general term for what is fed into a computer, whereas the machine itself is known as the 'hard wares.'

Software protection is essential for protecting creative works and promoting creativity and innovations. However, the growth of the software industry depends heavily on intellectual property rights protection in the software in the absence of which neither new product will develop nor now jobs will grow. The software piracy, re-packaging data and database and 'reverse-engineering' have made the legal protection of computer software a very challenging task. This is more so in India where software piracy rate is still very high. The software industry affects not only individual software vendors, but also the IT industry in general and the government. According to a study, the Indian software industry lost about $2 billion of revenue in the year 2007, due to pirated software. Although computer software piracy rates in India declined, the country still registered losses of $2 billion in 2007 in monotony terms, compared to $1.28 billion in 2006. Piracy of software on personal computers in India has come down to 69% points for 2007. Reducing personal computer ('PC') software piracy in India over a period of four years could generate an additional 44,000 new jobs, $3.1 billion in economic growth, and $ 200m in tax revenues.[3] To this end factors driving piracy in India viz high cost of commercial software, lack of stringent enforcement of intellectual property rights ('IPR') laws, lack of awareness of IPR laws by users, easy availability of pirated software in the grey market, high usage of assembled PCs in India, growing availability of illegal software on the Internet and improper software asset management by organisations need to be addressed in the most effective way. According to industry experts, curbing software piracy in India needs a combination of raids, litigation and an active education campaign.[4] The campaign should aim to educate users about the IPR in software and create public opinion in favour of stringent

enforcement of IPR laws. It is also imperative that existing intellectual property laws are critically examined and evaluated from time to time in the light of the protection needs of the computer software industry. This paper seeks to make a modest attempt in this regard.

**COPYRIGHT PROTECTION FOR SOFTWARE**

Copyright protection is the most widely used legal protection model for software. However in the beginning, the opinions of the leading writers in the field were widely divided on the question of applicability of copyright protection to computer programmes and the extent of protection to be given to them under the copyright laws in view of the fundamental difference between a computer programme and any other literary work and even the originators of software had doubts about the efficacy of copyright protection of software in comparison to protection offered by trade secret and patent laws. The disadvantages of trade secret and patents however led national governments and software producers to turn their attention to the traditional protection of copyrights for the following reasons. First, standards to qualify as works eligible for copyright protection are not high and as a consequence, all most all software will fall within the purview of copyright protection. Secondly, copyright protection is relatively inexpensive and easy to obtain. Thirdly, given the automatic nature of copyright system, software can get the benefit of copyright protection immediately after its development without any further application and approval. Fourthly, as most states, which have put in place a copyrights regime, are members of the Berne Convention and the Universal Copyright Convention, software can easily gain international protection under a copyright protection system and hence there is no need to conclude multilateral treaties to protect software. Fifthly, copyrightability of software does not unnecessarily inhibit competition in the development of new computer software. Finally, copyright protection has relatively long duration than patents.

Extending copyright protection to computer software by assimilating it under the rubric of a literary work faced stiff resistance from defendants in the first generation of cases involving copyright infringement in read only memory ('ROMs') before the controversy was set at rest by clear and express provisions of copyright laws making software a copyrightable subject matter. The main lines of argument that were used in the past to resist an extension of copyright protection to software were as follows: first, computer software is purely utilitarian when it is presented in the context of direct copying of a particular programme. Secondly, as the programme as it appears on a ROM is in object code form and therefore not intelligible to human beings, it does not constitute copy for the purposes of copyright laws. Thirdly, giving copyright protection to computer manufacturers for their software will be counterproductive as such protection would hinder competition in the development of new computers.[5] These arguments however could not impress upon the courts[6] and governments and copyright protection was extended to software in different jurisdictions at different points of time. Thus whatever doubts existed with regard to copyright protection for software in the United States of America (United States) was finally removed by the passage of the Computer Software Act 1980. Since the passage of the Computer Software Rental Amendment Act in 1990, distribution of a computer program (including any tape, disk, or other medium embodying, such a program) for direct or indirect commercial advantage by way of rental, lease or lending amounts to an infringement in copyright. In China, under Regulations on the Protection of Computer Software, software that is independently developed and is in a material form, such as magnetic media or CD, will enjoy copyright protection.

Turning to legal position regarding copyrightability of software in India, the Indian Copyright Act as amended by Act 38 of 1994 and Act 49 of 1999 extends protection to computer programs and computer databases by considering them 'literary work'. For the purposes of the Act, 'computer program' means a set of instructions expressed in words, codes, schemes or in any other form, including a machine readable medium capable of causing a computer to perform a particular task or achieve a particular result.[7] 'Copyright' means the exclusive right subject to the provisions of this Act to do or authorise the doing or any of the following acts in respect of work or any substantial part thereof, namely in the case of computer program to do any of the acts specified in s 14(a) viz to reproduce the work in any material form to issue copies of the work to the public, to perform the work in public, or communicate it to the public, to make any cinematograph film of sound recording disc etc. A copyright holder in a computer program has also the right to sell or give on commercial rental or offer for sale or for commercial rental copy of the computer program. This right however is subject to the caveat that such commercial rental does not apply in respect of computer programs where the program itself is not the essential object of the rental.

In India, infringement of a copyright is a penal offence. A person, infringing or abetting an infringement is liable to imprisonment, which may extend to three years and fine which may extend to 2 Lakh rupees.[8] Section 63A provides for enhanced penalty for second and subsequent convictions. Knowing use of infringing copy of a computer

program is an offence punishable with imprisonment which shall not be less than seven days but which may extend to three years and with a fine which shall not be less than 50 thousand rupees but which may extend to two lakh rupees.[9] However, if the computer program has not been used for gain or in the course of trade or business, the court may, for adequate and special reasons to be mentioned in the judgment, not impose any sentence of imprisonment and may impose a fine which may extend to 50 thousand rupees.

The Indian copyright law relating to software protection is in accord with the Berne Convention and the Trade Related Aspects of Intellectual Property Agreement (TRIPs).[10] While the former provides that computer software (source code and object code) and compilation of data should be protected under the copyright legislation, article 10 of the TRIPs requires member states to amend their laws accordingly.

The basic issue of whether copyright protection could exist for all computer software has been resolved but the next issue of determining what exactly might be covered by copyright continues to trouble the courts. In the United States, the courts first sought to tackle this issue by applying the 'look and feel test'[11] but when this test began to lead to overly broad protection, the courts adopted a two-part test assessing intrinsic and extrinsic similarities.[12] In subsequent years, the courts abandoned the 'look and feel' test and began to apply traditional copyright doctrines that had been evolved in relation to a play or other literary work in the computer software field. Thus, in *Computer Associates International Inc v Altai Inc*,[13] the court proposed three steps, the 'abstraction, filtration, comparison test'. That test was evolved for determining whether there had been infringement in cases other than there had been direct actual copying of non-literal elements (literal elements being sources code and object code only). It was held that copyright protection could in principle exist in input and output formats and used interfaces as long as these formats were not dictated by external requirements. The 'merger' doctrine[14] and the 'scenes a fair' doctrine[15] the effect of which is to limit copyright protection are also being applied by the American courts in the field of software. At a time when the jurisprudence of Indian courts on the subject under consideration is in the process of evolution, they can take a lesson or two from their American counterparts and facilitate the development of law by returning to or applying the traditional copyright doctrines and principles evolved by them in the context of a play or a literary work in cases related to copyright protection of computer software.

So far, Indian courts have not got an opportunity to test the protection of non-literal elements of a computer programme. It remains to be seen what kind of approach is followed when the matter arises. It is believed that any approach which will be followed will revolve around the judgment of the Supreme Court in *RG Anand v Delux Films*.[16] According to the court, the best test to determine copyright infringement was 'to see if the reader, spectator or the viewer after having read or seen both the works is clearly of the opinion and gets an unmistakable impression that the subsequent work appears to be a copy of the original.'[17] The above observation suggests the inclusion of the 'look and feel' approach in Indian Law. In the instant case, while dealing with the allegedly infringed play, the court employed the *Abstraction test from Nichols v Universal Pictures*.[18] The court identified various levels of generality in the script of the play. In addition to above, the step of comparison was also applied. The court observed that the similarities arose out of the common themes of the works. Thus it seems that Indian courts are equipped to apply the two steps of abstraction and comparison of *Altai*. It is important to note that owing to the highly technical character of computer programmes, it may not be possible to apply the test of an ordinary spectator or viewer.

It is also necessary to mention two WIPO treaties relating to copyright, namely the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty,[19] which complement the Rome Convention 1961. These treaties require member states to make it unlawful either to circumvent copyright protection devices or to remove or alter copyright management information. To effect these changes in the existing law, the Digital Millennium Copyright Act was passed in 2000. The Act made it unlawful in general from October 2000, to circumvent a technological measure that effectively controls access to a protected work; it also made it unlawful to provide false copyright management information or intentionally remove or alter any copyright management information. Another significant change made by the Act is to make it unlawful to manufacture, import, offer to the public, provide, or otherwise traffic in any technology, product, service, device component or part thereof that is primarily designed or produced to circumvent a technical measure that effectively controls access to a work or protects a right of a copyright owner in a work protected by copyright. The Act also makes it unlawful to manufacture, import or provide, etc. any technology, product, service, device etc. if that has only limited commercial significant purpose or use other than to circumvent a technological measure that effectively controls access to a work or protects a right or a copyright owner in a work protected by copyright. There are, however, a few exceptions to the first and third provisions, for

example for law enforcement, certain encryption research, reverse engineering on a programme in certain circumstances, etc.

Although India has not ratified the WIPO Internet treaties, the recent 2012 Amendment of the Copyright Act includes the digital agenda of the WIPO internet treaties in the law. Provisions relating to the protection of effective technological measures[20] and rights management information[21] have been included. It has become unlawful to circumvent the effective technological measure employed by the content providers (including the author of a computer programme) to protect their content. The law obliges the content providers to provide certain information which are required for efficient management of rights[22] in online medium. It assures that if anyone knowingly tampers with the rights management information, penal consequences will follow. The inclusion of anti-circumvention measures in law will facilitate the online delivery of software. Authors of computer programmes can benefit from the new digital agenda and protect their work by employing technology envelop. It is, however, believed that a long list of exceptions of the general rule of anti-circumvention as contained in s 65A(2) may dilute the utility of the provision. The working of these provisions may create troubles in future because important terms like 'effective technological measures' and 'circumvention' have not been defined in the Act. Till the time a definition emerges, American definitions may be used.

**TRADE SECRET PROTECTION FOR COMPUTER SOFTWARE**

Before copyright protection was extended to computer software, most countries protected computer software as trade secrets. In common, parlance trade-secret refers to and signifies confidential information associated with industrial and commercial activity, although in a legal sense, it is more than confidential information. In order to be protected as a trade secret, the information must remain outside the public domain for something which is public property and public knowledge does not constitute as confidential.[23] As defined in the American Law Institutes Restatement of Law of Torts, a trade secret 'may consist of any formula which is used in ones' business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it'.[24] Thus, a formula, plan, sketch or something of that kind, even when it is built up upon materials which are already available for the use of anybody will be confidential if it is a result of the use of the brain of its maker.[25]

As technical and business information characteristics of trade secrets coincide with computer software to some extent, the trade secret model of protection can be very useful in providing legal protection to software because of the following advantages it has over patent or copyright protections. Thus while copyright and patent are defined by statute and are limited in duration, there is no time limit for trade secret protection. Further, a trade secret is protected not by registration but by contractual restrictions on use. Again, invention or innovation not meeting the non-obviousness standard of patent law can also be held as a trade secret. Likewise, many things which are not patentable, or for which patents and copyright protection are not available, can also be protected by trade secrets. Copyright law protects expression and not ideas but by trade secrets even the ideas can be protected so long as they are not disclosed in any way. Thus, trade secrets protection protects both expressive forms and the ideas of software. At the same time, requirements for trade secret protection are less strict than those for patent application, but more strict than those for copyright protection. Trade secret however does not confer on its holder exclusive rights to make, use, sell or reproduce a creation or product in which it exists in the manner of other IPRs.

In view of the aforesaid characteristics of trade secret, it is suitable for computer software protection to a great extent. In order for software to be protected as a trade secret, the subject matter of trade secret must be secret, meaning that it must not be of public knowledge or of a general knowledge in the trade or business. The element of secrecy is not lost, however if the trade-secret holder reveals the trade secret to another in confidence, and that that person has an implied obligation not to use or disclose it. The recipient of confidential knowledge may be a licensee or employee of the holder of a trade secret. The novelty of the information is not essential for a trade secret but it should be inaccessible and crucial to its actual or potential economic value.

Although the requirements for trade secret protection and nature and extent of such protection may vary from country to country, it is widely recognised in most countries that trade secret laws do not prohibit any one, who does not know of the trade secret and discovers it by fair and honest means viz — independent invention, accidental disclosure or so called reverse engineering. The law, however, extends protection to the trade and secret holder against its unauthorised use or disclosure by those to whom the secret has been confided under the express or implied restriction of non-disclosure or non-use. A trade secret holder is also protected against disclosure by improper means like theft, wiretapping or even aerial reconnaissance; but where the information is disclosed by

accident or uncovered by third parties through the use of legal means, a trade-secret-holder will be without any remedy. Obviously, any attempt on the part of producers/manufacturers to limit contractually the reverse engineering of unpatented invention runs the risk of being declared unenforceable by the courts.

The object of trade-secret protection is to offer an incentive to innovation and the development of new technology and encouragement of research and development (R&D). Trade secrets however, also have the potential of adversely affecting the economic development of a country by creating a situation of monopoly and increasing the technological dependency on few firms and for this reason, their protection is also likely to create serious challenges for competition law and transfer of technology.

Trade secrets are protected as property in the United States and in other jurisdictions under the law of contract or tort and legal concepts like unfair protection or unjust enrichment provide the basis for their protection. In India, cases related to breach of trade secrets or confidential information are governed by the Specific Relief Act 1963, s 27 of the Indian Contract Act and s 16 of the Indian Copyright Act 1957. The common law remedies under the law of torts and equity are also available for breach of trade secrets / confidential information in this country.

So far, where the regulation and protection of trade secrets at the international level is concerned, the agreement on the trade related aspects of intellectual property has expressly brought them within the purview of international law by linking the protection of trade secrets to protection against unfair competition as provided in article 10 *bis* of the International Convention for the Protection of Industrial Property (Paris Convention). Notably, the TRIPs Agreement considers a breach of trade secret as an act contrary to honest practices and therefore brings it within the purview of unfair competition referred to in article 10*bis* of the Paris Convention. For its part, the Paris Convention does not give a definition of an act of unfair competition, although it illustrates it by giving certain examples in cl (3) of article 10*bis* and prohibits them.[26] The Model Provisions on Protection against Unfair Competition, adopted in February 1996 by the WIPO in article 6, defines when the use of secret information will constitute an act of unfair competition, which is closer to article 39 of the TRIPs Agreement, although para 4 of this provision seems to be in derogation of article 39(3) of the TRIPs Agreement.[27]

A careful consideration of article 39[28] of the TRIPs Agreement read with article 10 *bis* of the Paris Convention reveals the following: first, article 39(3) does not specify any timeframe for an obligation of non-disclosure. Secondly, there is no obligation on the part of governments to protect the information submitted to it or its agencies where its disclosure is in the public interest. Thirdly, a use in public interest of the relevant information is not subject to article 39 of the TRIPs agreement which means in effect, that the trade secret owner will not get compensation, a relief available to a patent holder. Fourthly, article 39 most probably implicitly allows for the use of disclosure of confidentially acquired information in the public interest under the court order. Fifthly, the trade secret holder may be unable to obtain an injunction against the unauthorised acquisition and use of the secret in a situation where the use of a trade secret involves use of ingredients in a manner or in proportion forbidden by law. Sixthly, as a general rule, article 39 of the TRIPs agreement does not provide protection against 'third parties', although the latter will be liable if they knew about the confidential nature of the information or were grossly negligent in failing to know about the involvement of the dishonest commercial practices in the acquisition of the information. Seventhly, there will be no protection against the accidental disclosure of the information or use of such information from a publicly available material. Finally, the trade secret owner is responsible to take reasonable steps to keep it secret. A preceding breach of confidentiality should be taken into account in deciding the ambit of dishonest commercial practice by the national court in accordance with its law.

In a few countries, criminal law protection is also available to trade secrets but most of the countries provide only civil law remedies for a breach of trade secret. Although trade secret laws may vary from jurisdiction to jurisdiction, common civil law remedies are injunction, damages, taking of accounts and delivery. In a civil law action, the aggrieved party has to show that specific actions have been taken to maintain the secrecy of the technology in question. It means that appropriate measures like technical and related personnel management and software management should have been taken to ensure the confidentially of the software. To ensure the confidentiality of the software, its manufacturers usually adopt the method of signing of confidentiality agreements and business prohibition agreements with their employees and licensing agreements with the distributors and end-users. In such agreements, confidentiality stipulations are included in order to ensure confidentiality. As the party who files a civil suit for a breach of trade secret bears the burden of proof, it may find difficulty in adducing the necessary evidence before the court. Special attention should therefore be paid to evidence collection.

As is well known, various types of software licenses are in vogue, Shrink wrap agreements refers to the purchase agreements that are attached to shipped products, usually bound by shrink wrap (plastic wrapping) that contain terms and conditions. In click wrap, contract users accept a series of provisions before the end of installation; but the legal effect of these methods leaves much to be desired. To illustrate the point, although prohibition of reverse engineering is always provided in the click wrap contract, redeveloping software through reverse engineering is generally considered to be legitimate. Reverse engineering, it may be noted, is 'starting with the known product and working backward to define the process which aided in its development or manufacture.'

In India, reverse engineering on copyrighted software for the fair use is permissible in view of s 52 of the Indian Copyright Act 1957. It means that persons other than the copyright holders or licensees can legally disassemble a copyrighted computer programme in order to gain an understanding of the unprotected functional elements of the programme. Support for this view can be found in the decision in *Sega Enterprises v Accolade Inc*.[29] In the instant case, Accolade, a computer game company, disassembled Sega game programmes in order to get information necessary to make the games compatible with the Sega Genesis Console. Thereafter, Accolade developed its own games and sold them. The games developed by Accolade were in competition with those developed by Sega and a third party developer. When Sega filed a suit for infringement of its intellectual property rights, Accolade took the plea of fair use. The court accepted that plea and held that, 'when the person seeking the understanding has a legitimate reason for doing so and when no other means of access to the unprotected elements exists', such disassembling is, as a matter of law, a fair use of copyrighted work.

As could be seen from the above, reverse engineering regarding interoperability of a computer programme or understanding of its working is permissible in respect of copyrighted software in view of s 52 of the Indian Copyright Act. The same however, does not hold true in respect of patented software because of the absence of the fair use clause in the Indian Patents Act. Experts like Julie Cohen, Pamela Samuelson and Suzanne Scotchmer however favour an inclusion of some clauses in the American Patent law to protect the fair use of patented computer software. Be that as it may, the position of a contract prohibiting reverse engineering regarding software with trade secrets claimed to be in the category of a patent is at best uncertain.

Trade secret law requires that in order to get protection, one must take some steps to impose a confidential relationship with those who have access to the secret.

**PATENT PROTECTION FOR COMPUTER SOFTWARE**

Software protection is not within the purview of patent law of India. There are however more than half of the 176 countries in the world that grant patents, permit patent protection to software related inventions, at least to some degree.[30] Adoption of patent protection for software protection is indeed a worldwide phenomenon which received the necessary impetus following the adoption in 1994 of the TRIPs Agreement, which requires member countries to provide patent protection for inventions in all fields of technology. The United States and Japan have led the way for the patentability of software related inventions. This is evident from the fact that the number of software patents issued per year in the United States has increased every year since 1990. According to the data published in 2005 by the United States Patent Office, the number of software patents issued in 2004 was about five times the number issued in 1990 (about, 11600 vs 2400). The most obvious reason for such an increase in the number of software patents is the fact that it offers stronger protection than copyright and trade secret laws.[31] As it is well known, patent is a grant from the government to the inventor for a limited period of time, of the exclusive right to make use, exercise and vend his invention. A patent is valid against everyone in the country concerned who makes uses or sells the patented invention. Copyright only protects the expression of an idea. As software blurs the boundary between 'idea' and 'expression', courts are generally reluctant to extend copyright protection to computer software. In contrast to this, patent law also protects the underlying idea provided the idea is within the statutory categories of patentable subject matter and is not so fundamental that it constitutes a law of nature. As the software developer's ideas are the most valuable and as such are most in need of protection, patent protection is necessary for their protection. It also needs to be recognised in this context that if a technician somehow obtains the developer's design ideas, it should not be difficult for him to design a program via reverse engineering, reverse coding, or reverse assembly that shares the same or similar function. As both ideas and functions are within the purview of patent law, computer software is effectively protected once a patent is granted to it. Patent protection confers on a patent holder, exclusive and monopolised rights. As a consequence, once patent rights are granted to computer software, any similar inventions, even software technologies developed independently by others, falling within the

scope of patent protection will constitute an infringement. By contrast, copyright and trade secret laws do not protect a software owner against independently developed software. Patent protection is essential for software for another reason too, namely mass marketing of software products without a signed license agreement.

As computer programmes are protected as literary works under the copyright law and to some extent under trade secret laws, governments of the industrialised world were initially reluctant to extend patent protection to computer software. It is therefore not surprising that the European Patent Convention in article 52(2) excluded computer programmes from the list of patentable subject matter. This however does not mean that software related inventions are also not patentable under the European Patent Office (EPO) regime. To the contrary, thousands of software related inventions have been granted patents by the EPO and the latter has been very much liberal in accepting patent claims in software.

The EPO regime has evolved 'technical effects' doctrine for the purpose of patenting software related inventions. This doctrine holds that an invention comprising a computer programme plus something may be patentable if it makes a technical contribution to the art.[32] Under this doctrine, the following inventions have been held patentable: invention related to computer control of an X-ray apparatus,[33] invention concerning a method for the digital enhancement of images, a computer related invention for editing of a document,[34] computer related invention for displaying of an error message on a computer screen,[35] a computerised inventory and financial control,[36] a computer controlled method for controlling queuing of service centres[37] and a claim directed to technical process which is carried out under the control of a programme (whether the implementation is in hardware or in software). Patent however has been denied in the word processing cases on the basis of the 'mental act' exclusion doctrine.[38] Decisions in these cases were based on a restrictive interpretation of the technical features doctrine. According to this approach, if the novel and innovative feature is in a subject matter excluded from patentability under article 52(2) of the European Patent Convention, then patent protection would not be available. Thus where after the programme element has been removed from the claim, there remains no technical problem to be solved, the claimed invention will not be patentable. On this approach, a method for the display of characters in a particular font is not a technical method and therefore non-patentable because the programme in question does no more than a data processing device.[39]

According to another approach to the determination of the existence of technical features in a given case, which has been followed in most of the cases by the Board of Appeals, invention should be taken as a whole. If the invention as a whole makes a technical contribution to the art, it is to be considered patentable regardless of the fact that the novel and innovative feature lies in the subject matter excluded from patentability under article 52(2) of the EPC. While applying this doctrine, the Board of Appeals has also made a distinction between the processing as claimed, in which a re-arranged data array is produced and a method for 'digitally filtering data'. While the former is patentable, the latter is not because an abstract notion is not distinguishable from a mathematical method so long as it is not specified what physical entity is represented by the data. It has also been held that for an invention to be patentable, its exclusive or largely technical feature is not necessary. Hence, where an invention makes use of both technical and non-technical means, the use of non-technical means will not prevent its patentability if assessed as a whole, it is of a technical nature.

Under the EPO regime schemes, business methods are not patentable. Still in some cases, patents have been granted to business methods by bypassing the business method exception. Thus, a claim related to a computer system for plural types of independent management, including at least financial and inventory management has been held patentable.[40] In another case, it has been held that the mere fact that the method in question could be used in a business such as bank does not automatically make it a method for doing business. That case related to a computer-controlled method for controlling queuing at service counters for example in a bank.[41] That method was patentable when expressed as a claim to apparatus, including a number allocating unit service point terminals, and an information display unit.

As would be evident from the foregoing discussion, the EPO law regarding patentability of software has been liberal. It has been at least more liberal than the individual laws of some of the EPO countries that conduct substantive scrutiny on the merits. The leading case in the United Kingdom is *Fujitsu's Application*[42] in which the patent office, the patents court and the Court of Appeal all held that a computer based method of modelling crystal structure was not patentable. While the patents court rejected the patent claim on the basis of the mental act doctrine, Aldous LJ in the Court of Appeal applied the technical contribution doctrine to deny patent for the

computer-based modelling crystal structure. The patentability of software related inventions in Europe received a serious setback on 6 July 2005 when the European Parliament rejected a directive that aimed to harmonise national standards regarding patentability of software.

Today, the United States is the most favourable jurisdiction for the patent protection of computer software for two main reasons. First is the broad statutory definition of subject matter of patent since the time of Jefferson[43] and the intention of the United States Congress that patent laws should be given a wide scope.[44] Second is a progressive, liberal and innovative interpretation of patent laws to adapt them according to the changing needs of the United States economy. It should therefore not come as a surprise that statutory subject matter ie 'any new and useful process' is contemplated by the United States Congress to include 'anything under the sun that is made by man'. Under the existing patent laws, four categories of subject matter, namely process, machine, manufacture or composition of matter are patentable. Over time, the United States Courts identified three categories of subject matter that are excluded from patent protection, namely abstract ideas, natural phenomenon and laws of nature. Thus 'an idea of itself is not patentable, but a new device by which it may be made practically useful is.'[45] Again, 'a new mineral discovered in the earth or a new plant found in the wild is not patentable subject matter'.[46] Likewise, discoveries like, Newton's law of gravity or Einstein's celebrated law that E = MC2, are not patentable for such discoveries are 'manifestations of nature, free to all men and reserved exclusively to none'.[47] It has also been stated by the court that: 'He who discovers a hither to unknown phenomenon of nature has no claim to a monopoly of it which the law recognises. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.'[48]

In the United States, a claim falling within any of the categories of judicially excluded subject matter, an abstract idea, natural law phenomenon or law of nature is not patentable unless it recites some practical application of the abstract idea, natural phenomenon, or law of nature. Thus 'mathematical algorithms' are not a patentable subject matter to the extent that they are merely abstract ideas.[49] However, a claim becomes patentable if it applies algorithm to accomplish a specific technical purpose; but if it pre-empts the entire algorithm, it will not be patentable. In *Diehr*,[50] the court held that an 'application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.' Further, a claim that contains patentable subject matter under 35 USC 101 'does not become non-statutory simply because it uses a mathematical formula, computer programme, or digital computer.'

According to United States Patent and Trademark Office (USPTO) guidelines, the requisite practical application can be shown in two ways. First, the claimed process includes a physical transformation. Secondly, the claimed invention produces a useful, concrete and tangible result.[51] Accordingly, a computer with the sole purpose of calculating a mathematical formula (a non-statutory attempt at pre-emption in *Gottschalk v Benson*) is not patentable, but the use of a mathematical formula in combination with other steps in a process is. In *Diamond v Diehr*, a mathematical algorithm used in a process to cure synthetic rubber had been found patentable. Although the Supreme Court in the instant case had used the physical transformation criteria, it has been stated more recently by the Federal Circuit that, 'this is not an invariable requirement', but merely one example of how a mathematical algorithm may bring about a useful application.[52] It has also been stated by the Federal Circuit in *In re Alappat* that the Supreme Court 'never intended to create an overly broad, fourth category of subject matter (ie mathematical algorithms) excluded from s 101'.[53] Clarifying the requirement of the Alappat inquiry, the Federal Circuit observed that inquiry simply requires an examination of the contested claims to see if the claimed subject matter as a whole is a disembodied mathematical concept representing nothing more than a 'law of nature' or an 'abstract idea', or if the mathematical concept has been reduced to some practical application rendering it 'useful'.[54]

A few years ago, the United States courts extended patents protection to software related to business method and for that purpose abandoned the traditional business method exception and held that 'business methods have been, and should have been, subject to same legal requirements for patentability, as applied to any other process or method,[55] The Federal Circuit said so in *State Street Bank & Trust Co v Signature Financial Group*,[56] and affirmed the patentability of a hub-and spoke system for managing financial services. In what appears to be a very significant observation in this context, the court stated as follows: 'Today, we hold that, the transformation of data, representing discrete dollars 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.'[57] The court found support for its decision in its own precedent:[58]

> In *Alappat* we held that data transformed by a machine through a series of mathematical calculations to produce a smooth waveform display on a rasterizer monitor, constituted a practical application of an abstract idea (a mathematical algorithm, formula or calculation), because it produced 'a useful, concrete and tangible result' - the smooth waveform. Similarly, in *Arrhythmia Research Technology Inc v Corazonix Corp*,[59] we held that the transformation of electrocardiography signals form a patent's heartbeat by a machine through a series of mathematical calculations constituted a practical application of an abstract idea (a mathematical algorithm, formula or calculation), because it corresponded to a useful, concrete or tangible thing — the condition of a patient's heart.

The Federal Circuit concluded that: 'Certain types of mathematical application subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application, ie, 'a useful, concrete and tangible result.' It is important to note here that in the instant case, the claimed invention lacked sufficient physical activity as it was essentially directed to an accounting system that could be carried out even with pencil and paper. Yet the court held the system to be patentable. The decision in this case articulated a second way to show a practical application of an otherwise un-patentable abstract idea. As to be expected, it not only triggered a surge of patent applications for business method related software but also caused apprehensions that the Patent and Trademark Office (PTO) would now feel constrained to grant overly broad, unwarranted patents.

Some examples of business methods which were granted patent in the United States were: an online system of accounting, online rewards incentive system, online frequent buyer programme, letting customers setting their own prices for hotel booking, single click to order goods in an online transaction.

The patentability of software related inventions was not confined to the algorithms/business method area only. *In re Lowry*,[60] the Court of Appeals for the Federal Circuit even abandoned the printing matter exception and granted patent to a claim which fell in the category of a printed matter, stating that, 'the printed matter cases have no relevance where the invention as defined by the claims requires that the information be processed not by the mind but by a machine, the computer'. Subsequently, the USPTO Examination guidelines for computer-related inventions (1996) stated that claims to software elements started in a memory device were to be deemed to fall into the 'articles manufacture'. In *re Beauregard* also, the printed matter doctrine was not held applicable to claims to software contained in a floppy disc. The court held: 'computer programs embodied in a tangible medium such as floppy diskettes' could form patentable subject matter.

As would be evident from the foregoing discussion, the United States practice with regard to patenting of software related inventions evolved into more or less on the pattern of EPO practice during the 1980s and developed further thereafter and allowed claims to a computer program recorded on conventional magnetic disc on tape. The new guidelines of the USPTO which were issued in 1996 made software which demonstratively controlled of configured some hardware became patentable regardless of whether they included algorithms. Patent protection was also made available for databases in combinations with some form of computer readable memory.

*AT&T Corp v Excel Commc'ns, Inc*[61] is another landmark case on patentability of software. In that case, patent protection was extended to process claims which essentially related to a method for calculating charges for long-distance carrier that had been selected by the originator and the recipients. The court re-asserted its ruling in *Alappat* that if what was claimed was more than an abstract idea or law of nature or if the mathematical concept had been reduced to some practical application rendering it useful, then the statutory requirement was met. The court also held that there was no difference in principle between apparatus claims as found in *Alappat* and *Street Bank* and the process claims of the invention in the instant case. The court also rejected arguments that physical limitations are necessary for a software related claim to state patentable subject matter and reiterated that 'our inquiry here focuses on whether the mathematical algorithm is applied in a practical manner to produce a useful result'.

Turning to the question of patentability of the claimed invention in the instant case, the court answered it in the affirmative and reasoned thus: 'because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of s 101.'

Upward trend regarding grant of patent to business method related software was arrested in 2005 with a rare precedential opinion issued by a panel of the Board of Patent Appeals and Interferences in respect of the test for patentable subject matter in method claims. In *Ex Parte Lundgren*,[62] the board rejected the 'technological arts' test to determine patent eligible subject matter under s 101. In that case, the claims did not recite any computer components or means, but instead recited a method for compensating a manager based on the performance of his firm relative to other firms in the industry. On the heels of the Lundgren opinion, the USPTO published guidelines for its examiner which were later incorporated into the Manual of Patent Examining Procedure.

On the heels of the Lundgren opinion, the USPTO published guidelines for its examiner to follow when deciding whether a claim recites patent-eligible subject matter. The Manual of Patent Examining Procedure set forth four steps for analysing subject matter eligibility of a claim under s 101.

It also sets forth additional explanation of 'computer-related non-statutory subject matter.' Data structures and computer programs, if claimed merely as a set of instructions or data, are non-statutory descriptive material.[63]

In *Ex parte Bilski* at the USPTO,[64] the Board of Patent Appeals and Interferences held that method claims that did not recite any computer elements were not patentable under s 101 stating that 'we interpret the State Street and AT&T test to be a test for when transformation of data by a *machine* is statutory subject matter'.

The position taken by the USPTO in the *Bilski*'s case was reiterated in *In re Comiskey* at the USPTO. The case involved claims to a method for 'mandatory arbitration resolution regarding unilateral documents', which like the *Bilski* case recite no computer element or other apparatus.[65] Although the USPTO did not reject the claims as being un-patentable under s 101, the Federal Circuit raised the issue during oral arguments. In supplemental briefing to the Federal Circuit on the s 101 issue, the USPTO set forth its current position on statutory subject matter under s 101.[66]

Recent pronouncements of the United States Supreme court have raised uncertainty about the patentability of business method related software. In June, 2006, the Supreme Court considered the patentability of a method claim for detecting a vitamin b deficiency in warm blooded animals.[67] Although the court in this case dismissed the case stating that the petition to take it had been 'improvidently provided', three justices who dissented from the court's dismissal of the case found that 'at most respondents have simply described the natural law of issue in the abstract patent language of a process'. The dissenters commented that *State Street Bank* 'does say that a process is patentable if it produces a 'useful concrete and tangible result'. But this court has never made such a statement. In fact, if taken literally, the statement would cover instances where this court has held the contrary'.

In *eBay v MercExchange*,[68] the Supreme Court held that injunctive relief in patent cases should be subject to the same four-part test applied in non-patent cases. In his concurring opinion, Justice Kennedy, joined by Justices Stevens, Souter, and Breyer, opined that 'injunctive relief may have different consequences for the burgeoning number of patents over business methods, which were not of much economic and legal significance in earlier times. The potential vagueness and suspect validity of some of these patents may affect the calculus'. Later, the United States District Court that heard the case on remand from the Supreme Court denied MercExchange's request for an injunction, citing as one of its reasons the fact that the patent was for a business method.[69]

*Microsoft v AT&T* is another case decision of the Supreme Court in which again raises doubts about the patentability of a business method. In this case, the court found that computer software per se cannot be a component of a patented invention under s 271(f), the Supreme Court stated that 'whether 'an intangible method or process, for instance, qualifies as a 'patented invention' under s 271(f) [is] a question as to which we express no opinion.' The court went on to state that 'abstract software code is an idea without physical embodiment, and as such, it does not match 271(f)'s categorisation; 'components' amendable to 'combination'.' The court also stated that 'abstracted from a usable copy, software code is intangible, uncombinable information ... '[70]

The Supreme Court in *KSR v Teleflex*[71] gave its opinion in the context of obviousness requirement of s 103 of the United States patent statute, the Supreme Court characterised inventions in this way: 'we build and create by

bringing to the tangible and palpable reality around us new works based on instinct, simple logic, ordinary inferences, extraordinary ideas, and sometimes even genius.' By chance or by design, the Supreme Court again referred to inventions as 'tangible' and even 'palpable,' perhaps hinting at where it thinks the s 101 debate should end.

*In re Comiskey*,[72] the Federal Circuit ruled that claims reciting business methods can be patented only if they involve another class of statutory subject matter, such as a computer matter. The court rejected Comiskey's argument that an abstract idea or algorithm is patentable as long as it produces a 'useful, concrete, and tangible' result; the court decided that 'a claim reciting an algorithm or abstract idea can state statutory subject matter only if, as employed in the process, it is embodied in, operates on, transforms, or otherwise involves another class of statutory subject matter, ie, a machine, manufacture, or composition of matter.'[73] The court distinguished this case from *State Street Bank*, *Alappat*, and *Arrhythmia Research*, and summed up the current thinking on the subject in these words: 'the present statute does not allow patents to be issued on particular business systems — such as a particular type of arbitration — that depend entirely on the use of mental processes.'[74] *Comisky* had argued that his system claims did recite computer components. Yet the court warned that, '[t]he routine addition of modem electronics to an otherwise creates a prima facie case of obviousness.'

The above survey of the United States case laws reveals how the United States courts slowly but gradually developed new theories and principles to extend patent protection to computer software. It also shows how recent developments of the USPTO and recent pronouncements of the Supreme Court have created uncertainty about the patentability of business methods related software. It is generally believed that patenting of software inventions has played a positive role in the growth of the United States software industry. Although in recent years the United States Supreme Court has given the hints that it is interested in revisiting the patentability of software, it is difficult to believe that it would outlaw software patents altogether. However, even if software patents cease to exist tomorrow, it is not going to affect the software industry much in the United States. To quote *Pamela Samuelson*,[75] '(B)ased on twenty four years of studying software intellectual property protection, I believe the software industry would be no less innovative and no less competitive in the world market if software patents disappeared tomorrow.' This observation may be pertinent to the on-going debate on the desirability of extension of patent protection to software in India.

Coming to patent protection for software in India, the Indian Patents Act does not provide for such protection. In fact, s 3 which defines what are inventions, expressly exclude the following from the purview of patentable subject matter: a mere scheme or rule or method of performing mental act or method of playing game; a presentation of information; a literary, dramatic or any other aesthetic work; a mathematical or business method or a computer programme per se or algorithms. Despite this exclusion, there is perhaps still some scope for extending patent protection to software in cases where the claimed inventions involve something more than computer program or where algorithms have practical application. Support for this proposition can be found in the jurisprudence of the EPO regime and the United States Courts.

India is a leading software hub in the world, and because of a growing software industry, the software patenting has become an important issue. While stronger protection is needed in India, the law remains ambiguous. The lack of proper guidelines for Indian patent office will further make the law ambiguous. It is important to note that the law does not define 'Computer programme per se'; it seems that it is similar to the wording employed by the European Patent Convention which excludes 'Computer programmes as such' from the scope of patentability. This has been interpreted to mean that computer programmes which have a 'technical effect' were fit subjects for patent protection.

In 2004, an amendment was done through an ordinance which bifurcated this clause and narrowed the exclusion. It provided for exclusion of 'a computer programme per se other than its technical application to industry or a combination with hardware.' This ordinance was replaced by the 2005 amending Act which reverted to the 2002 position once again providing that 'computer programs per se' are excluded. Because of the legislative flip-flop, one is forced to conclude from this deliberate omission that it is not the Legislature's intent any longer that computer programs in combination with hardware enjoy patent protection. Thus the words 'per se' await authoritative judicial interpretation in Indian law and till that time the legal position of software patenting in India remains indeterminate.

In any case, there is a need to have a fresh look at the patent policy in this regard in view of the increasing number and legitimacy of software patents being issued in the United States, Japan and even in China. In China, the Guidelines to Patent Examiners promulgated by the State Intellectual Property Office, stipulates general principles and specific instances for software protection. Under the Guidelines, no patent protection is available for common computer programs; but if the software described in the invention application constitutes a technical program, then it becomes a patentable subject matter.

While patent protection of software has many advantages, it has two major deficiencies. First is the high cost involved in obtaining patent protection. Secondly, the economic life of software is not more than three years whereas the approval of the patent application usually takes not less than one year. These deficiencies should also be taken into account by policy makers if and when they take any decision with regard to patentability of computer software in India.

**CONCLUDING OBSERVATIONS**

Legal protection of software is necessary not only for the growth of the software industry and the national economy but also for creating new high-tech jobs and protecting the interests of end-users. In India, legal protection is available to computer software under copyright and trade secret laws. Each of these models of protection has its own advantages and disadvantages. As patents model provide strong protection for software than copyright and trade secrets laws, the software industry believes that making a provision in the national laws for patenting of software related inventions will give them a competitive advantage at the international level. However extension of patent protection to software continue to be a contentious issue as there is an equally strong opposition to patent protection to software on the ground that it will prove counter-productive and retard growth and innovativeness in the field. Opponents of patent protection for software also argue that software development and mass production is relatively inexpensive compared to other technologies and the lead-time the inventor enjoys is usually enough to allow recovery of the cost of the resources expanded in development of a software. But as more than half of the 176 countries in the world led by the United States and Japan presently permit patenting of software related inventions, it is high time for India to take a policy decision in the matter after having a comprehensive consideration of all aspects. In case of a national consensus in favour of grant of patent to software related inventions, necessary changes can be made in the Indian Patents Act. Meanwhile, should the need arise, the courts may develop their own software patent jurisprudence for which there is still some scope under the Act in the same way as the EPO and the United States courts have done.

As already noted, curbing software piracy needs a multipronged strategy in which effective intellectual property laws and their stringent enforcement are crucial components; but law alone cannot contain the menace of software piracy. It is therefore imperative that other measures like raids and an active education campaign should be adopted in combination with legal tools and strategies. The software industry has also suggested that the government should set up an independent body to conduct surprise checks on the software licenses of companies.

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[2] See BC Nirmal, *Copyright in Cinematograph Films*, in NC Patnaik (ed) Introduction to Copy right Law in India, Maghasanee Publications, Orissa, 2007, pp 1–39 at p 1.

[3] See 'Computer software piracy costs India $2 billion' *http://www.financialexpress.com/ news/computer-software-piracy-costs-india-2-billion/311322/*, Updated: 19 May 2008 at 2202 hrs IST.

[4] See 'Software piracy: Understanding the larger picture', *http://www.expresscomputeronline. com/20030721/ indtrend1.shtml*

[5] See John Richards, 'Copyright Protection for Computer Software in the United States', *http://www.ladas.com/Patents/Computer/SoftwareAndCopyright/Softwa01.html*

[6] See *Apple Computer, Inc v Franklin Computer Corp,* (1983) 714 F 2d 1240 (3rd Cir) cert den'd, 464 US 1033 (1984). *Williams Electronics, Inc v Arctic International Inc,* (1982) 685 F 2d 870; (1982) 215 USPQ 405 (3rd Cir). *Midway Manufacturing Company v Strohon,* (1983) 26 PTCJ 165 (ND I11.).

[7] See s 2 (ffb) of the Copyright Act 1957 [IND].

[8] See s 63 of the Copyright Act 1957 [IND].

[9] See s 63B of the Copyright Act 1957 [IND].

[10] For a critique of the copyright regime under TRIPs see, BC Nirmal, 'International Copyright law and Developing Countries', in SN Saxena (eds), *Spotlight on Intellectual Copyrights*, 2005, pp 98–113.

[11] See *Whelan Associates Inc v Jaslow Dental Laboratory, Inc,* (1985) 225 USPQ 156 (SD Penn), (1986) aff'd 230 USPQ 481 (3rd Cir).

[12] See, for example, *Brown Bag Software v Symantec Corp,* (1992) 22 USPQ2d 1429(9th Cir).

[13] (1992) 23 USPQ2d 1241. For other cases see John Richards, no 4, at pp 7–12.

[14] See *Interactive Network Inc v NTN Communications Inc,* (1995) 49 PTCJ 496 (ND Cal).

[15] This doctrine excludes form copyright protection those elements that follow naturally from a works' theme than the author's creativity. See *Landsberg v Scabble Crossword Came players Inc,* (1984) 221 USPQ 1140 (9th Cir), *Computer Management Assistance Co v Robert F DeCastro Inc* (2000) 55 US Q2d 1643 (5th Cir).

[16] MANU/SC/0256/1978.

[17] *Id*, para 46.

[18] (1992) 982 F 2d 693 .

[19] For details of these WIPO treaties see, BC Nirmal, 'Copyright and Neighbouring rights in International Law with Special Reference to the WCT and WPPT', in BN Pandey (ed) *Intellectual Property Rights*, Law School, BHU, 2003, pp 232–242.

[20] See s 65A of the Copyright Act 1954 [IND].

[21] *Id*, s 65B [IND].

[22] *Id*, s 2(xa) [IND].

[23] See *Spycatcher's case, Attorney General v Observer Ltd and another action; Re an application by Derbyshire County Council* [1986] 1 All ER 91; Stagthom LJ in *Lansing Linde Ltd v Kerr* [1991] 1 All ER 418 at p 425.

[24] See also s 1(4) of the Uniform Trade Secrets Act 1989 [CAN].

[25] See Lord Greene, MR in *Saltman Engineering Co Ltd v Campbell Engineering Co Ltd* [1963] 3 All ER 413n at p 415.

[26] A trade secret means information, including a formula, pattern, compilation, program, data, device, method, technique, or process, that: (i) derives independent economic value, actual or potential, from not being generally known to, and not readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use; and (ii) is the subject of efforts that are reasonable under the circumstances to maintain it secrecy.

[27] It runs: Any act or practice, in the course of industrial or commercial activities, shall be considered an act of unfair competition if it consists or results in (i) an unfair commercial use of secret test or other data, the origination of which involves considerable effort and which have been submitted to the competent authority for the purpose of obtaining approval of the marketing of pharmaceutical or agricultural chemical entities, or (ii) the disclosure of such data, except where necessary to protect the public, or unless steps are taken to ensure where necessary to protect the public, or unless steps are taken to ensure that the data re protected against unfair commercial use.' Compare this provision with article 39(3) of the TRIPS Agreement which provides as follows: 'Members, when requiring, as a condition of approving the marketing of pharmaceutical or of agricultural chemical products which utilize new chemical entities, the submission of undisclosed test or the other data, the origination of which involves considerable efforts, shall protect such data against unfair commercial use. In addition, members shall prohibit such data against disclosure, except where necessary to protect the public or unless steps are taken to ensure that the data are protected against unfair commercial use.' See also, SK Verma, 'Legal Protection of Trade Secret and Commercial Information', in SN Saxena et al (ed), *Spot light on Intellectual Property Rights*, (2005), pp 46–64 at pp 51–52.

[28] For aspects of article 39, see BC Nirmal 'Book Review' IJIL, 46, (2006), 641–644.

[29] 977 F 2d 15, discussed in Yathindra Singh, *Cyber Laws*, 2003, at p 27.

[30] See Fenwick, *Patent Protection*, http://www.softwareprotection.com/patent.htm

[31] For advantages of patent protection for software, see; 'Intellectual Property Protection for Computer Software in the United States,' http:/:www.welshkatz.com, 1 January 2006; Seagull Song Haiyan and XuYuezhu 'Computer Software Protection in China' King & Wood IP Bulletin http://www.mondaq.com/article.asp?articleid=51096 8 August 2007.

[32] see, generally, 'Europe-European Patent Convention', www.ladas.com/patents/computer.EPOJP.html; Philip W Grubb, *Patents for Chemicals, Pharmaceuticals and Biotechnology*, 1999, pp 262–266.

[33] T 26/86 (OJ 1988, 19) Koch and Sterzelux/X-ray Apparatus.

[34] T 110/90 (OJ 1994, 557).

[35] T 115/85 (OJ 1990, 30) IBM (Computer related invention).

[36] T 769/92 (unpublished), see Grubb *op cit* at p 265.

[37] T 1002/92 (OJ 1995, 506).

[38] T 38/86 (OJ 1990, 384).

[39] T 158/88 (OJ 1991, 566) *SIEMENS/Character form*.

[40] See Sohel/ General Purpose Management, T 769/92 (unpublished), see Grubb *op cit* at p265.

[41] Peterson/ Queing System, T 1002/92 (OJ 1995, 506).

[42] (1966) Reports of Patent Cases, 511 (Pat Ct); *Fujitsu's Application* (1997) RPC 610 (CA).

[43] The Patents Act of 1793 authored by Thomas Jaffersen embodies this philosophy that 'ingenuity should receive a liberal encouragement. See *Grahm v John Deer Co,* (1966) 383 US 17–10.

[44] The Committee Reports accompanying the 1952 Act informs that the congress 'intended statutory subject matter to include anything under the sun that is made by man.' The US Congress intervention to give wide interpretation was noted in *Diamond v Chakrobarty, 447, U.S. 206.* 447, US 206.

[45] See *Rubber-Tip Pencil Co v Howard,* (1874) 87 US 498 at p 507.

[46] See *Diamond v Chakrabarty,* (1980) 447 US 303 at p 309 (citing *Funk Bros Seed Co v Kalo Inoculant Co,* (1948) 333 US 127, at p 130. cited in Arner, Erika Harmon, 'Patenting Software and Business Methods in 2007,' *IPO Daily News*, 29 January 2008.

[47] *Ibid*.

[48] See *Funk Bros Seed Co v Kalo Inoculant Co,* (1948) 333 US 127, at p 130.

[49] See *State Street Bank & Trust Co v Signature Financial Group, Inc,* (1998) 149 F 3d 1368, at p 1375 (Fed Cir).

[50] See *Diamond v Diehr,* (1981) 450 US 175 at p 188.

[51] See Arner, Erika Harmon, 'Patenting Software and Business Methods in 2007,' *IPO Daily News* 29 January 2008.

[52] See *AT&T Corp v Excel Commc'ns, Inc, (1999) 172 F.3d 1352, 1358* (1999) 172 F 3d 1352, at p 1358 (Fed Cir).

[53] See *In re Alappat,* (1994) 33 F 3d 1526, at p 1543 (Fed Cir).

[54] See AT&T Corp, 172 F 3d at p 1357.

[55] See *State Street Bank & Trust Co v Signature Financial Group, Inc,* (1998) 149 F 3d 1368, at p 1375 (Fed Cir).

[56] See *State Street Bank & Trust Co v Signature Financial Group, Inc,* (1998) 149 F 3d 1368, at p 1375 (Fed Cir).

[57] *Id*, at p 1373.

[58] *Ibid*.

[59] (1992) 958 F 2d 1053; (1992) 22 US PQ2d 1033 (Fed Cir).

[60] 564 F supp 1358, 218 USPQ 212.

[61] (1999) 172 F 3d 1352, at p 1358 (Fed Cir).

[62] (2005) 76 USPQ2d 1385, at p 1390 (BPAI).

[63] However, if this functional descriptive material is recorded on some computer-readable medium that permits its function to be realised, such a claim would be statutory. Nonfunctional descriptive material, including music, literary works, and data compilations, is non-statutory whether claimed alone or recorded on a computer-readable medium.

[64] See *Ex parte Bilski*, 2006 WL 4080055, at *2 (BPAI 2006).

[65] See *In re Comiskey, (* (2007) 499 F 3d 1365, at p 1369 (Fed Cir).

[66] 'The PTO's understanding of the precedents at present is: Any computer program claimed as a machine implementing the program (Alappat, State Street) or as a method of a machine implementing the program (AT&T), is patentable if it transforms data and achieves a useful, concrete and tangible result (State Street, AT&T). Exceptions occur when the invention in actuality preempts an abstract idea, as in a mathematical algorithm (Benson, 409 US at pp 71–72)'.

[67] See *Laboratory Corp of Am Holdings v Metebolite Labs, Inc,* (2006) 126 S Ct 2927, cert dismissed.

[68] *LLC,* (2006) 126 S Ct 1837, 1841.

[69] See *Merc Exchange, LLC v eBay, Inc,* (2007) 500 F Supp 2d 556 at p 586 (EDVa, 27 July).

[70] (2007) 127 S Ct 1746, at p 1756, n 13.

[71] See *KSR Int'l Co v Teleflex Inc,* (2007) 127 S Ct 1727,at p 1746.

[72] (2007) 499 F 3d 1365, at p 1376 (Fed Cir).

[73] *Id*, at p 1376.

[74] *Id*, at p 1378.

[75] See Pamela Samuelson, 'Legally Speaking: Software Patents and the Metaphysics of 271(f)', 2007,*http://people.ischool.berkeley.edu/—pam/papers/cacm%2Osw%2opat%20 extraterr.pdf*.

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