
Chapter 2

The Law

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Patents

Patent protection is used extensively today to protect software-related inventions both in the United States and abroad. According to practitioners in the field of computer law, most of the major developers of software are presently using patent protection for software-related inventions.¹ The following is a discussion of the patent system, and a survey of the issues arising from the protection of software-related inventions by patent.²

*Introduction to the Patent System*³

The first U.S. patent law, enacted in 1790, embodied Thomas Jefferson's philosophy that "ingenuity should receive a liberal encouragement." This law provided protection for "any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement [thereof]. Subsequent patent statutes were enacted in 1793, 1836, 1870, and 1874, employing the same broad language as the 1790 act. The Patent Act of 1952 replaced 'art' with 'process' as patentable subject matter.⁴ The Committee Reports accompanying the 1952 act demonstrated that Congress intended patentable subject matter to include "anything under the sun that is made by man. However, the U.S. Supreme Court has held that laws of nature, physical phenomena, scientific principles, and abstract ideas are not patentable.

Patents grant to inventors a limited property right to exclude others from practicing (making, using, or selling) the claimed invention for 17 years. In this

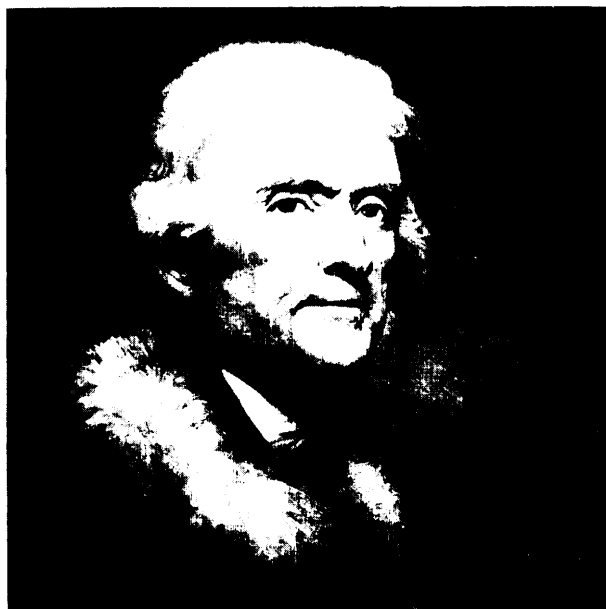


Photo credit: U.S. Library of Congress

The first U.S. patent statute was enacted by Congress in 1790. The patent law embodied Jefferson's philosophy that "ingenuity should receive a liberal encouragement."

way, patents are intended to encourage inventiveness. In the United States, patent law is exclusively within the jurisdiction of the Federal Courts.⁵ Strict examination of an invention is required,⁶ making the patent the most difficult form of intellectual property protection to obtain. Once obtained, a patent is maintained by periodic payment of maintenance fees during the life of the patent.⁷

¹ Robert Greene Sterne, Sterne, Kessler, Goldstein and Fox, personal communication Oct. 8, 1991.

² In this report, OTA sometimes uses phrases like 'patents for software-related inventions,' 'software-related patents,' or 'patenting algorithms' to refer generally to patent protection for computer-implemented processes and algorithms. The U.S. Patent and Trademark Office considers terms like "software patents" to be a misnomer because they may be interpreted to mean that a computer program *per se* (i.e., the sequence of coded instructions itself) is patentable, as opposed to the underlying computer process it carries out. (M. Keplinger, G. Goldberg, and L. Skillington, PTO, personal communication, Dec. 18, 1989.)

³ This material is adapted from U.S. Congress, Office of Technology Assessment, New Developments in Biotechnology: *Patenting Life*, OTA-BA-370 (Washington, DC: U.S. Government Printing Office, April 1989), pp. 37-43. For further discussion of biotechnology challenges to the patent system, see box 2-A.

⁴ 35 U.S.C. 101.

⁵ 35 U.S.C. 1 et seq.; 28 U.S.C. 1338. Questions related to patent licenses are governed by State contract law, but may be decided in Federal or State court, depending on the circumstances.

⁶ Some observers believe that the level of examination in the computer arts cannot be characterized as strict, particularly in the area of software-related inventions. Richard Stallman, Free Software Foundation personal communication, September 1991.

⁷ 35 U.S.C. 41(b).

Box 2-A—Biotechnology Challenges to the Patent System

Concerns about the integration of new technologies into the patent system are not confined to the area of computer software. In 1989 OTA published a report *New Developments in Biotechnology: Patenting Life*, in which it examined many of the intellectual property issues confronted by this industry. Biotechnology, broadly defined, includes any technique that uses living organisms, or parts of organisms, to make or modify products, to improve plants or animals, or to develop microorganisms for specific uses. Interest in commercial uses of living organisms has increased greatly over the past 15 years or so, spurred by new capabilities to select and manipulate genetic material. Proprietors' interest in obtaining biotechnology patents has increased accordingly. Like the computer software industry, biotechnology has confronted questions of subject-matter jurisdiction, the quality and efficiency of the examination process, disclosure and deposit requirements, and the expense and uncertainty of litigation of patents. In addition, Congress has addressed specific areas where the nature of the field of biotechnology was believed to warrant special treatment for the patents granted.

Subject-Matter Issues

Although there has been steady increase in the number of biotechnology patents issued since the early 1980s (i.e., since *Diamond v. Chakrabarty*), controversy has surrounded the issue of the appropriateness of intellectual property protection for biotechnology. The *Chakrabarty* decision concluded that Congress had intended the patent law to be given wide scope and that genetically engineered microorganisms, defined as useful products of human ingenuity as distinct from manifestations of nature, were patentable subject matter.

The controversy surrounding the issue of patents for biotechnology arises in large part from the very creation and patenting of 'inventions' that are themselves alive. The debate over whether to permit the patenting of living organisms frequently goes beyond the relatively simple question of the appropriateness of patents per se in this field of technology, focusing on the consequences of commercial use of patented organisms or the underlying merits of biotechnology itself. Discussion regarding patenting of genetically engineered organisms can turn to scientific questions, philosophical and ethical issues, environmental concerns, concerns for the welfare of genetically engineered animals, and economic considerations. One difficulty inherent in examining the desirability of these types of patents lies in the need to separate arguments that are new and directly related to patents in these areas of technology from broader arguments that would pertain independent of patent considerations. The 1989 OTA report on *Patenting Life* examined subject-matter issues, as well as issues related to patent prosecution and the operation of the Patent and Trademark Office.

Examination Speed and Quality

In the 1989 report, OTA found that the PTO was unable to process the ever increasing number of biotechnology applications in a timely manner. The PTO cited turnover among patent examiners, lured to the private sector by substantially higher salaries, as a significant reason for these difficulties. The number of applications severely challenged the process and examination capabilities of the PTO, despite the reorganization of biotechnology activities into a separate examining group in 1988, so that as of July 1988 there was a backlog of nearly 6,000 applications. The PTO issued just under 1,500 biotechnology patents in 1987. OTA found that approximately 15 months, on average, lapsed before examination of a biotechnology application was begun and another 27 months passed before examination was completed (either by issuance of a patent or abandonment of the application).

Disclosure and Deposit Considerations

OTA found that biotechnology presents a differentiating administrative issue in that it is the only art where words alone may be incapable of describing an invention sufficiently to enable one skilled in the art to make and use it in a reproducible manner. Currently, patent applications for inventions involving biological materials that are not generally available or reproducible without undue experimentation by a person skilled in the art are often supported by a deposit in a recognized patent depository. Although not automatically required, a deposit is employed in many cases to meet the requirement that a patent provide enablement or the 'best mode' of practicing an invention.

Patent Litigation

OTA found that biotechnology patent litigation required courts to assess whether patent holders have met the requisite requirements of novelty, usefulness, and nonobviousness, as well as issues relating to the scope of claims, infringement, and patent enforcement. OTA also noted the cost resulting from the existing uncertainty over the scope of protection, citing, for example, the additional litigation necessary to define the parameters of patent

protection. OTA further found that such costs undoubtedly influenced the R&D and intellectual property strategies of many companies: 85 percent of firms surveyed by OTA reported that, even though they might consider patent protection more desirable, they expected to pursue trade secret protection for biotechnology lines in addition to patent protection.

Experimental Use **Exception**

In biotechnology, the most relevant exemption from patent infringement is the experimental **use exception**, a court-created doctrine that holds that an experiment with a patented invention for the sole purpose of gratifying true scientific inquiry or philosophical curiosity does not attack the right of the patentee, and thus does not constitute infringement.

In 1984 the Court of Appeals for the Federal Circuit considered a case involving the testing of a pharmaceutical pursuant to Food and Drug Administration approval for a generic drug equivalent. This testing was conducted close to the end of the patent term for the original drug. The court found that such testing did not fall within the narrow confines of “experimental use” and thus was an infringement. In the wake of this case, Congress amended the patent code (Public Law 98-417) to allow a statutory exemption with respect to testing human drug products in order to meet FDA approval requirements.

PVPA Research Exemption

A complementary form of intellectual property is provided by the Plant Variety Protection Act of 1970 (PVPA), intended to encourage the development of new, sexually reproduced plants (new varieties and hybrids). Upon application to, and examination by, the U.S. Department of Agriculture, a plant variety certificate maybe issued on any novel variety of sexually reproduced plant, other than fungi, bacteria, or first-generation hybrids. Amendments in 1980 added protection for 6 vegetable crops and extended the period of protection to 18 years so that PVPA would be consistent with international plant-breeding provisions.

The PVPA has two important exclusions to a certificate holder’s protections: a farmer’s exemption and a research exemption. The farmer’s exemption allows individuals whose primary occupation is growing crops for sale (rather than plant breeding) to save protected seed for use on their farm or for sale to other such individuals. **The research exemption precludes a breeder from excluding others from using the protected variety to develop new varieties.** By contrast, utility patents for plants (which have been granted since 1985) do not have statutory exemptions from infringement: the holder of a plant utility patent can exclude others from using the patented variety to develop new varieties.

SOURCE: U.S. Congress, Office of Technology Assessment *New Developments in Biotechnology: Patenting Life*, OTA-BA-370 (Washington, DC: U.S. Government Printing Office, April 1989), pp. 37-43.

An invention must fulfill five major requirements to be deemed patentable.⁸ The invention must: 1) be patentable subject matter; 2) be useful; 3) be novel; 4) not have been obvious at the time it was made; 5) be disclosed in sufficient detail to “enable persons of ordinary skill in the art” to practice the invention without “undue experimentation. The patent must also disclose the “best mode” of practicing the invention known to the applicant as of the filing date. These issues of *statutory subject matter*, *utility*, *novelty*, *nonobviousness*, and *enablement/best mode* are addressed by 35 U.S.C. 101, 102, 103, and 112 respectively. If it is determined that these requirements have been fulfilled, and if certain other formal

requirements are met, a patent will be granted. The grant of a patent by the U.S. Government to an applicant gives a property right from the U.S. Government to the applicant or the applicant’s assignee.

Subject Matter

A patent may issue to:

[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof. ..⁹

⁸ *Application of Bergy*, 596 F.2d 952 (C.C.P.A. 1979). It should also be noted that it is the burden of the Patent and Trademark Office to show nonpatentability, rather than the burden of the applicant to show patentability. If, however, the PTO makes out a *prima facie* case of nonpatentability, the burden of proof then does shift to the applicant.

⁹ 35 U.S.C. 101,

Patents of this kind are known as *utility patents*, and are divided for examination purposes into three classes by the U.S. Patent and Trademark Office (PTO): chemical, electrical, and mechanical. Patents for software-related inventions are classified within the electrical class, relating to data processing methods and apparatus.

Under section 101, the invention must be

- . characterizable as a process, machine, manufacture, or composition of matter,
- a new invention, or a new, useful improvement of an existing invention; and
- useful.

Congress and the courts have interpreted the classifications of process, machine, manufacture, or composition of matter broadly. Although the subject matter of things that may be patentable is broad, it is not unlimited. Laws of nature, physical phenomena, scientific principles, and abstract ideas cannot be patented.¹⁰ The Supreme Court, in the case of *Parker v. Flook*, stated that the rule that discovery of a law of nature cannot be patented is based not on the belief that natural phenomena are not processes, but on the concept that natural phenomena are not the kind of ‘discoveries’ that patent law was designed to protect. The court stated that mere recognition of existing phenomena or relationships carries with it no rights to exclude others from their use or exploitation.¹¹ The issue of what constitutes patentable subject matter has been especially problematic in the area of software, as will be discussed below.¹²

In addition to the types of utility patents permitted under section 101, U.S. law provides for two other types of patents:

- *Design patents*¹³—A design patent may issue to the inventor of any new, original and ornamental design for an article of manufacture. Unlike other types of patents (which have

a term of 17 years from grant), design patents have a term of 14 years from grant.

- *Plant patents*¹⁴—A plant patent may issue “the inventor of any distinct and new variety of plant which is capable of asexual reproduction.

Utility

In general, utility is easily shown by the patent applicant. Utility is demonstrated by experimental data, commercial use, or through the drawings or description of the patent application.

Novelty

The requirement for patentability that an invention be novel is set forth in section 101 and is addressed in section 102 of the Patent Act. Under the provisions of section 102, an invention should not have previously existed through the work of others. The specific provisions of section 102 require that in order to qualify as prior art there be some public aspect to the previously existing work of others; inventions concealed through trade secret protection do not preclude patent protection on grounds of lack of novelty or nonobviousness.¹⁵

Under section 102, a patent can be denied under several conditions, including:

- the invention was known or used by others in the United States or patented or described in a printed publication in the United States or a foreign country before the invention date claimed by the applicant for patent;
- the invention was patented or described in a printed publication in the United States or a foreign country, or sold or used in the United States more than 1 year prior to the date of the application for a patent in the United States;
- the invention was abandoned by the applicant;
- the invention was made in the United States by another person who has not abandoned, sup-

¹⁰ *Diamond v. Chakrabarty*, 447 U.S. 303 (1980); *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948); *Gottschalk v. Benson*, 409 U.S. 63 (1972).

¹¹ *Parker v. Flook*, 437 U.S. 584 (1978).

¹² Biotechnology faces similar concerns about integration into the patent system as does the area of software. For further discussion of the problem of subject matter, as well as a brief survey of problems of the PTO in maintaining the quality and efficiency of the patent examination process for biotechnology patents, determining requirements for disclosure and deposit considerations, issues confronted in litigation, and special exceptions to the patent law as applied to biotechnology, see box 2-A.

¹³ 35 U.S.C. 171-173.

¹⁴ 35 U.S.C. 161-164.

¹⁵ Acts by an inventor to withhold an invention from public knowledge by either: 1) deliberately hiding the invention, or 2) fading to apply for a patent within a reasonable time after invention, may extinguish a first inventor's priority of invention such that a patent is granted to a later rival inventor. (35 U.S.C. 102Q.)

- pressed, or concealed it (in such cases determining the priority of invention becomes important); and
- the applicant is not the inventor.

Nonobviousness

To be patentable, an invention must be found to be not obvious under the terms of 35 U.S.C. 103, which states that a patent may not be obtained:

... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.¹⁶

Obviousness addresses the degree of difference between the invention sought to be patented and the inventions or technology that are known or available (the “prior art”) to the hypothetical person skilled in the relevant field of technology. Evidence of prior art (e.g., existing patents, publications) is evaluated not only for what it expressly teaches, but also for what it would reasonably suggest to one of ordinary skill in the relevant field of technology. Since an invention may be new (novel) but still be obvious, a determination as to whether or not the proposed invention is obvious needs to be made. The Supreme Court set forth the test for obviousness in 1966:

- . determine the scope and content of the prior art;
- . ascertain the differences between the prior art and the claims at issue; and
- resolve the level of ordinary skill in the pertinent art.¹⁷

In addition, the Court stated that secondary considerations of nonobviousness such as commercial success and long felt but unsolved industry need may be relevant to particular situations.¹⁸

How a Patent Is Obtained

An application for a patent must generally be made by the inventor. It must be in writing, contain a specification, and, where necessary, a drawing. The application must include claims and an oath or declaration that the inventor believes himself or



Photo credit: U.S. Library of Congress

The “model room” of the old Patent Office, where inventors deposited models of their inventions.

herself to be the original and first inventor of that for which the protection is sought.

The specification is the written description of the invention, describing the manner and process of making and using it “in such full, clear, concise, and exact terms” as to enable any person skilled in the art to which it pertains to make and use the same, and setting forth the “best mode contemplated by the inventor” (at the time of the application) of carrying out the invention (35 U.S.C. 112). The specification includes a set of one or more claims, each of which particularly points out and distinctly claims the subject matter which the applicant regards as his or her invention. The claims represent the metes and bounds of the property to be protected. As in real property, the claims stake out the patent holder’s territory, and any encroachment on that territory constitutes infringement.¹⁹

The purpose of the “best mode” requirement of section 112 is to prevent inventors from applying for patents while concealing from the public the preferred embodiment or implementation of the inven-

¹⁶ 35 U.S.C. 103.

¹⁷ *Graham v. John Deere Co.*, 383 U.S. 1(1966).

¹⁸ *Ibid.*

¹⁹ B.A. Amernick, *Patent Law for the Nonlawyer: A Guide for the Engineer, Technologist, and Manager* (New York, NY: Van Nostrand Reinhold Co., 1986).

tion. The meaning of this requirement in the context of computer software has been explored by the courts. The claims in *In re Sherwood*²⁰ were rejected by the examiner for failure to disclose any computer hardware, flow charts, algorithms, or programs with which best mode would operate. Yet the court overturned that determination, asserting that the question is not *how* an applicant discloses the best mode, but *whether* he has done so. The Court of Customs and Patent Appeals (C. C.P.A.) concurred, stating:

[T]here is no objective standard by which to judge the adequacy of a best mode disclosure. Instead, only evidence of concealment (accidental or intentional) is to be considered. That evidence, in order to result in affirmance of a best mode rejection, must tend to show that the quality of an applicant's best mode is so poor as to effectively result in concealment.²¹

Notwithstanding the applicant's failure to disclose the listing of the known program, the disclosure was sufficient to satisfy the best mode requirement.

In *White Consolidated Industries, Inc. v. Vega Servo-Control, Inc.*,²² a program that was an essential element to a claim for machine tool had been identified in the patent specification as an example. The program was not disclosed in the specification, but rather was maintained as a proprietary trade secret. The court held that, absent disclosure of the program, the specification required a great deal of experimentation by a skilled programmer to develop a workable program to make the invention operational. The proprietary nature of the program was irrelevant, given that it was the only way of disclosing the best mode of practicing the invention. The U.S. Court of Appeals for the Federal Circuit invalidated the patent on the ground that the disclosure failed to satisfy the enabling requirement under 35 U.S.C. 112.

The patent application may be made by the individual inventor, by two or more inventors

jointly, by legal representatives of the inventor or inventors, or by a person to whom the inventor has assigned a proprietary interest in the invention.²³ The actual filing date of the application is important because the presumption is that patent applications filed and documents published after the priority date do not constitute prior art for purposes of the earlier filed patent application.

Upon filing, the application is assigned to a primary examiner at the PTO, who conducts an examination of the PTO prior-art database as part of determining whether a patent should issue.²⁴ After the examiner initially reviews the application and the search results, there is an exchange of written correspondence between the patent applicant and the examiner. During this exchange, the examiner will often cite prior-art references in addition to those found and cited in the patent application that limit or preclude patentability of the claimed invention. The examiner will provide these to the applicant, who may then respond with amendments to the claims, information, or arguments to distinguish the claimed invention from the prior art. The back-and-forth procedure in which the applicant attempts to demonstrate the patentability of the claimed invention is called "prosecuting" a patent application.²⁵

If, after the initial examination process has been completed, the examiner determines that any claim of the patent application is unpatentable, the claim is rejected and the applicant is notified of the rejection with an explanation. If the applicant makes a request within 6 months,²⁶ he or she has a right to automatic reconsideration of the rejection of the claims, after which the examiner may make the rejection "final."²⁷ An applicant whose claims have been finally rejected may appeal the decision of the primary examiner to the Board of Patent Appeals and

²⁰ 613 F.2d at 816 (C. C.P.A. 1979)

²¹ *In re Sherwood*, 613 F.2d 809 (C. C.P.A. 1980) at 816.

²² *White Consolidated Industries, Inc. v. Vega Servo-Control, Inc.*, 214 U. S.P.Q. 796 (S.D. Mich. 1982), *aff'd* 713 F.2d 788 @-. Cir.1983).

²³ 35 U.S.C. 116-118.

²⁴ 35 U.S.C. 131.

²⁵ J. Drabiak, "Patents, Copyrights, and Trademarks: A Primer on Protecting Intellectual Property Work product," *Southern Illinois University Law Journal*, vol. 11, No. 1, fall 1986, pp. 1-28.

²⁶ The PTO can and often does set a shorter response period.

²⁷ 35 U. S.C. 132-133.

Interferences. Each appeal is heard by at least three members of the Board.²⁸

If an applicant is dissatisfied with the decision in an appeal to the Board, he or she may file an appeal with the Federal Circuit or file a civil action against the Commissioner in the U.S. District Court for the District of Columbia.²⁹ Appeals of *inter-partes* interference actions in the PTO to establish the priority of an invention proceed in a similar manner.³⁰ For the applicant who chooses to appeal to the District Court, a new hearing is conducted.³¹ One advantage of such a new hearing is that the applicant may be able to introduce additional evidence into the prosecution record.

The Term of Patent Protection

In the United States, patents are granted for a term of 17 years from issuance, so long as maintenance fees, which are required only for utility patents, are paid.³² Design patents are granted for a term of 14 years. For certain utility patents, the term may be extended for an additional 5 years.³³ For example, where a patent claims a product which must undergo regulatory review by the Food and Drug Administration prior to approval for commercial marketing or use, the patent may be eligible for such an extension if certain conditions are satisfied. Products eligible for such an extension are limited to human drug products, medical devices, and food or color additives.

Evolution of Case Law

Pre-Benson Patents for Computer Processes and Algorithms

During the early 1960s, the PTO faced a backlog of patent applications and a 4-year pendency for an application prior to issuance as a patent. The PTO and the patent system experienced further difficulties because of a limited budget and processing methods that could not adequately handle this

volume of applications. As a result, the President's Commission on the Patent System was established in 1965 to address these problems and suggest revisions to the Patent Act.³⁴ Reflecting the policy concerns of the PTO, the Commission recommended against patent protection for computer programs. The Commission report stated:

The Patent Office now cannot examine applications for programs because of the lack of a classification technique and the requisite search files. Even if these were available, reliable searches would not be feasible or economic because of the tremendous volume of prior art being generated. Without this search, the patenting of programs would be tantamount to registration and the presumption of validity would be all but non-existent.

As early as 1964, the Patent Office denied the patentability of programs, characterizing them as "creations in the area of thought." In 1966, the PTO attempted to formulate standards for patentability of software. In its first guidelines for Examination of Programs, the Patent and Trademark Office made recommendations regarding process claims based solely on computer execution of mathematical formulae and process claims called. These recommendations were withdrawn after hearings in which hardware manufacturers opposed the guidelines on the ground that software users must have access to software to promote the development of the technology. Software developers disagreed, maintaining that software was a technology entitled to protection under the patent laws.³⁵ These recommendations by the PTO came under attack during Senate hearings on the Patent Reform Act of 1967 for denying software manufacturers rights equal to those of hardware manufacturers.³⁶ During later House hearings, former PTO Commissioner Edward J. Brenner indicated that the PTO lacked sufficient pertinent prior art since there was a lack of prior art patents and most of the literature was not in the Office possession. The Commissioner also noted the diffi-

~ 35 U.S.C. 7, 134.

²⁹ 35 U.S.C. 141, 145.

³⁰ 35 U.S.C. 141, 146.

³¹ *Hoover CO. v. Coe* 325 U.S. 79 (1945).

³² 35 U.S.C. 154.

³³ 35 U.S.C. 156.

³⁴ Nelson Moskowitz, "The Metamorphosis of Software-Related Invention Patentability," *Computer Law Journal*, vol. III, 1982, p. 281.

³⁵ *Ibid.*, p. 283, citing Report of the Hearings on the Patent Office's Guidelines to Examination of Programs (1966).

³⁶ *Ibid.*, citing Hearings on S. 1042 Before the Subcommittee on Patents, Trademarks and Copyrights of the Senate Committee on the Judiciary, 90th Cong., 1st Sess. (1967).

culty of finding qualified examiners for computer software technology, the lack of experienced personnel, and the inadequate examination procedures in the area of software.³⁷

In 1968 the PTO, disregarding the arguments and line drawing of the previous guidelines published in 1966, issued another set of guidelines in which it stated that computer programs, however claimed, were not patentable unless combined with an apparatus which caused the physical transformation of matter. The PTO cited examples of transformation such as knitting a pattern or shaping metal. The legal theory on which the PTO based its guidelines was the doctrine of “mental steps”—i.e., if the process could be carried out purely in one’s mind, the invention was not patentable. As discussed below, the C. C.P.A. rejected these guidelines in *In re Prater*, and the PTO rescinded them.³⁸

In 1968, the C. C.P.A. issued a series of decisions testing the limits of the “mental steps” doctrine and the PTO guidelines. Because a programmed computer performed calculations that, in theory could have been carried out in the human mind, it was thought that the mental steps doctrine precluded the patentability of algorithms.

The C. C. P.A. ’S first decision in this series of cases was In re Prater.⁴⁰ The court reversed the Patent Office Board of Appeals which had affirmed the rejection of appellant’s claims to a spectrographic analysis in which linear equations were solved on a programmed general purpose digital computer. In its initial decision the court expressly held that the mental steps doctrine of *In re Abrams*⁴¹ and *In re Yuan*⁴² did not preclude the patenting of software. The court held that,

[P]atent protection for a process disclosed as being a sequence or combination of steps, capable of performance without human intervention and di-

rected to an industrial technology—a “useful art” within the intendment of the Constitution—is not precluded by the mere fact that the process could alternatively be carried out by mental steps.⁴³

The court found that in a case where the electronic or mechanical means for performing the process are disclosed in the application and where it is not reasonable to carry out the invention mentally, the invention is patentable subject matter under section 101. Because the applicants had disclosed that a computer, an electronic device, would be used for performing the process, and the process could not reasonably be performed in the mind, the court found that the invention was statutory.

On rehearing, the court sidestepped the 35 U.S.C. 101 statutory subject matter issue, and found that the mental steps doctrine did not apply because the applicants disclosed an apparatus for implementing the process without human intervention. The court, in a footnote, asserted that a general purpose digital computer programmed with a claimed process becomes a special purpose digital computer and could qualify as a patentable invention, assuming the requirements of novelty, utility, and nonobviousness are met. For this reason, the court allowed the apparatus claim. However, the court found that the applicants’ language failed to limit the process claim to its machine implementation and affirmed the patent examiner’s rejection of the specific process claim.⁴⁴

In response to the Prater decision, Con-missioner William E. Schuyler withdrew the PTO’S 1968 guidelines, stating:

We now will consider patent applications for computer programs on the basis of the merits for the specific inventions sought to be protected rather than refuse consideration for reasons such as those

³⁷ Ibid., citing Hearings on H.R. 5924, H.R. 13951, and Related Bills Before Subcommittee No. 3 of the House Committee on the Judiciary, 90th Cong., 1st Sess., Serial No. 11, pt. 1 at 37 (1967).

³⁸ Moskowitz, op. cit., footnote 34, at P. 284.

³⁹ Ibid., p. 286. Later court decisions distinguished between “mathematical” and other algorithms. “Mathematical” algorithms, as defined by the case law, are not statutory. However, some observers believe that patents for mathematical algorithms are, in fact, being granted. They cite U.S. Patent No. 5,031,134, which falls into, they claim, a classical area of mathematics, that of numerical integration. Richard Stallman, *The League for Programming Freedom*, personal communication, September 1991.

⁴⁰ *In re Prater*, 415 F.2d 1378 (C.C.P.A. 1968), *aff. on rehearing*, 415 F.2d 1393 (C.C.P.A. 1969).

⁴¹ *In re Abrams*, 188 F.2d 165 (C. C.P.A. 1951).

⁴² *In re Yuan*, 188 F.2d 377 (C. C. P.A. 1951).

⁴³ Ibid., at 1389.

⁴⁴ *In re Prater*, 415 F.2d 1393 (C.C.P.A.1969).

discarded by the court in the *Prater and Wei* case.⁴⁵

The C. C. P.A.'s conclusion in *Prater* was reaffirmed by the C. C.P.A. in *In re Bernhart*.⁴⁶ The permissible scope of subject matter was extended by the C. C.P.A. to include computer program processes in *In re Musgrave*⁴⁷ in which the court rejected the application of the mental steps doctrine and set forth a constitutional 'technological arts' standard for determining patentability. The concurring opinion in *Musgrave*, concluded that "there is very little left of the 'mental steps' doctrine." This view was borne out in subsequent C. C.P.A. decisions. (See box 2-B.)

Gottschalk v. Benson

The Supreme Court finally considered the issue of the patentability of computer software in the case of *Gottschalk v. Benson*.⁴⁸ The invention at issue in that case was considered first by the C. C.P.A. in *In re Benson*.⁴⁹ That case was an appeal from the decision of the Patent Office Board of Appeals which affirmed the rejection of two of the claims on the grounds that the claims were not directed to statutory subject matter. One of these rejected claims, claim 8, was for a method to be practiced in part using a particular apparatus called a "reentrant shift register." The other, claim 13, contained no reference to any apparatus, and in fact referred to the thing operated on not as "signals" but a 'representation. The method claimed in claim 13 was one for converting 'binary coded decimal number representations' into 'binary number representations.' The court thus addressed the issue of whether method claims reciting methods of converting binary-coded decimal numbers to binary numbers were statutory under section 101.⁵⁰

The C. C.P.A. found that Claim 8, reasonably interpreted in light of the specification (as directed in *Mahoney*⁵¹), was for statutory subject matter because the shift register referred to in the claim was

part of an electronic computer. The C. C.P.A. found digital computers used to manipulate signals representing binary numbers comparable to conventional cash registers and other machines which manipulate numbers. Since these machines had never been denied patentability, the court held that patentability could not then be denied digital computers.

Analyzing claim 13, which did not recite a shift register, the C. C.P.A. rejected the PTO's argument that the claim was not restricted to any apparatus and could be carried out directly by mental steps. Rather, the C. C.P.A. found that the claim must be interpreted in light of the specification and concluded that, with regard to claim 13, the "process had no practical use other than the more efficient operation and utilization of a *machine known* as a digital computer." The court held claim 13 to be within the statutory subject matter of section 101, and concluded in its opinion by stating that computers are "in the technological field and are in the useful arts, regardless of the uses to which their users may put them."⁵²

The Supreme Court considered the *Benson* application and reversed the C. C.P.A. in a brief opinion.⁵³ While the C. C.P.A. considered claims 8 and 13 separately, the Supreme Court's analysis made no distinction between the two. The Court stated that both claims 8 and 13 could be "performed without a computer," and that the "claims were not limited . . . to any particular apparatus. The court viewed the claims as broad, and not tied to any particular application. The Court stated:

Here, the 'process' claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure-binary conversion. The end use may (1) vary from the operation of a train to verification of drivers' licenses to researching the law books for precedents and (2) be performed through any existing machinery or future-devised machinery or without any apparatus.⁵⁴

⁴⁵ Moskowitz, op.cit., footnote 34, p. 287 at footnote 26.

⁴⁶ *In re Bernhart*, 417 F.2d 1395 (C. C.P.A. 1969).

⁴⁷ *In re Musgrave*, 431 F.2d 882 (C.C.P.A. 1970). For further discussion of *Bernhart*, and *Musgrave*, see box 2-A.

⁴⁸ *Gottschalk v. Benson*, 409 U.S. 63 (1972).

⁴⁹ *In re Benson*, 441 F.2d 682 (C. C.P.A. 1971).

⁵⁰ Ibid.

⁵¹ *In re Mahoney*, 421 F.2d 742 (C. C.P.A. 1970).

⁵² *In re Benson*, 441 F.2d 682 at 688.

⁵³ *Gottschalk v. Benson*, 409 U.S. at 64 (1972).

⁵⁴ Ibid., at 68.

Box 2-B-Court of Customs and Patent Appeals Cases After Prater

In re Bernhart¹

The C.C.P.A. reaffirmed the *Prater* holding in *In re Bernhart*. *In* that case, a general purpose digital computer was used to solve a set of transformation **equations** for a claimed apparatus and method which plotted three-dimensional figures onto any desired planar surface. The solutions derived by the general purpose digital computer were used to drive the plotter in drawing the two-dimensional representation from any desired angle and distance. Thus, as in *Prater*, **the court confronted the** question of whether a new machine is formed when a computer operates under the control of a program. In response to the examiner's argument that a programmed computer was structurally equivalent to the same computer without that program, and that the addition of new signals to the computer did not make it a new machine, the C. C.P.A. confirmed the patentability of the apparatus claims, and amplified its *Prater* footnote, stating:

... if a machine is programmed in anew and unobvious way, it is physically different from the machine without the program; its memory elements are differently arranged. The fact that these physical changes are invisible to the eye should not tempt us to conclude that the machine has not been changed. If a new machine has not been invented, certainly a 'new and useful improvement' of the unprogrammed machine has been, and Congress has said in 35 U.S.C. section 101 that such improvements are statutory subject matter for a patent.²

In re Musgrave³

The invention of *In re Musgrave* consisted of a process for establishing weathering corrections for seismic exploration. The claims include steps such as "generating signals" and "applying corrections." The Patent and Trademark Office rejected the claims, asserting that none of the claims defined a "process" within the meaning of section 101. The PTO Board of Appeals considered the claims by separating the "mental steps" from the "physical steps" and found that the point of novelty was found in the mental steps. Thus, the Board held the process did not fall within the category of patentable inventions.

The C.C.P.A. rejected the view that a mental versus physical distinction could be read into section 101. According to the court, dissecting the claims to arrive at some "point of novelty" was irrelevant to an analysis of statutory subject matter of the process under section 101. The court explicitly stated that:

As maybe seen from the statutory language, it contains nothing whatever which would either include or exclude claims containing 'mental steps' and whatever law may be on the subject cannot be attributed to Congress.

¹ 417 F.2d 1395 (C.C.P.A. 1969)

² *Ibid.*, at p. 1400.

³ 431 F.2d 882 (C.C.P.A. 1970)

The Court characterized the Benson method as a "mathematical formula" and went on to rule that processes are not patentable if they only claim or "preempt" a mathematical formula.

It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula for converting binary code to pure binary were patented in this case. The mathematical formula involved here has **no** substantial practical application except in connection with a digital

computer, which means that if the judgment below is affirmed, the patent would wholly **pre-empt** the mathematical formula and in practical effect would be a patent on the algorithm **itself**.⁵⁵

Nevertheless, the court stated specifically that it did not hold that there could be no patent for any program servicing a **computer**.⁵⁶ In ensuing cases before the C. C.P.A., the court attempted to interpret the *Benson* decision and apply it to a variety of factual situations.

⁵⁵ *Ibid.*, at 71.

⁵⁶ *Ibid.*, at 72.

It was irrelevant to the court in its section 101 analysis that some or all of the steps read on (but not solely on) a mental process. As a practical matter, the court stated that in their broadest context, process claims ‘read on’ physical and mental steps:

All that is necessary, in our view, to make a sequence of operational steps a statutory ‘process’ within 35 U.S.C. section 101 is that it be in the technological arts so as to be in consonance with the Constitutional purpose to promote the progress of ‘useful arts.’ [Const. art. 1, sec. 8.]

The court by this holding thus expanded the bases for a process as defined by section 101 to include any sequence of steps that can be performed by a machine as well as by a thinking person and that promotes the progress of the useful arts.

In re Mahoney⁴

The invention of *In re Mahoney* involved a data communication system, in which circuits and methods synchronized a receiver of digital information. The application for the invention disclosed a *method* of synchronizing a receiver with a bit stream containing digital information. The claims had been directed to steps in this process involving “comparing,” “registering,” and “counting.” These functions were performed on “bits” and “bit streams.” The PTO rejected these claims under 35 U.S.C. 112, stating that the claims failed to particularly point out and distinctly claim the invention since they read simultaneously on statutory subject matter (machine implementation) as well as on nonstatutory subject matter. The C. C.P.A. disagreed with this application of section 112, and pointed out that both section 112 and 101 rejections would be overcome if the claims in fact covered only machine implementation. The court found that references in the claims to ‘bits’ and ‘bit streams’ were sufficient to preclude reading the claims on a mentally performable process. It was clear from this case that method claims must include machine limitations to meet the requirements of section 112 and 101.

In re Waldbaum⁵/In re MacIlroy⁶

In re Waldbaum involved a process consisting of a method for controlling the operation of a data process, i.e., a computer program, to determine the number of “1s” in a data word. The Patent Office Board of Appeals affirmed a rejection of the claims on the basis that, *inter alia*, the application did not claim statutory subject matter. The board adopted the examiner’s grounds for a “mental steps” rejection, stating that since the apparatus limitations in the claims were only functional, the claims embrace “that which could be only an act of the mind rather than calling for an act on a physical thing. . .” The C. C.P.A. rejected the mental steps grounds for rejection and stated that “whether the appellant’s process is a ‘statutory’ invention depends on whether it is within the ‘technological arts’ . . .” The C. C.P.A. reversed the decision of the board.

⁴*In re Mahoney*, 421 F.2d 742 (C.C.P.A. 1970).

⁵*In re Waldbaum*, 559 F.2d 611 (C.C.P.A. 1977).

⁶*In re McIlroy*, 442 F.2d 1397 (C.C.P.A. 1971).

SOURCE: OTA, 1992.

Post-Benson to Diehr

After *Benson*, the C. C.P.A. applied a “point of novelty” test to determine patentability of the claimed invention. (See box 2-C.) The claims in *In re Christensen*⁵⁷ were directed to a process for determining the porosity of a subsurface formation. The claims recited a series of known steps for obtaining certain information and a new equation for computing the porosity from this gathered informa-

tion. While the C. C.P.A. was clearly of the opinion that the issue decided by the U.S. Supreme Court in *Benson* was narrowly drawn, it determined that in the *Christensen* claim reciting a new invention the “point of novelty” was a mathematical equation. Such an equation, the C. C.P.A. held, is not patentable. The steps involving establishing values for the variable steps which were not novel were not sufficient to render the invention patentable.⁵⁸

⁵⁷*In re Christensen*, 478 F.2d 1392 (C. C.P.A. 1973).

⁵⁸*Ibid.*, at 1394.

Box 2-C--Court of Customs and Patent Appeals Cases Following *Benson*

*In re Noll*¹: The C. C.P.A. in this case found apparatus claims for displaying images patentable. The input of the display device was provided in part by a programmed data processor.

*In re Chatfield*²: In this case the majority **opinion comments that the** C. C.P.A. 'S "point of novelty test" *in Christensen* does not mean that a claimed method maybe dissected to determine whether the novel portion lies outside the statutory classes of invention. The court repudiated any such analysis in *Christensen*, and reaffirmed its opinion in *Bernhart*³ that classification of the point of novelty as nonstatutory is inappropriate and irrelevant for Section 101 considerations.

*In re Deutsch*⁴: The court found the claimed method for control and optimization of multiunit plants at different geographic locations patentable, since the specific computing methods were independent of the claimed invention.

*In re Waldbaum*⁵: Characterizing the applicant's claims to a data processor controlled telephone switching system as "so abstract and sweeping" as to cover both known and unknown uses of the method claimed, the C. C.P.A. found the claims nonstatutory in view of ***Benson***, even though some of the claims were drawn to a data processing apparatus.

*In re Richman*⁶: The court held the claimed method of calculating using a mathematical formula unpatentable.

*In re deCastelet*⁷: The court held a machine method for generating a curve from data supplied to a computer to be nonstatutory because it was derived from the solution of a set of mathematical equations (a set of points along a curve) rather than a step in achieving a larger result.

*In re Freeman*⁸: This case focused on apparatus claims in means-plus-function form for a system of typesetting information using a computer-based control system in conjunction with a phototypesetter of known design. In its analysis, the C. C.P.A. set forth a two-part test which, with certain modification, has become the standard test for determiningg subject-matter patentability of software.

*In re Torna*⁹: The C. C.P.A. in *Torna* considered a method of operating a digital computer to translate from a source natural language (e.g., Russian) to a target natural language (e.g., English). The C. C.P.A. applied the Freeman rationale, determiningg whether the claims recite a *Benson type algorithm*. Finding that the program did not involve a solution for a mathematical problem, the method of enabling the computer was found to be within the technological arts and thus statutory.

¹ *In re Noll*, 545 F.2d 141 (C.C.P.A. 1976).

² *In re Chatfield*, 545 F.2d 152 (C.C.P.A. 1976).

³ *In re Bernhart*, 417 F.2d 1395 (C.C.P.A. 1969).

⁴ *In re Deutsch*, 553 F.2d 689 (C.C.P.A. 1977).

⁵ *In re Waldbaum*, 417 F.2d (C.C.P.A. 1969).

⁶ *In re Richman*, 563 F.2d 1026 (C.C.P.A. 1977).

⁷ *In re deCastelet*, 562 F.2d 1236 (C.C.P.A. 1977).

⁸ *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978).

⁹ *In re Torna*, 575 F.2d 872 (C.C.P.A. 1978).

SOURCE: OTA, 1992.

In a subsequent case, *In re Johnston*,⁵⁹ the application characterized the claims as apparatus claims for a computer program which conti-oiled an automatic computerized check sorting device. The C. C.P.A. held the invention patentable, construing *Benson* to apply only to process claims. Although the Supreme Court reversed the decision, finding the

invention obvious, the Court did not consider the matter of subject matter patentability under section 101.

Parker v. Flook

The Supreme Court again addressed the question of software patentability in *Parker v. Flook*.⁶⁰ The

⁵⁹ *Inre Johnston*, 502 F.2d 765 (C.C.P.A. 1974), *rev'd sub nom.*, *Dunn v. Johnston*, 425 U.S.219 (1976).

⁶⁰ *Parker v. Flook*, 437 U.S. 584 (1978).

Court reversed the C. C.P.A., holding that a method for updating “alarm limits” during a catalytic conversion process, in which the only novel feature was the use of a particular mathematical formula, was not patentable under section 101. The Court stated that the only difference between the claimed invention and conventional methods of changing alarm limits was that the applicant provided what the Court referred to as a “*mathematical algorithm or formula*”⁶¹ [emphasis added] for computing alarm limits.⁶² The application did not include disclosure about monitoring the process or the means of setting off an alarm or adjusting an alarm system.

The Supreme Court characterized its holding in *Benson* as precluding the patenting of the discovery of a novel mathematical formula, and addressed the issue of ‘whether the identification of a limited category of useful, though conventional, post-solution applications of such formula makes respondent’s method eligible for patent protection.’ The Court stated that it did not, holding that ‘a claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under Section 101 if the end use involves trivial “post solution activity.”’

The Supreme Court left open the possibility of patenting computer programs, and recognized that ‘a process is not unpatentable simply because it contains a law of nature or mathematical algorithm.’ A patent must not preempt a law of nature or a mathematical algorithm.⁶³

In subsequent cases, the lower courts bore in mind the *Flook* principles and continued to struggle with the limits of the patentability of software. In the cases of *In re Johnson*,⁶⁴ *in re Walter*,⁶⁵ and *In re*

*Bradley*⁶⁶ the C. C.P.A. attempted to apply the test set out in *Freeman* in light of *Flook* to determine whether a software-related invention constitutes statutory subject matter.⁶⁷

Diamond v. Diehr

In 1981 the Supreme Court decided the case of *Diamond v. Diehr*.⁶⁸

The application in *Diehr* recited a process of curing synthetic rubber. The process included use of a known mathematical formula to determine the time for curing, and a programmed digital computer to determine the proper length of time for curing the product and automatically opening the mold. The claims were rejected by the Patent Office as non-statutory subject matter. The Court of Customs and Patent Appeals reversed. The Supreme Court decided in a 5 to 4 decision that the process was patentable under section 101. The claims were not disqualified from patentability because of the use of a mathematical equation and programmed digital computer.

The Supreme Court characterized a mathematical formula or an algorithm to be “like a law of nature, which cannot be the subject of a patent.” The Court asserted that a claim drawn to otherwise statutory subject matter is not rendered nonstatutory simply because it involves a mathematical formula, computer program, or digital computer. The Court stated that the claims must be considered in their entirety, and held that the incorporation of a computer in the process claimed in the application does not render the process as a whole to be unpatentable subject matter.

⁶¹ The court in footnote 1 of the case stated, “We use the word ‘algorithm’ in this case, as we did in *Gottschalk v. Benson*, 409 U.S. 63, 65, 93 S. Ct. 253, 254, 34, L.Ed. 2d 273, to mean ‘[a] procedure for solving a given type of mathematical problem. . . .’”

⁶² *Parker v. Flook*, Sup. Ct. 2522 (1978), at 2523.

⁶³ The use of the term “mathematical algorithm” here refers to the case law definition of the word, rather than the meaning given it by the computer industry.

⁶⁴ *In re Johnson*, 589 F.2d 1070 (C. C.P.A. 1978).

⁶⁵ *In re Walter*, 618 F.2d 758 (CCPA 1980).

⁶⁶ *In re Bradley*, 600 F.2d 807 (C.C.P.A. 1979), *aff’d by equally divided court sub nom. Diamond v. Bradley*, 450 U.S. 381 (1981).

⁶⁷ For further discussion of these and other post-*Flook* cases, see Cary Sherman, Hamish Sandison, and Mark Guren, *Computer Software Protection Law*, (Washington DC: Bureau of National Affairs, 1991.)

⁶⁸ *Diamond v. Diehr*, 450 U.S. 175 (1981). Some commentators believe that *Diehr* has been misinterpreted by the Patent and Trademark Office and the lower courts. Professor Pamela Samuelson argues that as a result of *Diehr*, the Patent Office issues patents for a wide variety of nonindustrial computer program-related inventions and seems to be issuing patents for *Benson*-type algorithms. While some attorneys argue that this change is consistent with *Diehr*, she finds a substantial bias in patent law for *Benson*’s ruling that computer program algorithms are unpatentable. See, Pamela Samuelson, “*Benson* Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions,” *Emory Law Journal*, vol. 39, No. 4, fall 1990.

The Court in *Diehr* clearly stated that purely mathematical procedures or algorithms alone are not proper subject matter of patent protection:

[W]hen a claim recites a mathematical formula (or scientific principle or phenomenon of nature), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract. A mathematical formula as such is not accorded the protection of our patent laws, and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment. Similarly, insignificant postsolution activity will not transform an unpatentable principle into a patentable process. To hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection.

In cases such as that being considered by the Court, however, where the applicant wishes to protect an overall industrial process rather than simply a mathematical formula, the circumstances change.

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

In spite of this holding by the Supreme Court, it is still believed that the *Diehr* decision does not conclusively determine whether a computer program, standing alone, may be patented.⁶⁹ However, *Diehr* indicates that at least some subject matter involving software may be patented and that algorithms may be included as part of patentable subject matter.⁷⁰

PTO Policy and Procedural Response to Court Cases

Following the C. C. P.A.'s decisions in the companion cases of *Pardo*, *Taner*, *Abele*, and *Meyer* in mid-1982 (see box 2-D), the court did not further consider the subject of algorithms and statutory subject matter. The Court of Appeals for the Federal Circuit, established on October 1, 1982, did not hand down decisions on these issues until November 3, 1989 with the opinion in *In re Grams*.⁷¹ Just prior to this decision in September 1989, the PTO, in part in response to commentary in the media and academic journals, published a set of guidelines on the patentability of mathematical algorithms. In these guidelines, the PTO interpreted the law to encourage greater consistency in examination procedures among the different groups which handled patent applications that include mathematical algorithms.

The PTO relied upon the two-part test of *In re Freeman*⁷² as modified by *In re Walter*⁷³ and *In re Abele*⁷⁴ as the proper legal analysis of mathematical algorithm-statutory subject matter cases. Part 1 of the test is to determine whether a mathematical algorithm is recited, directly or indirectly, in the claims. The guidelines warn that, since mathematical algorithms have been determined not to fall within the section 101 statutory class of a 'process,' applicants may attempt to circumvent the nonstatutory subject matter rejection by drafting mathematical algorithms as 'apparatus' claims.⁷⁵ The guidelines require that the claims first be inspected to determine whether the claim recites a mathematical algorithm.⁷⁶ Noting that such a determination is not always possible by inspection of the claim, the guidelines indicate 'careful interpretation of each claim in light of its supporting disclosure.'⁷⁷

Part 2 of the test is to determine whether the mathematical algorithm is 'applied in any manner to physical elements or process steps.' The guide-

⁶⁹ Sherman et al., *Computer Software Protection Law*, op. cit., footnote 67. Sherman enumerates an extensive list of scholarly legal articles discussing the meaning of the *Diehr* decision.

⁷⁰ Sherman et al., op. cit. footnote 67, at page 403-419.

⁷¹ *In re Grams*, 888 F.2d 835 (Fed. Cir. 1989).

⁷² *In re Freeman*, 573 F.2d 1237 (C. C.P.A. 1978).

⁷³ *In re Walter*, 618 F.2d 758 (C.C.P.A. 1980).

⁷⁴ *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982).

⁷⁵ Lee E. Barrett, Associate Solicitor, *Official Gazette of the Patent Office*, Sept. 5, 1989.

⁷⁶ Ibid.

⁷⁷ *In re Johnson*, 589 F.2d at 1079.

Box 2-D—The Cases of *Pardo*, *Taner*, *Abele*, and *Meyer*

In re Pardo:¹ The case of *In re Pardo* involved an invention which controlled the internal operations of a computer through the compiler program, and consisted of a method for converting the computer from a sequential processor to a processor that is not dependent on the order in which it receives program steps. The patent application characterized the invention as an algorithm of a compiler program. The Court of Customs and Patent Appeals viewed the invention not as an algorithm, but as the rules by which a data processor operates, thereby governing the manner in which programs are executed. It rejected the argument that the claims were really mathematical calculations.

In re Taner:² Following the handing down of the *Diehr* decision, the Patent and Trademark Office rejected a patent application for a method of seismic exploration using simulated seismic waves which were generated by summing the signals of conventional waves. A mathematical algorithm carried out on a digital computer was a part of the claimed invention. According to the court, the simulated signal constituted a physical conversion of the summed actual signals, and was therefore a patentable process.

In re Abele:³ *In re Abele* involved a patent application for an improvement for CAT scanning. The C. C.P.A. concluded that some portions of the invention were patentable subject matter in spite of the use of a computer to perform some of the calculations involved.

In re Meyer:⁴ The C. C.P.A. in *In re Meyer* held a process and apparatus claims covering the use of a computer program and algorithm for storing and comparing medical test results. The applicant conceded and the court found that the claimed invention computerized the thought process of a physician. The court concluded that the claims were properly rejected by the Patent Office because they related to a:

mathematical algorithm representing a mental process that has *not* been applied to physical elements or process steps and is not, therefore, limited to any otherwise statutory process, machine, manufacture, or composition of matter.

¹ *In re Pardo*, 654 F.2d 912 (C.C.P.A. 1982).

² *In re Taner*, 681 F.2d 787 (C.C.P.A. 1982).

³ *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982).

⁴ *In re Meyer*, 688 F.2d 789 (C.C.P.A. 1982).

SOURCE: OTA, 1992.

lines suggest that the *Abele* rule be followed, wherein the claim is viewed without the mathematical algorithm to determine whether what remains is “otherwise statutory.” If it is, the claim does not become nonstatutory simply because it includes a mathematical algorithm. Citing *Flook*, and recognizing that the line between a patentable “process” and an unpatentable “principle” is not always clear, the PTO suggests some “useful guidelines” synthesized from the court decisions, that should aid in drawing the line between a patentable process and an unpatentable “principle.” The PTO issued guidelines resulting from leading court decisions:

1. If the only limitation other than the mathematical algorithm is insignificant or nonessential “post solution activity,” the claimed subject matter is nonstatutory.⁷⁸
2. A mathematical algorithm is not rendered statutory by “attempting to limit the use of the formula to a particular technological environment,” so that “‘field of use’ or ‘end use’ limitation in the claim preamble do not suffice to constitute statutory subject matter.”⁷⁹
3. If the only claim limitations in addition to the mathematical algorithm are data gathering steps which “merely determined values for the variables used in the mathematical formulae used in making the calculations, such steps are insufficient to change a nonstatutory method of calculation into a statutory process,”⁸⁰
4. The PTO suggests that it is useful to analyze whether there is transformation of something physical into another form. A distinction is made between transformation of matter in one

⁷⁸ *Parker v. Flook*, 437 U.S. at 590.

⁷⁹ *Diamond v. Diehr*, 450 U.S. at 191.

⁸⁰ *In re Richman*, 563 F.2d at 1030.

physical state to another physical state, which is a statutory process in electrical arts, and mathematical manipulation of “data” which is not a statutory process.

5. Structural limitations in method claims have a limited effect on patentability. While such limitations are not improper, they are not generally to be given patentable weight unless they affect or form an essential part of the process.⁸¹

The analysis of the guidelines were used before the Federal Circuit in the Solicitor’s brief for the Commissioner in *In re Grams*,⁸² the first reported decision by the Federal Circuit in this area. The subsequent case of *In re Iwahashi*⁸³ indicates how mathematical algorithms in apparatus claims maybe handled by the PTO.

In re Grams involved method claims that combined a mathematical algorithm with data gathering steps. The invention at issue was a process for diagnosing a patient using an algorithm that manipulated data obtained from results of tests performed on the patient. The claim involved performing clinical laboratory tests on an individual to obtain data indicative of the individual’s medical condition. The invention further involved processing steps for manipulating the collected data. As a result of this process, a set of parameters corresponding to a combination of constituents responsible for the medical condition could be identified. Citing *Benson*, the Federal Circuit stated that these remaining steps were “a procedure for solving a given kind of mathematical problem. The court cited the rule of *Abe/e*, which stated that:

[i]f a claim would be otherwise statutory, albeit inoperative or less useful without the algorithm, the claim likewise presents statutory subject matter when the algorithm is included.

The Federal Circuit would not interpret this language as declaring any claim that was statutory without the algorithm as patentable. It also pointed to the “provided that” qualification in *Abele* as

denying effect to field of use limitations or nonessential postsolution activity. The court decided that the claimed process was nonstatutory subject matter because the step of performing lab tests “merely provides the data for the algorithm,” and that whether or not the claims required that the method be performed by a programmed computer was irrelevant to the determination of whether the claim defined a section 101 process.⁸⁴

*In re Iwahashi*⁸⁵ involved an electronic ‘unit’ for providing coefficients to be used in pattern recognition based on input values. The method in the prior art was based on a formula involving a multiplication step. The improvement in *Iwahashi* was based on the fact that a close approximation of the correct coefficient values could be obtained without multiplication by using instead a stated formula. This eliminated circuitry necessary to perform the multiplication function. All of the elements in the claim were in means-plus-function form, except for a read only memory containing certain necessary values. The Federal Circuit found that while the claim recited a mathematical algorithm, the preemption aspect of the two part test was not met because the mathematical algorithm was physically implemented to define structural relationships between physical elements of the claim. Even though the read-only memory unit in the computer stored a mathematical formula for calculating the square of numbers, the claim defined more than a mathematical algorithm. The Federal Circuit reversed a finding of nonstatutory subject matter.

As discussed previously in this chapter, the PTO in the 1960s was seriously concerned about a variety of administrative problems confronted by the office, citing long pendency periods for applications prior to issuance of a patent, a backlog of applications, and problems with classification and maintenance of prior-art search files which ultimately would affect the quality of patents issued. These complaints and similar ones are not new, nor have the patent community and industry ceased to voice them. They

⁸¹ *In re Castelet*, 562 F.2d at 1244.

⁸² *In re Grams*, 888 F.2d 835 (Fed. Cir. 1989).

⁸³ *In re Iwahashi*, 888 F.2d 1370 (Fed. Cir. 1989).

⁸⁴ One commentator has offered as a possible reconciliation of the *Abele* and *Grams* decisions that the pre-algorithm step of *Abele*, when combined with the post-algorithm step, defined a physical process. In *Grams* the algorithm merely replaced the subjective mental processes of a physician. See Ronald S. Laurie, “Patentability of Computer Programs in the USA,” *The Law of Information Technology in Europe 1992: A Comparison With the USA*, Computer Law Series.

⁸⁵ *In re Iwahashi*, 888 F.2d 1370 (Fed. Cir. 1989).

are also not exclusive to the U.S. system. In as early as the 1850s royal commissions in Britain investigated the operation of the patent system. Testimony damaging to the reputation of the patent system led to passage of a patent reform bill.⁸⁶

Presently, the PTO is again under scrutiny due to concerns about the patent system in general, as well as its implementation with respect to software. In addition to the problems cited in the 1960s which apparently persist, recent concerns also include the competence of examiners to make fair and proper decisions about applications for software-related inventions, citing in particular the controversy over the educational requirements for examiners, difficulty in training and retaining adequate technical staff, and the resulting insufficient number of examiners to address the huge and growing volume of incoming applications for software-related inventions. There are, in addition, ongoing concerns about the quality of the prior-art database, and problems of classification.⁸⁷ (For statistics regarding issuance of patents for software-related inventions, see table 2-1).

In response to these concerns within the software community and beyond, the Secretary of Commerce established in August 1990 the Advisory Commission on Patent Law Reform.⁸⁸ The Commission's objective is to advise the Secretary on the state of the patent system in the United States and the need for any reform, as well as to advise the Secretary on the need for any changes in U.S. law relating to enforcement and licensing of U.S. patents. The Commission is to consist of 8 to 15 members, serving for 2 year terms, appointed by the Secretary of Commerce to represent corporations involved in filing patent applications, members of the bar, and the general public.⁸⁹ The Secretary may appoint official observers from various government agen-

Table 2-1—Number of Patents Issued for Software-Related Inventions, 1970-91

Year	Number
1970	27
1971	51
1972	70
1973	35
1974	11
1975	14
1976	5
1977	7
1978	30
1979	23
1980	25
1981	21
1982	52
1983	64
1984	136
1985	153
1986	187
1987	227
1988	131
1989	193
1990	599
1991	602

SOURCE: Electronic Data Systems Corporation (EDS). The data in this table given for 1972 through 1989 reflect statistics compiled by EDS by examining notices published in the *Official Gazette*. Information given for 1990 and 1991 was collected using artificial intelligence technology involving a natural language interface created by EDS. Official database tapes purchased from the PTO were read using this technology to characterize each patent and determine which involved software-related inventions. When there was some difficulty ascertaining the nature of patent, EDS personnel referred to the *Official Gazette*.

cies, such as the U.S. Trade Representative, the Office of Science and Technology Policy, the National Science Foundation, and the Small Business Administration.⁹⁰

On May 16, 1991, the Patent and Trademark Office published in the Federal Register a "Request for Comments for the Advisory Commission on Patent Law Reform."⁹¹ In that request, the PTO solicited comments about whether current U.S. patent laws provide adequate and appropriate pro-

⁸⁶ U.S. Congress, Senate Subcommittee on Patents, Trademarks and Copyrights of the Committee on the Judiciary, *An Economic Review of the Patent System*, Committee Print, 1958, p. 4.

⁸⁷ Office of Technology Assessment Workshop on June 20, 1991; Eliot Marshal, "The Patent Game: Raising the Ante," *Science*, vol. 253, July 5, 1991.

⁸⁸ U.S. Department of Commerce, *Charter of the Advisory Commission on Patent Law Reform*.

⁸⁹ As of this writing, advisory commission members are as follows: *industry representatives*: John E. Pepper, President, Procter and Gamble; Keith R. McKennon, Executive Vice President, The Dow Chemical Co.; Vincent J. Rauner, Senior Vice President, Motorola, Inc.; Howard G. Figueroa, Vice president, IBM Corp.; Ardon B. Judd, Vice President, Dresser Industries, Inc.; Mike Pantuliano (representing Edmond Pratt), Pfizer, Inc.; *academic representatives*: Roland Schmitt, President, Rensselaer Polytechnic Institute; Edward L. MacCordy, President, Association of University Technology Managers; *patent bar representatives*: Douglas W. Wyatt, Wyatt, Gerber, Burke & Badie; Donald R. Dunner, Finnegan, Henderson, Farabow, Garrett & Dunner; *antitrust bar representative*: Robert P. Taylor, Pillsbury, Madison & Sutro; *small business representative*: Juan A. Benitez, President, Life-Stream Diagnostics; *public representatives*: William Keefauver, Edward H. Baxter.

⁹⁰ Ibid.

⁹¹ 56 *Federal Register* 22702 (May 16, 1991).

tection of novel computer-related inventions, and the relationship of patent protection for computer Program-related inventions to other intellectual property protection. In addition to these questions specific to computer software, the request sought public comment on broader issues critical to the patent system generally, e.g. Federal protection for trade secrets, cost and complexity of patent enforcement, first to file system, automatic publication of applications, and the term of patent protection.⁹²

In response to this invitation for public comment, the PTO received over 545 letters from individuals, small and large businesses, trade associations, academics, patent attorneys, and bar associations. While the responses addressed the range of questions raised by the PTO request, the majority focused on the issues surrounding computer-related inventions.

Many of the issues raised by the Patent Reform Commission are addressed by the efforts of World Intellectual Property Organization (WIPO) to harmonize patent laws in member countries. WIPO'S Committee of Experts on the Harmonization of Certain Provisions in Laws for the Protection of Inventions is considering a draft treaty which contemplates instituting requirements that would require changes in U.S. law. These would include a change from a first to invent to a first to file system, awarding the patent to the applicant who has the earliest filing date. Such a change would significantly reduce the U.S. interference practice. The WIPO treaty also contemplates a term of patent of 20 years from the date of filing a patent application, as opposed to the 17-year term from date of grant provided by the U.S. law.⁹³

One attempt by the private sector to address the problem of the prior art is the formation of a Software Patent Institute (SPI) as a mechanism to provide access to prior art in the software area and to further the PTO'S knowledge of software.⁹⁴ The proposed near-term objectives of SPI are: 1) to establish a database of prior art in the area of software and to encourage contributions to the database; 2) to facilitate searches and other appropriate access to the prior-art database by interested parties, including the PTO, potential applicants, potential challenges to issued patents, and others with similar needs; 3) to facilitate the advancement of the PTO's knowledge of the nature of software and software engineering by organizing educational and training opportunities for PTO personnel; and 4) to disseminate information about services of the SPI to the broad software community.⁹⁵ (See box 2-E for discussion of Analogous Patent Law in Foreign Countries.)

Copyright

Copyright law in the U.S. protects the right of an author to control the reproduction, adaptation, public distribution, public display, and public performance of original works of authorship of every kind, ranging from books to sound recordings.⁹⁶ While copyright comprises only one aspect of intellectual property protection for computer software, its role in that protection is a major one.

Goals of U.S. Copyright⁹⁷

A fundamental goal of U.S. copyright law is to promote the public interest and knowledge—the “Progress of Science and useful Arts.”⁹⁸ Although

⁹² Ibid.

⁹³ For further discussion of the WIPO draft treaty, see Edward G. Fiorito, “WIPO Experts Make Progress on Patent Harmonization Draft,” *BNA's Patent Trademark & Copyright Journal*, vol. 41, No. 1013, Jan. 10, 1991, pp. 231-241.

⁹⁴ Critics of such an idea note that an improved database of prior art is a common response to criticism of software patents. These critics claim, rather, that such a database would have little practical effect, in part because of the frequency with which techniques were developed in the past and never published, and in part because such a proposal assumes that it is sound policy to decide that the techniques patented today should be unavailable to the programmer provided they were in fact not published at an earlier date. Richard Stallman, The League for Programming Freedom, personal communication September 1991.

⁹⁵ Bernard Galler, Professor of Electrical Engineering and Computer Science, University of Michigan, personal communication, September 1991.

⁹⁶ Sherman et al., *Computer Software Protection Law*, op. cit., footnote 67.

⁹⁷ This material is adapted from U.S. Congress, OTA, *Copyright & Home Copying: Technology Challenges the Law*, OTA-CIT-422 (Washington, DC: U.S. Government Printing Office, October 1989).

⁹⁸ The Constitution provides that:

Congress shall have Power. . . to Promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors, . . . the exclusive Right to their respective Writings and Discoveries.

This provision arguably distinguishes authors from inventors and writings from discoveries, suggesting a fundamental distinction between copyrightable works of authorship and patentable works of utility. For further discussion of this question of scope, see *Computer Software Protection Law*, op. cit. at footnote 1, Section 204,6(a).

Box 2-E—Analogous Patent Law in Foreign Countries

The Pacific Rim

Patent laws of Japan,¹ Taiwan, Korea and Thailand are all silent on the issue of patentability of computer programs. In theory, patent law does not provide protection for a computer program itself. However, Japan and Taiwan have granted patents for certain computer programs, especially if the computer program is described in conjunction with a method or computer in which the program is used in the specification of an application.²

Western Europe

The European Communities have agreed in their Software Directive that the prescribed protection of computer programs under copyright law does not prejudice the application of other forms of protection where appropriate. Computer software may be protected under patent law in addition to copyright in European Community member nations.³

France—French patent law provides that computer programs are not patentable. This rule is narrowly interpreted so that computer program standing alone is not patentable, while a process including software may be patentable. The patent protects the process, but not the software; the software can be used independently or in another process. Hardware may be patented.⁴

Switzerland—Swiss law does not provide patent protection for computer software.⁵

Latin America

Argentina—In Argentina software was not known or considered when the patent Law was enacted so that it is not specifically mentioned in the law. The Patent Office may allow patent protection when it is part of the essence of an invention.⁶

Brazil—While under Brazilian law hardware is subject to patent protection, software is not considered patentable and is expressly excluded from patentable subject matter by the Industrial Property Code.⁷

¹Several reviewers have voiced particular concern regarding what they believe to be aspects of the Japanese patent system that are unfair to United States applicants. An investigation of such charges is outside the scope of this report. However, Senator Lloyd Bentsen and Senator John D. Rockefeller IV plan to ask for an investigation into charges that Japanese companies use their patent program to acquire foreign technologies. This request was made in a letter to General Accounting Office Comptroller General Charles Bowsher. "Washington Technology," October 10, 1991, p. 4.

²Paul C. B. Liu, "Computer Software and Intellectual Property Law in the Pacific Rim Countries," Contractor Report for the Office of Technology Assessment, March 1991, p. 37-38.

³Council Directive of May 14, 1991 on the legal protection of computer programs (91/250/EEC) preamble, para. 30; published in the Official Journal of the European Communities, No. L 122/42, May 17, 1991.

⁴Cary Sherman, et al., *Computer Software Protection Law* (Washington DC: Bureau of National Affairs, Inc. 1990) p. FR-26.

⁵Ibid. at p. CH-3.

⁶Ibid. at p. AR-41-42.

⁷Ibid. at p. BR-20.

copyright is a property interest, its primary purpose was not conceived of as the collection of royalties or the protection of property; rather, copyright was developed primarily for the promotion of intellectual pursuits and public knowledge. As the Supreme Court has stated:

The economic philosophy behind the clause empowering the Congress to grant patents and copyrights is the conviction that encouragement of individual

efforts by personal gain is the best way to advance public welfare through the talents of authors and inventors in Science and the useful Arts.⁹⁹

Therefore, the congressionally mandated grant of a limited monopoly for authors is based upon a dualism: the belief that the public should benefit from the creativity of authors and the belief that a copyright monopoly is necessary to stimulate the

⁹⁹ *Mazer v. Stein*, 347 U.S. 201, 219 (1954).

Box 2-F—Early Protection Against Copying¹

Professional copyists have long reproduced famous or popular works to sell to those who could not afford originals. Forgers have copied works of well-known artists, or more commonly have produced works that imitate their styles. Paintings and drawings have been reproduced as prints, sculptures as plaster or bronze casts. With the rise of prints in the early Renaissance came the first measures to protect *against* copying.

The increased attention given to copies by art theorists in the 17th and 18th centuries reflects the rise of the professional copyist, catering to the expanded art market that resulted from the general public's rising interest in art. Many young artists of this period, particularly in tourist centers like Rome, worked in the mass production of copies of famous or popular paintings. Given the prevalence of copying, artists often sought ways to protect the authenticity of their works. One such attempt was the *littera veritatis*, "the book of truth," of Claude Lorrain, an often imitated artist. The art historian Baldinucci recounts:

Not only was his composition cribbed by some envious persons desirous of unfair earnings, but, through imitation of his manner, copies were sold in Rome as originals by his brush; but this the master was being discredited, the patron for whom the pictures were painted badly served, and the buyers defrauded since they were given copies instead of the originals. . . . Poor Claude did not know from whom to guard himself among the numerous persons who came to his studio nor what decision to take. Everyday similar pictures were brought to him so that he might recognize whether they were by his hand or not. Thereupon he decided to keep a book and began copying the composition of all the pictures which left his studio.²

The most famous instance of a complaint by one artist against another for copying his work is recounted by Vasari of Durer and the engraver Marcantonio Raimondi. Marcantonio, visiting Venice, found a set of Durer's engravings for sale there and was so impressed that he spent almost all of the money he had brought with him to purchase them:

Marc 'Antonio, having considered what honor and profit might be acquired by one who should apply himself to [the art of engraving] in Italy, formed the determination to give his attention to it with all possible assiduity and diligence,

¹ This material is excerpted from: "Copying in the Visual Arts in Europe Since the Renaissance: Forms, Functions, Response and Restrictions," contractor paper, Robert Echols, July 1991.

² Rudolf and Margot Wittkower, *Born Under Saturn: The Character and Conduct of Artists* (London: 1965).

greatest creativity of authors.¹⁰⁰ A direct corollary to this concept is that the grant of a monopoly would not be justifiable if the public did not benefit from the copyright system.¹⁰¹ Thus, policy arguments that equate copyright with royalty income, or theories that assert that copyright is necessary in order to secure royalty income, run counter to this theory and appear to be inconsistent with the intent of the Framers.

Development of U.S. Copyright¹⁰²

Much of the structure and basis for American law is derived from its British legal antecedents. After

the introduction of the printing press in England in the late 1400s, the Crown's first response was to control what writings were printed or copied. The earliest British copyright laws were enacted in the 1500s to promote censorship by the government in cooperation with a monopolistic group of printers known as the Stationers' Guild.¹⁰³ This system collapsed when the company failed to exercise discretion as censor, but used its monopoly power to set high prices. Parliament's response in 1695 was to allow the Stationers' copyrights to expire, but this resulted in a period of anarchical publication. In 1709 Parliament responded to the situation by

¹⁰⁰ The Supreme Court commented on this dualism in *Sony Corporation of America v. Universal City Studios*, 464 U.S. 417, 429 (1984), wherein it discussed the:

difficult balance between the interest of authors and inventors in the control and exploitation of their writings and discoveries on the one hand, and society's competing interest in the free flow of ideas, information and commerce on the other hand.

¹⁰¹ Melville Nimmer observed that the Framers of the Constitution regarded the system of private property as existing per se for the public interest. Therefore, in recognizing a property status in copyright, the Framers extended a recognition of this public interest into a new realm (Melville Nimmer, *Nimmer on Copyright* (New York, NY: Bender, 1991), vol. 1, sec. 1-32.1).

¹⁰² This material is adapted from *Copyright & Home Copying: Technology Challenges the Law*, OTA-CIT-422, op. cit., footnote 97.

¹⁰³ See U.S. Congress, Office of Technology Assessment, *Intellectual Property Rights in an Age of Electronics and Information*, OTA-CIT-302 (Melbourne, FL: Kreiger Publishing Co., April 1986), pp. 34-36.

He thus began to copy those engravings by Albrecht Durer, studying the manner of each stroke and every other detail of the prints that he had bought, which were held in such estimation on account of their novelty and their beauty, that everyone sought to have some. Having then counterfeited on copper, with engraving as strong as that of the woodcuts that Albrecht had executed, the whole of the said Life and Passion of Christ in thirty-six parts, he added to these the signature that Albrecht used for all his works, which was "A.D.," and they proved to be so similar in manner, that, no one knowing that they had been executed by Marc' Antonio, they were ascribed to Albrecht, and were bought and sold as by his hand. News of this was sent in writing to Albrecht, who was in Flanders, together with one of the counterfeit Passions executed by Marc' Antonio; at which he flew into such a rage that he left Flanders and went to Venice, where he appeared before the Signoria and laid a complaint against Marc' Antonio. But he could obtain no other satisfaction but this, that Marc' Antonio should no longer use the name or the above-mentioned signature of Albrecht on his works.³

Marcantonio continued to produce copies of Durer's engravings with his own monogram in place of Durer's.

Perhaps as a result of this expedience, when Durer published his wood cuts of the Life of the Virgin in 1511, he prefaced the edition with the warning:

Woe unto him who ventures to assail us and lay hands on the toil and invention of another!

The next year the Town Council of Nuremberg issued a notice stating that:

. . . a foreigner is taking the liberty of selling pictures bearing Durer's mark, but these are counterfeits; he shall be compelled to remove all the marks, or everything shall be confiscated.⁴

It was in fact in Venice that the first protections akin to modern copyright were issued. The concept of an exclusive right to publish a text or image for a fixed period of time, known as a privilege, originated during the rapid rise of publishing in the 15th century in centers like Venice and Nuremberg. The Venetian Senate issued the first recorded privilege in 1469 and soon began to grant privileges for prints as well.⁵

³ Giorgio Vasari, *The Lives of the Artists*, trans. George Bull (Penguin Books: 1965) (vol.1) and 1987 (vol.2).

⁴ Michel Melot et al., *Prints* (Geneva: 1981), p. 47.

⁵ Susan Tire, *The Image Multiplied Five Centuries of Printed Reproductions of Paintings and Drawings* (London: Abaris Books, 1987).

enacting legislation known as the Statute of Anne. This statute granted a copyright to authors, as opposed to printers, for a period of 14 years. The copyright was renewable for an additional 14 years if the author was still alive. After the expiration of the copyright, the writing became part of the public domain, available for use by anyone. This first modern copyright law became the model for subsequent copyright laws in English-speaking countries.¹⁰⁴

After severing political ties with Great Britain, the former American colonies sought means to secure copyright laws. In 1783, the Continental Congress passed a resolution encouraging the various States to enact copyright legislation. All of the States except

Delaware enacted some form of copyright statute, although the various State laws differed greatly.¹⁰⁵ Because of the differences in the State copyright laws and the ensuing difficulties, the Framers of the Constitution, notably James Madison, asserted that the copyright power should be conferred upon the legislative branch.¹⁰⁶ This concept was ultimately adopted, and Congress was granted the right to regulate copyright (art. I, sec. 8, cl. 8).¹⁰⁷

The First Congress in 1790 enacted the first Federal copyright act.¹⁰⁸ This legislation provided for the protection of authors' rights. Commentators have written that the central concept of this statute is that copyright is a grant made by a government and a statutory privilege, not a right.¹⁰⁹ The statute

¹⁰⁴ Ibid.

¹⁰⁵ Lyman Ray Patterson, *Copyright in Historical Perspective* (Nashville, TN: Vanderbilt University Press, 1968), p. 183.

¹⁰⁶ Ibid., pp. 192-193.

¹⁰⁷ Congress constitutional grant of copyright regulation is more restricted than its English antecedent.

¹⁰⁸ Ch. 15, Sec. 1, 1 Stat. 12. See: OTA-CIT-302, op. cit., footnote 103, p. 64.

¹⁰⁹ Patterson, op. cit., pp. 198-199.

was substantially revised in 1831¹¹⁰ to add copyright coverage to musical compositions and to extend the term and scope of copyright. A second general revision of copyright law in 1870¹¹¹ designated the Library of Congress as the location for administration of the copyright law, including the deposit and registration requirements. This legislation extended copyright protection to artistic works. The third general revision of American copyright law in 1909¹¹² permitted copyright registration of certain types of unpublished works. The 1909 legislation also changed the duration of copyright and extended copyright renewal from 14 to 28 years. A 1971 amendment extended copyright protection to certain sound recordings.¹¹³ The fourth and most recent overhaul of American copyright law occurred in 1976, after years of study and legislative activity.¹¹⁴ The 1976 legislation modified the term of copyright and, more significantly, codified the common law fair-use concept as a limitation on the exclusive rights of the copyright holder. In 1980, following recommendations made by the National Commission on New Technological Uses of Copyrighted Works (CONTU), legislation explicitly extended copyright to computer programs.¹¹⁵

The *Scope and Nature of Copyright Protection*

The copyright statute¹¹⁶ interprets the Constitutional term “writings” broadly, defining it as:

works of authorship. . . fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced or otherwise communicated, either directly or with the aid of a machine or device.

Copyright protection is expressly provided for eight categories of works: literary; musical; dramatic; pantomimes and choreographic; pictorial,

graphic, and sculptural; motion picture and other audiovisual works; sound recording; and architectural; however, the legislative history indicates that these categories are not meant to be exhaustive. Computer programs are copyrightable as “literary works” as defined in 17 U.S.C. 101.¹¹⁷ The term “computer program” is also defined in section 101 as “a set of statements or instructions used directly or indirectly in a computer in order to bring about a certain result.

Copyright protection subsists from the time a work of authorship is created in a fixed form. The copyright in the work becomes the property of the author immediately upon creation. Only the author, or one deriving rights through the author, can rightfully claim copyright.

In the case of works made for hire, the employer rather than the employee is presumptively considered the author. A work made for hire is defined as:

1. a work prepared by an employee within the scope of his or her employment; or
2. a work specially ordered or commissioned for use in a variety of circumstances enumerated by the statute.¹¹⁸

Copyright does not protect ideas, but rather the expression of ideas. Copyright protection does not extend to any:

. . . procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated or embodied.¹¹⁹

Copyright protects the writings of an author against unauthorized copying, distribution, etc., and protects the form of expression rather than the subject matter of the writing. Unlike patents, it does

¹¹⁰ 104 Stat. 436.

¹¹¹ Act of July 8, 1870, C. 230, 16 Stat. 198.

¹¹² Act of March 4, 1909, C. 320, 35 Stat. 1075.

¹¹³ Public Law 92-140, Oct. 15, 1971, 85 Stat. 391.

¹¹⁴ Public Law 94-553, Oct. 19, 1976, 90 Stat. 2541, codified at 17 U.S.C. 101, et seq. (1982).

¹¹⁵ In the 1980 amendments, a definition of “Computer program” was added to section 101 of the Copyright Act of 1976 and a new section 117 was added, limiting computer-program copyright holders’ exclusive rights. The owner of a computer program may make another copy or adaptation of that program if the copy is needed for a specific step in using the computer program or if the copy is for archival purposes.

¹¹⁶ 17 U.S.C. 102(a)

¹¹⁷ 17 U.S.C. 101 Provides in pertinent part: “Literary works” are works, other than audiovisual works, expressed in words, numbers, or other verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks or cards, in which they are embodied.

¹¹⁸ 17 U.S.C. 101.

¹¹⁹ 17 U.S.C. 102(b),

not protect against independent creation. Copyright grants the owner the exclusive right to do and to authorize others to do the following:¹²⁰

- reproduce copies of the copyrighted work;
- prepare derivative works based on the copyrighted work;
- distribute copies of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending;
- perform the copyrighted work publicly; and
- display the copyrighted work publicly.¹²¹

The statute does, however, specify certain limitations to the copyright owner's exclusive rights that are noninfringing uses of the copyrighted works. These limitations include the "fair use" of the work¹²² (17 U.S.C. 107 (1988)), certain kinds of reproduction by libraries and archives (17 U.S.C. 108 (1988)), certain educational performances and displays (17 U.S.C. 110 (1988)), and certain other uses (17 U.S.C. 117 (1980)).

It is an infringement of the copyright for anyone to engage in any of the above activities without the authorization of the copyright owner. The copyright statute provides that the copyright owner may institute an action for infringement against the alleged infringer (17 U.S.C. 501(b) (1988)). A court may issue an injunction against the copyright infringer to prevent further infringement of the copyright (17 U.S.C. 502 (1988)). An infringer of a copyright may be subject to the payment of actual damages and profits to the copyright owner (17 U.S.C. 504(b) (1988)); or in certain circumstances the copyright owner may elect specified statutory damages within specified ranges in lieu of actual damages and profits (17 U.S.C. 504(c) (1988)). In addition, in certain cases the court may permit the

recovery of legal fees and related expenses involved in bringing the action (17 U.S.C. 505 (1988)). Criminal sanctions may also be imposed for copyright infringements in certain cases (17 U.S.C. 506 (1988)).

*The 1976 Copyright Act and Fair Use*¹²³

The tension between the stimulation of intellectual pursuits and the property interests of the copyright owner has been a central issue in the development, implementation, and interpretation of American copyright laws. Moreover, the concept of copyright presents a seeming paradox or contradiction when considered within the context of the first amendment freedom-of-speech guarantees: while the first amendment guarantees freedom of expression, it can be argued that copyright seems to restrict the use or dissemination of information. It can be argued, however, that copyright, to the degree that it stimulates expression and encourages writing and other efforts, furthers first amendment expression values by encouraging the quantity of speech that is created.¹²⁴ In attempting to resolve these conflicting interests, the courts have adopted a test that weighs the interests of freedom of expression and the property interests of the copyright holder to arrive at an acceptable balance.¹²⁵ An extensive body of case law has been developed that weighs and counterbalances first amendment concerns and the rights of the copyright holder.¹²⁶

Hence, the American copyright system is based on dual interests: intellectual promotion and property rights. Combined with these factors is the first amendment freedom-of-expression concern. Courts have balanced and assessed these seemingly con-

¹²⁰ Not all works, however, enjoy all rights. For example, sound recordings have no public performance right. 17 U.S.C. 106(4).

¹²¹ 17 U.S.C. 106.

¹²² Before codification of the "fair-use" exception in the 1976 copyright act, the fair-use concept was upheld in a common law copyright action in *Hemingway v. Random House, Inc.*, 53 Misc.2d 462, 270 N.Y.S. 2d 51 (Sup. Ct. 1967), *aff'd on other grounds* 23 NY.2d 341, 296 N.Y.S.2d 771 (1968). The common law concept of "fair use" was developed over many years by the courts of the United States. See, for instance, *Folsom v. Marsh*, 9 F.Cas. 342 (N. 4901) (C.C.D. Mass. 1841); and *Mathews Conveyor Co. v. Palmer-Bee Co.*, 135 F.2d 73 (6th Cir. 1943).

¹²³ This material is adapted from *Copyright & Home Copying: Technology Challenges the Law*, op. cit., footnote 97.

¹²⁴ It is also argued that freedom of speech guarantees the speaker the right to speak his own expression, and that it does not give him the right to speak (or copy) someone else's expression. Nor does it prevent a speaker from using the ideas or information in someone else's ideas, facts, or information. Copyright requires the speaker to arrive at his own expression for the ideas he wishes to express. The resulting conflict or balance between these interests is part of copyright itself—limited protection with the limitations specifically designed to encourage publication and access to information. The remaining conflict, it is argued, may be resolved by fair use. Mary Jensen, University of South Dakota School of Law, personal communication, Sept. 29, 1991.

¹²⁵ Nimmer, op. cit., footnote 101, vol. 1, sec. 1.10.

¹²⁶ See *Harper & Row Publishers, Inc. v. Nation Enterprises*, 471 U.S. 539 (1985).

Box 2-G Copying in Renaissance Art¹

Copying has appeared in many guises in the history of the visual arts. Artists have produced multiple originals, sometimes identical, sometimes variants of the same composition, with varying degrees of assistance from others in their workshops. Students have copied masterworks as part of their training. Mature artists, even the greatest, have copied the works of other artists as a way of enriching their own styles. Compositions or individual motifs invented by one artist have reappeared in the works of others, transformed to a greater or lesser extent, and questions about the roles of imitation and innovation in art have been among the most frequently debated in the many treatises about art theory written since the Renaissance.*

The present day tendency to prize originality of form and content, while denigrating art that relies on earlier art as derivative and retrogressive is inconsistent with the practice of art in the past.³ One scholar writes:

Art into art, the acquisition of style by limitation, is the way almost all artists learned their skills until very recently. Certainly they worked from life, taking inspiration whenever they found it but the fundamental techniques of design, of drawing and modeling, were gained from other art. The study of plaster casts, the visit to the church or, in later centuries, to the museum to copy the works of others, the examination of illustrated woods, these were part of the experience of every Western artist. Copying was the right and logical thing **to do**. It was the way one learned, and it **kept** the artist in touch with the wellsprings of the past.⁴

The Paduan painter Cennino Cennini advises the young artist to begin by:

constantly copying the best things which you can find done by the hand of the great masters. . . . You will eventually acquire a style individual to yourself, and it cannot help being good. ...⁵

A century later, Leonardo da Vinci prescribed a course of study in which the young artist turned to nature only after copying first from drawings, then from paintings, then from sculpted reliefs.⁶

Renaissance art theorists prescribed copying as a way of reaching beyond the imperfections of the real world to achieve the ideal. Leonbattista Alberti, the most important theorist of the 15th century, first applied the Aristotelian idea of imitation (mimesis) to painting, defining the goal of art to be the imitation of nature *as it ought to be*. Models for this perfected nature could be found in the art of antiquity and of modern masters who had themselves learned from antiquity. Over the course of the 16th century art became increasingly self-referential,

¹ **This material is** excerpted from: "Copying in the Visual Arts in Europe Since the Renaissance: Forms, Functions, Response and Restrictions," contractor paper, Robert EchoIs, July 1991.

² *Ibid.*, p. 1.

³ *Ibid.*, p. 2.

⁴ **Bruce Cole**, *The Renaissance Artist at Work* (New York, NY: Harper & Row, 1983) p. 31.

⁵ **Cennino Cennini**, *The Craftsman's Handbook: "Il libro dell'arte"* (trans. Daniel V. Thompson, Jr., New York, NY: Dover, 1954), p. 15.

⁶ **@ & Haverkamp-Begemann and Carolyn Logan**, "Creative Copies: Interpretive Drawings from Michelangelo to Picasso," exhibition catalogue, The Drawing Center, New York, 1988, p. 17.

flicting elements, and Congress has considered them in enacting copyright legislation.

Much of the **historical** balancing has occurred in the context of the fair-use doctrine. The doctrine of fair use as codified in the "1976 Copyright Act has antecedents in English law of the 18th and 19th centuries and in 19th-century U.S. case law.¹²⁷ Various approaches have been adopted to interpret

the fair-use doctrine. It has been said that *the* doctrine of 'fair use' allows the courts to bypass an inflexible application of copyright law, when under certain circumstances it would impede the creative activity that the copyright law was supposed to stimulate.¹²⁸ Indeed, some commentators have viewed the flexibility of the doctrine as the "safety valve" of copyright law, especially in times of rapid

¹²⁷ For thorough treatment of the evolution of fair use and an analysis of case law and the fair use factors, see William Patry, *The Fair Use Privilege in Copyright Law* (Washington, DC: The Bureau of National Affairs, 1985).

¹²⁸ See *Harper & Row, Publishers, Inc. v. Nation Enterprises*, 471 U.S. 539 (1985); *Iowa State University Research Foundation, Inc. v. American Broadcasting Co.*, 621 F.2d 57 (2d Cir. 1980).

especially in Rome and Florence; the imitation of styles and the quotation of forms from the work of past masters was the basis of the *maniera* “the correct way of painting.” Later in the century the reform movement led by the Carracci reacted against overreliance on past masters, but advocated not a rejection of the past by greater “invention” in imitating its models. In the 17th century the influential critic Bellori returned to the Aristotelian notion of imitation:

The idea, originating in nature, supersedes its origin and become the origin of art.

The idealized nature found in the great works of art, ancient and modern, was thus the appropriate source of inspiration for the artist.⁷

Such theories of art were codified and put into practice in the art academies that gradually became the principal institutions controlling the production of art: Lorenzo de’ Medici’s informal school for artists in Florence, where Michelangelo studied the antique sculptures in the Medici collection; the Academy of the Carracci in Bologna; the Accademia di San Luca in Rome; the French Academy, founded in 1648; numerous academies in Germany; and eventually the Royal Academy in England. In Vienna, the Empress Maria Theresa opened the Imperial Gallery to students, providing them with a room in which to make their copies. Although copying as a mode of art instruction has gone out of present day fashion, visitors to museums can observe that the practice still has its adherents.⁸

The “translation of images” from artist to artist extends beyond copying to what is generally referred to as “quotation” or “borrowing”—the use of compositions or motifs taken from other works of art. A typical monograph or catalogue on a Renaissance subject lists many instances of this practice. The National Gallery of Art’s 1979 catalogue entry on Tintoretto’s *Conversion of Saint Paul* identifies motifs in the painting taken from Leonardo, Pordenone, Titian, Schiavone, and Raphael, and notes that the influence of Tintoretto’s painting may be seen in a work by Rubens.⁹ One critic states that:

During the Renaissance and long after it, imagery was still largely shared, . . . The sense, to which we attach so much importance, of the personality of the artist with its incumbent personal baggage of imagery and manner was in embryo and the vocabulary of images was datively small.¹⁰

The English artist Fuseli said that he found William Blake “damn good to steal from.”¹¹ Manet took the basic funeral motifs of two of his most avant-garde paintings, *Olympia* and *Le déjeuner sur l’herbe*, from Titian’s *Venus of Urbina* and a print by Marcantonio Raimondi after Raphael, respectively. Such practices have continued into the 20th century in various forms of paraphrase, parody, quotation, collage, and most recently, “appropriation.”

⁷ The summary of artistic theories of imitation in this paragraph is based on overviews provided in Haverkamp-Begemann *ibid.*, pp. 16-20; and Rosario Assunto, “Mimesis,” *Encyclopedia of World Art*, vol. 10 (New York, NY: McGraw-Hill, 1985), pp. 93-117.

⁸ *Children of Mercury: The Education of Artists in the Sixteenth and Seventeenth Centuries* (Providence: Brown University, 1984).

⁹ Fern R. Shapley, *Catalogue of the Italian Paintings* (Washington DC: The National Gallery of Art, 1979), pp. 468-469.

¹⁰ Ayrton K.E. Mason, *Theme and Variations: Five Centuries of Master Copies and Interpretations*, 2d ed. (London: H.N. Abrams, 1966), p. 16.

¹¹ *Ibid.*, p. 21.

technological change. Others have considered the uncertainties of the fair-use doctrine the source of unresolved ambiguities.

In codifying the fair-use exception in the Copyright Act of 1976, Congress did not formulate a specific test for determining whether a particular use was to be construed as a fair use. Rather, Congress created statutory recognition of a list of factors that courts should consider in making their fair-use determinations. The four factors set out in the statute are:

1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. the nature of the copyrighted work;
3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
4. the effect of the use on the potential market and value of the copyrighted work (17 U.S.C. 107 (1988)).

Congress realized that these factors were “in no case definitive or determinative” but rather “provided

some gauge [sic] for balancing equities.”¹²⁹ It appears that Congress developed a flexible set of criteria for analyzing the circumstances surrounding each fair-use case, and that each case would be judicially analyzed on an ad hoc basis. Therefore, courts seem to have considerable latitude in applying and evaluating fair-use factors.¹³⁰ Courts have given different weight and interpretation to the fair-use factors in different judicial determinations. The following illustrations demonstrate how some courts have interpreted certain fair-use factors.

In evaluating the first factor, the purpose and character of the use, courts have not always held that use “of a commercial nature” precludes a fair-use finding,¹³¹ nor does a “nonprofit educational” purpose mandate a finding of fair use.¹³² A defense of fair use on the basis of the first criterion will more often be recognized, however, when a defendant uses the work for educational, scientific, or historical purposes.¹³³

Consideration of the second factor, the nature of the copyrighted work, must be based on the facts and circumstances of each particular case. For instance, courts have interpreted the scope of the fair-use doctrine narrowly for unpublished works held confidential by their authors.¹³⁴

In examining the third factor, the amount and substantiality of the portion of the work used, courts have looked at both the quantitative aspect—how much of the work is used¹³⁵—and the qualitative factor—whether the “heart” or essence of the work

is used.¹³⁶ The fair-use doctrine is usually not considered to be applicable when the copying is nearly a complete copy of the copyrighted work, or almost verbatim.¹³⁷ Prior to the Court of Claims’ decision in *Williams & Wilkins’ns Co. v. United States*,¹³⁸ courts as a rule did not allow fair use for copying of entire works or substantial portions of a work. However, the issue of copying entire works was the topic of significant debate prior to passage of the 1976 act. The result of this debate, which allows for this kind of copying under limited circumstances, is found in section 108, which sets out guidelines for classroom copying, and in interpretation of fair use in the legislative reports.¹³⁹

In assessing the fourth factor, courts have examined the defendant’s alleged conduct to see whether it poses a substantially adverse effect on the potential market for, or value of, the plaintiff’s present work.¹⁴⁰ These considerations are used with great care by the courts in applying the fair-use doctrine on a case-by-case basis.

Congress looked to the issue of copyright fair use at some length in 1991, examining whether the fair use doctrine and the First Amendment permit biographers to make unauthorized use of their subject’s unpublished letters and manuscripts. The courts have decided this issue on the basis of the specific facts of each case, but emphasizing the unpublished nature of the work in denying fair use.

In 1991 the Senate passed S. 1035 to clarify that the unpublished nature of a copyrighted work does

¹²⁹ H.R. Rep. No. 1476, 94th Cong., 2d Sess. 65 (1976).

¹³⁰ For a historical analysis of the fair-use factors, see William Patry, op. cit., footnote 127, ch. 17.

¹³¹ *Harper & Row Publishers, Inc. v. Nation Enterprises*, 471 U.S. 539, 593 (1985) (Brennan, J., dissenting); *Consumers Union of U.S., Inc. v. General Signal Corp.*, 724 F.2d 1044 (2d Cir. 1983).

¹³² *Marcus v. Crowley*, 695 F.2d 11, 71 (9th Cir. 1983).

¹³³ See *Italian Book COW. v. Amen’can Broadcasting Cos.*, 458 F. Supp. 65 (S.D.N.Y. 1978).

¹³⁴ A recent case articulating the fair-use doctrine involved the personal correspondence of author J.D. Salinger. The court determined that the author had a copyright interest in his correspondence. *Salinger v. Random House, Inc.*, 811 F.2d 90 (2d Cir. 1987), cert. denied, 108 Sup. Ct. 213 (1987).

¹³⁵ *Consumers Union of U.S., Inc. v. General Signal Corp.*, 724 F.2d 1044 (2d Cir. 1983).

¹³⁶ *Maxtone-Graham v. Burtchaell*, 803 F.2d 1263 (2d Cir. 1986).

¹³⁷ *Walt Disney Productions v. Air Pirates*, 581 F.2d 751 (9th Cir. 1978), cert. denied 439 U.S. 1132 (1978). But see *Universal City Studios, Inc. v. Sony Corp. of America*, 480 F. Supp. 429 (D.C. Cal. 1979), rev’d, 659 F.2d 931 (9th Cir. 1981), rev’d, 464 U.S. 417 (1984). It might well be noted, however, that with respect to the questions of “amount and substantiality of the portion used” in the area of computer programs, this aspect of the fair use limitation is argued by some to be of little use, because, as they assert, copies of only part of a program are rarely useful. Mary Jensen, University of South Dakota, School of Law, personal communication, September 29, 1991.

¹³⁸ *Williams & Wilkins Co. v. United States*, 172 U.S.P.Q. 670 (Ct. Cl. 1972), 487 F.2d 1345, 180 U.S.P.Q. 49 (Ct. Cl. 1973), aff’d by an equally divided court, 420 U.S. 376, 184 U.S.P.Q. 705 (1975).

¹³⁹ William Patry, op. cit., footnote 127, pp. 449-450.

¹⁴⁰ This factor was of considerable importance in *Universal City Studios, Inc. v. Sony Corp. of America*, 480 F. Supp. 429 (D.C. Cal. 1979), rev’d, 659 F.2d 963 (9th Cir. 1981), rev’d, 464 U.S. 417 (1984). See also *Consumers Union of U.S., Inc. v. General Signal Corp.*, 724 F.2d 1044 (2d Cir. 1983).

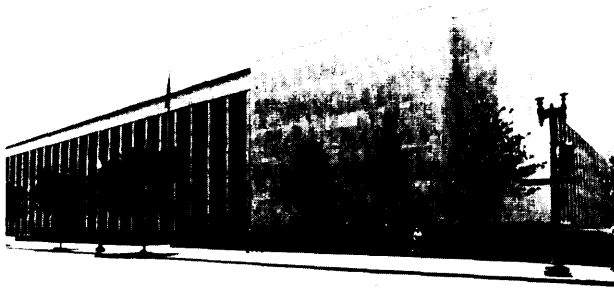


Photo credit: U.S. Library of Congress

The Copyright Office is housed in the James Madison Building of the Library of Congress.

not per se preclude applicability of the fair use defense to infringement. A similar measure was deleted from H.R. 2372 when a district court ruled in favor of a biographer in *Wright v. Warner Books*.¹⁴¹

The Copyright Office

The Copyright Office is charged with administration of the copyright law, and is an influential source of legal authority in the field of copyrights. Courts give weight to the Copyright Office's interpretation of the copyright statute.

The 1976 act authorizes the Copyright Office to issue regulations concerning the requirements for registration of claims for copyright and concerning fixation and placement of copyright notice.¹⁴² These regulations contain authoritative interpretation of the copyright statute, which has been cited with approval by the courts.

The Copyright Office may issue certificates of registration for deposited material only if it determines that it constitutes "copyrightable subject matter."¹⁴³ Thus, the Copyright Office's decision to register a work is evidence that a work is copyrightable. Likewise, a denial of registration indicates that the work is not eligible for protection.¹⁴⁴ Weight is given by the courts to the Copyright Office's determination about registrability of a particular category of works. The Copyright Office maintains

Table 2-2—Copyright Registrations, Generally: 1974 to Present

Year	Number
1974	372,832
1975	401,274
1976	410,969
1976 ^a	108,762
1977	452,702
1978	331,942
1979	429,004
1980	464,743
1981	471,178
1982	468,149
1983	488,256
1984	502,628
1985	539,165
1986	560,212
1987	581,276
1988	565,801
1989	611,328
1990	617,241
1991 (January to June only) ..	332,582

^aTransitional quarter—Registrations made July 1, 1976, through September 30, 1976, reported separately owing to the statutory change making the fiscal years run from October 1 through September 30 instead of July 1 through June 30.

SOURCE: U.S. Copyright Office.

Table 2-3—Copyright Registration, Computer-Related Works: FY 1986 to Present

Year	Textual	Unpublished textual works
1986	5,565	4,744
1987	5,137	4,433
1988	5,124	6,046
1989	4,397	5,412
1990	5,350	5,214
1991 (1st quarter only)	2,441	4,519

NOTE: "Textual works" is a Copyright Office Administrative classification which, in the case of computer-related works, includes such items as user manuals, floppy disks, and program code, i.e., all aspects of computer-related works which are written.

SOURCE: U.S. Copyright Office.

statistics regarding the rate of issuance of copyrights generally and for computer-related works. (See tables 2-2 and 2-3.)

To facilitate efficient issuance of copyright and to be of assistance to the public, the Copyright Office issues forms and instructions for copyright registration, as well a series of circulars discussing copyright issues. Of particular interest is *Circular R61*,

¹⁴¹*Wright v. Warner Books*, 745 F. Supp. 105 (DC SNY 1990). The Second Circuit affirmed.

¹⁴² The Berne Convention Implementation Act (now part of Title 17) amends the U.S. copyright notice requirements. See discussion of the Berne Convention, ch. 3.

¹⁴³ Registration is not a *Perquisite* for copyright protection, but may be required for court enforcement of the copyright.

¹⁴⁴ Such denial is not a *conclusive* finding of lack of eligibility for protection.

which deals with copyright registration of computer programs, discussing regulations, policy, and practice related to software. In addition, the Copyright Office publishes a more general document, the *Compendium of Copyright Office Practices*, which sets forth guidance of the Office in making registrations and recording documents. While these forms and guidelines reflect practices, policies, and legal interpretations, the positions contained in the documents are not necessarily adopted by the courts.¹⁴⁵

CONTU Recommendations Regarding Registrations and the Rule of Doubt

CONTU'S Final Report included recommendations for regulations concerning the registration and deposit of databases and other works fixed in computer readable media. These state that the registration and deposit regulations should permit and encourage registration and periodic updating of identifying material rather than the actual databases. With respect to computer programs, the CONTU report suggests that regulations relating to deposit and registration requirements should "promote public access to computer programs while being flexible enough to accommodate future changes in computer technology. Recognizing that repeated deposit of each version of a program would be burdensome to the program proprietor and the Copyright Office, the Commission set forth a variety of options, including a system of temporary deposit, and permanent deposit of complete copies of the original version of the program with subsequent filing of descriptions rather than complete copies of amended versions.

Rule of Doubt

The copyright law in general requires that an application for registration be accompanied by the deposit specified in the statute and the regulations issued under the statute.¹⁴⁶ The deposit must include "one complete copy" of an unpublished work or "two complete copies" of a published work. The Copyright Office is authorized to issue regulations permitting the deposit of "identifying material" instead of the actual copies.

As discussed, CONTU contemplated that the regulations would permit the deposit of identifying material other than "actual databases," and asserted that computer databases were appropriate for exemption from the deposit requirement. Further, the legislative history of the optional deposit provision states that the regulations could provide for the deposit of printouts of computer programs under certain circumstances.

The Copyright Office will issue a certificate of registration, even when an applicant for registration of a computer program containing trade secrets is not willing to submit source code and submits object code instead. When it issues such a registration, it does so under a "rule of doubt" procedure.¹⁴⁷ The "rule of doubt" is more accurately described as the rule of "the benefit of the doubt" (in favor of the copyright applicant).¹⁴⁸ If the application is otherwise proper, the Copyright Office will issue such a registration, which makes it clear that no determination has been made concerning the existence of copyrightable authorship. The Copyright Office issues its registration on this limited basis because of its belief that the object code is "basically unintelligible" to its examiners, so that they cannot make a definitive determination of its copyrightability.¹⁴⁹ In order to receive such a rule of doubt registration, the applicant must submit a letter stating that the program does contain original authorship.

While there is no clear case law delineating how the rule of doubt registration affects the status of the registered work in litigation, it is likely that such a registration would not be accorded the same weight as a conventional registration. The Copyright Office has recognized that in making this kind of registration, the burden is placed on the courts to make a determination about the existence of copyrightable authorship. This additional burden is especially important in the case of requests to the court for preliminary relief in the form of temporary restraining orders and preliminary injunctions.

¹⁴⁵ *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*, 797 F.2d 1222, 1242, n.38 (3rd Cir. 1986), cert. denied, 479 U.S. 1031 (1987).

¹⁴⁶ However, under the Berne Convention and the Berne Implementation Act, registration and deposit themselves are not required.

¹⁴⁷ 37 C.F.R. 202.20(c) (2)(vii)(B).

¹⁴⁸ Ronald Laurie, Weil, Gotshal & Manges, personal communication, September 1991.

¹⁴⁹ Cary Sherman et al., op. cit. footnote 90, at Section 208.2(g)(5).

CONTU and the 1980 Amendment

Congress established the National Commission on New Technological Uses of Copyrighted Works to make recommendations for computer copyright legislation. The Final Report, published in 1978, is generally regarded as quasi-legislative history. While the relevance of the report is somewhat discounted or even ignored by some courts,¹⁵⁰ it is used by many courts as an aid in interpreting the 1980 amendment.

In carrying out its congressional charter, CONTU made specific recommendations for legislation dealing with computer software or programs, databases, and works created by the use of computers.

With respect to computer software or programs, CONTU recommended that the new copyright law should be amended:

1. to make it explicit that computer programs, to the extent that they embody an author's original creation, are proper subject matter of copyright;
2. to apply to all computer uses of copyrighted works by the deletion of section 117; and
3. to ensure that rightful possessors of copies of computer programs may use or adapt these copies for their use.

CONTU also recommended that the 1976 act be amended to apply to all computer uses of copyrighted databases and other copyrighted works fixed in computer media, and that works created by the use of computers should be afforded copyright protection if they are original works of authorship within the 1976 act.

These recommendations allayed doubts concerning the copyrightability of programs under the 1976 act,¹⁵¹ as the 1980 act expressly added a definition of "computer program" in section 101.¹⁵² Further,

the old version of section 117¹⁵³ was repealed and replaced by what is now section 117 of the current statute, which provides a defense to a claim of software copyright infringement if the defendant's activity falls within its scope. Section 117 insulates from infringement liability certain steps that CONTU considered essential in the utilization of a computer program in conjunction with a computer.¹⁵⁴

Section 117 of the Copyright Act now provides as follows:

Notwithstanding the provisions of section 106, it is not an infringement for the owner of a copy of a computer program to make or authorize the making of another copy or adaptation of that computer program provided:

1. that such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or
2. that such new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.

Any exact copies prepared in accordance with the provisions of this section may be leased, sold or otherwise transferred, along with the copy from which such copies were prepared, only as part of the lease, sale, or other transfer of all rights in the program. Adaptations so prepared may be transferred only with the authorization of the copyright owner.

Only the "owner of a copy of a computer program" may take advantage of the privileges set out in section 117. An owner is one who purchases a disk, diskette, or other medium in which a program is stored. A person who does not own a copy of the plaintiff's computer program may not take advantage of a section 117 defense. The licensee who acquires possession but not ownership of a disk copy

¹⁵⁰ See *Whelan Associates, Inc. v. Jaslow Dental Laboratory, Inc.*, 797 F.2d 1222, 1241, which commented that the report was not binding and did not consider it authoritative legislative history. See also *Lotus v. Paperback Software*, 740 F. Supp. 37 (D. Mass. 1990).

¹⁵¹ The House Report of the 1976 act indicates that computer programs are to be considered "literary works" (H.R. Rep. No. 1476, 94th Cong., 2d Sess. 54, reprinted in 1976 U.S. Code Cong. & Ad. News 5659, 5667 ("literary works" . . . includes] . . . computer programs."))

¹⁵² Section 101 defines a computer program as a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result. Some commentators maintain that this amendment merely suggested that writings otherwise copyrightable could be in the form of a computer program. Stephen Y. Chow, personal communication, Cesari and McKenna, Sept. 27, 1991.

¹⁵³ The original text of Section 117 stated:

Notwithstanding the provisions of sections 106 through 116 and 118, this title does not afford to the owner of copyright in a work any greater or lesser rights with respect to the use of the work in conjunction with automatic systems capable of storing, processing, retrieving, or transferring information, or in conjunction with any similar device, machine, or process, than those afforded to works under the law, whether title 17 or the common law or statutes of a State, in effect on December 31, 1977, as held applicable and construed by a court in an action brought under this title.

¹⁵⁴ See CONTU Report at 13.

of a licensed program is not entitled to exercise these privileges. There must be a transfer of title, as provided for under applicable State law, for the privilege to obtain.

This requirement of ownership in section 117 is a change in the statutory language from the CONTU recommendation. CONTU would have allowed a rightful possessor of a copy of a program to perform or authorize the acts permitted by the section. There appears to be no legislative history on the reasons for this change; however, those who were involved in the congressional hearing on the 1980 amendments say that the change reflected concerns of the Justice Department relating to antitrust considerations.¹⁵⁵

Evolution of Case Law

Complete coverage of software copyright case law is beyond the scope of this report. However, protection of software via copyright has involved several key issues. Three of the most important are: 1) whether object as well as source code is protected; 2) whether a program's structure, sequence, and organization is protected (and what such protection implies); and 3) whether the user interface is protected. A summary of the evolution of cases addressing these three key issues follows.

Apple v. Franklin

The case of *Apple v. Franklin*¹⁵⁶ specifically addressed the question of whether a copyright can exist in a computer program expressed in object code as well as source code. The court described source code as usually written in a higher-level programming language and object code as the version of the program in which the source code language is converted into (binary or hexadecimal) machine language. The court determined that both the source code and the object code are copyrightable.

In its decision, the court traced the legislative history which, it stated, suggests that computer programs are considered copyrightable as literary works under section 102(a) of the Copyright Act.¹⁵⁷

CONTU later recommended that the copyright law be amended "to make it explicit that computer programs, to the extent that they embody an author's original creation, are proper subject matter of copyright."¹⁵⁸ In accord with the CONTU report recommendations, the 1980 amendments to the Copyright Act included a definition of a computer program:

A "computer program" is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result. (17 U.S.C. 101.)

The court further noted that language of 17 U.S.C. 117 carves out an exception to normal proscriptions against copying of computer programs, thus indicating that programs are, in fact, copyrightable and are otherwise afforded copyright protection. Indeed, the Third Circuit Court of Appeals had, in the prior case of *Williams Electronics, Inc. v. Artic International Inc.*,¹⁵⁹ concluded that "the copyrightability of computer programs is firmly established after the 1980 amendment to the Copyright Act."

In arriving at its finding that object code as well as source code are copyrightable, the court in *Apple v. Franklin* also stated that, under the statute, copyright extends to works in any tangible means of expression "from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device."¹⁶⁰ As stated above, the definition of a "computer program" adopted by Congress in the 1980 amendment is a "set of statements or instructions to be used *directly or indirectly* in a computer in order to bring about a certain result."¹⁶¹ Since source code instructions must be translated into object code before they can be utilized by the computer, only instructions expressed in object code can be used "directly" by the computer, and as such, object code falls under the definition in the statute. Further, the court emphasized that a computer program in object code could be classified as a literary work, since the category "literary work," one of the seven copyrightable

¹⁵⁵ Personal communication, Ronald Laurie, Weil, Gotshal & Manges, September 1991.

¹⁵⁶ *Apple v. Franklin* 714 F.2d 1240 (3rd Cir.1983).

¹⁵⁷ See H.R. Rep. No. 1476, 94th Cong., 2d Sess. 54, reprinted in 1976 U.S. Code Cong. & Ad. News 5659, 5667 ('literary works'...include[s]...computer programs").

¹⁵⁸ National Commission on New Ethnological Uses of Copyrighted Works, *Final Report*.

¹⁵⁹ *Williams Electronics, Inc. v. Artic International Inc.*, 685 F.2d 870 (3rd Cir.1983).

¹⁶⁰ 17 U.S.C. Section 102(a).

¹⁶¹ 17 U.S.C. Section 101.

categories in section 101, includes expression not only in words but also “numbers, or other . . . numerical symbols or indicia.” Thus, the court held that a computer program, whether in object code or source code or whether an operating system or application program, is a “literary work” and is protected from unauthorized copying. The court cited *Midway Mfg. Co. v. Stroh*¹⁶² and *GCA Corp. v. Chance*¹⁶³ as in accord with its holding.

Apple v. Franklin addressed the issue of copyrightability of operating and application systems. While Franklin conceded that application programs are an appropriate subject of copyright, it contended that operating systems are not the proper subject of copyright regardless of the language or medium in which they are freed, and that operating system programs are per se excluded from copyright protection under the express copyright terms of section 102(b) of the Copyright Act and under the precedent and underlying principles of *Baker v. Selden*.¹⁶⁴ According to the court, “an application program usually performs a specific task for the computer user” (e.g., word processing, checkbook balance function) while “operating system programs generally manage the internal function of a computer or facilitate the use of an application program” (e.g., translates an application program from source code to object code.) Franklin based its argument on the grounds that an operating system program is either a “process,” “system,” or “method of operation” and hence uncopyrightable, since section 102(b) specifically precludes copyright protection for these.

In *Apple v. Franklin*, the court found that operating system programs are copyrightable. The court pointed to prior courts which rejected the distinction between application programs and operating system programs. The court also cited the CONTU majority and the Congress, neither of which distinguished between operating system and application programs. The court reasoned that, since both operating system programs and application programs instruct the

computer to do something, it should make no difference under section 102(b) whether these instructions tell the computer to prepare an income tax return or translate high level language from source to binary object code. The court stated that, “Since it is only the instructions which are protected, a process is no more involved because the instructions in an operating system program may be used to activate the operation of the computer than it would be if instructions were written in ordinary English in a manual which described the necessary steps to activate an intricate complicated machine.”¹⁶⁵ The court found no reason to afford any less copyright protection to the instructions in an operating system program than to the instructions in an application program.

Structure, Sequence and Organization¹⁶⁶

The concept of ‘structure, sequence, and organization’ is found outside the area of computer software in elements such as the plot, subplot, sequence of scenes, setting characterization and patterns of dialogue in works of fiction or drama; or in the detailed outline and organization and selection, coordination and arrangement of information in textbooks or other nonfiction works. In computer software, structure, sequence, and organization include the arrangement of computer program modules in relation to each other, as opposed to the literal text of the program.¹⁶⁷ The cases addressing the issue of the protectability of the structure, sequence, and organization of a program have found that courts must look beyond the literal text of the defendant’s program to determine whether there is substantial similarity to the plaintiff’s program.

*Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc.*¹⁶⁸ presented the issue of whether there can be “substantial similarity” of computer programs when the similarity exists in the structure, sequence, and organization of the program and there is no line-for-line copying. The case involved a program designed by the plaintiff to run a dental laboratory

¹⁶² *Midway Mag. Co. v. Stroh* 564 F. Supp. at 75@751.

¹⁶³ *GCA Corp. v. Chance* 217 U. S.P.Q. at 719-20.

¹⁶⁴ *Baker v. Selden*, 101 U.S. 99, 25 L.Ed. 841 (1879).

¹⁶⁵ *Apple v. Franklin*, 714 F.2d at 1251.

¹⁶⁶ For a more extensive discussion of issues of structure, sequence, and organization, see Morton David Goldberg, “Copyright Protection for Computer Programs: Is the Sky Falling?” *American Intellectual Property Assn. Quarterly Journal*, vol. 17, pp. 294-322 (1989).

¹⁶⁷ *Ibid.*

¹⁶⁸ *Whelan Assocs., Inc. v. Jaslow Dental Laboratory, Inc.*, 609 F.Supp.1307 (E.D. Pa. 1985), *aff’d*, 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 479 U.S. 1031 (1987).

business, written for the IBM Series 1 computer in Event Driven Language (EDL). The defendant's program was written in BASIC for the IBM PC computer. The evidence demonstrated the defendant's access to the plaintiff's source code.

The court found that computer programs were protected under copyright against "comprehensive nonliteral similarity," and held that "copyright protection of computer programs may extend beyond a program's literal code to its structure, sequence and organization. In the particular case of *Whelan*, copyright did protect the structure, sequence, and organization. The court defined the protectable expression in the structure, sequence, and organization to include everything about the program's construction and design except its basic purpose or function (i.e., 'efficient operation of a dental laboratory').¹⁶⁹ Thus, it was possible to infringe the copyright of" a computer program without verbatim copying of the computer code. In a significant footnote, the court stated that it did not intend to imply by this characterization of copyrightable expression that the idea or purpose behind every utilitarian or functional work will be exactly what it accomplishes, so that structure and organization would therefore always be part of the expression of those works. It drew the distinction between the situation in *Whelan*, and instances where the idea or purpose behind a utilitarian work is to accomplish a certain function in a *certain way*, such that the structure or function of a program is essential to that task.¹⁷⁰

Other cases reflect the court's reasoning in *Whelan*.¹⁷¹ In *SAS Institute, Inc. v. S&H Computer Systems, Inc.*¹⁷² the court found that S&H infringed the copyright held in a program called SAS 79.5, which was written to run on IBM and IBM-compatible computers by converting it to run on

Digital computers. The court cited instances of "literal, near literal and organizational copying," of structural detail and nearly exact duplication of the SAS structure and organization. The court also discussed the idea of merger of idea and expression, stating:

... throughout the preparation of a complicated computer program such as SAS, the author is faced with a virtually endless series of decisions as to how to carry out the assigned task. . . At every level, the process is characterized by choice, often made arbitrarily, and only occasionally dictated by necessity. Even in the case of simple statistical calculations, there is room for variation, such as the order in which arithmetic operations are performed. . . As the sophistication of the calculation increases, so does the opportunity for variation of expression.

Finding that the processes of SAS could be expressed in a variety of ways, the Court stated that:

... to the extent that similarities between the SAS and the S&H product have existed, they represent unnecessary, intentional duplication of expression.

*Q-Co. Industries, Inc. v. Hoffman*¹⁷³ reflected the idea/expression merger concept. The defendants' program was written to run on an IBM PC in Pascal and IBM Assembler language. The court found that the defendants' program did not infringe plaintiff's program, written in Basic and Atari to run on an Atari 800-XL," in spite of similarities in the structure, sequence, and organization of the program, in addition to similarities in the program text between plaintiff and defendants' programs. In making this finding, the court stated that the similarities between the two programs were similarities in ideas rather than in expression. The use of functionally similar modules in the same sequence in the two programs was an inherent part of any program of the type developed by the plaintiff.

¹⁶⁹ T& aspect of the *Whelan* decision has been the subject of heavy criticism.

¹⁷⁰ *Whelan Assocs. v. Jaslow Dental Laboratory*, 807 F.2d 1256, 1260, footnote 34.

¹⁷¹ A number of cases uphold structure, sequence and organization protection as a legal principle and find substantial similarity on at least some of the facts in each case. See *Johnson Controls, Inc. v. Phoenix Control Systems, Inc.*, 886 F.2d 1173 (9th Cir. 1989); *Broderbund Software, Inc. v. Unison World, Inc.*, 648 F. Supp. 1127 (N.D. Cal. 1986); *Dynamic Solutions, Inc. v. Planning & Control, Inc.*, [1987] Copyright L. Dec. (CCH) Para. 26,062 (S.D.N.Y. 1987); *Pearl System, Inc. v. Competition Electronics, Inc.* 8 U.S.P.Q. 2d 1520 (S.D. Fla. 1988); *Soft Computer Consultants, Inc. v. Lalehzaradeh*, [1989] Copyright L. Dec. (CCH Par. 26,403 (E.D.N.Y. 1988); *Manufacturers Technologies, Inc. v. CAMS, Inc.*, 706 F. Supp. 984 (D. Conn. 1989); *Lotus Development Corp. v. Paperback Software Int'l* 740 F. Supp. 37 (D. Mass. 1990); Customs Service Decision 90-40 (Jan. 10, 1990) File: HQ 732291 CPR-3 CO: R:C:V 732291 SO. 24 Cust. B & Dec. No. 14, p. 28, [1990] Guide to Computer Law (CCH) Par 60,212 (Apr. 4, 1990).

¹⁷² *SAS Institute, Inc. v. S&H Computer Systems, Inc.*, 605 F. Supp. 816 (M.D. Tenn. 1985).

¹⁷³ *Q-Co. Industries, Inc. v. Hoffman*, 625 F. Supp. 608 (S. D.N.Y. 1985).

In *Healthcare Affiliated Services, Inc. v. Lippany*¹⁷⁴ the court held that the result of very general creative decisions were not protectable structure, sequence, and organization. Basing its findings upon plaintiff comparison of the first 50 lines of the two programs, the court stated:

The evidence merely documents that certain choices were made among factors at a gross level, e.g., the scope of the system, the number of variables to be used or the portions of the work force to be included in calculations of labor hours. The result of these choices, however, do [not] constitute the programs' structure, sequence and organization within the meaning of *Whelan*.

The Fifth Circuit Court of Appeals did not follow *Whelan* in *Plains Cotton Cooperative Ass'n v. Goodpasture Computer Serv., Inc.*¹⁷⁵ Relying on expert testimony, the court found no copying when an allegedly infringing program, designed to run on a personal computer rather than a mainframe computer, was found very similar to the plaintiff's program on the functional specification. Even though the court found the two programs very similar with respect to programming and documentation levels, and found that portions of the design appeared to be direct copies, the court looked to other evidence and found no copying. The court did not adopt the *Whelan* holding that the structure, sequence, and organization of a computer program is copyrightable. The court held that similarities in the two programs--each of which was designed to perform the same particular task within the agricultural cotton market--were dictated by the "externalities of the market. The record indicated that the market significantly affected the determination of the sequence and organization of cotton marketing software, since both programs attempted to provide the same information to the user. The court did not hold that such patterns could not constitute an idea in the context of computers. Thus, the decision in *Plains Cotton* narrowed *Whelan* such that the defendant can show that similarities in structure and organization may be dictated by market factors—

externalities--so that the same information must be presented to the user.

*NEC Corp. v. Intel Corp.*¹⁷⁶ involved two parties whose microprocessors both utilized the Intel 8086/88 instruction set. NEC'S V-series microprocessors contained similarities to the hardware of the 8086/88 microprocessor, but also had additional hardware. Intel claimed that NEC'S microcode violated its 8086/88 microcode copyrights, but not that the hardware similarities or use of the microinstruction set violated its copyright. The court found no infringement, basing its holding on the following findings:

1. no substantial similarity of the works ' 'considered as a whole;
2. insufficient evidence that NEC copied important parts of Intel's microcode;
3. programming "constraints" accounting for similarities between the two microcodes; and
4. the limited number of ways in which to express the ideas underlying some of Intel's more basic microroutines.

The findings of the court were particularly well supported through the evidence of "Clean Room" microcode presented to the court. NEC had contended that many of Intel's micro sequences were not copyrightable because they were made up of only a few obvious steps and thus lacked the originality necessary for copyright protection. NEC focused on cases cited by Melville Nimmer, in which copyright protection was denied to fragmentary words or phrases, noncreative variations of musical compositions, and forms of expression dictated solely by functional considerations. The court looked to Clean Room microcode, developed by a third party, as compelling evidence that the similarities between the NEC microcode and the Intel microcode resulted from constraints. It found that the Clean Room microcode was governed by the same constraints of hardware, architecture, and specifications as applied to the NEC microcode, and that copying was not involved. The developer of the 8086 microcode for Intel acknowledged that the microarchitecture of the

¹⁷⁴ *Healthcare Affiliated Services, Inc. v. Lippany*, 701 F. Supp. 1142 (W.D. Pa. 1988). Additional cases have upheld structure, sequence, and organization as a principle but found the evidence or pleading insufficient. See *Q-Co Industries, Inc. v. Hoffman*, 625 F. Supp. 608 (S. D.N.Y. 1985); *Digital Communications Associates, Inc. v. Softklone Distributing Corp.*, 659 F. Supp. 449 (N.D. Ga. 1987); *Telemarketing Resources v. Symantec Corp.*, 12 U.S.P.Q.2d 1991 (N.D. Cal. 1989); *Bull HN Information Systems, Inc. v. American Express Bank Limited*, [1990] Copyright L. Dec. (CCH) Par. 26,555 (S. D.N.Y. 1990).

¹⁷⁵ *Plains Cotton Cooperative Ass'n v. Goodpasture Computer Serv., Inc.*, 807 F.2d 1256 (5th Cir.) cert. denied, 484 U.S. 821 (1987).

¹⁷⁶ *NEC Corp. v. Intel Corp.*, 645 F. Supp. 590 (N. D. Cal. 1986), vacated, 835 F.2d 1546 (9th Cir. 1988), 10 U.S.P.Q.2d 1177 (N.D. Cal. 1989).

8086 microprocessor affected the manner in which he created his microcode, and that he would expect that another independently created microcode for the 8086 would have some similarities to his. The court found that the similarities between the Clean Room microcode and the Intel microcode must be attributed in large part to these constraints.

With respect to the issues of copying and the limited number of ways in which to express ideas underlying basic microroutines, the court cited testimony that independently created microcode for the 8086 would have fewer similarities in the longer sequences than in the shorter sequences, because more opportunities exist for longer sequences to be expressed differently. The court found that this was borne out: the longer sequences in NEC'S code and in Intel's microcode were not nearly so much alike as the shorter sequences.

The court in *Computer Associates International, Inc. v. Altai, Inc.*¹⁷⁷ rejects the Whelan test of "structure, sequence and organization" to determine similarities in computer programs. Instead, the court applied the "levels of abstractions test" articulated by Learned Hand in *Nichols v. Universal Pictures*,¹⁷⁸ which, they stated, was the law of the Second Circuit Court of Appeals. The "levels of abstractions test" of *Nichols*'s reads:

Upon any work. . . a great number of patterns of increasing generality will fit equally well, as more and more of the incident is left out. The last may perhaps be no more than the most general statement of what the [work] is about and at times might consist only of its title; but there is a point in this series of abstractions where they are no longer protected, since otherwise the [author] could prevent the use of his "ideas" to which, apart from their expression, his property is never extended.¹⁷⁹

Applying this test, the court found no infringement of computer Associates' copyright,

User Interface (the Screen Display Cases)

Courts have also addressed copyright issues in disputes relating to computer program screen dis-

plays, distinguishing copyrightable expression from unprotected elements in the text, menu hierarchies, command structures, key sequences, and other aspects of a program's "interface" with the user.

The court in *Broderbund Software, Inc. v. Unison World, Inc.*¹⁸⁰ held that the structure, sequence and organization of screen displays in defendant's "Print Master" infringed the copyright on the audiovisual displays of the plaintiff's program, "The Print Shop." Citing *Whelan*, the court upheld protection for the "overall structure of a program, including its audiovisual displays [emphasis added]." According to the court, the idea of creating printed materials (which may vary infinitely in their combination of text and graphics) is the concept behind "The Print Shop" and "Print Master." The created printed materials may vary indefinitely in their combination of text and graphics, and thus the idea is separable from the expression in the screens.

Broderbund differs from the earlier case of *Synercom Technology, Inc. v. University Computing Co.*,¹⁸¹ in which the court considered the issue of whether the sequence and ordering of plaintiff's input formats used in a structural analysis program was protected expression or an unprotected idea. Synercom supplied its customers with instructions describing the order in which data should be entered in the analysis program. University Computing, providing its users with similar printed input instructions, filed suit. The court held that the sequence and ordering of data was inseparable from the idea underlying the formats. These were not, therefore, copyrightable.

In the case of *Digital Communications Associates v. Softklone Distributing Corporation*¹⁸² the court was confronted with the question of what elements in a single menu screen constituted an idea and what elements constituted expression. The court concluded that the copied elements of the defendant's program that were nonessential to program operation constituted expression and therefore were infringing. It rejected Softklone's arguments that:

¹⁷⁷ *Computer Associates International, Inc. v. Altai, Inc.* No. CV 89-0811, U.S. District Court, E.D. New York, Aug. 9, 1991. This decision has been appealed; arguments were to be heard January 9, 1992.

¹⁷⁸ *Nichols v. Universal Pictures* 45 F.2d 119, 121 (2d Cir. 1930), cert. denied, 282 U.S. 902 (1931).

¹⁷⁹ *Nichols v. Universal Pictures*, 45 F.2d at 121.

¹⁸⁰ *Broderbund Software, Inc. v. Unison World, Inc.*, 648 F. Supp. 1127 (N.D. Cal. 1986).

¹⁸¹ *Synercom Technology, Inc. v. University Computing Co.*, 462 F. Supp. 1003 (N.D. Tex. 1978).

¹⁸² *Digital Communications Associates v. Softklone Distributing Corporation*, 659 F. Supp. 449 (N.D. Ga. 1987).

1) the idea and expression of the Crosstalk screen merged because the screen was a 'necessary expression of its idea,' and 2) the status screen was nothing more than an unprotectable 'blank form' designed to record the user's choices of parameter values.

This issue was most recently addressed in *Lotus Development Corporation v. Paperback Software International*.¹⁸³ The *Lotus* decision extended the copyrightability of the nonliteral elements of computer programs to menu command structures. The structure, sequence, and organization of the menu command system were all found copyrightable—including the overall structure, the choice of letters, words, or symbolic tokens' used to represent each command, the structure and order of the command terms in each menu line, the presentation of the command terms on the screen, and the long prompts.

Lotus brought suit in 1987 against Paperback Software International for copyright infringement of Lotus 1-2-3 by Paperback's VP-Planner, which was advertised by Paperback to be a "workalike" of Lotus 1-2-3. The programs were similar in appearance, and knowledge of Lotus 1-2-3 could be transferred to VP Planner without retraining. Although Paperback had not copied the literal elements of Lotus 1-2-3 (the source code or object code), the court found Paperback had copied the copyrightable nonliteral elements of the program.

The *Lotus* court established a three-part test for determination of the copyrightability of a particular nonliteral element. Applying this test, the court held that the idea of an electronic spreadsheet was not copyrightable. The rotated "L" at the top of the screen used by Lotus to represent the headings and columns normally found on a paper spreadsheet the court found, was a format used by most other electronic spreadsheet computer programs. For these reasons, the court held that the rotated "L" was not copyrightable. The court also held that the use of the slash key to evade the menu, the "enter" key to invoke a command, and the arithmetic symbol keys were not copyrightable, because of the limited number of keys remaining on the computer keyboard which had not already been assigned some specific purpose (such as an alphabetical or numerical value).

The court in *Lotus* also concluded that the menu command structure is not essential to the idea of an

electronic spreadsheet and that, as a result, Lotus 1-2-3's menu command structure was copyrightable expression and infringed by VP-Planner. The court emphasized that each nonliteral element of the user interface may or may not be protectable and that the computer program must be viewed as a whole. "The fact that some of these specific command terms are not quite obvious or merge with the idea of such a particular command term does not preclude copyrightability for the command structure taken as a whole." To determine if illegal copying had occurred, the court found that it need only identify copyrightable elements and decide if those elements considered as a whole had been copied.

In the recent case of *Engineering Dynamics, Inc. v. Structural Software, Inc. and S. Rao Guntur*,¹⁸⁴ the court, in spite of plaintiff's urgings, did not follow the reasoning of *Lotus*, looking instead to the Fifth Circuit for guidance. Citing *Plains Cotton*, the court held that formats are not copyrightable. Engineering Dynamics claimed defendants infringed several of its manuals in the development and marketing of defendant's product StruCAD. It also claimed the defendants infringed its copyright in the "user interface," comprised mainly of input and output reports. The court found that the scope of infringed materials included the text, pictures, diagrams, illustrative examples and flow charts depicted in the manuals, but not the input and output formats since the law of the Fifth Circuit provides that a user interface in the form of input and output reports is not copyrightable.

Databases

Databases are protected under copyright law as compilations. Under the copyright law, a compilation is:

A work formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship (17 U.S.C. Section 101).

Copyright protection in a compilation does not provide protection for every element of the compilation. Section 103(b) of the Copyright Act provides that:

The copyright in the compilation. . . extends only to the material contributed by the author of such work,

¹⁸³ *Lotus Development Corporation v. Paperback Software International*, 740 F. Supp. 37 (D.Mass.1990).

¹⁸⁴ *Engineering Dynamics, Inc. v. Structural Software, Inc. and S. Rao Guntur*, Civ. Act. No. 89-1655.

as distinguished from the preexisting material employed in the work, and does not imply any exclusive right in the preexisting material. The copyright in such work is independent of, and does not affect or enlarge the scope, duration, ownership or subsistence of, any copyright protection in the preexisting material.

Circuit courts of appeal have been inconsistent in their treatment of compilations. The Ninth Circuit Court of Appeals has consistently held that the discovery of a fact, regardless of the necessary input of labor and expense, is not the work of an author, so that verbatim repetition of certain words in order to use the nonprotectible facts is also noninfringing. To hold otherwise, according to the Ninth Circuit, would extend copyright protection to facts.¹⁸⁵ It is well established that copyright law never protects the facts and ideas contained in published works.¹⁸⁶ Indeed, the Ninth Circuit in *Cooling Systems & Flexibles Inc. v. Stuart Radiator, Inc.*¹⁸⁷ stressed the narrow range of protectable expression in factual works, acknowledging that to whatever extent the arrangement and expression of facts is original, an author is protected against its copying.¹⁸⁸ Similarly, the Second Circuit requires that selection, coordination or arrangement is necessary to form a copyrightable compilation.¹⁸⁹

The Eighth Circuit case of *West Publishing Co. v. Mead Data Central*¹⁹⁰ expands the scope of what is protectable as a compilation. West publishes texts of cases decided in State and Federal Courts and has developed a citation system in which cases can be found by reference to the volume number of the West volume and the page number on which that case appears. Mead Data publishes Lexis, a computer database of cases published by West as well as other Federal and State Court decisions. Mead Data uses the West citation system to locate cases, placing in its databases the first page on which a case appears and also the “jump pages” for each case. West

claimed that the page numbering system of its reporters was copyrightable and the court agreed, holding that the compiling and arranging of the cases meets the originality requirement of the copyright law. Mead Data’s infringement consisted of taking the arrangement of the cases, not the numbers themselves. However, by using the citation system Mead had infringed West’s copyright in the arrangement and selection of cases.

The Seventh Circuit, on the other hand, took into consideration the author’s industry, or ‘sweat of the brow’ in producing a compilation. In *Schroeder v. William Morrow & Company*,¹⁹¹ an action for infringement of a copyright on a gardening directory, the court stated that copyright protects not individual names and addresses but compilation, *the product of the compiler’s industry* [emphasis added]. In making its finding of infringement, the court stated that:

[i]t is clear . . . that the bulk of compilations in plaintiff’s directory were made with substantial independent effort and not by merely copying from other sources. The use of another copyrighted directory to obtain sources of information or for verification and checking, to the extent it occurred, was not wrongful and did not put plaintiff’s compilation beyond the protection of the statute.¹⁹²

The Supreme Court finally addressed this issue in *Feist Publications Inc. v. Rural Telephone Service Co., Inc.*¹⁹³ in which it rejected the “sweat of the brow” basis for copyrightability in fact-based works such as compilations. The court concluded instead that the Copyright Act of 1976 indicated that originality is the proper test in such cases. The *Feist* case involved the suit by Rural Telephone against Feist for copyright infringement, on grounds that Feist had illegally copied Rural Telephone’s phone listings.

¹⁸⁵ *Worth v. Selchow & Righter Co.*, 827 F.2d 569 (9th Cir.1987).

¹⁸⁶ *Harper & Row, Publisher, Inc. v. National Enterprises*, 471 U.S. 539, 105 Sup. Ct. 2218, 85 L. Ed. 588 (1985); *Mazer v. Stein*, 347 U.S. 201, 217, 74 Sup. Ct. 460, 470, 98 L. Ed. 630, *reh’g denied*, 347 U.S. 949, 74 Sup. Ct. 637, 98 L. Ed. 1096 (1954).

¹⁸⁷ *Cooling Systems & Flexibles Inc. v. Stuart Radiator, Inc.*, 777 F.2d 485 (9th Cir.1985).

¹⁸⁸ *Ibid.*, p. 492; See also *Landsberg v. Scrabble Crossword Game Players Inc.*, 736 F.2d 485 (9th Cir. 1984) *cert. denied* 469 U.S. 1037 (1984).

¹⁸⁹ *Eckes v. Card Price’s Update*, 736 F.2d 859 (2d Cir.1984), *Financial Information, Inc. v. Moody’s Investor Service, Inc.*, 751 F.2d 501 (2d Cir. 1984); 808 F. 2d 204 (2d Cir. 1986).

¹⁹⁰ *West Publishing Co. v. Mead Data Central*, 799 F. 2d 1219 (8th Cir.1987).

¹⁹¹ *Schroeder v. William Morrow & Company*, 566 F.2d 3 (7th Cir.1977).

¹⁹² See also *Gelles-Widmer Co. v. Milton Bradley Co.*, 313 F.2d 143 (7th Cir. 1963).

¹⁹³ *Feist Publications Inc. v. Rural Telephone Service Co., Inc.*, — U.S.—, 111 Sup. Ct. 1282 (1991).

The Court noted that the case involved two propositions of law which are traditionally in tension: first, that facts are not copyrightable and second, that compilations of facts generally are. The court concluded that while Feist clearly appropriated a significant amount of factual information from Rural Telephone's directory, Rural Telephone's selection, coordination and arrangement of its white pages did not satisfy requirements for copyright protection. The Court, therefore, held that Feist's taking of the listing could not constitute an infringement.

Two new cases flow from Feist and appear to establish an emerging line of authority regarding the treatment of spreadsheets. The Second Circuit, in *Kregos v. Associated Press*,¹⁹⁴ found baseball pitching forms to be sufficiently original in the selection for copyright protection of nine categories out of the universe of pitching statistics. In *Key Publications Inc. v. Chinatown Today Publishing Enterprises Inc.*,¹⁹⁵ the Second Circuit upheld the copyright in the yellow pages of a Chinese-American community directory. The copyright was based upon the compiler's original selection and arrangement of business listings. At the same time, the court found the copyrighted directory not infringed by a competing directory that used a different arrangement of categories and principles of selection for included listings. This finding of non-infringement suggests that thin protection exists in a compilation.¹⁹⁶

Other Concerns About Copying

Software developers, especially packaged-software developers, have also been concerned about two issues related to unauthorized copying: software rental and States' sovereign immunity from money damages for copyright infringement. These concerns have received congressional attention re-

sulting in new legislation in the 101st Congress: Title VIII of Public Law 101-650 makes it an infringement of copyright to rent computer software without the copyright holder's permission; Public Law 101-553 allows Federal courts to hold the States and their agencies and employees liable for copyright infringement. Before the latter was enacted, Federal courts had refused to hold the States or their agencies (e.g., State universities) liable for money damages for copyright infringement, on the grounds that the copyright law does not clearly show the intent of Congress to abrogate the States' sovereign immunity under the 11th Amendment.¹⁹⁷

The rental legislation was motivated by software industry concerns that most software rentals would be motivated by the desire to copy, rather than to "try before buying," and that software rental to potential copiers would displace sales. Similar concerns had previously resulted in the record-rental provisions of the current copyright law.

The *Semiconductor Chip Act*—The Semiconductor Chip Protection Act of 1984 was enacted to extend legal protection to a new form of statutory subject matter, semiconductor chip products and mask works.¹⁹⁸ According to the legislative history, the Semiconductor Chip Protection Act is intended to combat the problem of chip piracy,¹⁹⁹ as Congress perceived that the existing law failed to address that problem. In effecting this purpose, Congress attempted to incorporate the goals of the U.S. Constitution regarding copyrights and patents: to reward authors and inventors for their labors, to provide them with an incentive for future creativity, so as to ultimately benefit the public.

The Chip Act is a special or *sui generis* law, creating a statutory scheme to provide proprietary protection for chip products separate from and

¹⁹⁴*Kregos v. Associated Press*, 937 F.2d 700, 19 U. S.P.Q. 2d 1161 (2d Cir.1991).

¹⁹⁵*Key Publications Inc. v. Chinatown Today Publishing Enterprises Inc.*, 20 USPQ1122 (2d Cir.1991).

¹⁹⁶A number of other rulings have flowed from Feist. *Bellsouth Advertising & Pub. Corp. v. Donnelly Info. Pub.*, 933 F.2d 952 (11th Cir.1991) held that copying the categories of a yellow page directory infringed that directory even though the copying was for unrelated use. *Victor Lalli Enterpr. v. Big Red Apple, Inc.*, 936 F.2d 671 (2d Cir. 1991) held that an particular format for reporting racing-related data was not copyrightable because it was a format used by many others and was dictated entirely by the intended use as a means to gamble on the numbers game.

¹⁹⁷See *BNA Patent, Trademark, and Copyright Journal*, vol. 41, January 1991, pp. 301-302.

¹⁹⁸**Semiconductor** chips are integrated circuits containing transistors, resistors, capacitors and their interconnection, fabricated into a very small single piece of semiconductor material. A mask work is a set of images fixed or encoded at a later stage of manufacturing, that produces the circuitry of the final chip product. Stanley M. Besen and Leo J. Raskind, 'An Introduction to the Law and Economics of Intellectual Property', *The Journal of Economic Perspectives*, vol. 5, No. 1, pp. 3-27, at 19.

¹⁹⁹The legislative history indicates that incentives for piracy are great. There is a great disparity between the cost of developing a chip and the cost of copying it; the legislative reports indicate that initial development can cost as much as \$100 million, while copying costs as little as \$50,000.

independent of the Copyright Act.²⁰⁰ Protection for domestic products attaches upon fixation and commercial exploitation.²⁰¹ **Registration with the copyright Office** is a condition of mask work protection. Protection is forfeited if the mask work is not registered within 2 years after the date of first commercial exploitation. The Copyright Office makes provisions for registration. The act provides for a 10 year term. Owners of a protected mask work are granted the right to bar reproduction of the mask work by any means and the right to import or distribute a semiconductor chip product in which the mask work is embodied. The Act establishes reverse engineering as a defense to a claim of infringement. The reverse engineering provisions provide an exemption from infringement liability in spite of proof of unauthorized copying and striking similarity, as long as the resulting chip product was the result of study and analysis and contained technological improvement. The act also provides remedies similar to those associated with copyright protection. However, criminal penalties are not available, and the limit on statutory damages is higher than that provided for by the Copyright Act.²⁰²

Design Patent Protection—Design patents provide protection for designs for an article of manufacture that are new, original, and ornamental. The design may be surface ornamentation, configuration or a combination of both. Courts have defined a patentable ornamental design as one that must “appeal to the eye as a thing of beauty.”²⁰³ As with other inventions granted patent protection, the subject of design patent protection must undergo an examination process in the Patent and Trademark

Office and meet the standards of novelty and nonobviousness. The configuration of a useful object may constitute a patentable design, so that the elements of a design may be functional. However, a design dictated by considerations of function is not a proper subject for a design patent. A design is not patentable if the only points of novelty or nonobviousness over prior designs are dictated by fictional improvement or alteration.²⁰⁴ Once a patent is granted for a design, the term of protection is 14 years. For infringement of a design patent to exist, the accused article must be so similar to the protected one “as to deceive an observer, inducing him to purchase one supposing it to be the other. . . .”²⁰⁵

Industrial Design Bills in the United States—

Industrial design protection is crafted to protect designs inadequately protected under patent, trade dress and copyright law. The history of proposals in the Congress of this method of protection is long.²⁰⁶

Several proposals to protect industrial designs were presented to the 100th Congress.²⁰⁷ These proposals use a similar modified copyright approach. All three would have amended Title 17 to protect designs that are “original.” The bills provided for copyrightlike registration process, rather than a patentlike examination process. Commonplace designs, those “dictated solely by utilitarian function” were excluded from protection. All provided for a term of protection of 10 years. Design rights, under the statute, would not affect any rights under patent, trademark, or copyright law. The bills required that notice of protection appear on the article. Copying an article without knowing that it was a protected design would not constitute an infringement.²⁰⁸

²⁰⁰ See Robert W. Kastenmeier and Michael J. Remington, “The Semiconductor Chip Protection Act of 1984: A Swamp Or Firm Ground?” *Minnesota Law Review*, vol. 70, No. 2, December 1985, pp. 417-470. According to Kastenmeier and Remington, while working in harmony with the copyright law, The Semiconductor Chip Protection Act avoids tailoring copyright principles to accommodate the singular character of the use of chip designs in the manufacturing process so as to distort the way in which copyright was applied to other categories of copyrightable works. At the base of their theory is the proposition that dissimilar things should not be treated in a similar fashion. See especially pages 443-444.

²⁰¹ Foreign products are granted protection by the president upon a finding that a foreign nation extends to U.S. nationals the same protection as the United States accords to the foreign nationals.

²⁰² Ibid.

²⁰³ *Wabern P_k_in Indus., Inc. v. Cut Rate Plastic Hangers, Inc.*, 652 F.2d 987, 210 U.S.P.Q. 777 (2d Cir. 1981) *Bliss v. Gotham Indus., Inc.*, 316 F.2d 848, 137 U.S.P.Q. 189 (9th Cir. 1963).

²⁰⁴ Chisum, *Patents*, Section 1.04[2][d].

²⁰⁵ *Gorham Mfg. Co. v. White*, 81 U.S. (14 Wall.) 511, 20 L. Ed. 731 (1872).

²⁰⁶ See, Jacques M. Dulin, “Design Protection: Walking the Pirate Plank?” *Bulletin, Copyright Society of the U.S.A.*, vol. 12, No. 6, August 1965; Note, “Protection of the Design of Useful Articles: Current Inadequacies and Proposed Solutions,” *Hofstra Law Review*, vol. 11, spring 1983, p. 1043 at p. 1065.

²⁰⁷ See H.R. 902, H.R. 3017, H.R. 3499.

²⁰⁸ “Court Rescinds Ruling That dBase Copyright Is Invalid,” *BNA Patent, Trademark & Copyright Journal*, vol. 4, p. 543.

Opponents of the industrial design bills have argued that there is already sufficient incentive for production of articles of industrial design.²⁰⁹ Other critics of the bills maintain that industrial design bill might, by virtue of its characterization as ‘ ‘industrial,’ cover functional designs, such as automobile windshields, replacement parts, and product packaging, thus favoring original equipment manufacturers and brand name marketers over the makers of less-expensive after-market auto parts and store brand consumer products. Publishers are concerned about liability for publishing books that contain type face designs protected under the legislation.²¹⁰

H.R. 1790, the Design Innovation and Technology Act of 1991, was introduced in the 102d Congress. This bill would amend the copyright law to provide for the protection of industrial designs of useful articles, including typefonts.²¹¹ The bill sets the term of protection at 10 years and provides for requirements for marking, application, and fees. The bill specifies criteria for determination of infringement of a protected design and grants the owner of a protected design the exclusive right to make, import, or distribute for sale or use in trade any useful article embodying the design.

H.R. 1790 addresses concerns raised during hearings on design legislation held in 1990. As a result, it requires that protected designs meet a standard of ‘originality’ if they are to be protected, such that the design must be the result of a designer’s creative endeavor that provides a “distinguishable variation over prior work pertaining to similar articles.” This variation must be more than trivial and must not have been copied from another source. The bill also expands an exemption for certain replacement parts for automotive and other products. The bill protects distributors and retailers who innocently trade in infringing products. Publishers

are not subject to infringement actions under the legislation for reproducing, modifying or distributing printed materials even if these contain an infringing typeface. The aggrieved party must seek a remedy from the actual infringer. Finally, the legislation requires that the registrant for design protection forego simultaneous protection under the patent and copyright laws.

Design protection granting the designer or other owner of the design exclusive rights in the use of his creation has been enacted in foreign countries including Canada, France, the Federal Republic of Germany, India, Italy, Japan, the Netherlands, and the United Kingdom.²¹² Such legislation in the United Kingdom and Canada has been recently enacted. Other laws, such as those of Germany and Italy, have been amended in recent years. The definition of industrial design may vary from country to country. However, it appears that generally design protection involves elements such as configuration, shape, pattern, and combinations of lines and colors which provide a product with a new or aesthetically improved appearance. Novelty and the industrial application of the design are generally required to obtain protection. In the countries listed above, the term of protection ranges from 8 to 15 years. The laws in these countries are enforced and provide for civil remedies in cases of infringement of exclusive rights. In some cases, the law provides for imposition of sanctions for criminal offenses.²¹³

Hybrid Design Protection

One intellectual property scholar, Professor Jerome Reichman, has suggested that software is, like industrial design, an example of a ‘ ‘legal hybrid’ falling between the patent and copyright systems.²¹⁴ Other examples are biotechnology and medical processes. These hybrids are characterized by the fact that considerable investment is required to

²⁰⁹ For a discussion of some of the economic considerations associated with the protection of industrial design, see Robert C. Denicola, “Applied Art and Industrial Design: A Suggested Approach to Copyright in Useful Articles,” *Minnesota Law Review*, vol. 67, pp. 707, 721-727.

²¹⁰ Ibid.

²¹¹ The bill specifically excepts designs that are: 1) not original; 2) staple or commonplace; 3) different from commonplace or staple designs in insignificant ways; 4) determined solely by a utilitarian function; 5) embodied in a useful article that was made public by the designer or owner in the United States or in a foreign country more than one year before the date of application for registration; 6) composed of three dimensional features of shape and surface in wearing apparel; 7) a semiconductor chip product already protected under another provision; 8) embodying a process or idea or system; or 9) for motor vehicle glass.

²¹² See Giovanni Salvo, “Industrial Design Protection,” document of the Law Library of Congress, European Law Division, March 1990, LL90-23, pp. 1-2.

²¹³ Ibid.

²¹⁴ J. H. Reichman, “Computer Programs as Applied Scientific Know-How: Implications of Copyright Protection for Commercialized University Research,” *Vanderbilt Law Review*, vol. 42, No. 3, April 1989, p. 655.

achieve incremental innovation, and the “know-how” is vulnerable to rapid duplication by competitors who bear no part of the development expenditure. However, these products have fallen outside the copyright regime, and patent protection would not be available because the innovation is incremental, not “non-obvious.”

Reichman believes that a *sui generis* know-how law built on modified copyright principles could provide adequate protection to this kind of legal hybrid without embracing the full copyright paradigm. He believes that this approach would eventually unify the treatment of innovations such as computer software and industrial design.

Reichman has written that:

[t]he fundamental problem remains that of rewarding or simply recompensing large expenditure for incremental innovations that fall chronically short of the current legal threshold for patentable inventions.²¹⁵

These technologies are not adequately protected because they deviate from the assumptions underlying the classical forms of intellectual property.²¹⁶ The solution, in Reichman’s view, is a new intellectual property paradigm that provides this incremental innovation with artificial lead time in which investors can recoup their investment and turn a profit. *17

Other commentators have also argued that the patent and copyright laws are not appropriate for computer software, and that a *sui generis* law based on a modified copyright approach would be better.²¹⁸ However, while Professor Reichman argues

that software belongs to a larger class of “legal hybrids” requiring a new intellectual property regime, these commentators favor the creation of a law specifically directed at computer software. One of the arguments which has been advanced against a *sui generis* regime for software is that it risks being obsoleted by changing technology.

Other arguments have been advanced for continuing to work within the existing patent and copyright regimes. First, it is argued that the present regimes are working well, and their economic effects are appropriate.²¹⁹ The CONTU report concluded that copyright law was an appropriate mechanism for protecting computer programs and, they claim, the case law has been evolving properly.²²⁰ Further arguments against *sui generis* protection are that a new regime would create uncertainty, and that international copyright agreements provide a framework for the protection of computer programs in other countries.²²¹ (See box 2-H for discussion of Analogous Copyright Law in Foreign Countries.)

Trade Secret Law

Introduction

Trade secret law protects certain types of confidential technical or business information against unauthorized use or disclosure. Some believe that the object of the trade secret law is to protect *confidential relationships*,²²² and promote ethical standards of competitive behavior while others subscribe to the theory that its purpose is to protect the secret *information itself*. As with copyright and patent, the proprietary interest in the information

²¹⁵ Ibid., at p. 653.

²¹⁶ Ibid., at p. 661.

²¹⁷ J. H. Reichman, “Proprietary Rights in the New Landscape of Intellectual Property Law: An Anglo-American Perspective,” study prepared for the International Literary and Artistic Association (ALAI), Congress of the Aegean Sea II, Athens, June 19-26, 1991.

²¹⁸ See Pamela Samuelson, “Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions,” *Emory Law Journal*, vol. 39, No. 4, p. 1025, p. 1150; Richard H. Stern, “The Bundle of Rights Suited to New Technology,” *University of Pittsburgh Law Review*, vol. 47, No. 4, p. 1229. Professor Paul Goldstein argues that copyright law runs the risk of providing too much protection to functional aspects of works belonging in the domain of patents. He further perceives problems with patent protection for software (prior art problems, problems of patenting obvious subject matter, etc.) so that, he asserts, subject matter is being protected which is not appropriately covered by patent or copyright law. He believes that, if improperly applied, the law will result in consumers paying higher prices for software than warranted, among other dislocations. See generally, Paul Goldstein, “Infringement of Copyright in Computer Programs,” *University of Pittsburgh Law Review*, vol. 47, No. 4, Summer 1986.

²¹⁹ Ronald T. Reiling, Chairman, Proprietary Rights Committee, Computer and Business Equipment Manufacturers Association Testimony at Hearings before the House Subcommittee on Courts, Intellectual Property and the Administration of Justice, Nov. 8, 1989, Serial No. 119, p. 167.

²²⁰ Morton David Goldberg, op. cit. at footnote 166.

²²¹ Ronald T. Reiling, op. cit. at footnote 218.

²²² See *Rockwell Graphic Systems, Inc. v. DEV Industries, Inc.*, 925 F.2d 174 (7th Cir. 1991).

may differ from a proprietary interest in the physical object embodying the trade secret.²²³

Trade secret law is generally based on common law and contractual provisions. State law addresses all trade secret claims, even when a trade secret claim is tried in Federal court. As a result, the fine points of trade secret law may vary from state to state. However, a Uniform Trade Secrets Act (UTSA) has been adopted in about half the States.²²⁴ In States where it has been adopted, the UTSA operates as a statute and is part of the State civil code. In spite of this state to state variation of trade secret law, one accepted definition of a “trade secret” is that of the *Restatement of Torts*:

A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. It maybe a formula for a chemical compound, a process for manufacturing, treating or preserving materials, a pattern for a machine or other device, or a list of customers.²²⁵

The UTSA sets out a simpler definition of trade secret than that contained in the *Restatement*. According to the UTSA, a trade secret may be any kind of information, including but not limited to, “a formula, pattern, compilation, program, device, method, technique or process. . . .” A trade secret must derive independent economic value, actual or potential, from the fact that it is *not generally known to the public* or competitors. The UTSA does not require absolute secrecy; the information may derive actual or potential economic value from relative secrecy. However, the information must be “the subject of efforts that are reasonable under the circumstances to maintain its secrecy.” Thus, even if information is not leaked, protection may be lost if it is not treated as secret.

The law of trade secret generally focuses on inequitable use of the information, whether by abuse or breach of confidence or trust, impropriety in obtaining or using the information, or breach of contract or other express obligation not to disclose the information. The indicia for establishing a claim

of misappropriation of a trade secret or confidential information set forth by the *Restatement of Torts* are that:

1. There must be a *protectable interest* i.e. a trade secret;
2. The plaintiff must have a *proprietary interest* in the trade secret or information;
3. The trade secret must be *disclosed* to the defendant *in confidence* or it must be *wrongfully acquired* by the defendant through improper means;
4. There must be a *duty not to use or disclose* the information; and
5. There must be a *likely or past disclosure or use* of the information, if in a different form, which is unfair or inequitable to the plaintiff.

Under the UTSA, two major types of trade secret misappropriation are prohibited:

1. Simple acquisition of trade secrets, regardless of whether the information is used, by a person who knows or has reason to know that the trade secret was acquired by improper means.
2. Misappropriation based on use or disclosure:
 - use of improper means to obtain a trade secret;
 - use or disclosure of a trade secret knowing or having reason to know that the secret was improperly obtained;
 - use of information acquired by accident or mistake after learning, and before materially changing position, that the information is a trade secret.

Characteristics of a “Trade Secret”

In order to qualify as a trade secret, information must possess certain characteristics. First, the information that is the subject of trade secret protection must be of some minimal *competitive value or advantage* to the owner or his business. Trade secrets can include technical information, customer lists, suppliers, or accumulated business wisdom. The information must also be the result of some minimal *investment or expense*, and must not be generally known to the public. Courts also consider the amount of effort that is invested in creating a

²²³ For example, even if people own certain cards on which information is printed, they do not necessarily have a right to use the confidential information on those cards. *American Republic Ins. Co. v. Union Fidelity Life Ins. Co.*, 470 F.2d 820, 825 n. 3 (9th Cir. 1972).

²²⁴ Ronald Abramson, “Trade Secret Protection for Computer Software—Procedures for Protection: Recent Decision On Its Scope,” *Computer Software 1990: Protection and Marketing* (New York, NY: Practising Law Institute, July 1990) p. 479.

²²⁵ *Restatement of Torts*, section 757, comment b, at 5 (1939).

Box 2-H—Analogous Copyright Law in Foreign Countries

The Pacific Rim

Japan—To ensure inclusion of computer programs as protectable subject matter of copyright, Japanese revised copyright law defines computer programs as “a set of instructions for a computer which are combined in order to function [sic] the computer so that one result can be obtained.”¹ This definition establishes four requirements for a copyrightable computer program. First, the set of instruction must function to operate a computer. Second, the minimum requirement for a copyrightable program is a set of instructions which can effect one result.² Third, a program consists of a set of instructions to be input into a computer.³ Fourth, a program must be an expression; to be the subject matter of copyright law, a program must be the expression of an idea.

Under Japanese law, both source code and object code are copyrightable. Translation from source code to object code constitutes a reproduction of the source code.⁴ A report prepared by the Japan Copyright Committee in January 1984 defines a set of instructions stored in read only memory to operate a preselected operation as a microprogram, making them subject to Japanese copyright. This definition is not widely accepted, leaving some doubt as to the copyrightability of microprograms.

Japanese Copyright Law further provides that the author shall have the exclusive right to reproduce his work. The law provides that the author shall have the exclusive right to translate, arrange, transform, dramatize, cinematize, or otherwise adapt his work. In principal, a person who possesses a copy of a program is prohibited from making another copy or adapting the original copy without the copyright owner’s consent. However, like U.S. law, Japanese Copyright Law limits the scope of the author’s exclusive right of reproduction regarding a program work, by allowing copies or adaptation to the extent deemed necessary for the purpose of using the work in a computer to be made by the owner of a program for his own use.⁵

The period of protection for computer software in Japan is life of the creator plus 50 years.⁶ For unpublished software, the copyright endures 50 years after the creation of the work.⁷

Korea—In Korea computer programs are defined as a set of instructions and commands, expressed in a specific manner, to be used directly or indirectly in a computer to bring about a certain result. The scope of protection afforded software by Korean law is similar to that granted to software in Japan.

The term of protection for software in Korea is 50 years from the time at which the program is created.

Taiwan—*Taiwan* law defines a computer program as a set of instructions to be used in a computer in order to bring about a certain result. The Ministry of the Interior published a document in 1986 clarifying the coverage of software by the copyright law. Prior to release of that document, software registrations were accepted but no explicit provision provided for software.⁸

Taiwanese copyright law provides protection for the life of the author plus 30 years. If the work is created by an employee, 30 years of protection are provided.⁹

¹ Paul C.B. Liu, “Computer Software and Intellectual Property Law in the Pacific Rim Countries,” contractor report prepared for the Office of Technology Assessment, p. 20, citing copyright law, art. 2, para. 1, item 10-2 (Law No. 48, 1970), translated by EHS (Eibun-Horei Sha Inc.), Law Bulletin Series, Japan Vol. 3. The definition has also been translated as: “an expression of combined instructions given to a computer so as to make it function and obtain a certain result,” Atsuo Torii, Legal Protection of Computer Software in Japan, *AIPPI Journal*, December 1985, p. 150.

² “One result” is the final result of one data processing function. For example, if a whole program includes a set of subroutines, each subroutine is protectable as a copyrightable program.

³ Thus, material written in language other than machine-readable language, such as a flow chart, is not a computer program under Japanese copyright law.

⁴ Liu, op. cit. footnote 1, citing 14 (3) Mutaizaisank en Kankei Minji Gyosei Saiban Reishu 7% (Tokyo District Ct., Dec. 6, 1982).

⁵ Japanese Copyright Law, art. 47(b).

⁶ Ibid., art. 53, para. 1.

⁷ Ibid., art. 53, para. 3.

⁸ R. Michael Gadbaw, et al., *Intellectual Property Rights: Global Consensus, Global Conflict?* (Boulder, CO): Westview press, 1988) p.374.

⁹ Ibid.

Western Europe

The European Communities have adopted a directive on the legal protection for computer software, which must be implemented by each of the EC member states. This directive requires that software be protected by copyright as a literary work within the meaning of the Berne Convention.¹⁰

Each of the member states must adopt legislation necessary to comply with the directive by January 1, 1993. However the following are examples of copyright protection for software as it now exists in the EC member states of France and in Switzerland, which is not a signatory to the EC treaty.

France—The French legal system, based on statutory law rather than case law, did not address the question of copyright in its Civil Code Law of March 11, 1957. The law of July 3, 1985 modifies the copyright law to take into account modern technologies such as computers. The July 3, 1985 law expressly provides that software is copyrightable, but leaves to the courts the task of defining software (referred to in France as “logiciel”). The law of July 3, 1985 differs in several respects from the normal rules of copyright. A decree of December 22, 1981 proposes a definition of software as:

the combination of programs, processes and rules, and possibly the documentation, relevant to the functioning of a system for the treatment of information.

This text is not strictly regarded by the courts.

Copyright protects not the idea of a creation but the form or expression of the creation. French law has no requirements for registration, deposit or notice. While there is no value requirement for protection, the creation must be original; i.e., it must reflect the personality of the creator.

The owner of a copyright has rights of reproduction and adaptation. While the buyer of software is entitled to make one backup copy of software, any other unauthorized copy or unauthorized utilization is an infringement.

The term of protection under copyright in France is 25 years from the date of creation of the software.

Switzerland—Opinion as to whether computer programs are copyrightable in Switzerland is mixed. However, generally, in order to be protected under Swiss law, a work: 1) must be a creation, 2) must be in the literary or artistic field, and 3) must have an original character. Swiss law lists explicitly the exclusive and absolute rights of copyright holders. Among these are the right to reproduce a protected work, and the right to sell, offer for sale, or put into circulation copies of the work. Protection extends for the life of the author plus 50 years. Switzerland has no formality requirements.

Latin America

Brazil—Copyright law in Brazil pertains to all “creations of the mind. . . regardless of their form of expression.”¹¹ Software programs are not included in an enumerated list of creations subject to protection, and are not registered by the National Copyright Council of the Ministry of Culture.

A work is protected by copyright in Brazil for the life of the author plus 60 years after the author’s death. Registration is not required for copyright protection.

Argentina—Argentine law protects all traditional forms of creative expression. Source code programs may have copyright protection. While the Argentine National Copyright Registry allows for registration of source code programs and object code programs, the courts have not made a specific ruling on this practice. Draft laws grant protection to both object code programs and source code programs, as well as to the operating system software and application software.¹²

Mexico—Mexican law now includes computer programs as a category of protected works under the copyright law. Mexican law includes no private use or “fair use” type of limitation.

¹⁰ See Couch Directive of May 14, 1991 on the legal protection of computer programs (91/250/EEC), preamble, para.30; published in the Official Journal of the European Communities, No. L 122/42, May 17, 1991. For further discussion on the European Economic Community’s treatment of computer software in the software directive, see ch. 3.

¹¹ Gadbow, et al. op. cit., footnote 8, p. 172.

¹² Gadbow, ibid, p. 133; Cary Sherman, et. al., *Computer Software Protection Law* (Washington DC: Bureau of National Affairs, Inc., 1990), p. AR 8-9.

SOURCE: OTA, 1992.

program when determining whether a trade secret exists.²²⁶ Finally, the owner of a trade secret must affirmatively *maintain the secret*.

The Need to Maintain the Trade Secret

A critical requirement for establishing the existence of a protectable trade secret is that the proprietor has exercised a substantial effort to retain secrecy that was reasonable under the given circumstances. While the trade secret owner must take affirmative, concerted and continuing action to protect his trade secret, the requisite level of secrecy is characterized by relative secrecy:

“The owner of the secret need only take reasonable precautions to ensure that it would be difficult for others to discover the secret without using improper means.”²²⁷

There are several widely recognized indicia as to whether the information is entitled to protection as a trade secret:

1. the extent to which the information is known outside the company;
2. the extent to which it is known by employees and others involved in the business;
3. the extent to which the owner has gone to assure its secrecy;
4. the value of the information to the owner and his competitors;
5. the cost of developing the information; and
6. the ease with which the information could be properly duplicated or acquired by others.²²⁸

General disclosure of protected information will entail permanent loss of its character as a secret. However, the “necessary element of secrecy is not

lost if the holder of the trade secret reveals the trade secret to another in confidence, and under an implied obligation not to use or disclose it,’ or under a similar express obligation.”²²⁹ Thus, licensing of software or its disclosure to an employee will not void the secrecy of the information embodied in it, provided that the recipient is subject to an implied or express obligation to maintain confidentiality. While one court has held that secrecy remains when software is distributed in object code only,²³⁰ the question remains how wide a distribution vitiates requisite secrecy.

Employment contracts through which employees are placed under an obligation to maintain secrecy are governed by State law and are an important tool in implementing trade secret protection. It is suggested that the prevalence of such contracts is one argument against a Federal trade secret law, since to attempt to regulate such contracts on the federal level would impinge upon the power of the States to govern employer/employee relations.

Software and Trade Secret Law

Trade secret law is one of the most widely used forms of legal protection for intellectual property interests in computer software. Numerous courts of a variety of U.S. jurisdictions have ruled that trade secret properly protects computer software.²³¹

When software is distributed to relatively few customers, licenses establishing the confidential relationship and obligations necessary for trade secret can be obtained through signed written agreements.²³² *Developers* of computer software have attempted to address the more difficult problem of maintaining trade secrecy in mass marketed

²²⁶ *Cybertek Computer Products, Inc. v. Whitfield*, 203 U.S.P.Q. 1020, 1023 (Cal. Super. Ct. 1977) *Computer Print Systems, Inc. v. Lewis*, 422 A.2d 148, 153-54 & n. 2 (Pa. Super. 1980).

²²⁷ *Henry Hope x-Ray Prods., Inc. v. Marron Carrell, Inc.*, 674 F.2d 1336, 1340 (9th Cir. 1982), *Jostens, Inc., v. National Computer Sys., Inc.* 318 N.W.2d 691, 700 (Minn. 1982). Similarly, the UTSA provides that the information as discussed earlier in this section, must be “the subject of efforts that are reasonable under the circumstances to maintain its secrecy.” Information must be consistently treated as a secret, as otherwise it may lose its trade secret status even if it does not leak out.

²²⁸ *Restatement of Torts*, section 757, *Cement b*, at 6 (1939), reprinted in app. D.; *SI Handling Systems v. Heisley*, 753 F.2d 1244 (3rd Cir. 1985).

²²⁹ *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 475 (1974).

²³⁰ see, e.g., *Q-Co Industries Inc. v. Hoffman*, 625 F. Supp. 698, 617-18 (S.D.N.Y. 1985).

²³¹ *Telex Corp. v. Inter'l Business Machines Corp.*, 510 F.2d 894 (10th Cir.), cert. dismissed, 423 U.S. 802 (1975); *University Computing CO. v. Lykes-Youngstown Corp.*, 504 F.2d 518 (5th Cir. 1974); *Q-Co. Industries, Inc. v. Hoffman*, 625 F. Supp. 608 (S. D.N.Y. 1985); *Cybertek Computer Products, Inc. v. Whitfield*, 203 U.S.P.Q. 1020 (Cat. Super. Ct. 1977); *Corn-Share, Inc. v. Computer Complex, Inc.*, 338 F. Supp. 1229 (E.D.Mich. 1971), aff'd., 458 F.2d 1341 (6th Cir. 1972).

²³² Considerable scholarship exists discussing the use of contract above and beyond the protection provided by the traditional intellectual property laws. Such modes of providing protection for software and software related inventions are of importance, given the European Community's Directive on legal protection for computer software, which in article 9 specifically provides that contractual provisions contrary to article 6 or to the exceptions provided for in article 5(2) and (3) are nullified by article 9. For further discussion of contracts in this area, see box 2-I.

Box 2-I-Contract Law Protection of Electronic and Computer Technology

Apart from the provisions of the intellectual property law, contractual agreements are used to provide the terms for the distribution of computer goods and services. These agreements have allowed the vendor or licensor to define its relationship with the user or licensee concerning the goods and services. Traditionally, a considerable amount of service and maintenance was required in connection with computer goods. Contracts covered this aspect of the relationship and defined certain obligations which existed on the part of the vendor/licensee and the user/licensee, including warranties, limitation on liability, risk of loss and damages.

As computer technology evolved, both in terms of its cost-effectiveness and the extent of its distribution, the nature and breadth of contractual agreements also developed. In the area of mass-marketed software for microcomputers, the industry adapted the contractual relationship and developed the so-called shrink-wrap license agreement. The shrink-wrap license does not necessarily require that the user/licensee formally execute the agreement and return it to the vendor/licensee. Instead the contract may become binding upon use of the licensed program by the user/licensee.¹

According to some sources, the distinction between hardware, software, and data is beginning to blur significantly at the same time that more and more resources are being invested in their development. Typically, the relationships between the buyers and sellers regarding their rights in these are set forth between parties in written agreements.²

The Interface Between State Contract Law and Federal Patent Law

While Federal patent law preempts State-based protection that provides patentlike protection,³ Federal patent law does not preempt State-based protection of trade secrets⁴ and does not prohibit States from enforcing valid contracts that provide protection for unpatented products.⁵ In the case of *Aronson v. Quick Point Pencil Co.* the Supreme Court stated:

Commercial agreements traditionally are the domain of state law. State law is not displaced merely because the contract relates to intellectual property which may or may not be patentable, the states are free to regulate the use of such intellectual property in any manner not inconsistent with federal law. [citations omitted In this as in other fields, the question of whether federal law preempts state law “involves a consideration of whether that law ‘stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress.’ [citations omitted].” If it does not, state law governs.⁶

The Court of Appeals for the Federal Circuit has adopted the principles expressed by the Supreme Court in *Aronson* in a number of decisions.

In *Universal Gym Equipment v. ERWA Exercise Equipment*,⁷ the Federal Circuit held that parties to a contract may limit their rights to take action they previously had been free to take. For example, a licensee or licensor may contract to prohibit the licensee from reverse engineering or manufacturing any features of a licensor's product-even after the agreement is terminated. Before contracting, the licensee may have reverse engineered and manufactured the licensor's unpatented products without violating the licensor's rights.⁸

In *PowerLift, Inc. v. Watherford Nipple-Up Systems, Inc.*,⁹ the Federal Circuit, in deciding a preemption issue, stated:

¹ The shrink-wrap license is discussed in further detail in this chapter, and in box 2-J.

² Robert Greene Sterne, Sterne, Kessler, Goldstein and Fox, personal communication, Nov. 20, 1991.

³ Indeed, not all forms of State-based protection are preempted by Federal patent law. For example, *Bonito Boats* did not prohibit States from protecting trade dress. *Bonito Boats, Inc. v. Thunder Craft, Inc.*, 489 U.S. 141 (1989); 376 U.S. 225 (1964); and *Compco Corp. v. Day-Brite Lighting, Inc.*, 376 U.S. 234 (1964).

⁴ *Keewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470 (1974).

⁵ *Aronson v. Quick Point Pencil CO.*, 440 U.S. 257 (1979).

⁶ *Aronson v. Quick Point Pencil Co.*, 440 *Aronson v. Quick Point Pencil CO.*, U.S. 257 (1979) at 301-302.

⁷ *Universal Gym Equipment v. ERWA Exercise Equipment*, 827 F.2d 1542 (Fed. Cir. 1987).

⁸ *Universal Gym Equipment v. ERWA Exercise Equipment*, 827 F.2d 1542 at 1550. See also *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1241-42 (Fed. Cir. 1989), which held that where parties contract to limit the use by the recipient of features, designs, technical information or know-how disclosed under the contract, such a contractual arrangement is not incompatible with the patent law.

⁹ *Power Lift, Inc. v. Watherford Nipple-Up System, Inc.*, 871 F.2d 1082 (Fed. Cir. 1989)

Continued on next page

Box 2-I--Contract Law Protection of Electronic and Computer Technology--Continued

[w]e follow the Supreme Court guidance in *Aronson* which binds all circuits addressing federal preemption of state contract law.¹⁰

The Interface Between State Contract Law and Federal Copyright Law

The Copyright Act preempts private contracted arrangements between parties that affect their rights in copyrighted works, only in a few limited circumstances specified in the statute. The legislative history of section 301 of the act states:

nothing in the bill derogates from the rights of parties to contract with each other and to sue for breaches of contract. . .¹¹

In the instances in which Congress intended in the Copyright Act to create exceptions to individuals' freedom to contract, it did so unequivocally. Section 203 grants authors the right to terminate transfers or licenses to their works after 35 years, and section 203(a)(5) explicitly limits an author's ability to contract that termination right away, providing that:

[termination of the grant maybe effected notwithstanding any agreement to the contrary. . .

The legislative history is clear on the effect of the provision:

[A]lthough affirmative action is needed to effect a termination, the right to take this action cannot be waived in advance or contracted away.¹²

Contracts that impose restrictions beyond the immediate scope of the rights granted under section 106 of the Copyright Act have been upheld. For example, in *SAS Institute, Inc. v. S & H Computer Systems, Inc.*¹³ the court found the defendant liable for violating specific terms of a license agreement, among them a prohibition against using the computer program on an unauthorized central processing unit. In addition, agreements that relate to subject matter that is not protected under any form of intellectual property protection are not uncommon.

Providers of copyrightable and uncopyrightable databases rely on contracts to protect against unauthorized reproduction and use of their data.¹⁴ Particularly since the Supreme Court's decision in *Feist Publications, Inc. v. Rural Telephone Service Co.*,¹⁵ contractual protection is considered by some to be essential to the development and marketing of databases.¹⁶

¹⁰ *Power Lift, Inc. v. Watherford Nipple-Up Systems, Inc.*, 871 F.2d 1082, at 1085, footnote 5.

¹¹ H.R. Rept. No. 94-1476 at 132 (1976).

¹² H.R. Rept. No. 94-1476 at 125 (1976).

¹³ *SAS Institute, Inc. v. S & H Computer Systems, Inc.*, 605 F.Supp. 816 (M.D. Tenn. 1985)

¹⁴ In the case of *Telerate Sys., Inc. v. Caro* (689 F. Supp. 221 (S.D.N.Y. 1988)) on a motion for preliminary injunction the court found that Telerate, a financial database provider, was likely to succeed on its claim for tortious interference with contract. The claim was brought against the developer of a software package that allowed speedup and manipulation of Telerate data but which required that foreign equipment be interfaced with Telerate equipment in violation of Telerate's contract with its subscribers.

¹⁵ *Feist Publications, Inc. v. Rural Telephone Service CO.* 111 S.Ct. 1282 (1991).

¹⁶ The right to make agreements respecting a copyrighted work may be limited by a judicial doctrine of copyright misuse. The CO@ in *Lasercomb America, Inc. v. Reynolds*, 911 F.2d 970 (4th Cir. 1990) refused to enforce a copyright where plaintiff employed a license agreement with some of its licensees other than the defendant which prohibited the other licensees from independently creating a competing program. However, in *Atari Games Corp. v. Nintendo of America, Inc.* (Nos. C-884805-FMS, C-89-0027-FMS, slip opinion (N.D. Cal. Mar. 5, 1991)) the court rejected a misuse defense and distinguished *Lasercomb v. Reynolds*. For further discussion of the defense of copyright misuse, see 3 *Nimmer on Copyright* section 13.09, II; P. Goldstein, *Copyright: Principles, Law & Practice* section 9.6 (1989 & 1991 Supp.).

SOURCE: OTA, 1992.

software, extensive distribution of which might otherwise destroy requisite secrecy, by use of what is known as a "shrink wrap" license. (See box 2-J.) Theoretically, such a license is used in conjunction with the practice of publishing program code in object code form. Object code is understandable to people only after extensive effort, and would ordi-

narily require intermediate steps to recover a higher level language representation of the program (see ch. 4). Distributing the code in such a form is intended to maintain the secret nature of the information. In addition, it invokes the provisions of the copyright law, since recovering a high-level language version may involve the making of a copy or derivative work

Box 2-J—The Shrink-Wrap License Controversy

Considerable controversy surrounds the practice of using shrink-wrap licenses to maintain trade secret status for mass-distributed software. Questions arise both from the perspective of the trade secret and the copyright law.

The decision in *Bonito Boats* would indicate that for products sold on the mass market there is a Federal policy that favors allowing the buyers to examine a distributed product and use any unpatented and noncopyrightable aspects of that product. But it is argued that copyright protection limits this buyer right by preventing reverse engineering.

From the perspective of the trade secret law (which requires reasonable efforts to maintain secrecy for trade secret protection to exist), some observers believe that the degree of difference in the level of secrecy maintained in limited distribution products and in mass-marketed products is so great that a shrink-wrap license alone does not qualify as the requisite effort to establish trade secret status. These observers also question whether any form contract can establish the kind of contract or confidential relationship that would enable the publisher to sue the end user who simply reverse engineers the work.¹

From the perspective of the copyright law, some hold that copyright does not prevent reverse engineering of software. They believe that fair use may well permit the copying of an entire work where the sole purpose of the copying is that it is a necessary part of making the work perceptible to humans so that they can perceive and use the underlying ideas which are not protected by copyright. Further, there is concern that a shrink-wrap license allows a licensor to extend his or her right beyond the underlying property right on which the license is based; i.e. the license is based on copyright and yet attempts to prevent the licensee from copying the noncopyrightable *expression in the work*.

In keeping with the requirement that effort be made to maintain secrecy for trade secret protection to exist, these observers believe that a trade secret is only enforceable to the extent that mass marketing can be determined to be a reasonable action for someone attempting to keep the idea secret. Some would argue that any trade secret status would be lost when a program was put on the market, because the secret could be obtained through recompilation. The copyright law's prohibition on copying, they assert, would not prevent a court from finding that information related to computer program, e.g., how a particular step in the program is configured or the sequence of steps used to obtain a particular result, was readily accessible because the program in question was mass marketed without copy protection. A shrink-wrap license, they believe, might be enforceable as a contract, but likely would not be found adequate to show the proprietor of the secret information in a mass-marketed computer program had taken reasonable steps under the circumstances to maintain the secrecy of the information.²

¹ Raymond Nimmer, Professor of Law, University of Houston Law Center, personal communication, Aug. 9, 1991.

² Mary Jensen, University of South Dakota School of Law, personal communication, Sept. 29, 1991.

SOURCE: OTA. 1992.

of the object code program. The making of such a copy or derivative work is believed by some to be a violation of the copyright law, and is not given explicit treatment under Section 117 of the Copyright Act, or the doctrine of fair use.²³³

The shrink-wrap license further signals secrecy, and is established by marketing software in a sealed package with a notice and a license agreement that is visible on the exterior of the package. The agreement generally provides that the user, by opening the package, is deemed to have accepted the license terms and conditions. The terms of such a

license generally prohibit recompilation, disassembly or copying of a program for any reason except for use and backup purposes, so that copying of the object code in the process of obtaining a higher level language version of the program arguably becomes, in addition to a violation of the copyright law, a breach of the shrink-wrap agreement, assuming that the agreement is enforceable. Some shrink-wrap agreements contain an express prohibition on "reverse engineering" or decompilation/disassembly. Occasionally a card is provided which must be signed and returned in order to receive information

²³³ See, e.g., *SAS Institute, Inc. v. S&H Computer Systems, Inc.*, 605 F. Supp. 816, 828.831 (M.D. Tenn. 1985); *Hubco Data Prods. Corp. v. Management Assistance Inc.* 219 U.S.P.Q. (BNA) 450, 455-56 (D. Idaho 1983). But compare *Vault Corp. v. Quaid Software Ltd.*, 847 F.2d 255 (5th Cir. 1988). For further discussion of the technical aspects of decompilation, See ch. 4.

on product updates or extended warranty, thus securing the user's consent to the terms of the license. The more traditional shrink wrap procedure allows the user to either agree to the contract terms or to return the product.

The enforceability of shrink wrap licenses remains in question, and has not been tested specifically by any courts. In the case of *Vault Corp. v. Quaid Software Ltd.*,²³⁴ the district court ruled on the enforceability of the shrink wrap license, stating that the contract was an unenforceable contract of adhesion under state law, so that it could only be enforced through special statute. The Fifth Circuit held that certain provisions of the shrink-wrap license at issue were unenforceable because they conflicted with the Copyright Act by attempting to avoid the provisions of the first sale doctrine and to extend the term of copyright protection indefinitely. The court did not address the issue of the enforceability of the shrink-wrap license itself. Other cases raising this issue have been filed and settled, so that they do not provide guidance on the issue.²³⁵

Other arguments cited as grounds for a finding that such licenses are not enforceable are that shrink-wrap licenses do not provide for proper offer and acceptance, the agreement is unconscionable, the agreement violates State consumer protection legislation, or the agreement is a sham intended to circumvent the provisions of the Copyright Act of 1976, particularly the restrictions of the first sale doctrine.²³⁶

Some believe that while the issue has not been addressed from the standpoint of trade secret law, it is unlikely that a court would find that a shrink-wrap license constituted reasonable efforts on the part of the trade secret proprietor, under the circumstances of mass marketing, to keep the information secret.²³⁷

Still others assert that section 117's adaptation right permits the copying necessary to disassemble and recover higher level code than object code for purposes of fixing a bug or adapting a program to the user's specific needs or even to determine the ideas embodied in the program and not protected by copyright.²³⁸

Relationships Among Patent/Trade Secret/Copyright Laws

In the Kewanee Oil case, the Supreme Court expressly ruled that State law may protect trade secrets and that trade secret law is compatible with patent law. However, the Supreme Court also ruled recently that State law may not prohibit copying of utilitarian and design ideas that the patent laws have otherwise left unprotected.²³⁹ State law further may not provide protection akin to the patent laws and may not set down a rule in favor of legal protection where Congress has "struck a balance" in favor of nonprotection.²⁴⁰

When a patent is granted, the patent itself, which must disclose the "best mode" for practicing the invention, becomes a public document and the file wrapper, consisting of supporting materials on file (specifically, the prosecution history of the application), becomes available for public inspection. As a result, the trade secret status of the matter disclosed in the patent or related PTO file is destroyed. These submitted materials remain secret unless and until the patent is granted, so if the patent is not granted or is withdrawn by the applicant prior to issuance, the secret is maintained. This is the case only in the United States; in foreign countries applications are published after 18 months, whether or not the patent ultimately issues. Some believe that with harmonization under WIPO, the confidential system in the United States is likely to change.²⁴¹

²³⁴ *Vault Corp. v. Quaid Software Ltd.*, 847 F.2d 255 (5th Cir.1988).

²³⁵ *MicroPro Int'l Corp. v. United Computer Corp.*, Civ. Action No. C-893-3019 W.D.S.(N.D. Cal. filed June n', 1983; *Lotus Dev. Corp. V. Rixon* (D. Mass. filed Jan. 31, 1984).

²³⁶ In this context, see *StepSaver Data Sys. v. Wyse Technology*, 939 F.2d 91 (3d Cir. 1991), which holds that a "package license" did not become part of the contract between two merchants. In effect, there was an oral contract for sale followed by the packaged form. Applying standard Uniform Commercial Code analyses, the court stated that this does not alter the primary contract. The new terms in the form do not become part of the agreement unless the vendor makes clear through its actions that it will not proceed with the transaction unless the buyer consents to the new terms.

²³⁷ G. Lee Skillington, Alice Zalik, U.S. Patent and Trademark Office, Office of Legislation and International Affairs, personal communication, Sept. 27, 1991.

²³⁸ Mary Jensen, University of South Dakota School of Law, personal communication, Sept. 29, 1991.

²³⁹ *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 109 SUp. Ct. 971 (1989).

²⁴⁰ *Bonito Boats, supra*; *Sears Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225 (1964); *Compco Corp. v. Day-Brite Lighting, Inc.*, 376 U.S. 234 (1964).

²⁴¹ J. Jan@ American Bar Association, personal Communication Sept. 22, 1991.

Because of the “secret” nature of the protected subject matter, inventions maintained as trade secret are not made of public record and necessarily do not function as prior art for purposes of the patent system (although earlier filed, secret, patent applications are prior art).²⁴² As a result, inventions maintained as a trade secret cannot, for the most part, preclude issuance of a patent on the basis of lack of novelty or obviousness unless the invention is described in an earlier filed patent application. Thus, while a patent requires complete disclosure, it allows the rightholder to exclude everyone else from practicing that invention, even if independently invented. Conversely, while trade secret law allows, and indeed requires, that an idea be held in secrecy, the fact that the trade secret cannot be used as prior art against a third party patent application precludes protection from independent invention by another, who may then obtain patent protection. Some, however, maintain that, because the requisite level of secrecy required for trade secret protection is not total, i.e., the information which constitutes a trade secret must only not be generally available or readily ascertainable, situations exist in which a trade secret may be available as prior art.²⁴³ In any case, once a U.S. patent is granted, it can be used as prior art from the filing date of the corresponding patent application notwithstanding the secret status of the application during prosecution.

In contrast to the mutually exclusive effect of the patent and trade secret law, and despite the arguments of some commentators that the benefits of copyright protection should not be granted except in

exchange for full disclosure of a work,²⁴⁴ copyright and trade secret protection are simultaneously available for computer software. The legislative history of 17 U.S.C. 301 (the preemption section) under the Copyright Act of 1976 and the software amendments of 1980 make this clear. When it enacted the Copyright Act of 1976, Congress stated that the evolving common law rights of, among others, trade secrets,

would remain unaffected as long as the causes of action contain elements. . . that are different in kind from copyright infringement. Nothing in the bill derogates from the rights of parties to contract with each other and to sue for breaches of contract. . . however, to the extent that the unfair competition concept known as ‘interference with contract relations’ is merely the equivalent of copyright protection, it would be preempted.

Congress reaffirmed its position on the limited scope of preemption of “remedies for protection of computer software under State law” when it passed the software amendments of 1980. Trade secret law provides protection for the underlying ideas, concepts, processes and algorithms (as well as the form in which expressed), while copyright law protects only the *form* of expression. Thus, some observers believe that the simultaneous protection of software by copyright and trade secret arguably affords coverage for both idea and the expression and avoids the idea-expression dichotomy of copyright law.²⁴⁵ By contrast, others assert that this is seldom the case, and that few ideas, concepts, processes, and algorithms underlying mass-marketed computer programs would not be generally available or readily

²⁴² One commentator observed that in many cases a software “invention” is not published for reasons other than maintenance of a trade secret. He cited among the common reasons why programmers do not publish the techniques they develop the following: techniques maybe circulated informally among programmers; techniques may be “so obvious that scholarly credit is impossible;” the developer may lack the motivation and writing skill to write a paper suitable for magazine publication, and may not see the purpose in any other kind of publication; the developer may not realize that he has developed anything worth publishing; the developer may keep the source code of a program secret to conceal the overall design rather than any particular technique. Richard Stallman, *The League for Programming Freedom*, personal communication, September 1991.

Another spoke of programming techniques not described in patents or the general technical literature that are known generally to programmers as the “folk art.” Letter of John L. Pickitt, President, Computer and Business Equipment Manufacturers Association, to E.R. Kazenske, Executive Assistant to the Commissioner, U.S. Patent and Trademark Office, July 15, 1991.

²⁴³ For example, the information might appear in a printed publication that is obscure because of age or because it has not been translated into a language understood by many Americans. If the publication was in the PTO’s Scientific Library, however, it could be cited as prior art to show lack of novelty or to show obviousness of an invention claimed in a patent application. These same commentators assert that when the validity of a patent is challenged in patent litigation, trade secrets might also be considered prior art. G. Lee Skillington, Alice Zalik, U.S. Patent and Trademark Office, Office of Legislation and International Affairs, personal communication, Sept. 27, 1991.

²⁴⁴ See, e.g., Pamela Samuelson, “CONTU Revisited: The Case Against Copyright Protection of Computer programs in Machine-Readable Form,” 1984 *Duke Law Journal*, 663, 705-27. By contrast, the actions of Congress and the courts would indicate that that these bodies have rejected this point of view. The grant of copyright to unpublished works in the 1976 act and provisions for registering unpublished works under the 1909 acts are evidence that Congress did not intend to require full disclosure for copyright protection. Some observers comment that the limitation in the copyright law and the idea/expression dichotomy as opposed to the fuller protection granted by patent are the reasons why Congress might not have seen fit to require full disclosure for more limited protection.

²⁴⁵ Office of Technology Assessment Workshop on June 20, 1991.

ascertainable to those in the industry. Further, as discussed above, this dual protection potentially addresses the problem of loss of trade secret protection through mass distribution of software. If the extensive marketing of" the software arguably destroys the secrecy requisite for trade secret protection, some believe that copyright law may be invoked to protect the unpublished source code of the program, with its relatively easily understandable ideas by prohibiting illegal copying of the published object code which must be copied or

transformed to allow for easy understanding of the underlying idea.²⁴⁶ Indeed, copyright law also provides a safety net in the event that trade secret protection is lost by accidental or public disclosure.

Foreign countries grant trade secret protection under a variety of provisions and to differing extents. While some countries provide specifically for trade secret protection, others allow for similar protection under unfair competition law and the law of contracts (see box 2-K).

²⁴⁶Office of Technology Assessment Workshop on June 20, 1991. However, one observer believes that the exclusive reproduction right can never be used to preclude indirect access to nonprotectable matter excluded by section 102(b) merely because use of the unprotected matter entails an unauthorized reproduction. He believes that this was the holding of *Baker v. Seiden*, which, he asserts, already guaranteed "reverse engineering" if the utilitarian feature of a functional work can only be used by making a copy. Jerome Reichman, Vanderbilt University, personal communication September 1991.

Box 2-K—Analogous Trade Secret Law in Foreign Countries

The Pacific Rim

Japan—Japan is the only Pacific Rim nation whose law provides for trade secret protection. The Japanese law defines a trade secret as technological or business information useful for business activities, controlled as a secret, which is not publicly known art. Under the law, if a computer program properly qualifies as a trade secret, the owner of a computer program who is damaged or is likely to suffer damage by unauthorized use or disclosure of his program may require the offending party to stop the unauthorized use or disclosure of the program. The owner of a trade secret may request that the media on which the program is stored be destroyed (However, since there are no “protective orders” in court proceedings, the secret may be lost as a result of bringing the litigation.) Unfair activity includes acquisition of a trade secret by stealing, deception, or threats, or acquisition from a third party while aware that the trade secret was originally acquired by an unfair activity.¹

Korea—The Republic of Korea has committed itself to the future adoption of a law of trade secrets. Presently there is some recognition that trade secrets should be protected from unlawful encroachment or misappropriation under tort theory. There is also some recognition of a law of trade secrets in the criminal code.²

Taiwan—There is no specific law protecting trade secrets in Taiwan.³ Taiwan’s criminal code enables an employer to obtain criminal sanctions against an employee in violation of a secrecy agreement made with the employer. However, there is no current provision of the law allowing one company to take action against another for misappropriation of a trade secret.⁴ A district court in Taiwan determined that know-how is not an intellectual property right nor a property right recognized in the civil code, and that there is no legal obligation to keep such knowledge secret.⁵

Thai/and-Thailand has no specific law covering, nor a clear definition of, trade secrets. Protection of this kind comes from the Penal Code or Consumer Protection Law. The Penal Code covers only industrial secrets, scientific discoveries, and scientific inventions which may include industrial know-how. The Consumer Protection Act prohibits unauthorized disclosure of business secrets.⁶

Western Europe

The European Communities have agreed in their long debated Software Directive that the prescribed protection of computer programs under copyright does not prejudice the application of other forms of protection where appropriate. Thus, computer software is properly protected by trade secret in addition to copyright in European Communities member nations.⁷

¹ Paul C.B. Liu, “Computer Software and Intellectual Property Law in the Pacific Rim Countries,” contractor report prepared for the Office of Technology Assessment, March 1991, pp. 37-38.

² Ibid., pp. 38-39.

³ R. Michael Gadbaw, et al., *Intellectual Property Rights: Global Consensus, Global Conflict?* (Boulder, CO: Westview Press, 1988), p. 374.

⁴ Ibid., pp. 374-375.

⁵ Liu, op. cit., footnote 1, p. 39 (footnote 16).

⁶ Ibid.

⁷ Council Directive of May 14, 1991 on the legal protection of computer programs (91/250/EEC), preamble, para. 30; published in the Official Journal of the European Communities, No. L 122/42, May 17, 1991.

Continued on next page

Box 2-K—Analogous Trade Secret Law in Foreign Countries-Continued

France—French law presents two independent aspects of trade secret protection. In the first instance, divulgence of a trade secret is a criminal offense under the Penal Code. The circumstances giving rise to such a criminal offense are narrowly drawn, making prosecution under this provision difficult. Unauthorized disclosure of a trade secret may also be actionable under the law of tort or contract. For the most part, however, in the absence of contractual agreement, divulgence of a trade secret will not give rise to liability. Under French law an invention not protected by copyright or patent is considered an idea only, which is believed to be in the public domain. An action brought in tort must rely on theories of unfair competition, which requires proof of misconduct beyond theft of ideas.⁸

Switzerland—Trade secret protection in Switzerland is derived from three major sources. The Swiss Penal Code provides that a person who discloses an industrial or commercial secret which he is under a duty to keep secret, and the person who benefits from the disclosure, will be punished by fine or imprisonment. The Swiss Code of Obligations provides that employees and agents are bound to secrecy with respect to confidential business information obtained in the course of the contractual relationship. The 1986 Federal Act makes it an offense for a competitor to entice employees or agents to discover a secret, and another offense to use or disclose trade secrets which have been improperly revealed. In addition to these statutory provisions, a body of case law exists in Switzerland in which a trade secret holder is protected on the basis of contract law and by the fact that the other party is bound by a nondisclosure agreement.⁹

Latin America

Brazil—Brazil has no specific law of trade secret protection. Case law and Brazilian scholarship have concluded that three identifiable elements of trade secret law exist. First, a trade secret must give its owner a competitive advantage and must have commercial value. Second, a trade secret involves an element of innovation. Third, parties must sign contracts in which the confidentiality requirement is set forth.¹⁰ Brazilian courts have dismissed the majority of trade secret cases brought under this law, usually because the original trade secret holder was found not to have taken proper measures to protect his trade secret. Thus, scholars have maintained that article 178 of the Code of Industrial Property provides protection for trade secrets. Under this provision a company may sue an employee for disclosure of trade secrets and may take action against a third party for acquiring secrets by unfair means.¹¹

Argentina—There is no Argentine law directed specifically toward protection of trade secrets. Disputes about unauthorized divulgence of confidential information are addressed by enforcement of secrecy agreements between employers and employees.¹²

Mexico—Mexican law protects generally industrial secrets, or industrial application information kept confidentially by an individual or corporation when sufficient measures or systems have been adopted to preserve the secrecy and restricted access. No specific provisions are made for trade secrets in computer software.

⁸ Cary Sherman, et al., *Computer Software Protection Law* (Washington DC: Bureau of National Affairs, Inc., 1990), p. ~-16.

⁹ Ibid., p. SW-16

¹⁰ Ibid., p. BR-17

¹¹ Gadbow, et al., op. cit., footnote 3, p. 141 (footnote 17).

¹² Ibid., p. 141.

SOURCE: OTA, 1992.