International Lawyer

Volume 21 | Number 3 Article 8

1987

Classification of Computer Software for Legal Protection: InternationaL Perspectives

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Classification of Computer Software for Legal Protection: International Perspectives†

Computer and software technology are international industries in the full sense of the term. United States and foreign companies compete not only in U.S. markets, but also in the international marketplace. These are new industries created during an era in which all major areas of commerce have obviously international, rather than purely domestic frameworks. The technology industries are viewed as central to national economic development in many countries. However, the technology and products are internationally mobile. They entail an information base that can be recreated in many countries, and is not closely confined by local resources. International protection in this context is highly dependent on reciprocal and coordinated legal constraints. The computer industry deals in new and unique products that have no clear antecedents. Defining the character of international legal protection entails not merely defining a framework for protection of particular products, but also developing frameworks of international technology transfer, information flow, and the like. International patterns of legal protection and classification of computer software serve as a case study of legal policy adaptations to new technologies; undoubtedly, in this era of high technology many more such adaptations will be necessary.

In this article, we review the developing patterns of international legal protection for software. This review documents a marked differentiation of technology protection themes. In technologically advanced countries,

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national decisions about software protection reflect an emerging consensus that supports copyright as the primary form of product and technology protection. In contrast, while lesser developed countries participate in international conventions on intellectual property protection, none have expressly placed software within an existing protection system. Even in the technically advanced countries, recent legislation represents an uneasy compromise in both national and international legal policy. There is a recurring, felt need to legislate with specific reference to software despite the existence of general copyright laws. Various countries have seriously examined proposals for hybrid protection systems in lieu of copyright. Even though the proposals were withdrawn due to industry pressure, the issue of which form of protection is preferable is unsettled. The international protection of computer software remains in turmoil.

I. Definitional and Policy Issues of Software Protection

A. Definitions and Policy Focus

Computer "programs" are sets of instructions that, when incorporated in appropriate machine readable form, are capable of causing a computer to perform particular functions, operations or to display particular results.[1] The term "software" properly encompasses not only the "program," but also the supporting documentation and underlying outlines or diagrams. In this article, the terms are used interchangeably and with particular reference to the coded instructions and flowchart design of a program.

Computer programs exist in various types and forms. For potential legal significance, the primary distinction in form is between or among various development stages of a program moving from an algorithm (solution/idea), through a flowchart, source code (program written in a language such as BASIC or FORTRAN) and eventually in machine form in diskette, disk, tape, or chip.[2] Distinctions among types of programs are often made based on the function the program performs, differentiating between "applications" programs (e.g., games, accounting systems) and "operating" programs that configure the computer environment in which other programs operate.[3]

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1. Model Provisions on the Protection of Computer Software § 1(i) (World Intellectual Property Organization 1983) [hereinafter Model Provisions]; *see* Copyright Act, 17 U.S.C. § 101 (1982).

2. *See* R. Nimmer, The Law of Computer Technology ¶ 1.03[2] (1985).

3. In the United States, where litigation is more extensive and rapid than other countries, this distinction represented an immediate concern for software developers. With a focus on copyright for protection, transparent difficulties exist in applying protection of expression to contexts involving primarily technical, operational programs. U.S. courts substantially

Issues of international software protection have been controversial for more than fifteen years. They entail many core decisions of policy about technology protection.[4] While it is common to confine discussion to deciding in which existing intellectual property law system software protection should reside, analysis of international developments in software protection must move away from categorical labels and instead focus directly on the type of protections desired. This permits direct discussion of whether existing intellectual property laws provide optimal models and whether new systems should be developed. The importance of this focused attention increases as countries that have established some protection face second and third generation questions concerning the scope and character of the enacted protection.

B. Protections against Third Party Intervention

Initially, we should differentiate between protections involving two parties and protection against third party intervention. Two-party protections are typically founded in contract or confidentiality theories. These examine "voluntary" relationships, determining the permitted scope of private law or agreements.[5] Can a company enforce contracts or licenses that mandate secrecy? Can it enforce restrictions on employee or licensee competition with the original proprietor of technology? The issues are often resolved under labels of contract and trade secrecy.

While contract and confidentiality issues assume great importance,[6] unique questions of legal classification of software are more often associated with issues about extending protection beyond a contract relationship.[7] The primary focus entails the extent to which restraints are placed against third parties dealing with the technology.

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overcame these concerns in two decisions involving Apple computer "operating" programs. *See generally* Apple Computer, Inc. v. Formula Int'l, Inc., 725 F.2d 521 (9th Cir. 1984); Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984); *see also* Stern, *Another Look at Copyright Protection of Software: Did the 1980 Act Do Anything for Object Code?*, 3 Computer L.J. 1 (1981).

4. *See* R. Nimmer, *supra* note 2, ¶¶ 8.01, 8.02.

5. Generally focus is on licensing law and trade secrecy. *See generally* R. Nimmer, *supra* note 2, at ¶¶ 3.02-.18; R. Milgrim, Business Organizations, Milgrim on Trade Secrets (1986).

6. These issues are especially controversial internationally because of the gross disparities in various national laws regarding confidentiality and restrictive agreements in employment contracts. *See generally* Greenberg, *The WIPO Model Laws for the Protection of Unpatented Know-How: A Comparative Analysis*, 3 Int'l Tax & Bus. Law 52 (1985).

7. In many countries, however, the status of a particular product or technology under intellectual property law affects the treatment of licenses regarding that technology, especially under antitrust or competition laws. *See, e.g.*, Digidyne Corp. v. Data Gen. Corp., 734 F.2d 1336 (9th Cir. 1984), *reh'g denied*, 106 S. Ct. 18 (1985); Schlieder, *European Competition Policy*, 50 Antitrust L.J. 647, 661 (1982).

1. *Restraints against Third Parties*

Classification questions are often construed as methods of primary protection for software. In truth, however, the code issues focus more broadly on deciding what third party protections should be available for computer programs and what methods can best implement this protection. The various types of potential protection include differences in (1) the accessibility of protection (the qualifying steps and level of innovation required), (2) the aspects of the program that are protected, (3) the scope of protection (what actions others are prevented from taking), (4) the extent to which public disclosure is required, and (5) the duration of protection.[8] The proper analysis requires that we balance these factors in determining what type of protection is appropriate in light of policy objectives.

In the United States and in most advanced countries, the initial policy thrust is to establish legal barriers against commercial software piracy. Piracy consists of comprehensive unauthorized reproduction of a program product for distribution in competition with validly created products. Prevention of this activity is essential to safeguarding commercial incentives for software innovation, attracting the commitments of time and resources required for continued development.[9] Significantly, however, many valuable commercial products are not protected against piracy (absent trade name infringement). As a result, a threshold question is whether or not software is unique so as to require a different policy approach than that applied to these other products?

Beyond piracy issues, there is disarray even in developed countries as to when or if further controls or protections are justified. The disputes involve a series of second tier questions regarding the extent to which a developer of software should have rights in the technology to restrict even independent developers, whether use of the technology is controlled or only copying, whether copy owners should have to duplicate and modify their copies, and to what extent protection of the software gives control over derivative rights or products.

2. *International Aspects of Developer's Rights*

Decisions classifying software for legal purposes involve choices among these (and other) features allocating third party protections. The various national decisions are often incorporated, at least initially, under traditional intellectual property law.

8. *See* Kinderman, *Review of Suggested Systems of Software Protection*, in H. BRETT & L. PERRY, THE LEGAL PROTECTION OF COMPUTER SOFTWARE 139 (1981).

9. *See generally* R. NIMMER, *supra* note 2, ¶¶ 1.03-.06; NAT'L COMM'N OF NEW TECHNOLOGY USES OF COPYRIGHTED WORKS, FINAL REPORT 16 (1978).

The subissue that distinguishes purely national from international considerations involves determining not only what protection should be given to programs in, for example, Brazil, but how this interacts with protection in, for example, China, Japan, and Germany. The need to consider interaction derives from a desire for similarity, avoiding conflict in legal approach in the various national laws. It also derives from the presence of multilateral treaties relating to the subject. Such multilateral arrangements are already in existence with respect to copyright and patent law, but have not been created with specific reference to software.

Thus, a primary rationale for using existing legal systems is established. Rather than creating new types of protection not governed by existing international conventions, having the potential for international protection becomes attractive. Technologically advanced countries need to adopt some common internal framework of protection to ensure smooth development of an international industry, but it is equally significant that there be reciprocal rights. This same result must also occur in less advanced countries. The ease and speed of duplication that characterizes software technology defeats effective protections on a purely national basis unless augmented by enforceable international restraints applicable within national borders and reciprocally enforceable in third party states. Absent an ability to enforce rights in other countries, the proprietor of the technology must rely on importation laws to preserve market advantage. These restraints cannot be completely effective against microelectronic technology.[10]

II. Classification of Protections

While classification issues internationally require decisions about what specific protections are desirable for software, the initial question in any country is whether software is protected under existing intellectual prop-

10. In the United States there has been an increased use of importation law restrictions to combat piracy and there have been a number of patent settlements involving semiconductors. The use of International Trade Commission proceedings to exclude infringing products represents a problematic response to uncertain international coordination of remedies. *See* Schuchat, *The Semiconductor Industry and International Trade: Getting Down to Cases*, 4 COMPUTER L. REP. 319 (1985). *See also* 64K Dynamic Random Access Memory Components from Japan, USITC Pub. No. 1735, Inv. No. 731-TA-270 (Aug. 1985) (preliminary ruling supporting a finding of material injury on claimed dumping in relation to 64K chips); EEPROM Antidumping Petition, *reprinted in* 4 COMPUTER L. REP. 458 (1985); Certain Coin-operated Audiovisual Games and Components Thereof, 1983-84 Copyright L. Rep. (CCH) ¶ 25,652 (Apr. 19, 1984) (exclusion order granted); Certain Personal Computers and Components Thereof, USITC Pub., Inv. No. 337-TA-140 (Mar. 20, 1984) (exclusion order against completed, infringing personal computers and certain nearly completed assemblies of parts).

erty law within that country. The choices include patent, copyright, misappropriation, or a trade secret law based on confidential relations.

A. Decisions about Protections

1. *From Uncertainty to Protection*

In selecting from the options, the first question involves whether the technology and associated products should receive any protection against copying or use by unauthorized third parties. The weight of authority in developed countries favors protection against copying for at least certain forms and types of programs.[11] In most countries that have dealt with the question, protection against third party copying has developed. In fact no country has firmly adopted a rule that software can be freely copied. Nevertheless, the available protections remain inadequate for an international industry. Most countries do not expressly reject protection, but many have not clearly adopted software protection concepts. This is especially true in lesser developed countries where the incentive to protect developers is less clear.

In software protection, there is a natural progression followed in technologically advanced countries. The initial stage involves uncertainty and speculation about whether any protections are available.[12] This uncertainty reflects that software does not fit neatly into any of the traditional categories of intellectual property law, thus creating the risk that none of the existing laws apply.

The period of speculation commonly leads to an early case law period. While not invariant, in most countries courts extend protection to software. This occurred in Germany, France, and Japan and preceded legislation in those countries.[13] In some countries, however, the case law enhances uncertainty and may suggest that no protection is provided. Australia initially experienced this outcome before resolution by legislation.[14] In fact, however, even in the short term, this is the exception rather than the rule since advocates of software protection seldom lose even the initial case in advanced countries. Commonly, though, even if the cases are favorable, the case law is incomplete because of the variety

11. *See, e.g.*, Model Provisions, *supra* note 1; *see also* the discussion of various countries *infra* text section II.C.3.

12. *See generally* Tapper, *Copyright in Computer Programs: An International Perspective*, 1 Computer & High Tech. L.J. 13 (1985).

13. *See, e.g.*, Note, *French Law Provides Protection for Computer Software*, 2 Software Protection, Mar.-Apr. 1984, at 15; Judgment of Aug. 13, 1981, 83 BB 992 (Koblenz, W. Ger.); Judgment of Sept. 13, 1983, Statikprogramme, GRUR 84 (W. Ger.) 429; Judgment of Dec. 6, 1982 (Chisai) (Dist. Ct.), Tokyo.

14. *See* discussion *infra* note 40.

of forms and types of programs; cases leave the application to the various types of programs speculative and uncertain.

Uncertainty is an abiding characteristic of legal policy pertaining to this technology. For most commercial products and technologies—even breakthrough innovations—the source and scope of legal protection are clear from the outset, although often the criteria for protection become apparent. In contrast, for software (and other computer technologies) the starting point is uncertainty and doubt. Software resembles both literary art and industrial technology, yet it fully corresponds to neither; at least initially, it can be reasonably argued that no protection exists.

In the next stage, legislation in many industrial countries expressly incorporates software under some form of protection. There has been legislation in the U.S., France, Portugal, Australia, West Germany, Great Britain, and Japan.[15] As described below, however, even this legislation does not necessarily resolve all classification and protection issues and secondary uncertainty is common as attention shifts to whether particular types or forms of programs are protected.[16]

The nature of the product provides continuing basis for doubt. Significant variations in form, substance, and function—ranging from highly sophisticated industrial programs to superficial video games—cannot comfortably be accommodated under a unitary structure without some emergent and continuing doubt. This uncertainty impedes the industry, but may not be solvable over a short term, regardless of the character of any legislation, treaty, or case law.

While this pattern of uncertainty, enactment, and uncertainty is common, there are many countries in which no formal protection is yet enacted. Often, this does not result from an overt policy choice against

15. *See* Copyright Amendment Act of 1984 (Austl.); Copyright Act UrhG § 2 (as amended 1985) (W. Ger.); Law N. 85-660, art. 1 and 45-51, JOURNAL OFFICIEL, July 4, 1985, at 7495 (France); Law for Partial Amendments to the Copyright Law (No. 62, June 14, 1985), *published in* WIPO, COPYRIGHT (July-Aug. 1985) (Japan).

16. Currently, in Canada and Italy, case law supports some protection under copyright, but there is no legislation confirming this result. *See* Judgment of Oct. 17, 1983, Turin Trib. (Italy), Giusisprudenza Piemontese n. 4 (1983) (video output of a game). Canadian cases generally support the existence of copyright for some forms of software. *See* IBM Corp. v. Ordinateurs Spirales, Inc., 27 Bus. L. Rep. 191 (1985) (protection granted to object and source code copied in Taiwanese import copy of IBM bios); La Société d'Informatique R.D.G., Inc. v. Dynobec, [1984] C.S. 1189, *aff'd*, Dynabec v. Société d'Informatique R.D.G., Inc., (Quebec Court of Appeal, Apr. 4, 1985). A decision denying Apple Computer an injunction against reproduction of programs in ROM cast doubt on this result since the court held that, while international cases indicate that copyright protection exists, there are sufficient contrary arguments to preclude an injunction. Apple Computer, Inc. v. Macintosh Computers, Inc., 3 Can. Pat. Cases 3d 34 (1985). Subsequently, however, the court held that the chip encoded programs were copyrightable. *See* Kyer, *Canadian Court Holds Computer Program Embodied on Chip to be Subject to Copyright*, 3 COMPUTER LAW. 28 (June 1986).

protecting software. More commonly, the issue has not arisen in court and has not attained sufficient priority for legislative action. This situation apparently exists in many smaller European countries (Belgium, Denmark, Sweden, Norway) where the likely eventual result is that software protection will exist if the case or need arises.[17]

2. *Problems of Legal Framework: Two Views*

Under one view, the problem of legal framework (as compared to effective enforcement) thus concerns uncertainty, rather than adverse decision. A notable exception is Brazil where national informatics policy may incorporate a decision to defer software protection in favor of technology transfer laws that emphasize retaining technology in that country.[18] Additionally, countries with thriving "reproduction" industries may act slowly to protect foreign intellectual property at the immediate expense of important local "industry."[19]

A second viewpoint regards the current international framework less optimistically. This view recognizes that there is a tension between technologically advanced countries and lesser developed states. Intellectual property law presumes that it is important to promote innovation and to do so by rewarding the author or inventor. This reward historically concentrates on grants of exclusive control over aspects of the technology, work, or invention that the innovator developed. Within any given country, these premises provide incentives for legislatures to develop systematic protections for important creative work.

The technologically advanced countries obtain net benefits in relatively immediate form when they enter cooperative or reciprocal enforcement arrangements. If protection encourages innovation of new works, shared protection in an international marketplace enhances the economic incen-

17. Compare the circumstances in the Netherlands where, although not dispositive, several cases support copyright protection of software. The copyright statute does not expressly include or refer to computer software. *See* Judgment of Mar. 31, 1983, Court of Appeals, Amsterdam, Auteursrecht/Amr 56 (1983) (copyright applies to both the visual and the underlying program aspects of video game); Judgment of Jan. 30, 1981, District Court, Hertogenbosch; Judgments of Jan. 30, 1981, May 14, 1982, *reprinted in* BIJBLAD INDUSTRIELE EIGENDOM 323 (1983); Keustermans, *Protection of U.S. Software in Belgium and the Netherlands*, 2 COMPUTER LAW. 19 (1985).

18. *See generally* Atkin & McKenzie, *Licensing Computer Software in Latin America: The Impact of Technology Transfer Laws*, 1 COMPUTER LAW. 22 (Dec. 1984). Recently, however, an agreement was announced under which Brazil will undertake a revision of software protection rules to safeguard U.S. developers and a relaxation of joint venture rules. *See* Notes, 5 COMPUTER L. REP. 567 (1987).

19. *See* Davidson, Gregaras & Bahrick, *International Software Protection*, 4 COMPUTER L. REP. 330, 338-42 (1985) (discussion of proposals for software protection in several Asian countries).

tives. Presumably, while a particular country loses some value when control of a technology remains in a foreign proprietor, this is offset by the creative work product induced by the intellectual property law in that country and the enhanced incentive generated by the reciprocal rights established elsewhere. Most technologically-advantaged large western bloc countries have enacted specific protections for software technology.

3. *Desirability of Reciprocal Enforcement Rights*

The desirability of reciprocal enforcement rights may not be immediately apparent, however, when viewed from the vantage of lesser developed countries. For these states, there may be a vague potential that reciprocity and protection might encourage an inventor to develop important technology in that country, and permit that country/inventor to retain such developments. The reality, however, is that these countries do not currently support or engage in advanced state of the art development and might not develop such research activity even given a comprehensive, internal protection system. The more realistic fear involves the use of intellectual property laws to retain control of technology outside of the country, encouraging and enhancing development in foreign states at an immediate loss to the lesser developed country.[20]

The countervailing argument for development of reciprocal, local protections in these lesser developed states deals less with encouraging local innovation and more with access to current and advancing technology. A comprehensive refusal to recognize intellectual property rights developed in other countries encourages the proprietor of the technology to decline to transfer it into the country that jeopardizes its rights.

Over a long term, lost access to new technology causes greater loss than a policy in permitting the original proprietor to withdraw the technology under intellectual property law after the expiration of a particular license term. Nevertheless, legislation and international proposals relating to technology in lesser advanced countries often entail "local rights" to

20. *See generally* W. FIKENTSCHER, THE DRAFT INTERNATIONAL CODE OF CONDUCT ON THE TRANSFER OF TECHNOLOGY (ICC Studies in Industrial Property and Copyright Law, vol. 4, 1980); Joelson, *United States Law and the Proposed Code of Conduct on the Transfer of Technology*, 23 ANTITRUST BULL. 835 (1978); Kantor, *Restrictions on Technology Transfer in Latin America*, 68 TRADEMARK REP. 552 (1978); Matsui, *The Transfer of Technology to Developing Countries: Some Proposals to Solve Current Problems*, 59 J. PAT. OFF. SOC'Y 612 (1977); Silverstein, *Sharing United States Energy Technology with Less-Developed Countries: A Model for International Technology Transfer*, 12 J. INT'L L. & ECON. 363 (1978); Note, *Japan and the Introduction of Foreign Technology: A Blueprint for Less Developed Countries*, 18 STAN. J. INT'L L. 171 (1982); Note, *Multinational Corporations and Lesser Developed Countries—Foreign Investment, Transfer of Technology and the Paris Convention: Caveat Investor*, 5 U. DAYTON L. REV. 105 (2980).

retain technology transferred into the country, notwithstanding contrary intellectual property laws.[21]

As of this writing, few less developed countries have legislation or reported decisions incorporating software under copyright or other protective systems. The causes for inaction vary. In many cases at least, the primary explanation is that the issue has no local importance. Inaction does not reflect a desire to strike out on a different path from developed countries. Part of this explanation lies, however, in the absence of the incentives to act that exist in the developed countries. Where action is taken in such countries, it often stems from bilateral pressure from the U.S. or other similarly advantaged countries.

Most countries participate in international conventions concerning copyright and patent.[22] Thus, arguably, no action is required to protect foreign rights. As described below, however, the industrial countries ordinarily conclude that special action beyond general copyright and patent statutes must occur to resolve uncertainty. These actions are uncommon in less advantaged countries. This enhances the uncertainty, and the net international effect is especially troubling because software can be rapidly and inexpensively reproduced with minimal resources.

B. Types of Traditional Protection

Assuming that at least some programs should be protected against copying, legal policy questions focus on what area or field of protection applies and whether new methods of protection should develop. Traditional types of protection offer a choice between patent and copyright laws. While both legal approaches protect technology, the prerequisites, procedures, and degree of protection may be quite different. Although uncertainty remains, developments in the past three years reflect a degree of emerging international consensus (among developed countries) in favor of copyright as the preferable form of legal protection of software.

1. *Patent*

Patent imposes high standards of innovation and originality to qualify for protection. It requires public disclosure and establishes a relatively short-term protection.[23] It grants control of any use of the protected

21. *See* Atkin & McKenzie, *Licensing Computer Software in South America: The Impact of Technology Transfer Laws*, 1 Comp. Law. 22, 24 (Dec. 1984); Kantor, *supra* note 20.

22. *See* Note, 5 Computer L. Rep. 567 (1987) (accord between Brazil and U.S. in which Brazil will expand software protections); Note, 5 Computer L. Rep. 389 (1987) (South Korea pledges copyright revision during 1987).

23. *See generally* P. Rosenberg, Patent Law Fundamentals (2d ed. 1980).

technology, including independent development—the patent protects the technology itself.

Computer programs are properly considered as a type of technology and it would seem obvious that protection under patent law would be a primary option. In the U.S. and elsewhere, however, patent protection for even highly innovative software has been difficult to obtain, and not clearly available internationally. Coupled with the high threshold of innovation required for protection, this reduces the importance of patent law as a method of international protection for software technology.

The recurring issue for software patent protection focuses on the extent to which a program can be patented divorced of hardware or other aspects of a system. In the United States, this issue is framed by the premise that no patent can issue for a mathematical algorithm (formula) in abstract and unconnected to a patentable system, machine, or process.[24] European and other national patent laws similarly exclude scientific discoveries and natural laws from patent protection, which would seem to include mathematical algorithms. Many foreign patent laws also contain express language excluding patents for computer programs "as such."[25]

The controversy of interpretation presented by such language is illustrated by developments in the European Patent Office. The underlying law expressly excludes from consideration as inventions "programs for computers," "mathematical methods," and "presentations of information" as such.[26] The interpretation of this language by the European Patent Office has undergone several transformations. The position announced in 1985 was that the exclusion does not bar protection of any invention containing a program, but only "inventions" defined solely by the program. The proposed guidelines commented:

> [An invention] must be of both a concrete and technical nature. . . . [If] a computer program is claimed in the form of a . . . disc, the contribution to the art is still no more than a computer program . . . [and is] excluded subject-matter. . . . If, on the other hand, a computer program in combination with a computer causes the computer to operate in a different way from a technical point of view, the combination might be patentable.[27]

24. The patentability of software in the United States was the subject of a series of Supreme Court decisions ending in 1981. The eventual result apparently establishes patentability for programs so long as the patent claim does not preempt all uses of a mathematical algorithm (formula). *See* Diamond v. Diehr, 450 U.S. 175 (1981); Parker v. Flook, 437 U.S. 584 (1978); Gottschalk v. Benson, 409 U.S. 63 (1972).

25. *See* R. NIMMER, *supra* note 2, ¶ 8.10A (Supp. 1986). *See, e.g.*, Patent Act, art. 52(2)(c) (W. Ger.); Supreme Court Ruling 2169, May 14, 1981, Guer. Ann, Dir. Ind. n. 1371, 58 (1981) (Italy); Patent Act 5.1(2)(c) (U.K.).

26. Arts. 52(1)-52(3) European Patent Convention (Annex I).

27. EUROPEAN PATENT OFFICE GUIDELINES C-IV, 2.2 (1985).

The patent law issue involves distinguishing protection of an invention (permitted) from protection that preempts abstract methods of calculation (precluded). The line is fuzzy and uncertain regardless of the country in which it is drawn. The difficulty is exacerbated when courts read claims for patent protection that are broad enough to encompass mental, rather than "technical" steps. Cases deciding this issue in the United States and internationally do not provide uniform results.[28] For example, in *Schlumberger Canada Ltd. v. Commission of Patents*[29] a Canadian court denied protection to a system for measuring and analyzing data from oil well bore holes, analogizing this computer system to a mental process. In contrast, the Paris Court of Appeals allowed patent protection to a statistics analysis system applied to geological survey data.[30]

This interpretation issue has not been resolved in most patent law systems, but the probable result is that a program, standing alone, will often be too abstract or insufficiently innovative. Especially when it implements a mathematical process, a program will often be unpatentable. Claims for protection of inventions that use a computer program, however, are not affected by the exclusion and are potentially patentable under most laws.[31]

2. *Copyright*

Copyright has literary origins and protects "expression." Arguably, this includes program code and design.[32] Copyright requires relatively low thresholds of originality and grants extended periods of protection without mandatory public "disclosure." Copyright prohibits reproduction (copying), but not independent development. It thus provides a suitable system for dealing with piracy. Copyright does not convey control of a process, function, or operational technology, however, but only duplication of particular expression (coding).[33] In most countries this gives the "author" protection against adaptations that modify the original expression, but substantially reproduce it. In many countries, the "author" of a copyrighted work also has various "moral" rights to prevent changes in the work.[34]

Even though copyright primarily concerns protection of literary and artistic rights, it is the dominant focus for software protection. A main

28. *See* R. NIMMER, *supra* note 2, ¶¶ 2.05-.09.

29. 56 Can. Pat. Rep. 2d 204 (1981).

30. Judgment of June 15, 1981, Cour d'appel, Paris, PIBD-1981 N. 285 III-175.

31. *See* Application of Int'l Business Machines Corp., (1980) F.S.R. 564 (U.K.); Supreme Court Ruling 3169, May 14, 1981, Guer. Ann. Dir. Ind. n. 1371, 58 (1981) (Italy).

32. *See generally* M. NIMMER, NIMMER ON COPYRIGHT (1978).

33. *See* R. NIMMER, *supra* note 2, ¶ 1.09A (Supp. 1986).

34. M. NIMMER, *supra* note 32, § 8.21A. *See generally* Sarraute, *Current Theory on the Moral Right of Authors and Artists Under French Law*, 16 AM. J. COMP. LAW 465 (1968); Strauss, *The Moral Rights of the Author*, 2 STUDIES ON COPYRIGHT 963 (1963).

reason for this result is that the character of the protection and the ease of access to that protection mesh with the most visible threats to the industry. Copyright is a direct legal policy response against commercial piracy. In most forms software can be readily reproduced, and the result within mass market elements of the industry is an emphasis on a field of law that deals directly with the right to copy. Copyright, as an existing, fully developed system, provides an obvious remedy of choice.

At present, a copyright protection is expressly available by case or statutory law to at least some computer software in a number of countries. This includes the United States, United Kingdom, France, West Germany, Australia, Japan, Italy, Portugal, Netherlands, and Canada.[35] In addition, in many countries where no decision has yet been reached, there is a likelihood that copyright in some form will be applied to software products. This result is likely in those European countries such as Denmark, Sweden, Spain, Finland, and Norway that have not as yet expressly encompassed software in copyright. The result is less likely in countries outside of this area where the immediate reference to experience in closely related countries is not persuasive, and a lower technological development reduces perceived incentives to act.

Although many countries expressly provide protection, substantial issues such as the following are left untreated: the scope of protection, whether all forms or types of software are protected, and what protections exist for works "authored" by nationals from other countries. Importantly, few countries have adopted and maintained software protection under existing copyright statutes without express legislative modification to incorporate software.[36] This testifies both to the effect of uncertainty and to the uncertain match between the technology and the form of protection adopted; it characterizes the uneasy compromise developing in this field. The barriers to using copyright to protect software technology are substantial. While some programs or aspects of programs involve artistically creative work communicated to humans, many programs solely control the internal operation of a computer and do not communicate in any manner normally associated with artistic work. Especially when programs are "written" on chips or diskettes, the connection between machine code and works of fiction or other traditional forms of authorship is not abundantly clear.[37] For many programs there is neither an expec-

35. Copyright Act, 17 U.S.C. § 101 (1982); Copyright (Computer Software) Amendment Act 1985, ch. 41 (U.K.); *see also supra* notes 15, 16, *infra* note 36.

36. *See* Judgment of Oct. 17, 1983, Turin Trib., Giurispurdenza Premontese n. 4 (Italy); Int'l Business Machines Corp. v. Ordinateurs Spirales Inc., 27 Bus. L. Rep. 191 (1985) (Canada); Judgment of Mar. 31, 1983, Court of Appeals, Amsterdam, 1983 Auleursrecht/ Amr 56 (Netherlands).

37. *See* Stern, *supra* note 3, at 12. The Australian High Court stands essentially alone

tation, nor any desire, that the code be read by another. The objective is utilitarian and functional; the code operates the computer to achieve the results desired by the programmer or the operator.

Several recurring issues arise in determining whether copyright should be available to computer programs. These include: (1) whether copyright applies to work in a form usable only by a machine, which would exclude programs in machine form; (2) whether copyright requires some communication to another human (e.g., an output), which would exclude programs purely oriented to operating the internal management of a computer; and (3) whether a copyright extends to output, code, and/or flowchart. These are largely technical issues that do not directly address the policy questions involved in deciding whether copyright is appropriate. The basic policy issue is whether existing law permits widespread, commercial copying of a product involving sophisticated technology and substantial investment. The argument for applying copyright to protect software derives from the underlying fact that copyright precisely orients to placing legal restrictions on the right of third parties to duplicate the product. The technical copyright issues, however, do reflect the character of the adjustments in perspective needed to make copyright law fit all forms and types of computer software.

In most countries that have dealt with the policy issue, it is determined that protection against copying is appropriate and, express legislation follows. In several countries the statutory action involves little more than adjusting the list of works covered by copyright specifically to include computer programs, perhaps by adding specific provisions relating to the rights of the buyer to make backup copies of the program. This form of legislation, adopted in Japan, the Federal Republic of Germany, and Great Britain, defines a computer program as a "literary work."[38] Such legislation applies the broad spectrum of copyright principles to computer programs, with the hope of avoiding ongoing uncertainty about the scope of protection. Experience in the U.S. and elsewhere, however, suggests that uncertainty is seldom allayed. Adoption of the general legislation is followed by continuing uncertainty about what might be described as "second" and "third" generation protection issues.

The ongoing controversy stems from the unique character of computer programs under copyright. The issues under this form of legislation can be expected to move to second generation about whether the statute

in rejecting copyright protection on this basis. *See* Computer Edge Pty., Ltd. v. Apple Computer (1986), *reported in* 6 COMPUTER L. REP. 64 (1986).

38. *See* Copyright Act Urgh Section 2 (1985) (W. Ger.); Copyright (Computer Software) Amendment Act 1985, ch. 41 (U.K.). This approach was also adopted in the Untied States. *See* 17 U.S.C. § 101 (1982).

includes program object code, programs with no expressive output for humans (operating system programs), and programs that are "printed" on microchips. The "third" generation issues follow, focusing on concepts of "copying," "adaptation" applied to the structured, esoteric world of coded programs.[39]

With respect to these second and third generation issues, active litigation in the United States led to rapid resolution of these issues by judicial decision that established benchmarks of protection. In other countries with a lower rate of litigation, progress is less likely to be as fast, resulting in extended uncertainty over a long period under the general statutes as they apply to particular forms and types of software. In some countries, such as Australia, more detailed protective legislation resolves at least some of the specific issues arising with reference to forms and types of software.[40]

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39. *See also* Nimmer & Krauthaus, *Copyright and Software Technology Infringement: Defining Third Party Development Rights*, 62 IND. L.J. 13 (1986); E.F. Johnson Co. v. Uniden Corp., 623 F. Supp. 1485 (D. Minn. 1985); Whelan Assoc., Inc. v. Jaslow Dental Laboratory, Inc., 609 F. Supp. 1307 (E.D. Pa. 1985); SAS Institute, Inc. v. S & H Computer Systems, Inc., 605 F. Supp. 816 (M.D. Tenn. 1985).

40. The Australian statute was in reaction to a court decision holding that copyright did not apply to computer programs. The decision was reversed by the Australian Federal Court before the statute was enacted. Apple Computer, Inc. v. Computer Edge Pty. Ltd. & Anor., [1984] F.S.R. 481, 53 A.L.R. 225 (Austl. 1984), involved duplication of Apple software in ROM chips by a Taiwanese computer. The full court held that copyright applied to both the source code and the object code infringement of the programs. "The source codes . . . express meaning as to the ordering and arrangements of instructions [and] it is incorrect to describe them simply as components of a machine. . . . The object codes . . . are a straightforward electronic translation into a material form. . . ." (per Fox, J.). In a final twist, the High Court of Australia reversed the Federal Court, holding that the by then modified copyright act did not apply to operating systems embodied in ROM. Computer Edge Pty. Ltd. v. Apple Computer (1986), *reported in* 6 COMPUTER L. REP. 64 (1986). This represents the only decision of an appellate court expressly denying software copyright protection.

Legislative amendment enacted roughly one month later expressly incorporates computer programs under Australian copyright law. The Act defines a computer program as "an expression, in any language, code or notation, of a set of instructions . . . intended . . . to cause a device having digital information to perform a particular function. Copyright Act ¶ 31(1)(a)(i)(Austl.). An adaptation of a computer program is defined as "a version of the work (whether or not in the language, code or notation in which the work was originally expressed) not being a reproduction of the work." Copyright Amendment Act of 1984, § 3(a). This clearly brings into the coverage of the Act any translations or compilations of the original program.

The amendment also deals with the form of creation or distribution of programs as they relate to copyright. It provides that the transmission of a program over a telephone line constitutes "supply" for purposes of copyright. *Id.* §§ 5, 6; Copyright Act § 132. On the other hand, the amendment clarifies that a work is in "material form" if it is in any "form (whether visible or not) of storage from which the work or adaptation, or a substantial part of [it] can be reproduced." Copyright Amendment Act of 1984, § 3(g); *cf.* 17 U.S.C. § 101 (1982).

In Australia special provision is made for reproduction of backup copies of the program by the owner of a copy. The Act expressly authorizes backup copies unless "contrary to

C. Nontraditional Protections: The Ongoing Debate

While copyright can be adapted to protect computer software, it is not particularly well-suited to the task, especially as subject matter shifts toward programs of a type more clearly oriented to technical process rather than artistic expression. Patent, on the other hand, suffers from the high threshold standards to obtain protection as well as the cost and time involved in qualifying. In light of these disadvantages of traditional forms of protection, there has been relatively extensive international debate on the character of protection desired for software and proposals defining a more focused protection. This concern has also occurred in other technology fields. In the field of semiconductors, for example, adoption in the United States of a hybrid form of protection for that type of property influenced new legal approaches in other countries, blending patent concepts of disclosure and registration, copyright concepts of ease of qualifications, and trade secret concepts of "reverse engineering."[41] To date, however, while hybrid proposals for software are not uncommon, they have not been widely enacted.

1. *Inertia and Forms of Protection*

There is substantial inertia to changing the legal structure pertaining to intellectual property and, especially, software protection. Initially, at least as against commercial piracy, there is sentiment in the software industry that copyright is an acceptable protection if its availability could be established uniformly and the uncertainty about what forms and type of software are protected could be resolved. While there is industry pressure for protective legislation, there is no strong support for moving outside the copyright framework.[42] This inertia is bolstered by the fact that protecting programs by copyright enables immediate access to international

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an express direction by or on behalf of the owner of the copyright." Copyright Amendment Act of 1984, § 4(2). This parallels provisions of § 117 of the U.S. act, but establishes a method by which the copyright proprietor can prevent backup copying. A right of a copy owner to make backup copies is also included in the recent Japanese legislation "if and to the extent deemed necessary for the purpose of exploiting that work in a computer by himself . . . ." Law for Partial Amendments to the Copyright Law, No. 62 of June 14, 1985, § 8; Copyright Law (Law No. 48, of 1970) art. 47bis (1) (as amended 1985).

Japanese legislation dealing with copyright of computer programs also contains relatively detailed treatment of the scope and character of protection. The most notable provision is that the legislation expressly excludes protection of "any programming language, rule or algorithm" used for making the computer program. Law for Partial Amendments to the Copyright Law, No. 62 of June 14, 1985, § 4; Copyright Law (Law No. 48, of 1970) art. 10(3) (as amended 1985).

41. *See generally* R. Nimmer, *supra* note 2, ch. 1.

42. World Intellectual Property Organization, Copyright (1983) [hereinafter Copyright 1983].

treaties and conventions that provide for reciprocal enforcement of copyright. In contrast, enacting wholly distinct forms of software protection excludes the technology from these existing networks.

The two applicable international copyright conventions are the Berne Convention[43] (seventy-six subscribing countries, but not currently the United States) and the Universal Copyright Convention (UCC)[44] (over forty subscribing countries including the United States, Japan, Canada, U.K., Australia, and the USSR). The Berne Convention exists in numerous drafts revised over time. Under the Convention works authored by a national of a participating country and published in a member country must receive the same protection in all member states that nationals of that country receive (national treatment principle). In addition, the Convention induced U.S. nonparticipation by requiring that copyright protection be automatic and that there be protection of the author's "moral rights" by member states. The Berne Convention applies to all "literary and artistic" works and generally creates a minimum term of protection of the author's life plus fifty years.[45]

The Universal Convention parallels aspects of the Berne agreement, most notably that related to national treatment. The Convention was tailored, however, to fit U.S. participation and permits countries to establish formalities for protection including the traditional "c" in a circle with the proprietor's name and the date of publication. The minimum term of protection required is the author's life plus twenty-five years.[46]

While special legislation might be desired to tailor protections to national policies, unless the terms of the general conventions are met, the character of protection in the international marketplace is severely restricted. Although a draft treaty on computer programs has been proposed, active work toward acceptance of the terms would require substantial time and effort that may not be consistent with a lack of clear industry support or with a perceived need to enact immediate, clearly available protections.

Despite the inertia and uncertainty, there are reasons to argue that copyright in its entirety is not the best mode of dealing with computer program protections. There are problems of both overprotection and underprotection. Copyright does not contain guarantees similar to those in patent systems that the protected technology will be disclosed to the

43. Berne Copyright Convention of 1886, 168 Perry's T.S. 185, *revised* July 14, 1967, 828 U.N.T.S. 221 [hereinafter Berne Convention].

44. Universal Copyright Convention, Sept. 6, 1952, 216 U.N.T.S. 132, *revised* July 24, 1971, 943 U.N.T.S. 178 [hereinafter Universal Convention].

45. *See* World Intellectual Property Organization (WIPO), Berne Convention for the Protection of Literary Works (Texts), Berne Convention, *supra* note 43, arts. 1, 6.

46. Universal Copyright Convention, *supra* note 44.

public. The unique character of computer program technology permits publication without disclosure of code and creates a potential monopoly of a technology without the opportunity for related development work by others that is stimulated under patent. This contradicts traditional policy judgments about technology protection to the effect that public disclosure, as a precondition of protection, importantly contributes to overall development. The contrary effects of copyright are accentuated by the long term of protection granted and the fact that few substantive barriers exist to obtaining protection.

Claims of underprotection focus on the fact that copyright does not preclude independent development and does not convey control to the proprietor over important, innovative technology except insofar as direct reproduction. Also, under copyright law, there is no protection against unauthorized use, merely unauthorized copying or adaptation. With a technology as contrasted to a book, of course, "use" connotes important applications that the developer desires to control.

2. *International Proposals: The World Intellectual Property Organization's Draft Treaty*

The discussion of international protections for software products began in the early 1970s under the auspices of the World Intellectual Property Organization (WIPO), the organization charged with administering the Berne Convention. In the late 1970s and early 1980s model draft proposals for national legislation relating to computer programs were developed, and a draft treaty proposed in 1983.

The draft treaty focused on committing signatory countries to provide protection against unauthorized disclosure, copying, and the use of program descriptions to create corresponding programs. It also provided for adoption of a national treatment principle for software. The term of protection would have been twenty years.[47] The proposal was discussed in 1983, and a substantial number of participating countries expressed the view that no treaty was needed because copyright protection was adequate.[48]

The model legislation proposes specific protections to the "proprietor" of the software, defined as the person who created a program or the employer for whom the work was completed during the course of the employee's duties. The proposed statute, however, expressly excludes any protection of the "concepts" on which the software is based.[49] It lists express rights given to the proprietor including rights to prevent

47. WIPO, Document LPCS/11/3 (1983).
48. COPYRIGHT 1983, *supra* note 42, at 271-79.
49. MODEL PROVISIONS §§ 3-4.

another person from: disclosing the work before it is made accessible to the public; allowing or facilitating access to an object storing the program before it is made accessible to the public; copying the software "by any means or in any form"; using the program description to produce a substantially similar "program description" or substantially similar program; and using the program to control the operations of a computer.[50]

Among the important features of this proposal are the express references to controlling use of the software to operate a computer and the general right to preclude disclosure of the program before it is made accessible to the public by the original proprietor. Both of these provisions represent extensions of copyright as it exists in the United States and both expand the protection of the proprietor.

3. *National Proposals*

a. *Japan*

The WIPO proposals have not been adopted in any country, but provide a framework for national debates. Equally important, the proposals illustrate a pattern involving intermittent review of what protections are appropriate. A controversial manifestation of this occurred in Japan, centering around proposals made by the Ministry for International Trade and Industry (MITI).

The MITI proposal blended copyright and patent concepts, along with relatively new approaches to software protection. It called for an extension of modified copyright, granting authors the rights to prevent unauthorized copying and use, but restricting the term of protection to fifteen years from the creation of the program.[51] The proposal, however, also called for a registration and examination procedure in which, while full public disclosure of the program was not required, a public disclosure outlining the function of the program was mandatory. In addition, there were provisions for compulsory licensing with compensation to the author in any case where the government considered this to be in the public interest.

The MITI proposal dealt directly with many of the explicit problems created by blanket application of copyright principles to software and came out in a manner that generally reduced the developer's protections. The examination process and disclosure were arguably based on a policy similar to that of patent, in which protection of the technology is conditioned on providing some access to information about the technology.

50. *Id.* § 5.

51. COPYRIGHT 1983, *supra* note 42; Karjala, *Lessons from the Computer Software Protection Debate in Japan*, 1984 ARIZ. ST. L.J. 53.

The compulsory licensing was arguably justified by a desire to promote multiparty development of technology while avoiding costly and inefficient duplication of development effort.[52] The proposal was seen in other countries, however, as threatening the viability of traditional confidentiality protections, as a scheme through which Japanese nationals could unfairly appropriate the work of others. The proposal was withdrawn amid controversy and replaced by a more traditional, copyright approach.[53]

b. *Canada*

In 1984 a White Paper issued by the Government in Canada proposed a tailored approach to software protection.[54] This report advocated copyright of programs in source code or other human readable form, but more limited protection for "programs in machine-readable form" (object or machine code). The protection for machine code versions would be limited to five years from the date of publication. As with the Japanese proposal, this was withdrawn in favor of a more traditional approach under copyright law when a new government was elected.[55]

c. *France*

A less unique, but nevertheless hybrid form of protection for software was enacted in France in 1985.[56] This legislation expressly includes software (logiciel) as a type of work covered by copyright, but especially defines some of the rights given to the proprietor of the work. The term of protection is limited to twenty-five years following the creation of the program, as contrasted to the author's life and fifty years for other works. The legislation also balances the rights conveyed to the program author and those reserved for third parties.

The French law expressly excludes from the software proprietor the "moral right" to oppose unauthorized modification of the work and "repent" or cancel the license in the event of such modification. This right is given to other works by copyright law in France.[57] In a technology

52. The proposal for compulsory licensing also has indirect relationships to the provisions of technology transfer laws enacted in many lesser developed countries, especially in South America, whereby the transferred technology remains in the country after completion of any authorized license period. *See* Atkin & McKenzie, *supra* note 21. Of course, both in focus and effect, the Japanese proposal does not call on similar policy support as would the technology transfer laws developed by countries attempting to bolster low technology profiles.

53. *See* Note, *Legislation Introduced to Protect Copyrights Abroad*, 12 COMPUTER L. & TAX REP. 4 (1985).

54. FROM GUTENBERG TO TELIDON, A WHITE PAPER ON COPYRIGHT: PROPOSALS FOR REVISION OF THE CANADIAN COPYRIGHT ACT (Supply and Services Canada, Ottawa, 1984).

55. A CHARTER OF RIGHTS FOR CREATORS (Report of the Subcommittee on the Revision of Copyright, Supply & Services Canada, Ottawa, 1985).

56. Law No. 85-660, arts. 1, 45-51, JOURNAL OFFICIEL, July 4, 1985, at 7495.

57. *See* Saurraute, *supra* note 34.

context, however, the resulting uncertainty of reliance of license agreements would be highly detrimental to development of the overall field.

In addition, the French software law permits the owner of a copy to make a backup copy for private use. This particular exemption from copyright's traditional exclusion of copying has become relatively commonplace in international software legislation, being first enacted in the United States and now adopted in France, Japan, and Australia. It responds to the fact that software is expensive and that, at least in mass market environments, there are perceived risks associated with the nature of the media on which it is recorded. A several-thousand-dollar program on a diskette entails greater risk of loss than a ten-dollar musical work on a record. The former receives a special treatment responding to the desire of the copy owner to protect against total loss.

In contrast, the French statute grants the program author a right to prevent or control "use" of the program, an extended right not available to other copyrighted works. As noted earlier, this is a significant extension of technology protection concepts into the copyright field. There are no national laws permitting the proprietor of copyright to control the "reading" of a novel, but the equivalent issue in context of software is clearly a more economically significant issue.

III. Conclusion

As this review indicates, international classification and protection of computer programs have begun to coalesce around a framework that emphasizes copyright law as a primary protection, with patent law available in limited circumstances. Significantly, in many of the countries in which this has matured into legal policy, the eventual development has been through legislation, rather than judicial action. Furthermore, in a large number of countries no definitive action has been taken and the status of available protection remains in doubt.

A major, secondary issue involves uncertainty about the desirability of fully extending copyright to computer programs. This becomes manifest in the various proposals for hybrid or restricted protection that emerged in Canada, Japan, and France. The concern runs in distinct and potentially conflicting directions. Laws enacting copyright protection often make special, limiting exceptions applicable to computer software products. Conversely, the laws of several countries expressly enact expanded rights of the proprietor of software to control the "use" of the program.

One difficulty in adjusting software protections involves the risk of moving outside of existing treaty networks or reciprocal enforcement. Of equal difficulty is the specification of the extent, character, and direction of the desired shift. While there may be an industry-based consensus

about the desired role of copyright as a basic protection, there is wide disparity on issues such as (1) required disclosure of frameworks, and (2) third party access rights to the technology.

Given this context, the development of international software protection law remains in its infancy. The reconciliation of disparate legal systems and national policy objectives here as in any other international law field is difficult, but the need to achieve consensus is heightened in the case of software in which the product is transportable, often very costly, and potentially invaluable to shaping future economies and future technological development.