UCLA
UCLA Pacific Basin Law Journal

Title
Legal Protection of Computer Software in Major Industrial Countries: A Survey of Copyright and Patent Protection for Computer Software

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Journal
UCLA Pacific Basin Law Journal, 9(1-2)

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Publication Date
1991

DOI
10.5070/P891-2021974

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COMMENTS

LEGAL PROTECTION OF COMPUTER SOFTWARE IN MAJOR INDUSTRIAL COUNTRIES: A SURVEY OF COPYRIGHT AND PATENT PROTECTION FOR COMPUTER SOFTWARE

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I. INTRODUCTION

It is now generally recognized that the development of software protection occurred approximately simultaneously in most industrial countries.[1] In the first half of the 1980s, courts in the leading software manufacturing countries had to decide cases under the existing copyright laws. These laws did not expressly encompass computer programs. These early cases are usually referred to as first generation cases. In most first generation cases, the courts recognized that computer programs were copyrightable. The courts held that the scope of copyright protection should apply to source codes,[2] object codes,[3] operation system programs,[4] application sys-

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1. *See* Soltysinski, *Protection of Computer Programs: Comparative and International Aspects*, 21 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 1 (1990).

2. Source codes, also referred to as source programs, are the programs originally written by a programmer. Such source programs are generally written in a high-level language such as Fortran, C, Algol, or Basic, or in an intermediate language such as assembly language. Source programs can theoretically be written in machine language. Machine language consists of a set of instructions and operation codes that can be used directly by a computer. Because of the complexity of machine language, most source programs are written in either high-level languages or assembly language. Source programs written in a high level language can be converted into machine language by a compiler or an interpreter. Programs written in assembly language can be processed into machine language by an assembler.

3. Object codes are programs in machine language directly usable by computers. They typically look like a string of numbers and letters. Because they are extremely

tem programs,[5] floppy disks,[6] and ROMs.[7] Courts thus granted copyright protection to all forms of storage, with possibly the exception of microcode.[8]

The courts used different tests for assessing the originality of a program. In the U.S., for example, courts created a generous test which accords originality to any program that differs from existing programs. However, courts in other countries, notably Germany and France, set the threshold much higher, possibly to avoid any monopolization of logic processes.

Although the courts of the leading countries answered the same questions both similarly and independently, the legislatures of those countries determined that the issue of whether computer programs were protected by copyright had to be resolved by way of statutory clarification. A debate arose in most industrial countries over whether computer programs needed a *sui generis* protection.[9] Eventually, all the leading countries amended their copyright laws, some extensively (U.S., Japan), some slightly (Germany). The new statutes generally fixed the term of protection of computer software protection.[10]

The new copyright laws generally codified the courts' holdings in the first generation cases. However, the new laws did not resolve

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difficult to write, they are generally the output of the assembling, interpreting or compiling of a source program.

4. Operation system programs refer to programs that manage the internal operations of a computer. They are either control programs or processing system programs. Control programs allow the computer to operate by initiating and controlling the execution of other programs. Processing system programs comprise compilers, interpreters, assemblers, loaders, and other programs directed to specific applications.

5. Application system programs are programs that direct a computer to perform a specific task, such as word processing, database management, game playing, accounting, payroll, etc.

6. Data can be stored on a variety of storage devices. The most common ones are magnetic tape and disks. Floppy disks, which are made of flexible material, are used primarily for personal computers.

7. Read-Only-Memory, or ROM, is a semiconductor or microcircuit chip that stores data permanently, unlike auxiliary storage devices such as floppy disks, or Random Access Memory (RAMs). The contents of a ROM can only be read or "dumped" in a printout and cannot be altered.

8. Microcode refers to a set of instructions to hardware and has been described as the "boundary between the system's software and its hardware." Soltysinski, *supra* note 1, at 6, n.72.

9. *Sui generis* protection of computer software refers to specific laws that would be drafted exclusively for the protection of computer software. For example, microchips are now protected in many countries by a set of specific laws.

10. For example, in the U.S. the term of protection extends for the life of the author plus fifty years, or seventy years from the time of first publication if the work is made for hire. 17 U.S.C. § 302 (a) and (c) (1990). In Japan, the term of protection is also for the life of the author plus fifty years and for a word created by an employee, fifty years after publication of the work or fifty years after creation of the work if it has not been made public within the period of fifty years following its creation. Law No. 48 of 1970, art. 53(1) and (3).

all the issues. In particular, they gave little guidance as to what they actually protected; the idea expressed in the computer program or the expression of that idea. A series of cases, referred to as second generation cases, dealt with issues that included the level of originality required for a copyright, reverse engineering, fair use, moral rights, and enforcement. In this second phase of software protection development, courts of the leading countries, excluding Germany, reached similar conclusions, resulting in some uniformity in international software protection.

This comment reviews the chronology outlined above in selected countries (Japan, U.S., France, Germany) and regions (the EEC). Typically, the copyright laws of these countries protect the expression of ideas, not the ideas themselves. The idea/expression dichotomy, however, has been blurred by many courts. Because of the inherent difficulties resulting from the idea/expression dichotomy, in the past few years, most of those countries have also played with the idea of protecting computer programs through their patent laws. This comment also reviews these attempts at using patent law to protect computer programs.

Finally, this comment questions whether a *sui generis* legislation would not resolve more adequately the problems encountered so far in the protection of computer program through copyright or patent protection.

II. COPYRIGHT PROTECTION: THE IDEA/EXPRESSION DICHOTOMY

Most copyright laws explicitly preclude the copyrightability of ideas. Expressions of ideas, however, are generally copyrightable. Courts in most countries have had difficulties distinguishing the idea from the expression, and often have merged the two concepts, extending copyright protection beyond the expression of the idea so as to protect the idea itself.[11] Though courts have proposed some rules to delineate the notions of idea and expression, none of those rules have proven readily workable. The question whether copyright protection should cover the idea behind the program code as well as the literal expression of the program code remains largely unanswered. A country-by-country review of the statutory provisions and the court implementations will illustrate how the idea/expression dichotomy issue has been approached in the leading software manufacturing countries.

11. *See* Hoffman, Grossman, Keane & Westby, *Protection for Computer Software: An International Overview, Part 1*, 10 EUR. INTELL. PROP. REV. 337 (1988) [hereinafter Hoffman].

A. Japan

1. The First Generation Cases

The current Japanese Copyright Act was enacted in 1970[12] and is one of the most modern copyright statutes in the world. It grants copyright to any production in which thoughts or emotions are expressed in a creative way.[13] The law also recognizes moral rights of authors and protects neighboring rights for performers, producers of phonorecords, and broadcasting organizations. Until the Japanese Copyright was amended in 1986 to explicitly cover computer programs, computer programs were not mentioned in the Japanese Copyright Law. Courts, however, regarded these programs as copyrightable works within Article 2(1)(i) of the 1970 Japanese Copyright Act as works of authorship in the scientific domain.

The first generation cases in Japan turned on the interpretation of Article 2(1)(xv), which broadly defines means of reproduction.[14] These landmark first generation Japanese cases questioned whether computer programs, in particular video game programs, were copyrightable works and whether ROMs and floppy disks that embody such programs were reproductions or copies of such programs within the ambit of Article 2(1)(xv) of the Copyright Law. All cases answered the question in the affirmative.[15]

In the pioneering case of *Digdug v. Zigzag*,[16] the defendant company copied the object code of plaintiff's program, Zigzag, a video game, and stored it unchanged, with the exception of a different name, in a ROM chip. The *Digdug* court found the level of originality of the Zigzag program high enough to deserve copyright protection under Article 2(1)(i) of the original 1970 Copyright Act. The court reasoned that a program could be copyrightable as a literary work as long as it had scholastic scope and expressed ideas in a creative way.[17]

That same year, in *K.K. Taito v. K.K. Ing. Enterprises*,[18] the Tokyo District Court held that a program for a video game was

12. Law No. 48 of 1970.

13. Law No. 48 of 1970, as amended by Law No. 62 of 1985 (amendments relating to computer programs), and as amended by Law No. 64 of 1986, as quoted in Hoffman, *supra* note 11, at 341, n.46. Article 2(1)(i) reads: "A work of authorship is a production in which thought or sentiments are expressed in a creative way, and which falls within the literary, scientific, artistic or musical domain."

14. Doi, *Amendment of the Copyright Law of Japan*, PATENTS & LICENSING, Aug. 1986 at 7, 9. Article 2(1)(xv) defines reproduction means (*fukusei*) as means for reproducing (*saisei*) in a tangible form by means of printing, photography, copying (*fukusha*), sound recording, visual recording or other method.

15. An excellent summary can be found in T. Doi, INTERNATIONAL COPYRIGHT LAW, JAP-17 (1990).

16. Hoffman, *supra* note 11, at 342, n.49.

17. *Id.* at 342.

18. Judgment of Dec. 6, 1982, Chisai (District Court), Tokyo, 1060 HANJI 18.

copyrightable and that the copying of the plaintiff's object code into a ROM constituted copyright infringement. The court noted that:

> The discovery of solutions and combination of instructions naturally requires logical thinking by the creator, and therefore the program as finally complete reflects the creator's individual characteristics, which are different from other programmers. The plaintiff's program is a creative expression of the scientific thoughts of the creator.[19]

Using the general provision of Article 2(1)(xv), which defines the reproducing means in broad terms, the court easily found that a ROM or a diskette in which a program was embodied constituted a reproduction of the program and that copying of another ROM or diskette was another reproduction.[20] In *K.K. Taito v. Makoto Denshikogyo K.K.*,[21] the Yokohama District Court also held that a plaintiff's program for a video game was a work of authorship, hence copyrightable, and that the defendant's storing of the object code program in other ROM's constituted an infringement of plaintiff's reproduction right. The court noted that the plaintiff's program was a creative expression of the programmer's thoughts that fell within the scientific domain.[22]

The Osaka District Court's holding in *Konami Kogyo K.K. v. K.K. Daiwa*[23] was almost identical to the holdings in the two previous *Taito* cases. However, the court did not rule on plaintiff's assertion that its video game was a cinematographic work. The Tokyo District Court issued such a ruling in *K.K. Namco v. Suishin Kogyo K.K.*,[24] where the court found infringement of a cinematographic work copyright for plaintiff's video game "PAC-MAN." In *Konami*, the court found that the plaintiff's computer program was a work of authorship in the scientific domain and the object code program stored in ROMs attached to the printed circuit board of the plaintiff's game was its reproduction. The court further held that the defendant's act of copying the object code program from the plaintiff's ROMs into another ROM with the aid of the ROM writer was reproduction and therefore constituted copyright infringement.[25] The court granted a broader protection in *Namco*, when it also recognized copyright infringement of the cinematographic aspects of a video game.

The above decisions held computer programs copyrightable

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19. *Id.*

20. *See* Doi, *Copyright Protection of Computer Programs*, PATENTS & LICENSING, Oct. 1985, at 7.

21. Judgment of Mar. 30, 1983, Chisai (District Court), Yokohama, 1081 HANJI 125.

22. *See News Section, Overseas News*, 5 EUR. INTELL. PROP. REV. D-138 (1983).

23. Judgment of Jan. 26, 1984, Chisai (District Court), Tokyo, 1129 HANJI 120.

24. Judgment of Sept. 28, 1984, Chisai (District Court), Tokyo, 1129 HANJI 120.

25. *See News Section, Overseas News*, 4 EUR. INTELL. PROP. REV. D-87 (1984).

under the old law and ruled that the object program stored in a ROM was a protected reproduction of the copyrighted program. "Means of reproduction" thus encompassed both ROMs and floppy disks embodying the programs. The Tokyo District Court went further in the more controversial case of *Microsoft Corp. v. Shuwa System Trading Co.*[26] In this case, the court broadly interpreted the concept of "means of reproduction" when it enjoined the defendant from publishing and selling books, containing a step-by-step analysis of plaintiff's program, made for Hitachi's PC-8001, and a translation of plaintiff's program into an assembly language program readable by programmers. Thus, the court held that ROMs and floppy disks were no longer the sole means of reproduction in which computer programs could be embodied. Books and any other printed materials containing computer programs in a form readable by programmers also constituted means of reproduction within the ambit of Article 2(1)(xv). The *Microsoft* case, while decided before the Copyright Act was amended, raised other issues that were typically dealt with in second generation cases. It will therefore be revisited in more detail below in the discussion of the second generation cases.

2. Statutory Amendments

The original 1970 Japanese Copyright Act arguably was sufficient to protect computer programs against unauthorized reproduction under the broad definition of "works of authorship" and "reproduction."[27] Yet, the general international tendency, led by the United States, was to mention explicitly computer programs in the copyright laws, and to remove any confusion arising from the previous caselaw. The Japanese legislature became interested in harmonizing Japanese software copyright protection with the copyright systems of other leading manufacturing countries (the U.S., Germany, France, U.K.) which at that time did not favor a *sui generis* approach.

In 1985, the Diet adopted a proposal by the Ministry of Educa-

26. Judgment of Jan. 30, 1987, Chisai (District Court), Tokyo, 1219 HANJI 48.

27. At the 1991 Conference on Computer Law in the Pacific Basin, Prof. Teruo Doi argued that "[i]t was the hot debate between the two government agencies (the Ministry of Education and the MITI) and the resulting confusion in the computer industry that prompted the legislative action to amend the Copyright Act. For the purpose of settling the debate and removing the confusion as to the copyright protection of computer programs, the amendment was timely. [. . .] The problems dealt with by these provisions should normally be left for courts to determine, but the legislative clarification will promote legal stability." Doi, *The Evolution of Software Copyright Protection in Japan and the Position of the Japanese Government Concerning the Proper Scope of Copyright Protection as Reflected in the Uruguay Round of the GATT*, paper presented at the Conference on Computer Law in the Pacific Basin, Newport Beach, California, February 15, 1991, at 8.

tion's Cultural Affairs Agency (CAA).[28] It rejected a proposal by MITI, which had advocated a *sui generis* protection.[29] The MITI project provided for a fifteen year period of protection, identical to the period of protection conferred by patents. It abolished moral rights[30] and included an "originality" examination[31] of the software. Programs would be deposited with a governmental agency and not be immediately available to the public. They would be published later as functional abstracts. The proposal also recognized that the idea underlying the program, i.e., the algorithm on which the program is based, could be protected if examined and deemed to be original. Finally, the MITI project contained regulations for compulsory licensing,[32] according to which the MITI would be able to force licensing of the protected software if it were considered to be in the national interest, or if a firm developing a new program based on the existing one wanted to sell its new product.

The MITI project was rejected by the Diet, very likely under pressure from the U.S and also due to Japanese companies' opposition to compulsory licensing provisions.[33] The EEC Commission

28. The CAA controls the Japanese copyright bureaucracy. The CAA's position is exposed in an interim report entitled: Cultural Affairs Agency, Interim Report of the Copyright Council, Sixth Subcommittee (on Computer Software), Jan. 1984.

29. *Proposal with Respect to Rearrangement of the Foundation for Software-Aiming at Security Legal Protection for Software* of Dec. 1983 *cited by* Hoffman, *supra* note 11, at 341. MITI controls Japanese Patent Policy. For an excellent analysis of MITI's proposal, see Rahn, *Sonderschutzgesezt für Computerprogramme Int'l Japan*, GRUR Int. 217, 218 (1984). MITI had also exposed its view in a much earlier report, *Interim Report of the Software Legal Protection Committee of the Japanese Ministry of International Trade and Industry, reprinted in* 6 COMPUTER L. SERV. REP. 1, 3-6 (1973).

30. Moral right is a concept derived from French copyright law and includes "non-property attributes of an intellectual and moral character which give legal expression to the intimate bond which exists between a literary or artistic work and its author's personality; it is intended to protect his personality as well as his work." It is to be distinguished from copyright, which is a property right and guarantees an author certain rights, such as the right of reproduction, of exhibition, etc. The moral right traditionally comprises four aspects: the right of divulgation, the right to withdraw or disavow, the right of paternity and the right of integrity. Sarraute, *Current Theory on the Moral Right of Authors and Artists Under French Law*," 16 AM. J. COMP. L. 465, 467, 480-481 (1968).

31. Hoffman, *supra* note 11, at 341. The originality requirement proposed by MITI was analogous to the patentability requirement.

32. Compulsory licensing refers to the granting of a non-exclusive license under certain conditions, for example in the case of a patent, when the patentee does not "work," i.e, use or commercialize the patented invention within a given period, typically three to five years. The royalties obtained through a compulsory license are generally low. Compulsory licensing is included in patent laws of most industrialized countries with the notable exception of the United States. Traditionally, compulsory licensing has had bad press in the United States even though in countries where it exists, very few compulsory licenses are ever granted.

33. U.S. companies feared that Japanese software companies could develop software developed by U.S. companies by simply paying a low royalty fee that would

also had addressed a critical formal note to the Japanese government.[34] Some commentators have argued that the amended Act kept a number of characteristics developed in the MITI proposal.[35]

The new law defines the expression computer program (*puroguramu*).[36] Commentators[37] agree that this definition of computer programs covers all types of programs, including application software operating system programs. The Amendment of 1986[38] added computer program works (*puroguramu no chosakubutsu*) to the list of works of authorship.[39] Computer programs are therefore now protected under the general copyright protection afforded by the original 1970 Japanese Copyright Act. Application programs are covered in both their source code and object code versions. Operating system programs permit application programmers to write programs in a more comprehensible type of language. Microcodes,

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not cover the research and development expenses involved in the software's creation. Japanese companies also worried that they may violate copyright laws in countries other than Japan if they sold software developed from existing protected software in those other countries.

34. "Note Verbale" of the EEC Commission, 1984 (exact reference not available). For further details, see O'Farrell, *Recent Developments in Copyright in the EEC*, 7 EUR. INTELL. PROP. REV. 102-107 (1985).

35. *See* Hoffman, *supra* note 11, at 341. In particular, the Amended Japanese Act, like the MITI proposal, excludes protection for programming languages, rules and algorithms. It permits modifications in a program work to use the software in a particular computer, i.e., it seriously diminishes the author's moral rights. Furthermore, it grants not only economic rights but also moral rights to the employer. Like the MITI proposal, it does not address the issues of reverse engineering. The new Japanese law also provides a generous exemption to the innocent user, who can continue using the program even after she learns about the program's illegitimate origin. Finally, the new law allows registration of programs.

36. Amended by Law No. 62 of 1985 (amendments relating to computer programs).

37. Hoffman, *supra* note 11, at 341, n.46. According to Article 2(1)(x) bis, a computer program is defined as follows: "[A] program means an expression of a combination of instructions and statements capable of causing a computer having information processing capabilities to achieve a particular result." Compare this with the almost identical U.S. definition 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." 17 U.S.C. Section 101 (1990), and the similar definition of computer program adopted by the World Intellectual Property Organization (WIPO) in 1978: " 'Computer program" means a set of instructions capable, when incorporated in a machine-readable medium, of causing a machine having information-processing capabilities to indicate, perform or achieve a particular function, task or result." Model Provisions of the Protection of Computer Software, 1978 Copyright 6, WIPO Publication No. 814.

38. *See* Karjala, *Protection of Computer Programs Under Japanese Copyright Law*, 8 EUR. INTELL. PROP. REV. 105 (1986).

39. Hoffman, *supra* note 11. Article 2(1)(i) of the Act defines "works" (*chosakubutsu*) as follows: " 'Works' means a production in which thoughts or sentiments are expressed in a creative way and which falls within the literary, scientific, artistic or musical domain." Article 10(1) of the Act enumerates various types of works including computer programs.

however, may not be covered by the new definition.[40]

The new law also contains express exceptions to protection given a program work. Protection under the new Act does not extend to programming languages, rules or algorithms used for making such works.[41]

The provision regarding the exclusion of programming languages has generally been interpreted by commentators as the exclusion of high level languages such as Cobol, Fortran, C and assembly languages. However, some authors have raised the possibility that the exclusion may also concern operating system languages and microcodes.[42] Japanese courts have not yet decided the issue regarding microcodes. However, the above-mentioned *Microsoft* case, decided before the enactment of the new Copyright Act, indicates that the statutory exclusion does not cover operating system programs.[43]

The "rule" exception has not been understood clearly by Japanese commentators. It may mean special conventions are necessary to connect a program with another program in the same computer or with a program in another computer.[44]

The "algorithm" exception provides the most interest, particularly in contrast with the corresponding U.S. statutory exception.[45]

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40. Hoffman, *supra*, note 11. Karjala argues that if a computer is simply the black box perceived by outside programmers, microcodes could be interpreted as a part of the computer that does not cause the computer to function in order to achieve a certain result until more instructions are given, such as an operating system program or an application program. However, if the computer is viewed as a set of hard-wired digital circuits, a microcode is a program because it instructs the circuits of the computer to operate in a particular sequence. However, Karjala believes that for policy reasons, microcodes, which are in fact a limited set of instructions, may not fall within the definition of works and should not be covered by the new Japanese Act.

41. In Article 10, para. 3, the new Act defines each of these terms:

> (i) "programming language" (*puroguramu gengo*) means letters and other symbols as well as their system for use as means of expressing a program;
> (ii) "rule" (*kiyaku*) means a special rule on how to use, in a particular program, a programming language mentioned in the preceding item; and
> (iii) "algorithm" (*kaihō*) means method of combining, in a program, instructions given to a computer.

Translated in Doi, *Copyright Protection of Computer Programs*, PATENTS & LICENSING, Oct. 1985, at 7.

42. Karjala, *supra* note 38, at 107, 111.

43. *Supra* note 25 and accompanying text. In *Microsoft*, the court held that the creation of such programs involves a high degree of technical knowledge, and is, in that sense, an expression of the scientific thoughts of the creators of those programs, which makes those works a part of the scientific domain.

44. Karjala, *supra* note 38, at 111.

45. Although it may be argued that the U.S. copyright law, contrary to Japanese copyright law, does not explicitly exclude algorithms, particularly in the light of U.S. court decisions such as *Whelan Assoc. Inc. v. Jaslow Dental Laboratory*, 609 F.Supp. 1307 (F.D. Pa. 1985), *aff'd* 797 F.2d 1222 (3d Cir. 1986), the corresponding U.S. section, probably Section 102(b), which states that: "In no case does copyright protection

Some commentators have interpreted the definition of algorithm in section 10(3)(iii) to include the protection of the idea while excluding protection of the structure. These commentators note that the definition of "algorithm" seems to be directed to the instructions and their combination rather than the idea underlying the algorithm.[46] More likely, the intent of the algorithm exception is to exclude from protection the organization and structure of a program, i.e., in other terms the algorithm, which is the basic structural method embodied in a program.[47]

The new law addresses the issues of employee proprietorship. An employer can be the author of a program work under specific statutory conditions.[48] Unlike other copyrightable works, program works need not be published under the name of the employer for the employer to become the author of the program works. This special treatment for computer programs was welcomed by software companies which often keep the programs as trade secrets and thus do not publish them. According to the new act, both moral rights and economic rights (*chosakuken*) are transferred to the employer when the program work is made for hire. Traditionally, only economic rights were transferable, whereas moral rights are inalienable.

Moral rights are further limited, if not abolished, by amended Article 20(2), which sets forth an exception to an author's right to the integrity of his work. Article 20 was amended in order to facilitate the use of computer programs by allowing necessary modifications.[49] In fact, what the Act gives with one hand in Article 20(2),

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for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." 17 U.S.C. § 102(b) (1990). For a discussion of the *Whelan* decision see *infra* notes 83, 84 and accompanying text.

46. *See* Hoffman, *supra* note 11, at 341, where the authors observe that there is no limiting language that restricts the meaning of "expression" to the appearance of the code rather than to its structure, form and organization. They conclude that the language of Article 2(1)(x) bis could be interpreted broadly as encompassing both the function of the program and its structure. This approach would be similar to the *Whelan* definition of expression discussed in section II B.

47. *See* Karjala, *supra* note 38, at 108, in which the author argues that "the copyright in the program work does not protect against use of the basic structural design revealed by examination of the program."

48. *See* Doi, *supra* note 41, at 11. Article 15(2) states that: "The authorship of a program work which, at the initiative of a legal person, etc. is made by its employee in the course of his duties, shall be attributed to that legal person, etc., unless otherwise stipulated in a contract, work regulation or the like in force at the time of the making of the work."

49. *See* Doi, *supra* note 41, at 11. Article 20(2) reads: "The right to preserve the integrity of a work provided in Article 20(1) shall not apply to the following modifications: (iii) modification which is necessary for enabling to use in a particular computer a program which is otherwise unusable in that computer, or to make more effective the use of a program work in a computer."

it takes away with the other in Article 47(2).[50] The latter article determines the limitations of the economic rights of an author and provides exceptions to an author's exclusive right of reproduction or adaptation.[51] The owner of a copy of a program is entitled to make copies or adaptations of the program only to the extent necessary to use the program in a computer. Apparently, the lessee may not be able to make copies unless that right has been contracted in the lease agreement.[52] Furthermore, in order to study the organization and structure of a program, which apparently is in the public domain, it is necessary to copy and reproduce the program. Article 47(2) may not authorize such actions since such reproduction would not constitute making a copy for use in a computer. In other words, reverse engineering, i.e., the study of the structure of a program from the object code, seems excluded by Article 47(2).

The term of copyright under Japanese law is fifty years after the death of the author or, for an entity, fifty years from publication or from creation if the work has not been published. Amended Article 51 extends this rule to all program works in which the employer is the author under amended Article 15(2).

Article 76 regards the registration of the date of creation of a program.[53] Because Japan is a signatory of the Berne Copyright Convention, copyright registration is not mandatory.[54] However, the new law provides for a copyright registration that gives a presumptory date of creation and authorship. The copyright regis-

50. *See* Karjala, *supra* note 38, at 108-109.

51. *See* Doi, *supra* note 41, at 8. Article 47(2) reads:

> (1) The owner of a copy of a program work may make copies or adaptations (including the making of copies of a derivative work created by means of adaptation) of that work if and to the extent deemed necessary for the purpose of exploiting that work in a computer by himself, provided that the provision of Article 113, paragraph (2) does not apply to the use of such copies in connection with such exploitation; (2) if the owner of a copy mentioned in the preceding paragraph has ceased to have the ownership of any of copies mentioned in that paragraph (including copies made in accordance with the provision of that paragraph) for reasons other than those of destruction, he may not thereafter preserve other copies in the absence of any declaration of the intention of the copyright owner to the contrary.

52. This provision is almost identical to the corresponding U.S. section in which the word "possessor" was amended, without any justification, to read "owner." 17 U.S.C. § 117 (1990).

53. *See* Doi, *supra* note 41, at 8. Article 76(2) reads:

> (1) The author of a program work may have the date of creation of his program work registered within the period of six months following the creation of that work; (2) Program works as to which the date of creation is registered in accordance with the preceding paragraph shall be presumed to have been created on the date registered.

54. The Berne Convention grants protection to works which comply only with the copyright formalities in the country of origin. Article 3, Paris Act. Furthermore, Article 17(2) of the Japanese Copyright Act states that no formalities are necessary for obtaining either economic or moral rights under the Japanese copyright law.

tration requires the true name of the author of a work, the date of first publication (or creation), and the transfers of a copyright or establishment of a pledge right regarding a copyright. This copyright registration is advantageous in litigation as it gives the registered software owner a valid presumption over the date of creation and the authorship.

Finally, Article 113 sets out infringement acts while granting a seemingly generous exemption to the innocent user.[55] According to article 113, an act of infringement requires bad faith. In practice, the bad faith requirement may not offer such a wide exemption due to the high burden borne to show good faith by the user of a widely pirated computer program.

Though the amended Japanese Copyright Law may not have been necessary to protect computer programs, it helps clarify what is copyrightable in a computer program. Though one of the most detailed statutes on computer programs, the Japanese law leaves a number of issues unclear. While algorithms and programming languages are not copyrightable, it is uncertain whether operating systems and microcodes are protected. Reverse engineering may not be permitted since it seems to run afoul of the copyright holder's exclusive right of reproduction. Some of those issues have been addressed in cases decided around the enactment of the 1986 Copyright Act.

3. The Second Generation Cases

In *Microsoft Corp. v. Shuwa System Trading Co.*,[56] the Tokyo District Court essentially held reverse engineering illegal. As discussed above, the defendant published and sold books containing a step-by-step analysis of plaintiff's BASIC interpreter, made for Hitachi's PC-8001, and its translation into an assembly language program readable by programmers. The defendant put much effort into retrieving the source code from the object code and intended to publish the program in a book in order to allow the users of that program to study the program and effectively use the program. The court recognized that operating system programs are copyrightable

55. *See* Doi, *supra* note 41, at 8. Article 113 reads:

> An act of using in a computer, in the conduct of business, copies made by an act infringing a copyright in a program work (including copies made by the owner of such copies in accordance with the provision of Article 47 bis, paragraph (1) as well as copies of a program work imported as mentioned in item (i) of the preceding paragraph and copies made by the owner of such imported copies in accordance with the provision of Article 47 bis, paragraph (1)) shall be considered to constitute an infringement on that copyright, so long as a person using such copies is aware of such infringement at the time when he has acquired title to use these copies.

56. Judgment of Jan., 1987, Chisai (District Court), Tokyo, 1219 HANJI 48.

because they involve a high degree of technical knowledge and therefore fall within the scientific domain. The court then held that defendant's source program was a reproduction of plaintiff's program as it had been derived from plaintiff's object program.[57] Finally, the court flatly rejected defendant's fair use claim.[58] The court was concerned that defendant acted against the will of the plaintiff. The court could not find sufficient policy reasons to justify defendant's publication of the programs. Thus, it appears that reverse engineering inevitably infringes copyrights under Japanese law since it requires the copying of the program, and thus, involves the reproduction of the computer program.[59]

The next important second generation case was *System Science K.K. v. Toyo Sokki K.K.*[60] There, the defendant copied three of plaintiff's programs, placed them in ROMs and installed the ROMs in devices that were later sold. The important issue was whether defendant also copied a fourth program. The Tokyo District Court, after looking at both plaintiff's program and defendant's program, held that there was no similarity between the creative elements and therefore there was no infringement. Using Article 10(3)(iii), which excludes algorithms from copyright protection, the Tokyo High Court agreed with the District Court on this particular issue. As stated in the district court's opinion:

> Where there is no similarity of elements containing creativity, we must say that even identity or similarity of expression in elements not containing creativity does not give rise to infringement of the adaptation right.[61]

The High Court examined the two programs with great care and found it difficult to find creativity in the combinations of the instructions for the program. The *System* decision strongly runs against the approach taken by U.S. courts and also seems to contra-

57. In fact, plaintiff's source program was never divulged to the court who finally held the two source programs identical without ever seeing plaintiff's source code. Karjala, *The First Case on Protection of Operating Systems and Reverse Engineering of Programs in Japan*, 10 EUR. INTELL. PROP. REV. 172, 173 n.9 (1988).

58. *Id.* at 172, 177. The exclusive rights of authors are subject to some limitations for policy reasons, for example, so that the general public can enjoy the author's works. Under Japanese Copyright Law, those limitations are as follows: (1) Private use and fair uses: (a) reproduction for private use under Article 30; (b) quotation of works under Article 32; (c) fair use in translation or adaptation under Article 43; (2) Non-profit, educational and charitable uses: (a) reproduction at public libraries under Article 31; (b) reproduction at schools and other educational institutions under Article 35; (c) reproduction for examinations and tests under Article 36; (d) reproduction in braille under Article 37; (e) non-profit public performance under Article 38; (3) Specific situations, under Articles 39, 40, 41, 42 and 44.

59. Karjala, *supra* note 57.

60. Judgment of Mar. 31, 1989, Chisai (District Court) Tokyo 1322 HANJI 138, *aff'd in part, rev'd in part*, Judgment of June 20, 1989, Kosai (High Court) Tokyo (slip opinion).

61. District Court Opinion at 20.

dict the *Microsoft* decision. In fact, the High Court's analysis is very similar to the analysis in the *Bappert und Berker v. Sudwestdeusche Inkasso* decision,[62]* which is still the landmark decision in German copyright law, as will be seen below.[63]

The early computer cases all favored copyright protection for computer programs. However, neither the 1986 amended Act nor the subsequent case law give much guidance as to what test of originality or creativity the courts will follow. Using the expression/idea terminology, a concept more to the U.S. courts, the new Japanese copyright law does not help to distinguish expression from idea. Clearly, only the expression is copyrightable.[64] Yet ideas, unlike algorithms, rules and programming languages, are not expressly excluded from copyright protection. The sequence, structure and organization (SSO) of a program may not be protected under Japanese law. The *System* court seems to indicate that the "processing flow" is an algorithm and therefore not copyrightable.

Japanese courts appear willing to protect computer programs at levels a bit higher than literal code, but unlike U.S. courts, seem reluctant to extend that protection beyond it to the SSO of the program.[65] In practice, this has been sufficient to provide adequate protection to computer programs.

B. United States

The original U.S. Copyright Act dates from 1909. In 1964, the U.S. Copyright Office started registering and granting copyright protection to computer programs as "books" as long as "the ele-

62. *English translation in Case Comment*, 8 EUR. INTELL. PROP. REV. 185 (1986). For a discussion of this case and relevant German law, see *infra* notes 121, 122 and accompanying text.

63. A detailed review of the *System* decision can be found in Karjala, *Japanese Courts Interpret the Algorithm Limitation on the Copyright Protection of Computer Programs*, 12 EUR. INTELL. PROP. REV. 235 (1990).

64. Article 2(1)(1) of the Japanese Copyright Law defines a copyright work as "the creative *expression* of thoughts or emotions, including literary, scholarly, artistic ,and musical works." (emphasis added).

65. Japanese copyright law also confers the copyright owner the exclusive right to derivative works. This right is called "adaptations right" (*hon-an ken*) and derives from Article 27 which states that the author shall have the exclusive right to translate, arrange musically, transform, dramatize, cinematize, or otherwise adapt his work. Commentators have stated that the right to derivative works does not apply to computer programs because of their functional, utilitarian nature. Copyright protection is limited to protection under the reproduction right. Durney, *Derivative Works and the Idea/Expression Dichotomy*, PATENTS & LICENSING, June 1989, at 7. Thus, unlike the U.S. case law that seems to accord broad protection to computer programs under the derivative works doctrine, copyright protection of computer programs in Japan would be limited to the prohibition of the use of software which is substantially identical to the literal expression of another software. See *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*, 609 F. Supp. 1307 (E.D. Pa. 1985), aff'd. 797 F.2d 1222 (3d Cir. 1986).

ments of assembling, selecting, arranging, editing and literary expression . . . are sufficient to constitute original authorship."[66] Fewer than two thousand computer programs were registered between 1964 and 1977.[67]

The 1909 Copyright Act was amended in 1976. Copyrightable works were defined as "original works of authorship in any tangible medium of expression" and comprise literary, musical, dramatic, choreographic, pictorial, sculptural, cinematic, audiovisual and phonographic works.[68] Section 102(b) was drafted to exclude copyright protection for any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.[69] Thus, copyright protection could only be granted to the expression of an idea and not to the idea embodied in the work.

The 1976 Copyright Act did not explicitly accord copyright protection to computer programs.[70] However, the legislative history made it clear that computer programs were considered as literary works, and as such copyrightable, as long as they incorporated authorship in the programmer's expression of original ideas. The House Report accompanying the 1976 Act stated that only the expression adopted by a programmer in a computer program was copyrightable while the method embodied in the program, i.e., the algorithm of the program, was not copyrightable.[71] The National Commission on New Technological Uses of Copyrighted Works (CONTU) recommended to the President and the Congress in 1978 that the copyright law be amended to "make it explicit that computer programs, to the extent that they embody an author's original creation, are proper subject matter of copyright."[72]

The CONTU's recommendations were substantially adopted by Congress when it amended the 1976 U.S. Copyright Act on December 12, 1980.[73] Amended section 101 now includes a definition of computer program.[74] Based on the CONTU's recommendations,

66. Levine, *History of Copyright Protection for Computer Programs*, paper presented at 1991 Pacific Rim Computer Law Conference, Newport Beach, California, February 15, 1991.

67. *Id.*

68. 17 U.S.C. § 102(a) (1990).

69. 17 U.S.C. § 102(b) (1990) reads: "In no case does copyright protection for an original work extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work."

70. Pub. L. No. 94-553, 90 Stat. 2541 (1976) (codified as 17 U.S.C. § 101-117 (1976)).

71. H. REP. No. 1476, 94th Cong., 2d Sess. 57, *reprinted in* 1976 U.S. CODE CONG. & ADMIN. NEWS 5659, 5670.

72. FINAL REPORT 1677 (1979).

73. Pub. L. No. 94-553, 94 Stat. 2541 (1980).

74. 17 U.S.C. § 101 (1990) now states that a computer program is "a set of state-

Congress also introduced two limitations of the exclusive right in an original program by authorizing the owner of a legally acquired computer program to make back-up copies and adaptations of the owner's software.[75] The limits of the right have not been clearly defined since the expression "owner of a copy" has been subject to conflicting interpretations in recent years.[76]

1. First Generation Cases

Unlike other nations which still struggled with judge-made notions of granting copyright protection to computer programs, U.S. copyright law was amended very early to encompass computer programs. Thus, the first generation of U.S. cases generally date from before 1980.

The leading U.S. first generation case is *Synercom Technology, Inc. v. University Computing Co.*[77] In *Synercom*, one of the earliest cases in which a court attempted to delineate the distinction between idea and the expression of an idea, University Computing Company developed a program comprising a preprocessor that would permit data stored in Synercom's input formats to be used in defendant's program. Plaintiff had established a "standard" data entry format in the field of structural analysis programs.[78] The

ments or instructions to be used directly or indirectly in a computer in order to bring about a certain result."

75. 17 U.S.C. § 117 (1990), states:

> Notwithstanding the provisions of § 106, it is not an infringement for the rightful owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided: (1) that such new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or (2) that such copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful. Any exact copies prepared in accordance with the provisions of this section may be leased, sold or otherwise transferred, along with the copy from which such copies were prepared, only as part of the lease, sale, or other transfer of all rights in the program. Adaptations so prepared may be transferred only with the authorization of the copyright owner.

The CONTU had originally proposed that the provision apply to the "rightful possessor" but Congress changed that expression to "rightful owner" without explanation.

76. *See* Soltysinski, *supra* note 1, at 11. The ambiguity has been extensively used by software producers. So-called shrink-wrap licenses do not grant the title of rightful owners to the licensee. Thus, a person who acquires possession of a computer program by rental, lease or some other similar fashion, may not be entitled to adapt or make a copy of a program for archival and other purposes defined by Section 117.

77. Synercom Technology, Inc. v. University Computing Co., 462 F. Supp 1003 (N.D. Tex. 1978).

78. For an excellent analysis of standards, see Scott, *'Look and Feel' and Other Emerging Issues: The Effect of Standardization in the Computer Industry on the Development of Computer Law*, paper presented at 1991 Pacific Rim Computer Law Conference, Newport Beach, California, February 15, 1991.

court held that input formats were not the expression of an idea, and, therefore, as a mere idea, were not copyrightable. Defendant had copied only the "expressed ideas" and not the expression of those ideas.[79] The court used a very interesting analogy, the figure-H shift pattern of the gear transmission in automobiles. It argued that just as the H-pattern may be socially desirable by avoiding the retraining of drivers so were standard data entry formats, and thus, the court would not prohibit the use of that pattern by a second manufacturer.

Because Congress quickly acted to clarify the copyright law in the field of computer programs and thus removed any lingering doubts about the copyrightability of computer software, the American first generation cases did not play the same role as in other countries where the statutory clarifications occurred later (Japan) or to a lesser extent (Germany).[80]

2. Second Generation Cases

Second generation cases have resulted in conflicting decisions, thus offering software users and manufacturers little guidance. In trying to interpret the 1980 amendments to the Copyright Act, the courts had trouble identifying the subject-matter of protection.

In an early case, *Apple Computer, Inc. v. Franklin Computer Corp.*,[81] the district court first granted copyright protection to an operating system software despite the absence of an operating system category in the amended statute. Defendant's operating program performed the same function as Apple's operating system program, as it had to be compatible with a given hardware. Franklin argued that the concept of compatibility was an idea that could not be copyrighted. Thus, Franklin was free to copy Apple's operating system program to make its Apple II-compatible hardware. The court reasoned that a program was copyrightable if it could be

79. The court stated that:

> The preparation of a computer program in *any* language from a general description of the problem to be solved (as, for example, is contained in the forms and manuals, which prescribe a problem involving a set of ordered inputs in a particular arrangement which must be accepted by the computer and transmitted to the . . . program) is very dissimilar to the translation of a literary work, or to the translation of a program from one language to another.

Synercom, 462 F. Supp. at 1013, n.5.

80. *See* section II (1) of this comment. The German legislature barely amended the Copyright Act to include computer programs. In Germany, the amendments to the Copyright laws did not reduce the threshold of originality required for computer programs. In the U.S., by contrast, the requirement for originality has been interpreted very liberally by the courts. Typically, most computer programs have passed the test for originality as long as the programs could be traced back to an author.

81. 545 F. Supp. 812 (E.D. Pa. 1982), *rev'd*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed per stipulation*, 464 U.S. 1033 (1984).

written in a different mode of expression. The court, using this criterion to determine whether the program was the expression of an idea or a mere idea, rejected Franklin's claim to the pursuit of true compatibility.[82]

In *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*,[83] the court interpreted very narrowly one of the statutory limitations to the exclusive right in an original program. In that case, the plaintiff developed a program in Even Drive Language (EDL), designed to run a dental laboratory, for use with the IBM Series 1 computer. The defendant, a former customer licensee of the plaintiff, had acquired that program legally. The defendant then designed a similar program compatible with the more common IBM PC. Even though there was no copying, the programming languages used being different and not interchangeable, the court found substantial similarity between the programs in their overall structure and organization (file structure, screen outputs and some subroutines). Straining the distinction between idea and expression, the court held that file structures and visual displays are copyrightable expressions. The *Whelan* court distinguished its holding from the *Synercom* decision based on the difference between input formats and programs *per se*.[84]

That same year, a Federal District Court in California in *Broderbund Software, Inc. v. Unison World, Inc.*[85] held that screen formats were also copyrightable. The court, noting "the eerie resemblance"[86] between the display screens and the user options of the Broderbund and the Unison programs, used the concept of

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82. The court stated that:

> The idea which may merge with the expression, thus making the copyright unavailable, is the idea which is the subject of the expression. The idea of one of the operating system programs is, for example, how to translate source code into object code. If other methods of expressing that idea are not foreclosed as a practical matter, then there is no merger. Franklin may wish to a achieve total compatibility with independently developed application programs written for the Apple II, but that is a commercial and competitive objective which does not enter into the somewhat metaphysical issue of whether particular ideas and expressions have merged.

714 F.2d at 1253.

83. 609 F. Supp. 1307 (E.D. Pa. 1985), *aff'd.*, 797 F.2d 1222 (3d Cir. 1986).

84. In a sweeping paragraph, the court asserted that:

> *the purpose or function of a utilitarian work would be the work's idea and everything that is not necessary to that purpose or function would be part of the expression of the idea* (emphasis in original). . . . Where there are various means of achieving the desired purpose, then the particular means chosen is not necessary to the purpose; hence, there is expression, not idea.

797 F.2d at 1236.

85. 648 F. Supp. 1127 (N.D. Cal. 1986).

86. *Id.* at 1133.

"look and feel."[87] The court did not distinguish the protection derived from the audiovisual formats from the protection derived from computer programs, which could be very distinct and yet produce the same screen outputs. After *Broderbund*, the issue of protectability of the computer "look and feel" concept was interwoven with the issue of the copyrightability of audiovisual displays.

The court in *Plains Cotton Cooperative Association v. Goodpasture Computer Service, Inc.*[88] did not follow the *Whelan* court and refused to find copyright infringement. Instead, it applied the reasoning of the *Synercom* decision. In *Plains Cotton*, the defendant developed a program that was very similar to the plaintiff's program in specifications, programming, documentation and output. The court reasoned that the similarities between the two programs were dictated by their compatibility to industry standards and the "externalities of the cotton market."[89] The court also indicated that protection of plaintiff's program would lead to monopolization of information, which the court determined was in the public domain.

By contrast, the court in *Digital Communications Ass'n Inc. v. Softklone Distributing Corp.*,[90] relied on the *Broderbund* decision to grant a permanent injunction against a defendant which had emulated plaintiff's program and duplicated its main program. The court found that the formats created by plaintiff were copyrightable as audiovisual arts.

Both the *Broderbund* and the *Softklone* decisions were criticized by small software firms who claimed that those decisions would stifle competition and that the protection of screen designs amounted to the monopolization of the user's experience.[91]

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87. The concept of "look and feel" was first defined in an old copyright case, Baker v. Selden, 101 U.S. (11 Otto) 99 (1879). In that case, the Supreme Court held that original bookkeeping forms appended to several books by the plaintiff were not copyrightable. In other words, the Supreme Court recognized that certain standards exist in a particular field and that when those standards are to be considered as "necessary incidents to the art, and given therewith to the public . . . for the purpose of practical application." *Id.* at 103. The "look and feel" concept was later found in the *Baker* progeny: Synercom Technology, Inc. v. University Computing Co., 462 F. Supp. 1003 (N.D. Tex. 1978); Q-Co Industries Inc. v. Hoffman, 625 F. Supp. 608, 616 (S.D.N.Y. 1985) (holding that only very limited portions of a "standard" can be protected); SAS Institute, Inc. v. S & H Computer Systems, Inc., 605 F. Supp. 816 (M.D. Tenn. 1985); Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc., 609 F. Supp. 1307 (E.D. Pa. 1985), *aff'd.*, 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 107 S.Ct. 877 (1987).

88. 807 F.2d 1256 (5th Cir. 1987), *cert. denied*, 108 U.S. 80 (1987).

89. *Id.* at 1262.

90. 659 F. Supp. 449 (1987).

91. *See* Soltysinski, *supra* note 1, at 9-10. *See also* Middleton, *A Thousand Clones: The Scope of Copyright Protection in the 'Look and Feel' of Computer Programs*, 63 WASH. L. REV. 195 (1988); Adapso, *Split over the Lotus Copyright Suit*, INFOWORLD, Apr. 6, 1987, at 9; Stern, *The Centre Will Not Hold—Recent Developments in Protecting 'Idea Aspects of Computer Software'*, 9 EUR. INTELL. PROP. REV. 126 (1987).

In summary, the determination of copyrightable subject matter in the field of computer software has fluctuated between the narrow standards of *Synercom* and *Plains Cotton* and the broad test set out in *Whelan*, *Broderbund* and *Softklone*.[92]

The current case law on computer copyright protection interprets narrowly the two statutory limitations to the exclusive right in an original program. In the same vein, it is presently unclear whether copying a program for the purpose of reverse engineering[93] constitutes an infringement. Court dicta go both ways[94] but it would seem that even if reverse engineering is not explicitly forbidden by copyright, the use of the information obtained by reverse engineering for creating a derivative program would constitute illegal copying.[95]

C. France

The French Copyright Law of 1957, which codified preexisting caselaw, was amended in 1985 to accommodate copyright protection of computer programs. The French conception of copyright,

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92. Soma has suggested that a pattern has also arisen, independently of the pure copyright dispute. Judges would be sensitive to the following elements:

> (1) the economic relationship between the plaintiff and defendant - which leads to access to the source and object code by the defendant and any sense of a breach of confidence by defendant (which appears to influence the trial court's factual decision as to similarity of defendant's source and object code to the plaintiff's code); (2) the posture of the case - i.e. at trial or at a preliminary injunction (where if a preliminary injunction is brought by the plaintiff, the evidence is weighted most favorably for the defendant); (3) the degree of copying, if any is even found, by the trial court (which is a factual determination made by the trail court and only reversible by appellate courts under the clearly erroneous standard, especially if expert witness testimony has been evaluated by the trial court); (4) the type of source and object code involved (system or application); and (5) the determination of the idea/expression dichotomy.

Thus, depending on whether or not the defendant comes to court with "clean hands" may influence a court much more than the more metaphysical distinction between idea and expression. Soma, *A Comparison of German and U.S. Experiences in Software Copyrights*, 18 INT'L. REV. OF INDUS. PROP. & COPYRIGHT L. 751 (1987).

93. Soltysinski, *supra* note 1, at 10. Reverse engineering is "a common industry practice permitting an expert to study a legally acquired product to obtain information necessary for producing a similar article (work)." *Id.*

94. *See Synercom*, 462 F. Supp at 1013, which seems to allow reverse engineering; *But see* Johnson Co. v. Uniden Corp. of America, 623 F. Supp. 1485 (1985); Hubco Data Corp. v. Management Assistance Inc., 219 USPO 450 (1983), which held that copying a program for reverse engineering constituted an infringement.

95. Software developers have also exploited a loophole in the law to protect computer programs in the form of copyright shrink-wrap licenses. Congress substituted the term "possessor" for the more restrictive concept of "owner of a copy" in § 117 of the U.S. Copyright Act. The Act states that owners are authorized to make backup copies or adapt a legally acquired program. Thus, only owners are allowed to make backup copies, not mere licensees—who are consequently not allowed to make adaptations or copies for the purpose of reverse engineering. *See* Soltysinski, *supra* note 1, at 11.

and in particular of "droits d'auteur,"[96] has exerted great influence on copyright laws throughout the world with the notable exceptions of common law countries. The 1957 Act granted copyright protection to the works of the mind, regardless of the kind, form of expression, merit or purpose of such works.[97] The 1985 Act acknowledged that computer software was copyrightable.[98] However, it also limited the scope of that protection by setting a short term of protection and modifying the grant of moral and economic rights directly to the actual authors. In this respect, it was the first major departure from the traditional broad concept of French copyright.

1. First Generation Cases

In the first important case in this field, *Pachot v. Babolat Maillot-Witt*,[99] the Paris Court of Appeals found that a computer program was copyrightable because:

> . . . the development of a computer program, both as regards its composition and its expression, represents an original intellectual creation and [. . .] programmers, like translators, may select various means of expression and presentation, so that their choice bears the imprint of their own personality.[100]

Two other cases[101] were also presented to the Cour d'Appel de Paris (Paris Court of Appeals) before the statutory amendments. In both cases the Court refused to grant copyright protection to video games and the underlying computer programs.[102]

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96. "Droits d'auteur," i.e., author's rights or moral rights are the interest in protecting the person of the author and are essentially the right to maintain respect of the author's work for the author's reputation. Moral rights are perpetual, inalienable, and imprescriptible, in contrast to economic rights. *See* Lewis, *The Droit Moral in French Law - Part I*, 9 EUR. INTELL. PROP. REV. 341 (1987).

97. Law of Mar. 11, 1957.

98. Law of July 3, 1985. Article 1.5 of the 1985 Act adds the term "logiciel" to the list of copyrightable works in Article 3 of the 1957 Act. "Logiciel" is defined as "any set of programs, procedures and rules, as well as possible documentation, related to the functioning of an information-processing unit." *A. Min. ind. et éduc. nat.*, Dec. 22, 1981, J. O., Jan. 17, 1982. It is generally recognized that "logiciel" is the French translation of software.

99. Judgment of Nov. 1982, Cour d'appel, Paris, 1983 Gaz. Pal., 1st Sem., 117

100. *Id.*

101. Société Atari v. Valadon, Judgment of June 4, 1984, Cour d'appel de Paris, and Société Williams Electronics v. Presotto et Société Jeutel, Judgment of Feb. 20, 1985. Cour d'appel, Paris, *reported in*, 9 EUR. INTELL. PROP. REV. 160 (1986).

102. In *Atari*, the Court of Appeal denied protection on the grounds that the game's design showed no originality and lacked aesthetic character since the luminous elements move in a fixed pattern and do not create a particular aesthetic impression which would be worthy of the protection granted to works of art. The Cour d'Appel also denied copyright protection because: "one cannot equate the writing of a computer software, whether it be the concept or the analyses, with an intellectual creation, even if the latter is intended to elaborate a game.[. . .] However technically complex, particularly for a layman, computer software or its programming may be, in the final analysis it is simply

The three cases were joined in appeals proceedings before the Cour de Cassation (French Civil Supreme Court). At the same time, the French Parliament passed the 1985 Amendments to the French Copyright Act,[103] which included computer programs in the list of copyrightable works while introducing special provisions. The Cour de Cassation reversed *Atari* and *Jeutel*, reasoning that the presence of aesthetic content was irrelevant and that the sole test of copyrightability was whether the work is original. The Cour de Cassation afforded copyright protection to scientific programs, as well as programs for video games. However, the Cour de Cassation did not elaborate on the originality requirement and provided little guidance for lower courts. It only stated that a program must represent an "individual personal effort beyond the mere application of an automatic and compelling logic, and . . . this effort [must be] fixed in an individualized structure."[104]

Under French procedural law, lower courts determine whether a program is original. The determination of originality is subject to review by the Cour de Cassation in exceptional cases. So far, most lower courts have found computer programs original because in most cases the programs can be written in a variety of ways. Like the translator, the programmer faces several possibilities of arrangement and execution. Thus, as in the United States, in practice, the test of originality is always met.

2. Second Generation Cases

The 1985 amendments offer programmers the same prerogatives as those for authors under the doctrine of author's rights. However, in a sweeping change from traditional copyright, the 1985 amendments also allow the purchaser of a program to adapt it and to make backup copies. The period of protection for computer programs was also reduced from fifty years to twenty-five years.

There are few second generation cases in France because the 1985 amendments are still recent. A French commentator, André Bertrand,[105] has noted, however, that the French Supreme Court is following a *Whelan* standard according to which "a program could

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a question of a technological arrangement which occasionally requires capable electromechanics but which should not be "consecrated" to the extent of being raised to the ranks of an intellectual creation included in the aforementioned Act of 1957." Société Atari v. Valadon, Judgment of June 4, 1984, Cour d'appel, Paris, *reported in*, 18 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 550, 551 (1987).

103. Law of July 3, 1985. The amendments related to rights of authors, performing artists, producers of sound recordings and video recordings and audiovisual communication enterprises. *See* Lucas, *Copyright and the New Technologies in French Law*, 9 EUR. INTELL. PROP. REV. 42 (1987).

104. Judgment of March 7, 1986, Cass. ass. plen. 1986, *excerpted in* 18 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 550 (1987).

105. Bertrand, *French Supreme Court Declares Software and Video Games Original*

be considered a copy of another program if its structure with its most characteristic elements is duplicated, even if this copy is written in another language."[106]

D. Germany

The 1965 German Copyright Law was amended in 1985 essentially to update the reprography regulations, and, as in France, to offer program works the same type of protection traditionally granted literary works.[107] "Programs for data processing" were added to the list of copyrightable works.[108] It is not the mathematical or technical idea that is protected but its embodiment in the recorded program. As with the French originality requirement, the program must be "a personal intellectual creation."[109] The new Act does not indicate what constitutes a "personal intellectual creation." The term of protection is seventy years after the death of the author or, if anonymously distributed, seventy years after the first distribution.[110] The scope of protection covers not only the original program but also derivative works, such as translations, adaptations or other modifications.[111] Infringement activities comprise not only the copying of the original program, but also the distribution and demonstration of the original program works or of derivative works.[112] Because computer programs are classified as literary works, moral rights apply.[113] Article 53 of the New Copyright Act relates to fair use. The copying of a computer program or of essential parts of a program is permissible only with the authorization of the copyright owner. Thus, the possessor of a computer program can load the possessed program into the storage of a computer and

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Works of Authorship Under the 1957 Copyright Act, SOFTWARE PROTECTION, Feb. 1986, at 14.

106. *Id.*

107. Act Modifying Provisions in the Field of Copyright Law, June 24, 1985, BGBl.I, 1137 (1985). The Federal Ministry of Justice was not interested in clarifying the definition of literary works to comprise programs for data processing as it believed that computer programs were already protected as literary works under Section 2(1)(1) of the Copyright Act. It feared that any legislative clarification would entail more clarifications. The amendments regarding computer programs were proposed by the Bundestag Committee on Legal Affairs. 8 EUR. INTELL. PROP. REV. 89 (1986). *See* Schroeder, *Copyright in Computer Programs - Recent Developments in the Federal Republic of Germany*.

108. German Copyright Law of 1965, as amended by Act Modifying Provisions in the Field of Copyright law, June 24, 1985, BGBl.I, 1137 (1985). Article 2, Paragraph 1, Subsection 1, reads in part: "Literary works, such as writings and speeches as well as programs for data processing . . . are copyrightable subject matter."

109. *Id.* at art. 2(2).

110. *Id.* at art. 64.

111. *Id.* at art. 3.

112. *Id.* at art. 17.

113. *Id.* at art. 12, 13, 14.

make backup copies only if the possessor has a license to do so.[114]

The departure from prior French law lies in the level of originality required for a computer program to be copyrightable. The case law illustrates the different requirements of the judicial system in this field. Some courts have plainly refused to grant copyright protection to computer programs. In a 1981 judgment,[115] the Mannheim Landgericht (Provincial Court) held that computer programs were not copyrightable because "no intellectual aesthetic content is ordinarily found in computer programs which could enable them to be included in the category of creative works." This left computer programs inadequately protected.[116]

The Mannheim decision was criticized by German commentators and the software industry.[117] The subsequent decisions adopted a more liberal standard, recognizing that a computer program could be a personal intellectual creation. In *Visicorp v. Basis Software*,[118] the Munich Londgericht acknowledged that a computer program could be a personal intellectual creative work within Section 2(2) of the 1965 Copyright Act if a particular problem was susceptible to a number of solutions from which a particular solution was selected. The court characterized the intellectual input as "the choice, collection, review, arrangement and classification of the material."[119] Subsequently, the Oberlandgericht of Karlsruhe (Appeals Court)[120] reversed the Mannheim decision and held that computer programs were copyrightable subject matter. The Karlsruhe court reasoned that though algorithms are not protectable, their expression is if the preparation, arrangement and execution of the algorithms show a personal intellectual creation.

However, several provincial courts kept requiring a high level of originality from computer programs for the programs to pass the test of personal intellectual creation. This instability culminated in the landmark decision of *Bappert und Berker v. Sudwestdeusche In-*

114. *Id.* at art. 108(a). This section states that for copyright infringements committed on a commercial basis, the penalty is imprisonment for up to five years or a fine.

115. Judgment of June 12, 1981, Landgericht, Mannheim (Provincial Court), 1981 BB 1543.

116. Computer programs could still be protected by the Act Against Unfair Competition, and to a much lesser extent by the Patent Act.

117. Ulmer & Kolle, *Copyright Protection of Computer Programs*, 14 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 160 (1983).

118. Judgment of December 21, 1982, Landgericht, Munich, (Provincial Court), 1983 NN 273. English version found in 10 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 432 (1983).

119. *Id.*

120. Judgment of February 9, 1983, Oberlandgericht, Karslruhe, *translated into English* by Sieber, *Copyright Protection of Computer Programs in Germany Part II; Appendix*, 6 EUR. INTELL. PROP. REV. 253-260 (1984); *commented on in*, Kindermann, *Copyright Protection for Computer Software in Germany: Recent FSC Decisions and the Copyright Revision Act of 1985*, 8 EUR. INTELL. PROP. REV. 179 (1986).

kasso,[121] probably the only important "second generation" German case. In that decision, the Federal Supreme Court retained the test requiring that the program be a personal intellectual creation. However, the Court also expanded the originality requirement test. It elevated the standard to an "above-average achievement" as compared with the average programmer's ability. The court based its decision on public policy, reasoning that the contents of working processes cannot be protected and, as such, monopolized, but must remain free for the producers and the users of other programs. As summarized laconically by Dietz, "the only thing which is really certain now in Germany is a major uncertainty as to the question under what conditions and in how many cases copyright protection for computer programs is really available."[122]

The *Inkasso* decision has released a flood of criticism and pessimism, particularly from foreign software companies. Imposing an above average requirement on computer programs may leave a number of programs which are ordinary or below average with nothing but trade secret or contract protection.

E. EEC DIRECTIVE

Following the Single European Act[123] and desiring to harmonize the copyright laws of the member states of the European Economic Community (EEC), the EEC Commission[124] recently published a proposal for a Council Directive on the Legal Protec-

121. Judgment of May 9, 1985, BGHZ (Federal Supreme Court, Civil Division), NJW 192, (1986), English extract *printed in*, Kindermann, *Case Comment*, 8 EUR. INTELL. PROP. REV. 185-187 (1986).

122. Dietz, *Copyright Protection for Computer Programs: Trojan Horse or Stimulus for the Future Copyright System?*, unpublished paper delivered at the Stanford Conference on the Legal Protection of Computer Software, Palo Alto, California, July 22-24, 1986, at 6.

123. The Single European Act is the first major amendment to the 1957 Treaty of Rome establishing the European Economic Community (EEC). Treaty of Rome, March 25, 1957, 294 U.N.T.S. 17. It sets out a number of sweeping amendments to the original treaty covering such diverse subjects as economic, social cohesion, environment, cooperation between the institutions and political cooperation between the member states of the EEC. The importance of the Single European Act lies in the establishment of a legal framework for a truly unified market by 1992.

124. The EEC's institutions are the European Parliament, the Council, the Commission and the Court of Justice, with the support of the Court of Auditors. The Council is made up of representatives of the governments of the member states. The Commission consists of seventeen members appointed by the member governments. Its role is to act as the guardian of the Treaty of Rome, the Single European Act and other treaties, to serve as the executive arm of the Community, to initiate the Community policy and to defend the Community interest in the Council. The Court of Justice ensures that implementation of the treaties is in accordance with the rule of law. The European Parliament is made up of 518 members directly elected by the citizens of the EEC. It plays a part in the Community's legislative procedure and keeps constant watch on the Commission's doings.

tion of Computer Programs.[125] This proposal has been criticized as unbalanced, one-sided, amateurish and hastily drafted.[126] The Proposal has been partially approved by the European Parliament which has also suggested several amendments.[127] The Proposal should become a Directive within the next few months.

Generally, the Proposal seems to favor the software producer/owner to the detriment of the competitor/user. The Proposal first states that computer programs shall be protected by copyright as literary works.[128] This contradicts the French law, which protects computer programs for twenty-five years and implicitly recognizes programs as works of applied art under the Berne Convention. This approach is consistent with the German Copyright Act, which also classifies computer programs as literary works. Thus, the Copyright directive would force a number of member states, such as France, to revise their copyright laws in accordance with the directive.

Article 1(3) of the Proposal states that ideas and principles are not protected by copyright, even "[w]here the specification of interfaces constitutes ideas and principles which underlie the program . . . ."[129] This conforms to the existing European caselaw.[130] However, the Proposal does not define any of the terms used in that article, leaving much room for interpretation and construction of the legislative intent. For example, "interface" is vaguely described as a principle describing any means of interconnection and interaction.[131] The amendment proposed by the EC Parliament simply

125. PB No. C91, Apr. 12, 1989. English version *printed in*, Vandenberghe, *Copyright Protection of Computer Programs: An Unsatisfactory Proposal for a Directive*, 11 EUR. INTELL. PROP. REV. 409, app. at 413 (1989).

126. *See* Vandenberghe, *Copyright Protection of Computer Programs: An Unsatisfactory Proposal for a Directive*, 11 EUR. INTELL. PROP. REV. 409 (1989). Among other things, the author criticizes the proposal for not clearly defining certain difficult notions such as "algorithm," "logic," "underlying a program," "interface," and for harming the user for the benefit of software producers and software owners. Some of those terms have been defined in the amendments proposed by the European Parliament.

127. On July 11, 1990, the European Parliament adopted amendments to the Proposal. The amendments adopted by the Parliament regard a number of topics, criticized by both academics and the software industry, such as reverse engineering, the scope and term of protection for software, the originality requirement, the fair use provisions and shrink-wrap licensing. *See* COMPUTER LAWYER, Sept. 1990, at 32.

128. Vandenberghe, *supra*, note 125. Article 1(2) states that: "Exclusive rights shall be conferred by the provisions of copyright laws. Protection shall be accorded to computer programs *as literary works*." *Id.*

129. Vandenberghe, *supra*, note 125. Original article 1(3) states that protection will "apply to the expression in any form of a computer program but shall not extend to the ideas, principles, logic, algorithms or programming languages underlying the program. Where the specification of interfaces constitutes ideas and principles which underlie the program, those ideas and principles are not copyrightable subject matter." *Id.*

130. *See* the *Inkasso* decision, discussed *supra*, note 121 and accompanying text.

131. The preamble of the Proposal states that:

Whereas for this purpose, a logical and, where appropriate, physical in-

provides that ideas and principles which underlie any aspect of a program, including its interfaces, shall not be protected by copyright under the Directive and that protection in accordance with the directive shall apply to the expression in any form of a computer program. Software manufacturers, who prefer that only ideas be uncopyrightable,[132] prefer the Parliament's language as it may be interpreted as providing protection for interfaces, logic, algorithms and programming languages. Software producers, particularly those in the U.S., prefer that user interfaces be subject to the same standard of copyright protection.[133]

Article 1(4) negatively formulates the nature of copyright applied to computer programs.[134] It does not define the originality requirement and implies that copyright protection is the exception rather than the rule. This may resuscitate the originality test that was fading in countries such as France or the U.K. while prolonging the consequences of *Inkasso* in Germany or *System* in Japan. One of the amendments proposed by the Parliament further defines the concept of originality. A program is subject to copyright protection if it is original in the sense that it is the result of the author's own creative intellectual effort. However, the Parliament does not describe what constitutes a creative intellectual effort. This general concept may be interpreted differently by national courts and may not alter the existing caselaw in each nation. Thus, the disparities that can be found between the French or British interpretations and the German construction, are likely to remain.

Article 2 addresses issues of authorship and is in conformity with the traditional copyright principle that moral rights belong to the author and are not transferable.[135]

Article 4 concerns the exclusive rights conferred to the author of a computer program. These rights include the right of reproduc-

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> terconnection and interaction is required to permit all elements of software and hardware to work with other software and hardware and with users in all the ways they are intended to function. The principles describing any such means of interconnection and interaction are generally known as "an interface."

Vandenberghe, *supra* note 125.

132. Software manufacturers, particularly those in the U.S., prefer the corresponding U.S. provision which excludes ideas and principles from copyright protection. They fear that an exhaustive list of exclusions may undermine copyright protection for programs in general. In this respect, the Commission's proposal is similar to the Japanese copyright law that explicitly excludes algorithms, programming languages and rules from copyright protection.

133. Greguras, *The European Community's Proposed Directive on the Legal Protection of Computer Programs: Comments from the Silicon Valley*, SOFTWARE PROTECTION, Jan. 1990, at 11.

134. Article 1(4)(a) reads: "A computer program shall not be protected unless it satisfies the same conditions as regards its originality as apply to other literary works." Vandenberghe, *supra* note 125.

135. Vandenberghe, *supra* note 125.

tion, of adaptation, and of distribution. Software manufacturers have easily evaded the U.S. Copyright Law by licensing through shrink wrap licenses rather than selling their software. The Proposal appears to contain the same loophole though the Parliament's amendment would provide a different treatment of shrink wrap licensing.[136]

Article 5, which contains the exceptions to the restricted acts, has been criticized.[137] Article 5 intends to provide legitimate competitors and users with certain rights in order to balance the interests of the different parties. It imposes formal requirements for using copyrighted programs such as a signed written agreement and limits the use of programs in libraries. The software industry would like to have shrink wrap licenses (which are generally not signed) included in this article.[138] Article 5 of the Proposal does not specifically prohibit reverse engineering nor does it establish a standard as to when reverse engineering constitutes infringement. One of the Parliament's amendments explicitly addresses the issue of reverse engineering. This amendment would permit reverse engineering of computer programs when essential to ensure the maintenance of the program and the creation or operation of interoperable programs. The reverse engineering section provides that only the licensee or another person entitled to use a copy of the program on his behalf may perform decompilation, and only if: (i) the information necessary to achieve interoperability has not been published or made available previously, (ii) the retrieval of information is confined to the parts of the original program which are necessary for the achievement of the aim of interoperability, (iii) the information retrieved is not communicated to third parties except to the extent necessary for operation of the second program, and (iv) the information retrieved is not used to create or market a program which violates a copyright in the original program.[139] Additionally, infor-

136. Vandenberghe, *supra* note 125, app. at 414. Article 4(c) states that "the right to control the distribution of a program shall be exhausted in respect of its sale and its importation following the first marketing of the program by the right holder or with his consent." Does this mean that a right holder does not exhaust his right to control distribution through a license? Shrink-wrap licensing arises from an ambiguous section of the U.S. Copyright Act which provides "the owner of a copy of a computer program" with certain rights, such as the right to make backup copies and the right to adapt the software, and not the possessor of the computer program as originally proposed by the CONTU. *Id.*

137. Vandenberghe, *supra* note 125, at 411. Vandenberghe refers to Article 5 as a "disaster." *Id.*

138. *See* Greguras, *supra* note 133, at 16.

139. Note that the fair use provisions of Section 107 of the U.S. Copyright law also comprise four factors:

> (1) the purposes and characters of the use, including whether such use is of a commercial nature or is for non profit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the

mation obtained in the process may not be used in a manner which unjustifiably damages the legitimate interests of the right holder or is contrary to the normal operation of the program.[140]

Article 6 defines secondary infringement. Possessing an unauthorized copy of a program, knowing or having reason to believe that it is an infringing copy constitutes infringement. As in the Japanese law, the Proposal introduces a *mens rea*, thereby allowing an innocent infringement defense. The software industry would clearly prefer removing any mental state to make infringement a strict liability offense.[141]

The Proposal has also been criticized for what it does not address. In particular, the Proposal does not address moral rights. The software industry would prefer a clear statement from the Commission similar to the French provision that no moral rights arise with respect to programs. This would provide certainty and help to avoid litigation.[142]

In spite of its weaknesses, the Commission's proposal has been generally well received by software manufacturers. Some of the contentious provisions of the proposal have been amended by the Parliament, under the intense lobbying pressure of U.S., Japanese and European software manufacturers. It is likely that most of those amendments will be accepted by the Commission. The fair use provisions regarding reverse engineering recommended by the Parliament seem to be compatible with the fair use provisions of the U.S. copyright law. The proposal should become a directive very soon and should bring some uniformity to copyright law throughout the European community. The directive requires that member states amend their copyright laws in compliance with the directive by January 1, 1993. However, even if a member state would not comply promptly, the directive would be directly applicable to any computer program created prior to the amendment of the national copyright law.

F. Is Copyright a Panacea for the Protection of Computer Programs?

The survey of copyright laws, shown above, acknowledges that a certain level of uniformity has been achieved in the past decade. However, a number of problems remain unresolved. This may change with the passing of the EEC Directive on Computer

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portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the market for or value of the copyrighted work.

18 U.S.C. § 107 (1990).

140. *See* COMPUTER LAWYER, *supra* note 127.

141. Greguras, *supra* note 133, at 12.

142. *Id.*

Software, which should harmonize the copyright laws of the EEC member states. However, because of the generally recognized stance against protecting algorithms, software makers have recently visited other fields of intellectual property rights, in particular patent law, for possible means to protect their software. The next section reviews how patent offices and courts in major industrial countries have reacted to these incursions into the patent world.

III. PATENT PROTECTION OF COMPUTER PROGRAMS

Patent laws have long been implemented in most countries to protect the "natural right" of a person to his own inventions. For example, the U.S. Constitution provides that "the Congress shall have 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."[143] The current U.S. Patent Act states that: "Whoever invents or discovers any new and useful process, machine, manufacture or composition of matter or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."[144] The Japanese Patent Law defines the word invention as "the highly advanced creation of technical ideas by which a law of nature is utilized."[145] The invention must also be industrially applicable.[146] In Europe, the invention must be new, susceptible of industrial application, and involve an inventive step.[147] Mathematical methods and programs for computers are explicitly regarded as non-patentable subject matter, but only to the extent to which a European patent relates to such subject matter as such.[148] Algorithm and computer program-related inventions have typically not been regarded as patentable subject-matter (by tradition in the U.S. and Japan, by statute in Europe). Recently, however, a number of computer program-related inventions have been patented in the U.S. and Japan, as well as, to a lesser extent, in Europe. This trend has been both acclaimed and harshly criticized.[149]

143. U.S. CONST. art. I, § 8, cl. 8.

144. 35 U.S.C. § 101 (1988).

145. Law No. 121 of 1959, art. 2(1).

146. Law No. 121 of 1959, art. 29(1).

147. European Patent Convention, Oct. 5, 1973, art. 52(1), 2 Comm. Mkt. Rep. (CCH)(1973).

148. *Id.*, art. 52(3).

149. For a critique of patent protection of computer programs, *see* Samuelson, *Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L. J. 1025 (1990) and Smith, *On Software Patents*, BYTE, Sept. 1990, at 232. The case in favor of patent protection can be found in Hecker, *Pursuing Patent Protection for Computer Related Inventions*, Eleventh Annual USC Computer Law Institute (1990) and Chisum, *The Patentability of Algorithms*, 47 U. PITT. L. REV. 959 (1986).

A. Advantages of and Problems with Patent Protection of Computer Programs.

Commentators have discussed at great length the benefits and problems associated with patent protection of computer programs.[150] Some have argued that software inventions do not involve an inventive step sufficient to pass the patentability test, because such inventions are intrinsically the result of a laborious effort and usually express noncreative ideas. Computer programs are not patentable because they do not contain the mental steps and algorithms which have traditionally been recognized as patentable subject matter. Program patents are also difficult to enforce. The examination of software patents is lengthy and difficult and undermines the marketability of a program, since, often, the protection of that program can only be obtained a number of years after its creation. Upgrading of programs presents a problem in the countries in which the patent systems do not provide for continuation patents or patents of improvement. The publication of the original software patent application makes those applications prior art for any subsequent application and destroys the inventive step of any subsequent application. Thus, new versions cannot be patented.

The benefits derived from patent protection have not yet balanced the problems associated with patent protection. One writer argues that patent protection is preferable to copyright protection, mainly because the scope of protection of a patent is broader than a copyright and protects the underlying idea, whereas the copyright only covers the expression of that idea.[151] Patent offices of major software producer countries have generally reached similar conclusions.[152]

B. Japan

The Japanese Patent Law does not explicitly exclude computer programs from statutory patentable subject matter.[153] The Japanese Patent Law is one of the rare statutes in the world that explicitly defines what an invention is. According to Article 2 of the

150. *See* Durney, *Patenting Computer Programs: Is It Feasible in Japan?*, PATENTS & LICENSING, Apr. 1989, at 7.

151. *See* Chisum, *supra* note 149.

152. *See, e.g.*, 1112 OFF GAZ. PAT. OFF., Mar. 13, 1990, criticizing the Federal Circuit's interpretation of In Re Iwahashi, 888 F.2d 1370 (Fed Cir. 1989); EXAMINATION STANDARD FOR COMPUTER PROGRAM RELATED INVENTIONS, released by the Japanese Patent Office in 1975 and amended in 1982 and 1989; *Patentability of Computer Related Inventions*, A comparative study prepared by the European Patent Office in September 1989, *cited at* 21 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 817 (1990).

153. For an excellent summary of the relationship between the Japanese Patent Law and computer programs, *see* Tani, *Preparation and Prosecution of Electronic and Computer-Related Patent Applications in Japan*, PATENTS & LICENSING, Apr. 1990, at 21.

Japanese Patent Law, an invention is "any advanced creation of technical ideas by which a physical law of nature is utilized." The Japanese Patent Office issued guidelines in 1975, known as the Standard, in which it discussed the patentability of software-related inventions.[154] In order to be statutory subject matter, a computer program must show that it uses the physical laws of nature and is not simply the expression of an idea or of a logical process. This test, difficult to perform, has led to various conflicting opinions.

The Standard requires a close connection between the software and the hardware of a computer.[155] In practice, however, the Japanese Patent Office has liberally accepted all kinds of computer-related inventions, along the same lines as the U.S. Patent Office. In order to be patentable, a computer program invention must also satisfy the requirements for patentability, namely that the computer program should involve technological thought, should have an industrial use, should be novel, and should involve an inventive step. Even when the computer program is found to be statutory subject matter, it often does not pass patentability muster since a computer program is rarely based on an inventive or creative idea. More often programs come from brute-force programming and thus do not involve an inventive step by Japanese standards.

The Standard of 1975 and subsequent guidelines issued by the

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154. *See* EXAMINATION STANDARD FOR COMPUTER PROGRAM RELATED INVENTIONS, *supra* note 152.

155. *See* EXAMINATION STANDARD FOR COMPUTER PROGRAM RELATED INVENTIONS, *supra* note 152, at 820-21. The Standard states that:

> [a] product or process invention must be a highly advanced creation of technical ideas by which laws of nature are utilized; the eligibility for invention of the subject-matter relating to a computer program is determined as to whether the procedure implemented by a computer program is regraded as a creation of technical idea utilizing laws of nature; if the subject-matter relating to microcomputer applied technology is regarded as an apparatus comprising means for implementing specific functions provided by microcomputer, said subject-matter is eligible for apparatus invention; in determining the patentability of computer-related inventions no distinction is made as to whether a data processing operation is implemented by means of a computer program or by means of special circuitry.

The Standard further excludes the following as being nonpatentable:

> programming languages (which are man made rules for the purpose of describing programs); data to be dealt with by computer (which merely express various phenomena, e.g. social or natural phenomena, with combinations of figures or symbols); documents as such (they are merely the permanent records which can be read by man or machine); law of nature itself; subject-matter utilizing laws other than laws of nature, e.g. economical laws, or laws of social phenomena, (like a method for doing business); subject-matter utilizing mental activities (reasoning or memorizing) (like a calculation method using mathematical formula derived from mathematical activities or an advertising method to attract public attention); subject-matter contradictory to laws of nature (like a perpetuum mobile).

Id.

Japanese Patent Office in 1982 and 1989 analyze the language to be used in a software patent application as well as the inventive step required from such applications, and discuss more specifically the format of the claims in a software patent.[156] The Japanese Patent Office currently uses a four-step test to determine the eligibility of computer-related inventions.[157]

Large main frame computer manufacturers have considered worthwhile the filing of patent applications related to computer programs even when those computer programs are already subject to copyright protection.[158] They find patent protection desirable because its coverage is broader than copyright protection and is directed to the idea underlying the program and not just the expression of that idea.

Since there has been no case law on the infringement of a software patent in Japan, it is unclear how courts would construe the claims of a software patent. The Japanese Patent Office has granted a number of patents on applications that were no more than pure computer programs, with no connection to hardware. However, until such patents are litigated, it is uncertain whether patent protection of computer programs in Japan is the best route for protection.

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156. The following claims have been accepted by the Japanese Patent Office under the EXAMINATION STANDARD FOR COMPUTER PROGRAM RELATED INVENTIONS:

- method/process based on a law of nature;
- method/process not based on a law of nature (such as business schemes, accounting, etc.);
- computer aided/controlled machine;
- apparatus to operate a computer or its components; or
- computer systems loaded with programs not related to laws of nature.

The following types of claims have not been accepted by the Japanese Patent Office:

- program per se;
- computer operation per se;
- recording medium storing a program;
- programmed computer.

Cited in Hoffman, *Protection for Computer Software: An International Overview: Part 2*, 11 EUR. INTELL. PROP. REV. 7 (1989).

157. The test is the following: (1) determine whether the subject-matter substantially relates to computer software; if not, apply the general standard. If yes, go to step 2; (2) determine whether the subject-matter is deemed to be a computer applied apparatus invention in the specific technical field (i.e. the software and the specific hardware are combined with each other); if yes, the invention is eligible for patenting, if not, go to step 3; (3) determine whether the software utilizes the specific character or structure of hardware resources; if yes, the invention is eligible for patenting, if not, go to step 4; (4) determine whether the procedure implemented by computer software is the creation of a technical idea utilizing laws of nature; if yes, the invention is eligible for patenting, if no, the invention is not eligible. Comparative study prepared by the European Patent Office, *supra* note 152, at 822.

158. *See* Durney, *supra* note 150, at 7.

C. United States

The U.S. Patent Office originally was adamantly opposed to any patent coverage for software inventions. In 1966, President Johnson commissioned a number of patent experts to deal with the adaptation of patent law to new technologies. The Commission determined that computer program inventions should not be granted patent protection.[159] In the first case to reach the Supreme Court regarding the patentability of software related inventions, *Gottshalk v. Benson*,[160] the Supreme Court reversed the Court of Customs and Patent Appeals (CCPA), holding that the invention at bar was patentable, and refused to grant patent protection to a method for converting binary-coded-decimal numerals into pure binary numerals.[161] However, the Court did not hold that "no process patent could ever qualify if it did not meet the requirements of our prior precedents."[162]

After a number of conflicting decisions,[163] this position was finally reversed in the landmark case of *Diamond v. Diehr*,[164] in which the Supreme Court upheld the patentability of a computer program controlled process for the curing of rubber in molds. The Supreme Court enunciated a test in the *Diehr* decision that assessed the patentability of a software invention.[165] The Supreme Court

159. 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), *cited in* Samuelson, *supra* note 149, at 1038-39. The Commission reasoned that computer program related inventions were not thought to be "processes." They were already adequately protected under copyright and trade secret laws, and the Patent Office was not equipped to assess the patentability of such inventions. *Id.*

160. 409 U.S. 63 (1972).

161. The U.S. Patent Act states that "whoever invents or discovers any new and useful process, machine, manufacture or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." 35 U.S.C. 101 (1988). The Court interpreted the method at bar as an invention involving mental steps, which therefore did not fall within the statutory classes of invention. 409 U.S. at 67.

162. 409 U.S. at 67.

163. The CCPA decided twenty cases between *Benson* and *Diehr*, in which it reversed the Patent Office in twelve cases, and affirmed the Patent Office in eight others. *See, e.g.,, In Re* Christensen, 478 F.2d 1392 (CCPA 1973), *overruled*; *In Re* Taner, 681 F.2d 787, 791 (CCPA 1982); *In Re* Johnston, 502 F.2d 765 (CCPA 1974), *rev'd sub nom*; *In Re* Noll, 545 F.2d 141 (CCPA 1976), cert. denied, 434 U.S. 875 (1977); *In Re* Chatfield, 545 F.2d 152 (CCPA 1976), *cert. dismissed for untimely filing*, 434 U.S. 875 (1977); *In Re* Freeman, 573 F.2d 1237 (CCPA 1978); Parker v. Flook, 437 U.S. 584 (1978); *In Re* Walter, 618 F.2d 758 (CCPA 1980); *In Re* Phillips, 608 F.2d 879 (CCPA 1979). Samuelson, *supra* note 149, at 1062, 1063.

164. 450 U.S. 175 (1981).

165. As summarized by Hoffman, *supra* note 156, at 8, the test is as follows: "(1) Determine whether the mathematical algorithm either directly or indirectly recited by the claim; (2) Determine whether the claim, taken as a whole, merely recite a mathematical algorithm." This determination could be made by positively answering any of the following questions: (a) Does the claim apply the mathematical formula in a struc-

found that while software inventions that recite a mathematical formula are not patentable subject matter, all other computer programs are *a priori* patentable.[166]

More recently, a decision by the Court of Appeals for the Federal Circuit (CAFC)[167] has cast some doubt on the validity of software-related patents. Thus, at this juncture, it is not clear how a software patent would be enforceable and whether it would even pass the statutory subject matter test if litigated.

In the interim, more and more computer related inventions are patented in the U.S. Patent Office. Although large computer manufacturers were opposed initially to patent protection of computer related inventions,[168] the strength of the protection offered by patents now appeals to most software developers.[169] The U.S. Patent Office has given explicit instructions to patent examiners regarding the examination of software patents. The Manual of Patent Examination Procedure (MPEP) provides some guidance as to what should be rejected as nonstatutory subject matter.[170] The MPEP

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ture or process, which considered as a whole, comprises a form of post-solution activity that fulfills a function of the patent law? or (b) is the post-solution activity significant, i.e, is the end-product merely a pure number as in *Benson* or *Flook*, or an applied solution that directly affects physical elements or controls process steps?

166. The Court stated:

> When a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (for example, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of section 101.

450 U.S. at 192.

167. *In Re* Iwahashi, 888 F.2d 1370 (Fed Cir. 1989).

168. In *Benson*, the Court received fourteen amici curiae briefs. The amici who urged the Court to deny patent protection to computer related inventions were major hardware manufacturers, namely IBM, Burroughs, Honeywell and a trade association Computer Business Equipment Manufacturers Association. The amici who urged the Court to affirm the CCPA's ruling were software developers. Samuelson, *supra* note 149, at 1053, n.90.

169. IBM is the assignee to 26% of all software patents issued between 1977 and 1987. Westinghouse has also filed a number of software patents. AT&T/Bell Research Labs lately has been very active (with 13 software patents issued between 1986 and 1989). *See* Soma et al., *Software Trends: Who's Is Getting How Many of What? 1978 to 1987*, 71 J. OF THE PAT. & TRADEMARK OFF. SOC'Y 415 (1989).

170. The MPEP states that:

> [An] invention must be in the technological arts; no distinction exists between computer related inventions and any other statutory subject-matter; the examining approach for a claim involving a computer program, algorithm or the like is the same as for any other type of invention; subject matter otherwise statutory does not become non statutory simply because it uses a computer program; the presence of a mathematical algorithm within the claim of a software invention does not automatically mean that the claim is non-patentable subject matter.

The MPEP also specifies that:

> a claim seeking coverage for a computer program would be non statutory when, considered as whole, it merely recites a mathematical algorithm or

suggests the *Freeman-Walter* test[171] to the examiners. In practice, however, the U.S. Patent Office has allowed claims related to pure algorithm.[172] None of the most recent controversial "algorithm patents"[173] has yet been litigated and it is, at this juncture, unclear whether those patents would be upheld in court.

D. France

The French Patent Law of 1968 excluded computer programs from patentable subject matter.[174] That law was amended in 1978 in an attempt to harmonize it with the nascent European Patent Convention.[175] The language of Section 6.2(3) limits the sweeping scope of the preceding section and appears to limit the patentability exclusion to those programs which are directed only to execution internal to the computer itself.[176]

French courts interpreted the 1968 law in two cases. In the

> a method of calculation which is not applied in any matter to physical elements or process steps; certain computer program related claims may be non statutory as falling within judicially determined exceptions outside the mathematics area, such as printed matter, naturally occurring articles, methods of doing business, scientific principles, mathematical algorithms, mathematical formulae.

Patentability of Computer Related Inventions, *supra* note 152, at 819.

171. *Id.* at 822. The test is the following: (1) Is a scientific principle, law of nature, or idea which may be represented by a mathematical algorithm directly or indirectly recited in the claim? If yes, the subject matter is non-statutory, if no, proceed to the next step. (2) Would the claim as a whole preempt others from using the algorithm in its entirety? If yes, the claim is non-statutory. *Id.*

172. For example, Patent No. 4,744,028, issued in 1988, and assigned to AT&T Bell Laboratories, concerns the Karmarkar algorithm. This algorithm rapidly solves a long-standing mathematical problem called the traveling salesman problem. It allows the efficient planning of routes such as airplane flight routes. AT&T has waived the use of the algorithm for academic purposes. Under *Benson*, the Karmarkar algorithm is probably unpatentable because the patent would effectively preempt the use of the algorithm. N.Y. Times, Feb. 15, 1989, at D1, col. 4.

173. Patent No. 4,646,256 for a system of solving the discrete Bracewell transformation, Patent No. 4,797,847 for a method of performing discrete cosine transformation, Patent No. 4,768,159 related to the squared radix discrete Fourier transform algorithm and Patent No. 4,797,729 for a system incorporating an error tolerant picture compression algorithm. Samuelson, *supra* note 149, at 1100, n.282.

174. Law of Jan, 2, 1968. Section 7 of the French Patent Act of 1968 disqualifies "programs or series of instructions for the execution of operations in a calculating machine."

175. Law of July 13, 1978.

176. Section 6.2(2) and 6.2(3) of the French Patent Act state that:

> 6.2(2) The following in particular shall not be regarded as inventions . . . : (c) schemes, rules and methods of performing mental acts, playing games or doing business, or programs for computers.
>
> 6.2(3) The provisions of paragraph (2) shall exclude patentability of the subject matter or activities referred to in that provision only to the extent to which a patent application or patent relates to such subject matter or activities as such.

first case, *In Re Mobil*,[177] the Court of Appeals of Paris invalidated a patent involving a computerized process for determining the correct combination of pigments on the basis that the program lacked "industrial character."[178] The Cour de Cassation dismissed the appeal and evaded the question whether programs could be afforded patent protection.[179]

In a second decision,[180] *In re Schlumberger*, the Court of Appeals of Paris articulated a less restrictive test. The case dealt with an invention regarding a process of reproducing the topographical characteristics of land formation in a computer graphics format based on measurements taken during drilling and subsequent evaluation by a computer. The French Patent Office rejected the application under Section 7 of the 1968 Law. The Cour d'Appel de Paris overturned the Patent Office's decision and argued that a process could not be excluded from patentability for the sole reason that one or several of its stages were carried out by a computer.

The Cour d'Appel de Paris enunciated a three-prong test for determining whether a program lacked industrial nature.[181] The Court applied this test to the subject case and concluded that the process was of an industrial nature.[182] Commentators have found this test, the "*Schlumberger* test," even more liberal than the corresponding U.S. test shown in *Diehr*.[183]

Since the *Schlumberger* decision and the 1978 amendments, a new actor has entered the landscape of European patent law, namely, the European Patent Convention. The recent changes in the European Patent Office guidelines for the examination of computer program inventions have provided new guidance to French courts in their efforts to assess the patentability of software inventions.

E. Germany

The German Patent Act excludes computer programs under

177. Judgment of May 22, 1973, Cour d'appel, Paris, *appeal rejected* by Cour de Cassation on May 29, 1975, *cited by* Hoffman, *supra* note 156, at 10.

178. *Id.*

179. *Id.*

180. Judgment of June 15, 1981, Cour d'appel, Paris, Gaz. Pal., 2d Sem., 69, *cited by* Hoffman, *supra* note 156, at 10, 11.

181. The test is the following: Is the objective of the process industrial? Is the application of the process involved in a series of concrete steps that are materially carried out? Does the result have a technical effect that comprises an industrial use? *Id.*

182. The court justified its position "because [the process] is situated in industry and oil exploration . . . in its application, because it does not consist of an abstract formula, but a series of concrete steps materially carried out . . . in its results, because it enables representation of the physical characteristics of land formations." *Id.*

183. *Id.*

sections 1(2)(1) and (3).[184] The case law is controlled by a landmark decision, *Disposition Program,*[185] which set out a fairly restrictive standard for patentable subject matter in the field of computer programs, and four subsequent decisions[186] that are characterized by German commentators as prohibiting patent protection for computer programs.[187]

In *Disposition*, the Federal Supreme Court found that mathematical algorithms and non-technical organizational rules were not patentable subject matter because they did not constitute technical subject matter, a judge-made requirement of patentability derived from Article 1 of the German Patent Act.[188] However, the Court did not clearly delineate the distinction between technical and non-technical inventions. So, unlike the *Diehr* decision which excluded algorithms only, the *Disposition* case contained a sweeping holding, extending the technical nature requirement not only to algorithms but also to organizational rules' "selection and arrangement and allocation of certain known effects."[189]

Although German commentators have been rather pessimistic about the possibility of patent protection for computer programs, it has been argued[190] that there is still an avenue available for computer programs seeking to solve problems of a technical nature because the adverse decisions all involved software inventions that were not related to technical problems.

As in France, however, the new approach adopted by the European Patent Office, which is relatively favorable to patent protection for computer program inventions, will most certainly have some impact on the German Patent Office and German courts judging software cases.[191]

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184. Hoffman, *supra* note 156, at 10. Sections 1(1), (2) and (3) read in pertinent part: "The following in particular shall not be regarded as inventions . . . 1. discoveries, scientific theories and mathematical methods . . . 3. schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers."

185. *Id.* at 9-10.

186. *Id.* at 9, which cites decisions which follow *Disposition Program.*

187. *Id. See also,* Ulmer & Kolle, *Copyright Protection of Computer Porgrams,* 14 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 160 (1983).

188. Hoffman at 8. Under Article 1, an invention must "permit industrial application." German courts have interpreted this expression as the requirement that an invention must be applied industrially to a technical field.

189. *See* Hoffman at 9, n.100.

190. *Id.* at 9.

191. *Id.* at 10. The recent European Patent Office practice concerning the examination of computer related inventions is not legally binding on the German treatment of the same inventions. Thus, a European patent claiming a computer related invention designed in Germany may very well be found invalid by a German court for lack of patentable subject matter. However, it is also likely that in desiring harmonization, national courts, particularly German courts, would want to align themselves with the generally favorable treatment of software cases. *Id.*

F. European Patent Office

The European Patent Convention (EPC), a compromise adopted by the states signatory to the Munich Convention, has exerted a great influence in the harmonization of European patent laws.[192] The examination and allowance of European patent applications from member states is conducted by a centralized patent office, the European Patent Office. The European Patent granted by the European Patent Office is a bundle of national patents that fall within the ambit of the national laws. Yet, in order to harmonize intellectual property laws in Europe, the national courts and the national patent offices have attempted to adjust their laws to the European Patent Convention.

The EPC specifically excluded protection for computer program applications. Article 51(1) stated that European patents shall be granted for any inventions which are susceptible of industrial application, are new and involve an inventive step. Article 52(2) sets out a non-exhaustive list of non patentable subject matter: discoveries, scientific theories and mathematical methods, aesthetic creations, schemes, rules and methods for performing mental acts, playing games or doing business, *programs for computers*, and presentation of information. However, Article 52(3) indicated that the patentability of such activities is only excluded to the extent to which the patent application relates to them as such.

In 1985, the European Patent Office Examination Guidelines were extensively revised to liberalize the examination of software inventions in the European Patent Office.[193] The amended guidelines emphasize that the basic test for patentability is whether the invention as claimed is of a technical character.[194] They also introduce a basis for the patentability of programs and indicate that if the claimed subject makes a technical contribution to the known

192. European Patent Convention, Oct. 5, 1973, 2 Comm. Mkt. Rep. (CCH). The European Patent Convention is a treaty providing for the grant of a bundle of patents in a number of European countries that have signed and ratified the treaty. It is only open to European countries. The member states are currently Austria, Belgium, Denmark, France, Germany (comprising the Former German Democratic Republic), Greece, Italy, Luxembourg, Netherlands, Spain, Sweden, Switzerland, Liechtenstein and the United Kingdom.

193. 1985 O.J. E.P.O. 473. The former guidelines specified that "a computer program claimed by itself or as a record on a carrier, is not patentable irrespective of its content. The situation is not normally changed when the computer program is loaded in to a known computer." The new guidelines hold that if the subject matter, considered as a whole, 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. The Guidelines are however not legally binding and only recommendations given to the Examiners. *See* Van Voorthuizen, *The Patentability of Computer Programs and Computer-Related Inventions Under the European Patent Convention*, 18 INT'L REV. OF INDUS. PROP. & COPYRIGHT L. 627, 628 (1987).

194. *Id.*

art, patentability should not be denied merely on the ground that a computer program is involved in its implementation. If the implementation of a computer involves a "technical contribution," then the computer operated by the program could be patentable.[195]

In the first computer-related case decided by the European Patent Office Board of Appeals, the *Vicom* case,[196] the Board considered the difference between a mathematical method and a technical process. The Board described a mathematical method as an abstract concept providing a result in numerical form. By contrast, a technical process was a process performed on a physical entity which provided some change in that entity. On this basis, the Board found that a method for digitally processing images was patentable subject matter because the protection was not sought for the mathematical method itself. In dictum, the Board added that a claim directed to a technical process carried out under the control of a computer program could not be regarded as a claim to the program per se. Furthermore, a computer of a known type set up to operate according to a new program could not be considered to form part of the state of the art.[197]

In a subsequent case,[198] the Board held that a method for obtaining x-ray images by means of a computer program was patentable because it contained a mix of technical and non-technical features. In deciding whether a claim related to a computer program as such, it was not necessary, the Board affirmed, to give a relative weighing to its technical and non-technical features. If the invention defined in the claim used technical means, it could be patented. The Board found that the program controlled the operation of the computer but also technically altered its functioning.

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195. *See* European Patent Handbooks, section 3.3.2.

196. 1987 O.J. E.P.O. 14 (T 208/84) — known as the *Vicom* case.

197. *Id.* The Board of Appeal placed the following headnotes in front of the decision:

> Even if the idea underlying an invention may be considered to reside in a mathematical method, a claim directed to a technical process in which the method is used does not seek protection for the mathematical method *as such*; a computer of known set up to operate according to a new program cannot be considered as forming part of the state of the art as defined by Article 54(2), EPC; a claim directed to a technical process which process is carried out under the control of a program (whether by means of hardware or software), cannot be regarded as relating to a computer program *as such*; a claim which can be considered as being directed to a computer set up to operate in accordance with a specified program (whether by means of hardware or software) for controlling or carrying out a technical process cannot be regarded as relating to a computer program *as such*.

Headnotes are not legally binding but are drafted by members of the Board of Appeals and are generally considered to be an accurate statement of the holding of the decision. For further details on the *Vicom* decision, see Hellfeld, *Software Protection in Europe*, PATENTS & LICENSING, Aug. 1986, at 15.

198. 1987 O.J. E.P.O. 19 (T26/86) — known as the *Koch & Sterzel* case.

The Board of Appeals recently decided three more test cases[199] presented by IBM.[200] The first case, T6/83, involved a data processor network. The Board found that the invention was patentable because the program controlled and coordinated like an operating program, the internal basic function of a computer, and its features were not concerned with the nature of the data.[201]

The second case, T22/85, involved a method for automatically abstracting, storing, and retrieving a document in machine readable form. The Board held that merely setting out the sequence of steps necessary to perform an activity in terms of functions to be realized with the aid of conventional computer hardware elements does not import any technical considerations. The Board concluded that the invention had no technical character and was therefore excluded from patentability.[202]

In the third case, T115/85, the Board held that a method of decoding phrases and obtaining a readout of events in a text processing system was essentially a method for performing a mental act expressed in the form of a computer program and was therefore unpatentable. However, the Board added that the application actually proposed a solution to a specific problem, namely providing a visual indication about events occurring in the input/output device of a word processor, and that automatically giving visual indications about conditions prevailing in a technical system was basically a technical problem, therefore, was patentable subject matter.[203]

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199. *See* Betten, *New Decisions of the European Patent Office Concerning Patent Protection for Computer Software*, SOFTWARE PROTECTION, Sept. 1989, at 7. The three cases are: T6/83 Data Processor Network/IBM of Oct. 6, 1988; T22/85 Document Abstracting and Retrieving/IBM of Oct. 5, 1988; T115/85 Text Processing System/IBM of Sept. 5, 1988.

200. *Id.*

201. *Id.* at 8.

202. *Id.* at 12. The decision had the following headnotes:

> (I) Abstracting a document, storing the abstract, and retrieving it in response to a query falls as such within the category of schemes, rules and methods for performing mental acts and constitutes therefore non-patentable subject-matter under Article 52(2)(c) and 52(3). EPC, (II) The mere setting out of the sequence of steps necessary to perform an activity, excluded as such from patentability under Article 52(2) and 52(3), EPC, in terms of functions or functional means to be realized with the aid of conventional computer hardware elements does not import any technical considerations and cannot, therefore, lend a technical character to that activity and thereby overcome the exclusion from patentability.

Id. at 14.

203. *Id.* at 15. The headnotes of the decision were as follows:

> (I) Giving visual indications automatically about conditions prevailing in an apparatus or system is basically a technical problem. (II) Even if the basic idea underlying an invention may be considered to reside in a computer program, a claim directed to its use in the solution of a technical problem cannot be regarded as seeking protection for the program as such within the meaning of Article 52(2)(c) and (3), EPC.

Id. at 17.

The three IBM inventions had been patented in the U.S. Patent Office. With the document abstracting and retrieving system (T22/85), the European Patent Office reached the same conclusions as the U.S. Patent Office. Commentators have concluded that, in the light of the recent decisions of the Board of Appeals, interfaces between hardware and software or between software and software as well as protocols appear to be patentable subject matter as long as they meet the other requirements for patentability. Since this remains unclear, and it is almost certain that IBM will continue testing the European waters.

The decisions of the European Board of Appeals are extremely important for the development of the national laws in Europe. Although technically a European patent may be revoked under the law of a European Patent Convention country, if the subject matter of the patent is found to contravene the national law, it is most likely that national courts will agree with the European Patent Office's interpretation of the patentability of a computer program invention. Otherwise, the situation could rapidly become chaotic should national courts go their own way. This would undermine the harmonization efforts made by the patent offices of the European Patent Convention countries.

IV. IS A SUI GENERIS LEGISLATION NECESSARY?

The legislatures of leading software manufacturing countries have now abandoned the issue of whether computer software deserves a *sui generis* protection. The most extreme example of a proposal for a specific protection for computer programs was the Japanese MITI proposal eventually rejected by the Japanese Diet. The amendments to the French Copyright Law were also influenced by the debate of where to place computer software between literary works and technological inventions.

Recently, scholars have supported *sui generis* for computer programs.[204] Soltysinski's position is that traditional copyright is not an appropriate system of protection for software and that a modified version of copyright would be better adapted to grant meaningful and valuable protection for software and its literary aspects (manuals, instructions, etc.). The nonexpressive elements of software innovations would be achieved by a *sui generis* intellectual property right, similar to the *sui generis* protection granted to semiconductor chips.

Computer programs are substantially the algorithmic solution to the problem of operating a machine usefully and efficiently. They are therefore more akin to inventions and industrial designs

204. Soltysinski, *supra* note 1, at 29.

than traditional copyrightable works. In this respect, patent law would be more appropriate because it rewards and protects useful solutions in the field of technology and science. Extending copyright protection to substantially utilitarian works has caused much confusion in many countries.

Although *sui generis* protection for software is probably desirable, most legislatures of the world have chosen to resort to the available intellectual property tools of copyright and patent law to protect computer software. This choice was in part dictated by the decision made by the U.S. Congress not to adopt a *sui generis* approach. The choice also was largely imposed by the difficulties in adopting an international standard for *sui generis* protection. By contrast, copyright standards had already been articulated in two major conventions: the Berne Convention and the Universal Copyright Convention.

Including computer programs among the works protected under the Berne Convention has required some intellectual stretching. The Berne Convention's main objective is to "protect the creators of beauty, entertainment and learning." Some scholars have concluded that software could not be copyrightable work within the meaning of the Berne Convention because it is a utilitarian work (not a thing of beauty, entertainment or learning). This position is erroneous. Although the member states of the Berne Convention are not required to accord its benefits to other works not explicitly falling within the literary and artistic works defined by the Convention, the principle of national treatment and reciprocity has contributed to the harmonization of copyright laws throughout the world. The same principle should bring about the same results for patent protection granted to computer software.

V. CONCLUSION

The expansion of the software market has forced legislators and judges to act promptly on the type of protection that should be granted to computer programs. Copyright and patent protection have been the prime means of regulation to the detriment of a *sui generis* protection that appears too difficult to define and to articulate. The dangers of overlapping protection between the copyright and patent laws are present and could lead to the overprotection of programs and hence stifle competition and impede the progress of useful art. After the patent expires (some seventeen to twenty years after the issuance or the filing of the patent, depending on the legal system), the apparatus still cannot be used effectively as long as the program that runs it is protected under copyright law. Multiple protection may therefore unjustly extend the life of a patent.

The comparative analysis of current software protection laws

in leading software manufacturing countries has shown a highly unusual level of harmonization which, in turn, has led to greater predictability. Japan and the U.S. seem to be in an imperfect unison, while Europe presents a more diverse landscape. Germany remains the tough player in the game. Yet, the passage of the new copyright EEC directive and the new approach adopted by the European Patent Office should bring the various European laws in complete accord with the rest of the world. Hopefully, the World Intellectual Property Organization will finally issue a unified international approach to computer software protection and encourage software innovations without impeding the progress of science and the arts.