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INTERNATIONAL PROTECTION OF COMPUTER SOFTWARE

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I. INTRODUCTION

Originally, computer manufacturers distributed "computer software" only as part of the whole computer system. They considered "software" to be inherently associated with "hardware." In the late 1960's, however, computer manufacturers ceased this "bundling" practice. From that moment, the software industry expanded.

Software products are quite vulnerable to "piracy." Competitors "pirate" software by making an exact copy of a program and selling it under their own label. Although software originators invest enormous amounts of time and money to develop a commercial software program, an exact copy can be made instantly and at minimal cost.[1] Clearly, it is essential that the software industry be legally protected against piracy.

Not only does literal copying threaten the industry but "cloning," which has emerged lately, has also allegedly endangered the industry. A clone, which is not an exact copy but rather is based on a thorough study of the original software, has functions identical to those of the original software. Since cloning can save competitors the considerable research and development expenses incurred by the original software creator, it gives them a great competitive advantage.

If competitors can gain advantage so easily, companies have little incentive to develop new software. Many countries have promulgated laws restricting software piracy and cloning within their own borders.

1. For example, in *Apple Computer, Inc. v. Franklin Computer Corp.*, (714 F.2d 1240, 1245 (3d Cir. 1983)), Apple Computer estimated that " 'works in suit' took 46 man-months to produce at a cost of over $740,000, not including the time or cost of creating or acquiring earlier versions of the programs or the expense of marketing the programs."

However, as a result of economic globalization, mere domestic restrictions are no longer sufficient for software protection.[2]

To cope with piracy and cloning and thereby preserve incentives for software development, a system of harmonized international legal protection for computer software should be adopted. But, what protection system should we formulate or resort to and how can we accomplish this critical end?

This Article outlines the historical background of efforts to formulate the international protection of computer software and proposes the appropriate framework for promising international protection thereof. In order to consider this proposal in its proper framework, this article will first provide a brief history as described in the following section.

II. TECHNOLOGICAL BACKGROUND[3]

A. HISTORY[4]

Computer "hardware" has developed at a very fast pace. Since the first general purpose electronic digital computer, the Electronic Numerical Integrator and Computer ("ENIAC"), was constructed in 1946, microelectronic technology has shown revolutionary development.[5] Today, a modern electronic digital computer which is more powerful than the ENIAC can be put on a tiny silicon chip.[6]

Keeping pace with the development of "hardware," the "software" industry has also expanded significantly.[7] The first step was marked by

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2. As described below, this issue is one of the vital topics in the current GATT negotiations, the so-called Uruguay Round.

3. For more details about the technology of software development, *see* T. FORESTER, HIGH-TECH SOCIETY (1987); J. SAVAGE, S. MAGIDSON & A. STEIN, THE MYSTICAL MACHINE (1986) [hereinafter J. SAVAGE].

4. "To date computer technology has passed through several basic technological phases. The four generations of computer hardware are based on vacuum tubes, transistors, printed circuits, and finally integrated circuits." Friedman, *Copyrighting Machine Language Computer Software—The Case Against*, 9 COMPUTER/L.J. 1, 3 (1989).

5. This "technological revolution—is bringing about dramatic changes in the way we live and work." T. FORESTER, *supra* note 3, at 9-37.

6. In 1971, M.E. Hoff, Jr., an engineer for Intel Corporation, invented the first "microprocessor." A microprocessor is a tiny silicon chip in which all elements of a computer are incorporated. For more discussion, *see* T. FORESTER, *supra* note 3, at 20-21; *see also* J. SAVAGE, *supra* note 3, at 34-35.

7. The term "computer software" is commonly understood to mean computer programs and "the detailed program description determining the set of instructions constituting the corresponding program and all kinds of supporting material created to aid the understanding or application of a computer program, such as user instructions." WORLD INTELLECTUAL PROPERTY ORGANIZATION GLOSSARY OF TERMS OF THE LAW OF COPYRIGHT AND NEIGHBORING RIGHTS 53 (1980). This paper will focus solely on the issues relevant to "computer programs," since documentation beyond computer programs has not had any significant problems in being protected as copyrighted work.

the "unbundling" of software and hardware.[8] The real revolution in software, however, came about in the early 1980's with the rapid spread of personal computers.[9] That leads directly to today's proliferation of packaged mass market software.

B. Basic Architecture of Computers

As shown in Exhibit A, a simple computer usually consists of a central processing unit ("CPU"), primary memory, and input and output devices. The CPU is the most important part as it performs the actual calculations by following the sequences of instructions that make up computer programs. In the course of its operations, the CPU retrieves (reads) data and instructions from memory and stores (writes) data into memory.[10] Information currently being used by the computer is stored in the primary memory which is directly accessible to the CPU. Memory devices used for the primary memory include random access memory ("RAM") and read-only memory ("ROM"). As implied by its name, ROM can be read from but can not be written into. On the other hand, RAM can be written into and stores information but only until the computer's power is turned off.[11] Both RAM's and ROM's are semiconductor chips, or integrated circuits, manufactured through a "photolithography process."[12]

C. Computer Programs

As suggested in the preceding subsection, computers could not fulfill their expected functions without being instructed by programs.[13] Typically, computer programs are divided by their functions into two categories. Those computer programs which are specifically designed to perform internal machine functions, such as allocation of memory space or translation of source-code to object-code (discussed below), are called operating system programs.[14] Those programs which fulfill a specific

8. In 1969, International Business Machines Corporation ("IBM") decided to sell hardware and software separately and announced its "unbundling" principle. *See*, Friedman, *supra* note 4, at 1-36; T. Forester, *supra* note 3, at 146.

9. In the 1980's, widespread use of so-called personal computers caused a more radical expansion of the software market. At present, the software market is a vital segment of the computer industry. For more discussion, *see* T. Forester, *supra* note 3, at 146.

10. J. Savage, *supra* note 3, at 44-46.

11. *Id.* at 58-60.

12. Photolithography is the technology used to imprint circuits on chips. *Id.* at 64-65.

13. In the beginning, "switches" in a computer were actually operated manually. These manually operated switches controlled a series of connections and disconnections, on's and off's, which were used to make computers accomplish certain tasks. Computer programs are designed to eliminate such bothersome manual operation by controlling the switches and directing the computer.

14. Copyrightability of this operation system has been discussed in various jurisdic-

task are called application programs.

Computer programs are usually written first in high-level languages, such as Basic,[15] Fortran, or Cobol,[16] which are usually called "source-code."[17] Source-codes can then be translated by special programs[18] into binary machine code, called "object-code," which represents 1's and O's, or "on's" or "off's" of electric current in certain parts of the circuit.[19] The object-code may be either recorded on a magnetic device such as a "diskette" or a "floppy disk," or expressed by circuits embedded in a ROM chip. As discussed below, since object-code is not intelligible to persons without a sufficient programming background, the copyrightability of programs in object-code format is in question—particularly by those alleged to have infringed on the copyrights of computer software.[20]

In contrast, source-codes, also called high-level programming languages, were developed in reverse process. Originally, programmers were required to produce programs in binary machine languages (ob-

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tions. *See, e.g.,* Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed,* 464 U.S. 1033 (1984); Annotation, *Copyright Protection of Computer Programs Under Federal Copyright Laws,* 70 A.L.R. FED. 153 (1984).

15. Originally developed and implemented at Dartmouth College in 1965, Beginner's All-purpose Symbolic Instruction Code ("BASIC"), resembles English words. BASIC is understandable to persons unfamiliar with computers. Its similarity to the English language enables one to analogize conventional literary works to computer programs.

16. Each programming language was developed to perform certain tasks. For example, Fortran, developed under the leadership of IBM and released in 1957, was designed for scientific calculation. Cobol, developed in 1959, was designed for business purposes such as file handling.

17. Strictly speaking, "source-code" is not always written in a high-level language. Although assembly languages are classified as low-level languages, they are written in mnemonic codes and in one of the kinds of "source-code."

18. Those "translator" programs include "assembler," "compiler" and "interpreter." *See* J. SAVAGE, *supra* note 3, at 219-46.

19. In addition, there is another type of language called "microcode." Microcode is the industry term for the software inside the microprocessor, consisting of sequences of micro instructions forming microprograms. Steinberg, *Microcode—Idea or Expression?,* 9 COMPUTER/L.J. 6, 62 (1989). In *NEC Corp. v. Intel Corp.,* (645 F. Supp. 590 (N.D. Cal. 1986), *vacated,* NEC Corp. v. United States, 835 F.2d 1546 (9th Cir. 1988)), copyright protection for microcode was recognized. However, the judge later disqualified himself for having a small financial interest in Intel Corp., ordering his decision vacated. On February 6, 1989, the court again decided that the Intel microcode could be proper subject for copyright protection, although it was ultimately held that Intel had lost its copyright due to the omission of copyright notice on a large number of chips. NEC Corp. v. Intel Corp., 10 U.S.P.Q.2d (BNA) 1177 (N.D. Cal 1989).

20. *See, e.g.,* Williams Elecs., Inc. v. Artic Int'l, Inc., 685 F.2d 870 (3d Cir. 1982), where defendant Artic International contended that a copyrightable work "must be intelligible to human beings and must be intended as a medium of communication to human beings." The court ruled for plaintiff and held that computer programs expressed in object-code and stored in read-only memory may be copyrighted.

ject-codes). Machine languages are hard to manipulate even for well-trained programmers. Later, assembly languages, which are similar to machine languages, (but do allow the use of mnemonic codes) were developed to help programmers remember each instruction's function.[21] Subsequently, computer programs evolved into high-level languages which significantly facilitated both user and programmer access.

III. LEGAL DEVELOPMENT[22]

A. HISTORICAL OVERVIEW

Since the early 1970's, the World Intellectual Property Organization ("WIPO")[23] has played an important role in the study of the proper international legal protection of computer software and is discussed in detail in section B. As discussed in more detail in the following subsections B.1, B.2, B.5, C.1, and C.3, the WIPO's study had four major phases: first, it published *sui-generis* model provisions; second, it pursued a special treaty; third, it researched copyright protection for software; and fourth, it prepared model copyright provisions. In summary, this study, which started from the view that *sui-generis* protection was appropriate for software protection, is about to result in the adoption of copyright protection.

About the same time WIPO pursued its study, many countries developed their own form of international software protection.[24] They too tended to adopt copyright protection instead of *sui-generis* legal protection. This matter will be discussed further in subsections B.3 and C.2.

In addition to these recent statutory developments in copyright protection, other new international trends are developing. At the Uruguay round of talks on the General Agreement on Tariffs and Trade ("GATT"), United Nations member-states have been negotiating for a new framework for protecting intellectual property rights. In the United States, "Special" Section 301 of the Omnibus Trade and Competitiveness Act of 1988[25] was passed. The GATT talks and the "Special"

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21. J. SAVAGE, *supra* note 3, at 220-25.

22. *See generally*, Kindermann, *The International Copyright of Computer Software*, 24 COPYRIGHT: MONTHLY REV. WIPO 201-26 (1988); Prasinos, *International Legal Protection of Computer Programs*, 26 IDEA 173 (1986). *See also* Exhibit B below.

23. WIPO is one of the sixteen specialized agencies of the United Nations system of organizations. The overall objectives of WIPO are to maintain and increase respect for intellectual property throughout the world. WIPO, BACKGROUND READING MATERIAL ON INTELLECTUAL PROPERTY 37-48 (1988).

24. The first legislative clarification at the national level was made in the Philippines in 1972. As part of a copyright amendment, computer programs were expressly adopted into the Decree on the Protection of Intellectual Property and equated to literary works. *See* Kindermann, *supra* note 22, at 201-26.

25. Pub. L. No. 100-418, 102 Stat. 1107 (1988).

Section 301 deeply influenced the international legal framework for computer software protection. This will be discussed further in subsection D.3.

B. *SUI-GENERIS* PROTECTION V. COPYRIGHT PROTECTION

1. *The WIPO Model Provisions on the Protection of Computer Software*

a. Introduction

In 1970, the United Nations, in an effort to facilitate developing countries' access to computer programming information,[26] requested that WIPO prepare a study on the appropriate form of legal protection for computer programs and on the possibility of international agreements. As a result, from 1971 to 1977 the first extensive research on the international protection of software was pursued by WIPO's International Bureau ("International Bureau"). The International Bureau, with assistance from the Advisory Group of Non-Governmental Experts on the Protection of Computer Programs ("Advisory Group"),[27] produced the Model Provisions on the Protection of Computer Software ("Model Provisions") which WIPO as a whole adopted in 1977. It is not a coincidence that the request was given soon after manufacturers began "unbundling" their software from hardware, thus creating a new market for software.[28] As a result of the unbundling, and as suggested in the preface of the Model Provisions, it became imperative to protect computer software.[29]

Although the Model Provisions have not been broadly adopted as national laws, the study supporting the Model Provisions has provided the basis for many subsequent discussions and thus deserves further review.

b. The Need for Protection

According to the preface to the Model Provisions, the development of computer software requires "large-scale investment"[30] and "is estimated to account for by far the greater part of the total cost of computer systems."[31] In addition, the "total expenditure on computer

26. *See* Note, *Model Provisions on the Protection of Computer Software*, 12 INDUS. PROP.: MONTHLY REV. WIPO 259-73 (1977) [hereinafter *Model Provisions*].

27. The Advisory Group's meetings consisted of four sessions: the first session was held June 17-20, 1974; the second session was held June 23-27, 1975; the third session was held May 17-21, 1976; and, the fourth session was held June 1-3, 1977. *Id.* at 259.

28. *See* Friedman, *supra* note 4, at 4; *see also* T. FORESTER, *supra* note 3, at 146.

29. *Model Provisions*, *supra* note 26, at 259-62.

30. *Id.* at 260.

31. *Id.*

software will constantly increase."[32] Problems arise because some forms of computer software are vulnerable to piracy. In fact, a computer software package is "expensive to prepare and easy to copy . . . ."[33]

In view of this vulnerability, the International Bureau stressed that providing legal protection for computer software would produce at least two advantages for encouraging dissemination of software. First, if software proprietors could rely on legal protection instead of confidential disclosure contracts, they would have incentive to disclose the software. This would ensure the ready accessibility of an important form of modern technology and facilitate exploitation of software. Second, by increasing the legal security of the relationship between the parties to a software sale or licensing agreement, the Model Provisions would facilitate such transactions. Therefore, the dissemination of software would be encouraged. The International Bureau's emphasis and the wording of the Model Provisions reflect the primary purpose of the study, *i.e.*, promoting dissemination of software to developing countries.[34]

c. Patent Law Approach v. Copyright Law Approach

The Model Provisions[35] were clearly prompted by the desire to en-

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32. *Id.*

33. *Id.* at 261.

34. *Id.* at 259.

35. The following shows the basic structure of the Model Provisions:

-Section 1 provides for definitions of "computer programs," "program description," "supporting material," and "computer software," to clarify the protected subject matter and the term "proprietor."

-Section 2 specifies the rule in determining the proprietor to the rights and the transferability of such rights.

-Section 3 provides for the requirement of originality for protection.

-Section 4 makes it clear that the concepts on which the computer software is based shall not be protected by the provisions.

-Section 5 describes the proprietor's rights.

-Section 6 defines infringement and specifies two cases that are not to be considered infringement.

-Section 7 regulates the duration of the rights.

-Section 8 establishes the relief available in the case of infringement.

-Section 9 makes clear that the provisions shall not preclude the application of other laws.

According to the Model Provisions, "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, supra* note 26, at 265. As this definition shows, programs in object-code format may be protected by the provisions. In addition, so-called operating system programs as well as compiler programs may be subject to the provisions.

As discussed below, a basis of the protection scheme under the Model Provisions is similar to the copyright protection system. For example, the rule of proprietorship pro-

courage software use and dissemination in developing countries. Nevertheless, the International Bureau did not necessarily adopt every conceivable incentive to encourage such use and dissemination.[36] For example, the Model Provisions did not make software protection dependent upon its registration or upon compliance with other formalities, such as the marking of the computer software. Yet, such requirements as mandatory deposit, compulsory registration or a formality requirement would have resulted in the disclosure of some information related to the computer software and thus promote the dissemination of computer software. Why did the Model Provisions refuse to accept these mandatory systems?

Apparently, the International Bureau was concerned with the interests of the software industry. The International Bureau pointed out in the preface to the Model Provisions that, "in view of the relative difficulty of detecting misappropriations of a computer program, . . . unrestricted disclosure to the public is not desirable."[37] The International Bureau reasoned that "compulsory formalities would not be in the interest of the small software enterprises or individual users, who might be unaware of the need to comply with them."[38] Thus, the International Bureau did not choose a patent law approach under which the rights would be granted subject to an adequate disclosure to the public and upon appropriate examination. Instead, the Model Provisions essentially adopted "a copyright law approach which takes account of their subject matter's affinity with copyright protection."[39]

d. Sui-Generis Protection

Another outstanding characteristic of the Model Provisions is their *sui-generis* form of protection. While the International Bureau stated in the preface of the Model Provisions that "the model provisions should not be understood as necessarily requiring adoption in a separate law on the protection of computer software,"[40] the Model Provisions were apparently aimed at formulating *sui-generis* protection which would necessitate a special treaty for computer software protection. The *sui-generis* form of protection seems to presuppose that existing treaties are inadequate to protect computer software.

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vided for by section 2 is comparable to that of authorship under copyright law; section 3 requires originality which is also a prerequisite for protection under copyright law; section 4 is similar to the idea/expression dichotomy under copyright law; finally, the Model Provisions consider the right to prevent unauthorized copying to be most important.

36. *Id.* at 262.
37. *Id.* at 261.
38. *Id.* at 263.
39. *Id.* at 261.
40. *Id.* at 264.

2. *The WIPO Special Treaty*

In November 1979, the Expert Group on the Legal Protection of Computer Software ("Expert Group") examined in detail what the contents of a treaty for the protection of computer software might be and agreed that the question of the desirability of a special treaty for the protection of computer software should be further studied.[41] In pursuit of an in-depth study, the Expert Group recommended that the International Bureau prepare a questionnaire to be distributed to each member country which would uncover problems that would be encountered in the international protection of computer software.

In accordance with this recommendation, the International Bureau conducted a survey, from 1979 to 1983, concerning the desirability and feasibility of a treaty for the protection of computer software. Based on the survey, the International Bureau prepared the Draft Treaty for the Protection of Computer Software ("Draft Treaty").

Apparently, the Model Provisions were not incorporated into the Draft Treaty. But, the Draft Treaty, like the Model Provisions, was intended to formulate a *sui-generis* protection of computer software. Its ultimate end was to eliminate uncertainty existing at that time with respect to the available form of international protection. Underlying this approach was the recognition that both the Berne Convention and Universal Copyright Convention were silent about the question of whether computer software was a "work" which could be protected under those conventions; and that the Paris Convention did not require member countries of the Union to grant patents for computer software.

3. *Amendment to U.S. Copyright Law*[42]

While the above-referenced study aimed at formulating *sui-generis* protection was conducted by WIPO, a different legal system was developed in the United States.[43]

In 1979, the year following the publication of the Model Provisions, the National Commission on New Technological Uses of Copyrighted Works ("CONTU") filed a final report ("CONTU Final Report") with

41. *See* Note, *Expert Group on the Legal Protection of Computer Software—First Session*, 16 COPYRIGHT: MONTHLY REV. WIPO 36 (1980). The Expert Group noted that the provisions of the Paris Convention and the Berne Convention did not fully cover the protection which should be granted to computer software.

42. *See* Wadley, *An Introduction to Copyright Protection of Computer Programs and the Semi-Conductor Chip Protection Act of 1984*, J. KAN. BAR A., July 1986, at 8; Friedman, *supra* note 4, at 5-7.

43. In 1964, the Register of Copyright of the United States first accepted computer programs for registration. The acceptance, however, did not mean the Copyright Office wholeheartedly endorsed the copyrightability of computer programs. Friedman, *supra* note 4, at 2-3, 6.

the United States Congress. Unlike the International Bureau of WIPO, CONTU did not choose *sui-generis* protection but recommended that copyright law be amended to "make it explicit that computer programs . . . are proper subject matter of copyright."[44]

In 1980, pursuant to this recommendation, the Congress amended the 1976 Act[45] to add the definition of the term "computer program"[46] to the U.S. copyright laws. The United States' adoption of this approach significantly influenced the WIPO Committee of Experts on the Legal Protection of Computer Software's appraisal of the Draft Treaty, as discussed below.

4. *Another Sui-Generis Protection System: The MITI Proposal*

By adopting the copyright law approach, the WIPO Model Provisions made software protection independent of software disclosure. The preface of the Model Provisions, however, suggested that there might be another *sui-generis* system for protecting computer software based on the patent law approach. In 1982, the Ministry of International Trade and Industry Japan ("MITI") proposed that Japan should adopt a patent law approach to software protection.[47]

According to the MITI proposal, *sui-generis* law should be enacted as follows:

> (i) limit protection to only fifteen years after the program has been written;
> (ii) set up a registration system for programs similar to that used for patents;
> (iii) give the MITI power to order compulsory licensing of programs; and,
> (iv) set up guidelines to require the program owner to disclose some details of the program when sold.[48]

For the purpose of "promoting dissemination of software to developing countries" as set forth in the preface to the Model Provisions, the MITI's proposed provisions seem more suitable than the Model Provisions themselves. On the other hand, the MITI provisions would be "particularly onerous to the countries that have a head start in [software] technology."[49] In fact, the MITI proposal was widely criti-

44. NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT 1 (1979) [hereinafter CONTU FINAL REPORT].

45. Pub. L. No. 94-553, 90 Stat. 2541 (1976) (codified at 17 U.S.C. § 101 *et seq.* (1988)).

46. Pub. L. No. 96-517, 94 Stat. 3028 (1980). According to the amendment, a "computer program" is defined as "a set of instructions to be used directly or indirectly in a computer in order to bring about a certain result." *See* 17 U.S.C. §§ 101-117 (1988).

47. *See* Prasinos, *supra* note 22, at 196-99.

48. *Id.*

49. *Id.* at 197.

cized, especially by the United States and the EEC Commission.[50] Even in Japan, the Ministry of Cultural Affairs and Education strongly criticized the MITI proposal and in its turn proposed a revision of the Japanese copyright law to specify that computer software was within the framework of copyright.[51]

5. *Failure to Adopt the Draft Treaty*

In 1983, the Draft Treaty was presented at the Second Session of the Committee of Experts on the Legal Protection of Computer Software ("Committee"),[52] but failed to gain sufficient Committee support.[53] The Committee found an "increasing trend at the national level in a certain number of countries of granting protection under copyright law to computer software."[54] The Committee participants agreed that they should no longer attempt to finalize the Draft Treaty but should instead pursue a study on the protection available under existing national copyright laws and treaties.

In 1985, WIPO, jointly with the United Nations Educational, Scientific and Cultural Organization ("UNESCO"), undertook this study and convened a meeting of the Group of Experts on the Copyright Aspects of the Protection of Computer Software ("Copyright Experts Group") as discussed below.

C. COPYRIGHT PROTECTION SYSTEM: SCOPE OF PROTECTION

1. *WIPO-UNESCO Joint Research*

In February 1985, the Secretariat of UNESCO, one of the specialized agencies of the United Nations, and the International Bureau of WIPO jointly convened a meeting of the Copyright Experts Group to discuss the applicability of copyright law to computer programs.[55] At this meeting, it was recognized that there was "a continuing general tendency to consider computer programs as works protected by copyright [among nations]."[56] However, according to a report entitled "Legal Protection of Computer Programs: A Survey and Analysis of

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50. *See* Kindermann, *supra* note 22, at 201-26.

51. *Id.* In the end, the counterproposal of the Ministry of Cultural Affairs and Education prevailed against the MITI proposal and, in 1985, the copyright law of Japan was amended to clarify the copyrightability of computer programs.

52. *See* Report, *Committee of Experts on the Legal Protection of Computer Software*, 19 COPYRIGHT: MONTHLY REV. WIPO 271 (1983).

53. The Committee recommended "that the consideration of the conclusion of a special treaty as presented to it should not be pursued for the time being." *Id.* at 278.

54. *Id.* at 272-74, 278.

55. *See* Report, *Group of Experts on the Copyright Aspects of the Protection of Computer Software*, 21 COPYRIGHT: MONTHLY REV. WIPO 146 (1985).

56. *Id.* at 147.

National Legislation and Case Law",[57] which was presented by the Secretariats of WIPO and UNESCO at the meeting, such a tendency was still not dominant. Brazil, Greece and the Union of Soviet Socialist Republics had reportedly considered the adoption of a *sui-generis* system for computer programs.[58] In addition, copyright protection was still under study in Australia, Canada, China, France, Israel and the Netherlands.[59] Thus, intense research had revealed that the perceived "general tendency" toward copyright protection was in reality unstable. In the final analysis, the research findings showed that, as of that time, there were no immediate and effective means with which to achieve a harmonized international protection system.

2. *National Legislation and U.S. Case Law Developments*

a. *National Legislation*

Subsequent to the meeting of the Copyright Experts Group, the applicability of copyright law to computer programs was discussed at the extraordinary session of the Executive Committee of the Berne Union ("Executive Committee") in June 1985.[60] By that time, the "general tendency" toward using copyright protection was further advanced and appeared to be more stable. Shortly before the meeting, the Federal Republic of Germany and Japan adopted amendments to copyright law which explicitly mentioned the copyrightability of computer programs. Further, in the United Kingdom, Canada and France, such amendments were reportedly in the process of being adopted.[61] Under these circumstances, no longer did it seem prudent and practical to insist on establishing a *sui-generis* international protection system. Instead, the Executive Committee decided it was more productive to discuss the substantive points of copyright law, including the scope of protection under the copyright law system and the necessity of revising the Berne Convention. Despite these advances, the copyright approach still did not officially prevail over the *sui-generis* approach. The participants on the

57. Mr. Michael S. Keplinger of the United States prepared this document in accordance with a request made jointly by WIPO and UNESCO. *See id.* at 146, 153-57.

58. *Id.* at 153-57.

59. According to the survey, Denmark, Finland, the Federal Republic of Germany, Ireland, Japan, Norway, Spain, Sweden and the United Kingdom were planning to adopt the copyright protection with or without amendment to their copyright laws. In India, an amendment to the copyright law was made in 1984 by which computer programs qualified as literary works. Report, *Executive Committee of the International Union for the Protection of Literary and Artistic Works (Berne Union)*, 23 COPYRIGHT: MONTHLY REV. WIPO 268, 276 (1987). *See also id.* at 268-77.

60. *See id.* at 276, 280-82.

61. In July 1985, both France and the United Kingdom adopted the copyright law amendment. *See* Kindermann, *supra* note 22, at 206-07. In 1987, a copyright law amendment bill was reportedly introduced in Canada. *See id.* at 213.

Executive Committee only agreed "to follow the developments both at national and international levels and regularly report on them to the Committees."[62]

b. Case Law Development in the United States[63]

In the United States, on the other hand, the key issue was no longer which form of copyright protection to use for computer software but what the scope of this protection should be. While the 1980 Copyright Law Amendment made it "explicit that computer programs . . . are proper subject matter of copyright,"[64] it could not encompass all potential cases that might come before the courts. Because the copyright law did not clarify the appropriate scope of protection, courts were called upon to develop such a definition. Thus, the adoption of copyright protection was only a first step which led to the following material questions on the scope of protection:

> (i) Whether or not computer programs expressed in object-code format are copyrightable;
> (ii) Whether or not computer operating system programs are copyrightable;
> (iii) Whether or not copyright protection extends to structure, sequence and organization of a computer program; and,
> (iv) Whether or not the audiovisual or pictorial displays are protected under the Copyright Law.[65]

i. *U.S. copyright law and object-code operating systems:* The first two questions are generally raised in actions against literal copying, *i.e.*, traditional piracy. Those questions were discussed in *Apple Computer, Inc. v. Franklin Computer Corp.*[66] In this case, the defendant, Franklin Computer, incorporated an operating system program, which was developed by Apple for "Apple II" computers and embedded in a ROM chip, into its own "Apple compatible" computers. The only difference between the Franklin operating system and the original operating system was that Franklin's program would not indicate Apple's copyright notice on the display screen when operated. In view of the enormous investment Apple made to develop the original operating system, it was clear that Franklin's business practice was unfair and should be prohibited. The defendant, however, presented several strong arguments in

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62. *Id.* at 282.

63. *See generally* Friedman, *supra* note 4. *See also* Soma, *A Comparison of German and U.S. Experiences in Software Copyright*, 18 I.C.C. 751 (1987).

64. CONTU FINAL REPORT, *supra* note 44, at 1.

65. In addition, copyrightability of "microcode" must be noted. *See supra* note 20 and accompanying text.

66. Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240 (3d Cir. 1983). *See also* Williams Elecs., Inc. v. Artic Int'l, Inc., 685 F.2d 870 (3d Cir. 1982); Apple Computer, Inc. v. Formula Int'l, Inc., 725 F.2d 521 (9th Cir. 1984).

favor of its actions. First, copyrightable work must be intelligible to human beings and intended as a medium of communication. The Apple object-code program, which the defendant used to create its own program, was not readily human readable.[67] Second, since operating system programs are purely utilitarian works and are considered to be uncopyrightable ideas, operating system programs are disqualified from copyright protection.[68] These arguments highlighted the significant differences between traditional literary works and computer programs. Suddenly, there was a question as to whether copyright protection of computer programs would always apply. The arguments against copyright protection as presented by Franklin seemed plausible. However, the court denied Franklin's arguments and held that:

> (i) a computer program in object-code embedded in a ROM chip was an appropriate subject of copyright; and
>
> (ii) the Apple operating system programs were not uncopyrightable processes, methods of operations or purely utilitarian works, because the Copyright Act makes no distinction between application programs and operating programs.[69]

This decision was rational, not only because it complied with the legislative intent underlying the copyright law, but also because it satisfied an urgent need to regulate conduct that appropriates others' assets after they already invested the thought and dollars necessary to develop that asset. Except for copyright protection, there was no effective and sufficient way to regulate such conduct in this field. The only way to protect Apple was the adoption of copyright protection.

ii. *U.S. copyright law and "clone" programs - protection of program structure:* Referring back to the questions raised when the U.S. adopted the Copyright Law Amendment,[70] the last two questions on the scope of protection under copyright law have emerged recently, involving "clone" programs. Clone programs have functions identical to those of the original program.[71] They are usually created by making a thor-

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67. While the traditional literal works are designed to be read by a human reader, a computer program in object code format can only be "read by an expert with a microscope and patience." Apple Computer, Inc. v. Franklin Computer Corp., 714 F.2d 1240, 1243 (3d Cir. 1983). This argument was originally made by the defendant in *Williams Elec. Inc. v. Artic Int'l, Inc.*, 685 F.2d 870, 877 (3rd Cir. 1982). Disagreeing with the argument, the *Williams* court accepted the copyrightability of object code programs.

68. The U.S. copyright law clearly provides that copyright protection does not extend to "any idea, procedure, process, system, method of operation, concept, principle, or discovery." 17 U.S.C. § 102(b) (1988). Further, in *Baker v. Seldon*, the court held that "the mere copyright of Selden's book did not confer upon him the exclusive right to make and use account-books, ruled and arranged as designated by him and described and illustrated in said book." Baker v. Seldon, 101 U.S. 99, 107 (1879).

69. 714 F.2d at 1249-52.

70. *See supra* note 65 and accompanying text.

71. A clone is produced by mimicking the essential structure of the software. There-

ough study of the original program and then a copy of the structure, sequence or organization of the original program. The key question is whether the creator of the original program should be given exclusive right to the structure, sequence or organization of the original program. In *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*,[72] the court permitted such an exclusive right, holding that "copyright protection of computer programs could extend beyond the programs' literal code to their structure, sequence, and organization."[73] Unlike the *Apple* case, Jaslow did not copy but instead developed a computer program which had functions identical to Whelan's program, but was written in a different programming language. The two programs, when written out, appeared totally different. In view of the *Apple* decision, the *Whelan* court could not conclude that Jaslow reproduced Whelan's program itself.[74] In order to protect Whelan, the court needed to extend copyright protection for software to its structure, sequence, and organization. But, why did the *Whelan* court decide to protect Whelan?

The court stated in the *Whelan* decision: "among the more significant costs in computer programming are those attributable to developing the structure and logic of the program."[75] Therefore, the extension of copyright protection "would provide the proper incentive for programmers by protecting their most valuable efforts."[76] As the court pointed out, "[a] program's efficiency depends in large part on the arrangements of its modules and subroutines."[77] In other words, the program's structure, sequence, and organization *are* its distinctive characteristics.[78]

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fore, the key problem is whether or not the structure of the software should be protected. *See* Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc., 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 479 U.S. 1031 (1987).

72. *Id.*

73. *Id.* at 1248.

74. In this case, Jaslow Laboratory first hired Whelan to develop software that would automate Jaslow Laboratory's management. After studying Jaslow Laboratory's operations, Whelan created a program written in a computer language known as EDL (Even Driven Language). Then, under an agreement, Jaslow Laboratory became Whelan's sales representative for the program. However, sensing that there might be a market for a program that served essentially the same function as Whelan's program but that could be used more widely, Jaslow Laboratory developed and marketed a clone program written in BASIC. *See id.* at 1225-27.

75. *Id.* at 1237.

76. *Id.*

77. *Id.* at 1230.

78. On the other hand, the court stressed computer programs' affinity with traditional literary works, and stated that "[t]he copyrights of other literal works can be infringed even when there is no substantial similarity between the works' literal elements" and "[o]ne can violate the copyright of a play or book by copying its plot or plot devices." *Id.* at 1234.

However, since the progress of computer programming "is achieved by means of 'stepping-stones,' a process that 'requires plagiarizing in some manner the underlying copyrighted work,' " protection of computer programs beyond their literal code may retard progress in the field of computer programming.[79] Besides, even if protection should be afforded to computer programs, questions remain as to whether copyright law can be, or should be, used to protect the elements of a computer program; and, if so, whether copyright protection is appropriate for such purpose. Those problems are discussed below.

iii. *U.S. copyright law and "clone" programs-protection of screen display:* Copyright protection of the computer program's structure, sequence, and organization is not the only way to prevent "clone" programs from spreading. Copyright protection of audiovisual or pictorial displays will also effectively discourage "clones." In *Broderbund Software, Inc. v. Unison World, Inc.*,[80] the court showed preference for the *Whelan* holding, and stated that "copyright protection is not limited to the literal aspects of a computer program, but rather that it extends to the overall structure of a program, including its audiovisual displays."[81] In this case, the defendant, Unison World, created a "clone" program which generated menu screens that were virtually identical with those of the plaintiff's program. The court held that this violated the copyright laws.

Although the outcome of the *Broderbund* case should have been beneficial to the software industry, this holding seemed to confuse the issues. Certainly, audiovisual displays generated by a computer program may be protected by copyright law as the court suggested, but it is not because the displays are generated by "a computer program;" rather, it is because the displays are considered to be an independent creation. Whether the work "is produced with the aid of a pen, pencil, or computer" is not crucial.[82] Furthermore, if, as the court decided, copyright protection of a computer program should extend to its screen displays, that would ruin the basic principle underlying copyright law, *i.e.*, the distinction between expression and "idea." The copyright law protects only "expression." The idea behind expression is not a copy-

79. *Id.* at 1238.

80. 648 F. Supp. 1127 (N.D. Cal. 1986).

81. *Id.* at 1133.

82. Friedman, *supra* note 4, at 12. At the same time, we must realize that there exists a significant difference between the display created by computer programs and the other works produced with "pen" or "pencil." Computer displays are, in some cases, deemed to express not only the visible elements appearing on the screen but also invisible elements behind the screen. The menu screen on a computer display expresses some function of the program, *i.e.*, the menu screen signifies that once one chooses a given task on the menu, the computer will accomplish that task.

right matter. The *Whelan* court's ruling did not radically depart from the principle since the arrangement of modules, subroutines or structure, sequence, and organization may be deemed expressed in a computer program. In contrast, screen displays to be generated by the program are undoubtedly not expressed in the program. The screen displays are the result or objective of the program, an element of an "idea." The reasoning of the *Broderbund* decision is hardly persuasive, although the result of this case is reasonable. Quite possibly, the *Broderbund* case overlooked one of the distinctive features of computer programs: a computer program is expression which generates another expression. In fact, the *Broderbund* holding was rejected by *Digital Communication Associates, Inc. v. Softklone Distributing Corp.*[83] In this case, the court correctly held that screen displays were not "copies" or "reproductions" of literary or substantive content of computer programs. The court thus held that the computer program underlying Digital's screen displays was not protectable copyright, but the screen displays themselves were copyrightable. Whether screen displays are protected by the underlying program has not been of great importance in subsequent cases; rather, courts have focused on what substantive standard should be used to decide the copyrightability of the screen displays.[84]

3. *Model Provisions for Copyright Legislation*

While U.S. courts unveiled the distinctive nature of computer programs and sought substantive standards for software protection, international trends toward adopting copyright protection continued.[85] In view of stable trends, the International Bureau prepared draft provisions for copyright protection on computer programs and included those provisions into its "Draft Model Provisions for Legislation in the Field of Copyright" ("Copyright Model Provisions") which was presented at

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83. 659 F. Supp. 449 (N.D. Ga. 1987).

84. In *Lotus Development Corp. v. Paperback Software International*, 740 F.Supp. 37 (D. Mass. 1990), two alternatives were mentioned: a test based on "look and feel," a widespread concept in public discourse on the copyrightability of computer programs, and a "three-element" test adopted by the court. As the court pointed out, the term "look and feel" is certainly too vague to be usable standard, though the term seems to underscore the goal of the copyright protection on screen displays. Going through the "three-element" test, basically a test to detect and analyze essential elements of screen displays, one can decide whether the "look and feel" of the displays are copyrightable.

85. In 1986, the Dominican Republic passed a copyright law which included computer programs in the catalog of copyrightable works. In 1987, Spain, Indonesia, Malaysia and Singapore, respectively, adopted copyright laws which ruled that computer programs were included among copyrightable works. *See* Kindermann, *supra* note 22, at 209, 212-13. *See also* Report, *supra* note 59, at 268-77. In addition, Denmark, Sweden and Israel have recently adopted copyright protection for computer programs. *Id.* at 259-69.

the first session of the Committee of Experts on Model Provisions for Legislation in the Field of Copyright ("Copyright Model Provisions Committee") held in February-March 1989.[86]

The purpose of establishing the Copyright Model Provisions is not solely to provide copyright protection for computer programs. The emergence of various new types of works, including computer programs, phonograms, and computer-generated works, caused discrepancies in views with respect to the scope of copyright protection at both international and national levels. This prompted a desire to clarify the scope of the subject matter covered by copyright and set forth appropriate standards for copyright protection on such new works. These issues were discussed at the meeting of the Committee of Governmental Experts on the Evaluation and Synthesis of Principles on Various Categories of Works held June 27 to July 1, 1988.[87] The Copyright Model Provisions Committee met to further these discussions.

At the first session of the Copyright Model Provisions Committee, the key issue was the copyrightability of computer software. Faced with "the dominating trend" towards adopting copyright protection, opponents of copyright protection faltered.[88] In fact, at the third session of the Copyright Model Provisions Committee, all participants agreed that computer programs should be protected by copyright.[89] It may be asserted, therefore, that the copyright approach will prevail against the *sui-generis* approach.

However, the mere adoption of copyright protection will not meet the ultimate goal. As shown in U.S. case law developments, even when computer programs are protected by copyright law, the scope of that protection is not always clear. Significant differences exist between computer programs and traditional literal works. Within the copyright framework, we need to further determine the substantive standards for software protection. A harmonized international legal system must

86. The Copyright Model Provisions Committee, convened by the Director General of WIPO, is expected to identify the questions with which the studies for the establishment of a possible protocol to the Berne Convention should deal. *See* Note, *Committee of Experts on Model Provisions for Legislation in the Field of Copyright*, 25 COPYRIGHT: MONTHLY REV. WIPO 146 (1989).

87. *See* Report, *Committee of Governmental Experts on the Evaluation and Synthesis of Principles on Various Categories of Works*, 24 COPYRIGHT: MONTHLY REV. WIPO 364-98, 445-76, 506-28 (1988).

88. Only three delegations, namely Algeria, Brazil and Czechoslovakia, "expressed doubts whether copyright protection of computer programs was an appropriate solution and, thus, whether any provisions on such a protection would be justified in the model provisions." Eighteen delegations "supported the inclusion of provisions in the model provisions on the copyright protection of computer programs." Note, *supra* note 86, at 148-49.

89. *See* Report, *Committee of Expert on Model Provisions for Legislation in the Field of Copyright*, 26 COPYRIGHT: MONTHLY REV. WIPO 282 (1990).

then be formulated based on these standards. However, these courses of action will take a long time.

D. FORMULATION OF A NEW PROTECTION SYSTEM

1. *Introduction*

Providing adequate protection for computer-related technology is so crucial that a number of attempts to formulate an international protection system have been made. Among these attempts, a treaty relating to integrated circuits, GATT negotiations and "Special" Section 301 of the Omnibus Trade and Competitive Act of 1988 are particularly noteworthy. Since a history of the integrated circuits treaty seems to suggest underlying problems in formulating an international software protection system, its brief history will be discussed in the following subsection.

2. *Treaty on Intellectual Property in Respect of Integrated Circuits*

On May 26, 1989, a treaty entitled "Treaty on Intellectual Property in Respect of Integrated Circuits" ("Integrated Circuits Treaty") was adopted by the Diplomatic Conference for the Conclusion of a Treaty on the Protection of Intellectual Property in Respect of Integrated Circuits.[90] The Conference was organized and convened by the WIPO in Washington, D.C.[91] The Treaty was designed to establish *sui-generis* protection for "layout-design" (topography). Layout-design encompasses such things as the three dimensional disposition of the elements and interconnections of an integrated circuit.[92] Integrated circuits, or semi-conductor chips,[93] which include RAM's, ROM's and microprocessors, are not computer programs themselves but may be considered to be media for storing or processing the programs. Protection on "layout-design (topography)" is deeply associated with software protection, but it is never a substitute for software protection. Nor does the software protection extend to "layout-design."

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90. Treaty on Intellectual Property in Respect of Integrated Circuits, May 26, 1989, *reprinted in* 25 COPYRIGHT: MONTHLY REV. WIPO 192 (1989).

91. *See*, Note, *Diplomatic Conference for the Conclusion of a Treaty on the Protection of Intellectual Property in Respect of Integrated Circuits*, 25 COPYRIGHT: MONTHLY REV. WIPO 191 (1989).

92. According to Article 2 (ii) of the Integrated Circuits Treaty, " 'layout-design (topography)' means the three-dimensional disposition, however expressed, of the elements, at least one of which is an active element, and of some or all of the interconnections of an integrated circuit, or such a three-dimensional disposition prepared for an integrated circuit intended for manufacture." *Id.* at 192.

93. Strictly speaking, an integrated circuit is not inevitably a semiconductor chip. However, in view of current technology, both terms have virtually the same meaning. *See id.* at Art. 3(1)(c).

The necessity of integrated circuit protection was first considered on an international level during discussions on software protection. In June 1983, at the second session of the Committee of Experts on the Legal Protection of Computer Software,[94] participants recognized the urgent need for protection of integrated circuits.[95] After intense discussion, the Committee recommended that the WIPO proceed with the study.[96] Thus, in a sense, the Integrated Circuit Treaty is a derivative product of discussions on software protection. However, the substance of the protection system is significantly different.

First, the Integrated Circuit Treaty adopted a *sui-generis* protection system, while *sui-generis* protection has not prevailed for protecting software. Almost all countries which protect the layout-design or mask works also adopted *sui-generis* protection.[97] Usually, the layout-design or mask works are considered to be purely utilitarian and therefore outside the scope of copyright protection. This is commonly seen as the essential reason that *sui-generis* protection prevailed. However, the preference of *sui-generis* protection over copyright protection was not a logical consequence. In fact, the initial plan in the United States, the country which seemingly led the rest of the world to establish *sui-generis* protection for integrated circuits, was only to amend the copyright law.[98] The decisive factor did not seem to be the nature of the mask works but instead the substantive standards suitable for effective protection.

Second, the Integrated Circuit Treaty permits the contracting party to adopt a mandatory registration system (Article 7(2)). In contrast, the Berne Convention for the Protection of Literary and Artistic Works ("Berne Convention")[99] generally prohibits member countries from having national treatment dependent on formality. In addition, the

94. *See* Report, *Committee of Experts on the Legal Protection of Computer Software—Second Session*, 19 COPYRIGHT: MONTHLY REV. WIPO 279 (1983).

95. *Id.* at 277-79.

96. Based on the study, the International Bureau of the WIPO started with the preparation of a treaty in 1985. Since then, four sessions of a Committee of Experts were convened from 1985 to 1988. *See* Note, *Developments in 1988 Concerning the Draft Treaty on the Protection of Intellectual Property in Respect of Integrated Circuits*, 25 COPYRIGHT: MONTHLY REV. WIPO 52-53, 191-97 (1989).

97. Those countries which protect layout-design of a chip include the United States, European Community countries, Japan, Canada, Australia, and Sweden. COPYRIGHT (issued by Copyright Research Institute of Japan), July 1989, at 18. It must be noted that instead of directly protecting layout-design, those countries protect "mask works." A mask is the stencil that is used to create the different layers of the chips. *See* Wadley, *supra* note 42, at 12.

98. *See* Friedman, *supra* note 4, at 30; 1 Copyright L. Rep. (CCH) ¶ 9005 (1988); Report, *Committee of Experts on the Legal Protection of Computer Software—Second Session*, 19 COPYRIGHT: MONTHLY REV. WIPO 277 (1983).

99. Berne Convention for the Protection of Literary and Artistic Works, Sept. 9, 1886,

Berne Convention principle contrasts with the Paris Convention for the Protection of Industrial Property ("Paris Convention").[100] The Paris Convention presupposes that member countries maintain a mandatory registration system. Thus, the Integrated Circuit Treaty's principle lies between the Paris and Berne Conventions.

In addition, while the Berne Convention provides that the duration of protection shall be at least the life of the author plus fifty years following the year of his death (Article 7), the Integrated Circuit Treaty's protection term is only eight years.

Another distinguishable character of the Integrated Circuit Treaty is its scope of protection. The Integrated Circuit Treaty explicitly permits so-called "reverse-engineering"[101] (Article 6(2)) and, further, allows the contracting party to adopt a non-voluntary license system (Article 6(3)). These characteristics are not found in the Berne Convention.

In addition, the Integrated Circuit Treaty introduced a unique dispute settlement system (Article 14). The Integrated Circuit Treaty states: (i) a contracting party may request another contracting party to enter consultations with it in order to settle disputes between them (Article 14(a)); upon agreement, the parties may resort to other means, such as good offices, conciliation, mediation and arbitration for amicable settlement (Article 14(2)); and, (iii) if the above means do not lead to an amicable settlement, a panel of three members to be selected from a list of governmental experts shall, at the written request of either of the parties, deal with the dispute (Article 14(3)). Both the Paris and Berne Conventions have been criticized in that neither convention provides an effective means for resolving disputes.[102] The inclusion of the above dispute settlement provisions seemingly responds to such criticism.

Given these novel provisions, the Integrated Circuit Treaty faces objections from both the United States and Japan, the two countries that dominate the semiconductor chip market.[103] The imbalance of

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as revised, *reprinted in* 7 COPYRIGHT MONTHLY REV. WIPO 135 (1971) (the latest revision was made in Paris in 1971).

100. Paris Convention for the Protection of Industrial Property, Mar. 20, 1883, as revised (the latest revision was made in Stockholm in 1967).

101. The term "reverse-engineering" was used in U.S. legislation. The Semiconductor Chip Protection Act of 1984, Pub. L. No. 98-620, Title III, 98 Stat. 3347 (1984), permits reproducing a mask work solely for teaching, analyzing, or evaluating its concepts, techniques, circuitry, logic flow, or component organization. In addition, persons conducting such studies are permitted to use the results to create and distribute original semiconductor chip products embodying their own mask works. 17 U.S.C. § 906(a) (1988).

102. Korn, *GATT—The Intellectual Property Dimension*, 1 INTELL. PROP. BUS. 2, 2-7 (1989).

103. The United States is reportedly opposed to the Integrated Circuits Treaty, for the following reasons: 1) the Treaty admits a non-voluntary license which is too broad; 2) the

technology makes it too difficult to gain universal consensus on the substantive standards for protection of "layout-design." This imbalance of technology can be seen not only in the field of integrated circuits, but also in the field of computer programs. Therefore, it is reasonable to expect that further discussions on software protection will confront the same situation, which may retard progress in establishing an international protection system.

3. *GATT and U.S. Trade Law*

a. GATT Negotiations

Debate over the issue of international protection of computer software is not limited solely to WIPO or UNESCO; it is also vigorously discussed in the current round of GATT talks, namely the Uruguay Round.

While previous rounds concentrated on reductions in tariffs and quotas, the Uruguay Round includes trade-related aspects of intellectual property rights for the first time.[104] An underlying cause for the inclusion of this topic is the computer industry's impatience with WIPO's slow progress in formulating an appropriate international protection system for computer software. WIPO has studied and discussed this issue for nearly twenty years, and has yet to solve even the threshold question, *i.e.*, the form of the protection. In addition, increased expectations for GATT may be indicative of the industry's dissatisfaction with the current legal framework, based largely on the Paris and Berne Conventions, neither of which has "any effective enforcement mechanism to compel states to introduce laws on intellectual property and to enforce such laws in a non-discriminatory manner."[105]

However, reliance on GATT would not be an immediate solution to the problem. The foremost barrier to the establishment of an international legal protection system of computer programs is neither the lack of enforcement mechanism nor the inability of WIPO. Instead, the imbalance of technology, that is, conflicting interests of developed and developing countries, has most hampered international legal development in this field. Thus, it is inconceivable that GATT would provide an immediate and effective solution to this problem. The mere change of forum will never solve the imbalance.

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protection period is shorter than that in the United States and some other countries; and 3) the dispute settlement system may lead to an unfair settlement due to political reasons. *See* COPYRIGHT (issued by Copyright Research Institute of Japan), Aug. 1989, at 13.

104. Korn, *supra* note 102, at 2-3.

105. *Id.* at 3.

b. "Special" Section 301 of the Omnibus Trade and Competitiveness Act of 1988

On August 23, 1988, the United States Congress enacted the Omnibus Trade and Competitiveness Act of 1988 ("Omnibus Trade Act of 1988").[106] The Omnibus Trade Act of 1988 was, among other things, designed to create a system to impose trade sanctions against nations that inadequately protect intellectual property.[107] The so-called "Special" Section 301, which is an amendment to Section 301[108] of the Trade Act of 1974,[109] was integrated into the Omnibus Trade Act of 1988 for accomplishing such a purpose. "Special" Section 301 was designed to enhance the Administration's ability to negotiate improvements in foreign intellectual property regimes. "Special" Section 301 has several important functions. First, the United States Trade Representative ("USTR") must identify those foreign countries that deny adequate and effective protection on intellectual property rights and market access to U.S. firms which rely on such protection, and determine which of those countries are "priority countries."[110] Once a country is identified as a priority country, the USTR must promptly initiate an investigation which must be completed within six months after date of initiation. Upon a determination that a priority country denies adequate and effective protection, the USTR may impose trade sanctions.[111]

The system created by "Special" Section 301 may significantly influence the international legal system for protecting computer software. Since the trade sanctions to be imposed by the USTR are so powerful, the United States may force other countries to introduce an equally protective system in order to meet the United States' standards. Thus,

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106. Pub. L. No. 100-418, 102 Stat. 1107 (1988).

107. *See* 1 Copyright L. Rep. (CCH) ¶ 20489 (1988). For more discussion, *see also* Hoffman & Marcou, *Intellectual Property Issues in the New Trade Bill* (1988) 5 E.I.P.R. 130; Smith, *Addressing Unfair Trade Practices in the International Market for Intellectual Property: Experiences with the Section 301 Informatics Action Against Brazil*, INT. COMPUTER L. ADVISER, Jan. 1989, at 9-17; Burchfiel, *The Effect of United States Trade Legislation on Intellectual Property Rights*, 19 I.C.C. 245, 245 (1988).

108. The previous Section 301 had "authorized" the United States Trade Representative ("USTR"), subject to the President's specific direction, to impose duties or other import restrictions in response to certain unfair trade practices. *See* Smith, *supra* note 107, at 9.

109. 19 U.S.C. § 2411 (as amended by the Omnibus Trade and Competitiveness Act of 1988, Pub. L. No. 100-418, 102 Stat. 1107 (1988)).

110. The term "priority foreign countries" means those foreign countries identified by the USTR as (i) denying adequate and effective protection of intellectual property rights, or (ii) denying fair and equitable market access to United States persons that rely upon intellectual property protection. 19 U.S.C.A. § 2242 (West Supp. 1990). *See* 1 Copyright L. Rep. (CCH) ¶ 11454 (1988).

111. *See* Hoffman & Marcou, *supra* note 107, at 134.

"Special" Section 301 may assure an international software protection system.

Nonetheless, we should not rely on "Special" Section 301's powerful, yet dangerous, scheme. There is no assurance that trade sanctions will be imposed on "reasonable" grounds. What is "reasonable" for one country is not necessarily "reasonable" for another country. "Special" Section 301, which was designed to eliminate "unfair" trade practices, may instead provide an "unfair" burden on other countries.

IV. PROPER FRAMEWORK FOR INTERNATIONAL PROTECTION OF COMPUTER SOFTWARE

A. GENERAL CONSIDERATIONS

As discussed above, copyright protection for computer programs continues to be the dominating trend in national law. Moreover, the International Bureau's Model Provisions will include sections which make explicit that computer programs are proper subject matter for copyright. However, in order to formulate a truly harmonized international protection system, it seems necessary to review why national laws and courts have tended to adopt copyright protection. In order to give due consideration to this issue, a brief description of the other possible legal frameworks will be provided in subsection (2), and, then, the suitability of copyright law for the protection of computer software will be discussed in subsection (3). Finally, based on this discussion, commentary on the future course of action for formulating an international protection system will be made below.

B. OUTLINE OF POSSIBLE LEGAL FRAMEWORK

In addition to legal protection under copyright law, other possible methods for protecting computer software include: (i) protection under patent law; (ii) protection of the program as a trade secret; (iii) contractual protection; (iv) protection under unfair competition law; and, (v) protection under special legislation.

Among these methods, patent protection is ordinarily unavailable and unsuitable for computer software, although some commentators as well as some jurisdictions suggest the possibility of protecting computer software under the patent system.[112] For the reasons described below, patent protection is too difficult to apply to computer programs written in presently conceivable languages. Thus, patent protection does not seem feasible for adequate protection of computer programs.

112. *See generally*, Jonqueres, *The Patentability of Software*, 18 INT'L REV. INDUS. PROP. & COPYRIGHT 607 (1987); *see also* Geissler, *Program Copyright-Patent Law in Disguise*, 17 INT'L REV. PROP. & COPYRIGHT 608 (1986).

Patent law is intended to protect "inventions" which are new, involve inventive steps and are industrially applicable. Although a computer program may be deemed new and industrially applicable, the program itself would hardly involve an inventive step, and, therefore, would not be an "invention."[113] Computer programs are developed by accumulating and arranging instructions and data. Each individual instruction and data incorporated within a computer program is alone so simple that it is difficult to find an inventive step within the elements of the computer program, *i.e.*, each instruction and data. Therefore, in order to conclude that a computer program involves an inventive step, that inventive step must be found in the arrangement of instructions and data. However, under patent law, a new creation that employs the use of existing elements must generate an unexpected result in order to be patentable; the arrangement of instructions and data comprising a computer program leads to the expected result. Without altering the concept of "inventive step," it is quite hard to conclude that the program is patentable.

In addition, the preface of the Model Provisions rightly suggests that unrestricted disclosure to the public—a fundamental principle of patent law—is not desirable for software protection in view of the relative difficulty in detecting misappropriations of a computer program.[114]

Moreover, the scope of protection under patent law is somewhat problematic. Under patent law, the patented invention may not be used by third parties without the authorization of the patentee, even if the third party has independently developed the same invention. This broad application of patent law to computer programs would require that computer program developers undertake extensive research to determine whether previous registration of an identical program already exists. Such a requirement would hamper dissemination of computer software and, as a result, progress in this field. Therefore, it is prudent not to stress the possibility of protecting computer programs under the patent system.

Another possible method for protecting computer software may exist under trade secret law. This method may be especially appropriate for the protection of computer programs developed in an enterprise. Pursuant to trade secret law, persons who owe a fiduciary duty to the enterprise are prohibited from disclosing confidential information related to the program.

However, this method would become inoperative once the fiduciaries disclosed the program to the public since trade secret law does not

113. It is noteworthy that the European Patent Convention contains an express provision to that effect. Convention on the Grant of European Patents, Art. 52(2)(c) (1979).

114. *Model Provisions*, *supra* note 26, at 261.

apply to third parties who do not have confidential obligations to the enterprise. As a result, the scope of protection of computer programs would not be defined and, thus, no distinction would be made between permissible reliance on the idea underlying the program and infringement upon the author's rights. In order to balance protection for computer programs (to provide the incentive to develop new technology) with the dissemination of technology (to facilitate technological development) it is vital to clarify the scope of protection for computer programs.

Furthermore, even contractual protection would be insufficient to create an efficient and productive balance between protection for and dissemination of technology. Contracts are not designed to provide universally applicable standards. Rather, a contract is a product of compromise between the parties to the contract. In addition, since contractual protection cannot be claimed against third parties outside the scope of the contractual relationship[115] to cope with piracy committed by a third party, the adoption of another protection system is inevitable. Further, one should note that if legal protection is insufficient to meet the computer industry's needs, the industry will likely attempt to restrict software use in its own agreements, thereby leading to a decrease in software availability. Ultimately, this lack of an effective protection system may result in the reduction of computers' usefulness.

Another method of protecting computer software may be under unfair competition law. This method may effectively regulate the misappropriation of computer programs by third parties. However, this method would not develop the notion that computer programs are the proper objects of intellectual property. Unfair competition law is not designed to protect "property" but, rather, to regulate competition. As a consequence, unfair competition law does not provide the adequate standards for governing ownership transfer and license of rights. Although it is possible to set forth such standards in unfair competition law, provided such standards are enunciated, the law would then no longer be an "unfair competition law" but instead a form of *sui-generis* intellectual property law.

In view of the above, two viable alternatives for a harmonized international legal system remain. They are copyright protection and *sui-generis* protection.

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115. For broadening the scope of contractual protection, so-called "shrink-wrap" licensing agreements have been widely used recently. The term "shrink-wrap" refers to the clear plastic wrapping that seals the software box and through which buyers can read the license agreement. "[The shrink-wrap] agreements offer to the 'purchaser' a license to use the software, which the 'purchaser' legally accepts when he tears open the shrink-wrap." *See* Note, *The Enforceability of State "Shrink-Wrap" License Statutes in Light of Vault Corp. v. Quaid Software, Ltd.*, 74 CORNELL L. REV. 222, 223 (1988).

C. SUITABILITY OF COPYRIGHT PROTECTION

As described in the preceding sections, significant differences between computer programs and conventional literary works exist. Based on these differences, the major arguments against copyright protection may be summarized as follows:

> (i) Computer programs are hardly "literary," "scientific" or artistic" works. Instead, they are considered utilitarian works;
> (ii) The unique nature of computer programs makes copyright protection unavailable; and,
> (iii) Copyright protection is inappropriate because of the duration of protection and other features of copyright law which are unsuitable for computer programs.[116]

Recognition of the distinctive nature of computer programs is vital. As described above, computer programs are not intended as a medium of communication between human beings. They involve various interrelated "expressions," namely "expression" in source-code format, "expression" in object-code format, "layout-design" of a ROM chip and audiovisual or pictorial displays. More specifically, source-code programs are designed to be translated into object-code programs; object-code programs, which may be embedded in a ROM chip, are designed to generate audiovisual or pictorial displays. Compared with traditional literary works, computer programs have quite complex dimensions. In addition, unlike traditional literary works, a computer program, rarely, if ever, intends to represent one's idea. The sole purpose of a computer program is to help operate a computer, a purpose unique to computer programs. These differences, however, do not necessarily lead one to conclude that computer programs are outside the scope of copyright law. It is still possible to "extend" the scope of copyright protection to computer programs, based on the computer programs' affinity with traditional copyrightable works. The decisive issue is not the interpretation of the notion of "literary," "scientific," "artistic" or "utilitarian," but the evaluation of the suitability for software protection.

On the other hand, it is possible to deny copyright protection and, instead, establish *sui-generis* protection of computer software as WIPO

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116. At the first session of the Committee of Experts on Model Provisions for Legislation in the Field of Copyright, the following main arguments were formulated against copyright protection of computer programs:

> Computer programs are not covered by the Berne Convention; they are of a technical and utilitarian character and cannot be considered to belong to the literary and artistic domain. In general, they lack originality and are composed of mere subroutine elements. Copyright protection's basic provisions do not suit the protection of computer programs; for example, the 50-year term of protection after the author's death is unrealistic; computer programs become obsolete within a much shorter period.

Note, *supra* note 86, at 148.

and MITI once attempted. In light of computer programs' distinctive character, it might seem more plausible to select this alternative. *Sui-generis* protection may furnish ideal substantive standards for software protection. The fatal flaw of this scheme is that, before introducing new legislation, one could not assure adequate protection of computer programs. Copyright protection can be provided based on the existing copyright law, while *sui-generis* protection cannot be given before its enactment. Since they were invoked to provide immediate protection, the courts could not afford to wait for such new legislation. The only alternative was to adopt copyright protection.

Thus, the key issues are: (i) whether or not copyright protection fits the need; and (ii) whether or not the adoption of copyright protection causes harmful side effects, *i.e.*, "the danger of corrupting and eroding longstanding copyright principles."[117]

Copyright law shall not permit the author of a copyrightable work to be given the exclusive right to the "idea" underlying the expression of the work. Competitors may exploit the idea to create their own works. This principle seems suitable for software protection. Copyright law may enable resources to be properly allocated without diminishing the incentive to create original computer programs. First, because the author can still enjoy the copyright on the expression of his computer program, copyright law may not be harmful to the incentive for creation. Second, if the author of a popular program is not be able to satisfy the demand for his program, competitors' programs may be substituted.

As argued, copyright is not an ideal tool to regulate the conflicting interests between the author of the original program and other competitors. The duration of protection is certainly too long. Some further adjustments to the copyright principle may be required, such as rental rights and moral rights. Since computer programs are so easy to be copied compared with traditional literal works, special consideration needs to be given upon the renting of computer programs. In addition, moral rights, which include the author's right to object to any modification of the work, might be adjusted in order to satisfy the users' need to modify the program. Nevertheless, provided there is an adequate scope of protection, copyright protection of computer programs seems effective and useful. Thus, we should strive to develop an international copyright protection system for software. If we correctly realize the distinctive nature of computer programs, applying copyright law to computer programs shall not pose "the danger of corrupting and eroding longstanding copyright principles." [118]

117. Friedman, *supra* note 4, at 18.

118. *Id.*

V. CONCLUSION: THE NEED TO ESTABLISH AN INTERNATIONAL PROTECTION SYSTEM

"The need for the law to respond to new developments in technology has been a recurring program throughout history."[119] In particular, the revolutionary development of computer technology seems hard to follow for both lawmakers and judicial circles. At the international level, the problem is even more complex. The remarkable imbalance of technology—*i.e.*, the conflicting interests of developed and developing countries—has hampered the formulation of an international legal system for the protection of computer programs. Even though progress seems too slow and national trade laws such as the Omnibus Trade and Competitiveness Act of 1988 appear to be an effective way out of this difficulty, we should not rely on such dangerous immediate tactics. In the end, what will produce fruitful results will be sincere multinational discussions which require enormous time and patience and, hopefully, result in a harmonized international protection system.

119. Wadley, *supra* note 42, at 13.

Exhibit A Basic Structure of a Computer

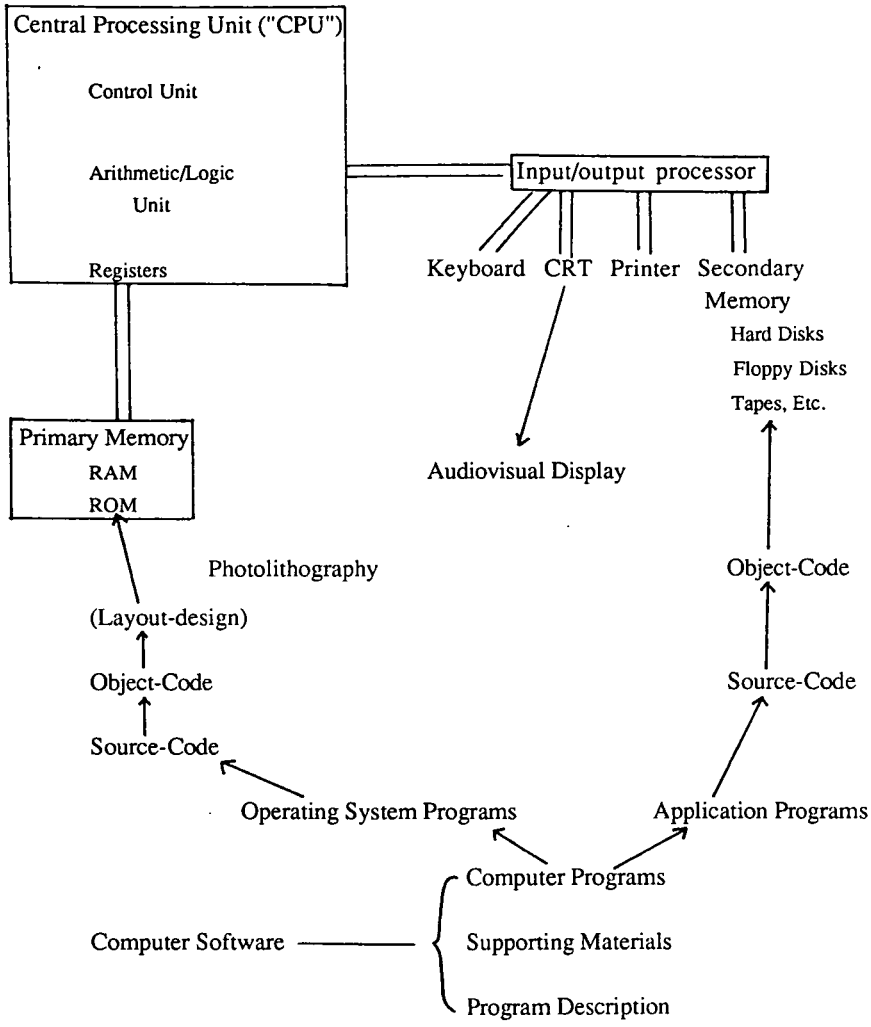

Exhibit B History of Computer Software Protection

	International Level	U.S.A.	Backgrounds
1964		The Register of Copyright first accepted software for registration.	
1969			IBM announced unbundling.
1970	UN requested WIPO to pursue study on software protection.		
1971			Intel invented the first microprocessor.
1972			In Philippines, copyright protection was adopted.
1977	The Model Provisions on the Protection of Computer Software		
1979	Expert Group on the Legal Protection of Computer Software	CONTU Final Report	
1980		Copyright Law Amendment	
1982		William Electronics v. Artic	MITI Proposal
1983	Committee of Experts on the LegalProtection of Computer Software	Apple Computer v.Franklin	In Hungary, copyright protection was adopted.
1984		Semiconductor Chip Protection Act Apple Computer v. Formula	Copyright Law Amendment in India and Australia

	International Level	U.S.A.	Backgrounds
1985	Group of Experts on the Copyright Aspects of the Protection of Computer Software Extraordinary Executive Committee of Berne Union		Copyright Law Amendment in West Germany, France U.K. and Japan
1986		Whelan v. Jaslaw NEC v. Intel Broderbund Software v.Unison	Copyright protection was adopted in Dominican Republic.
1987	Extraordinary Executive Committee of Berne Union		Copyright protection was adopted in Spain, Indonesia, Malaysia and Singapore.
1988	Committee of Governmental Experts on the Evaluation and Synthesis of Principles on Various Categories of Works Mid-term review of the Uruguay round	"Special" Section 301 of the Omnibus Trade and Competitive Act	
1989	Committee of Experts on Model Provisions for Legislation in the Field of Copyright Diplomatic Conference for the Conclusion of a Treaty on the Protection of Intellectual Property in respect of Integrated Circuits		Copyright protection was adopted in Denmark, Sweden and Israel
1990		Lotus v. Paperback Software	