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Originality in Computer Programs and Expert Systems: Discerning the Limits of Protection under Copyright Laws of France and the United States

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Originality in Computer Programs and Expert Systems: Discerning the Limits of Protection Under Copyright Laws of France and the United States*

Todd Shuster**

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I. INTRODUCTION

As the computer industry continues to impress us with the swift evolution of its technologic production,¹ lawmakers and courts worldwide labor to keep pace. Since construction of the first commercial electronic computer with a stored program in 1951,² the computer industry, previously dominated by a few major corporations, has proliferated and become significantly more competitive.³ Just as introduction of the printing press⁴ once precipitated an explosion of literary expression and broad dissemination of literature throughout society,⁵ today's advances in computer technology facilitate an ever-increasing current of creative output, raising persistent questions of domestic and international law.

1. The computer industry continues to experience significant yearly growth. By way of example, total production of software and software-related services worldwide reached U.S. \$65.6 billion in 1988. In 1989, total worldwide production reached U.S. \$76.1 billion, representing a 16% increase in growth. Between 1984 and 1994, the average annual growth in the world software industry is estimated at 21%. See the statistics published by Electronics International Corporation in 1989 and 1990. *En Demi Tête*, 01 RÉFÉRENCES, Mar. 1990, at 93; *L'industrie Informatique Japonaise en Pleine Santé*, LE MONDE INFORMATIQUE, Nov. 19, 1990, at 63.

2. See Richard L. Torczon, *Copyright, Patent and the Virtual Machine*, 9 COPYRIGHT L. J. 321, 321-53 (1989).

3. In spite of this increasing competitiveness, the domination of American companies in the world's computer industry cannot be underestimated. According to a report recently published by International Data Corporation, whereas French companies hold 8% of the world's \$110 billion market for software and software related services, American companies hold 57%. Among these American companies, several hold disproportionately powerful positions. For instance, in 1990, International Business Machines Corp. (IBM) commanded 19.6% of the software market in Western Europe as compared to the 1.6% held by Bull, France's premier software producer. See *Can the U.S. Stay Ahead in Software*, BUS. WK., Mar. 11, 1991, at 62-67; *L'Europe du Progiciel*, 01 RÉFÉRENCES, Mar. 1990, at 78-83.

4. See, e.g., *Sony Corp. v. Universal City Studios*, 464 U.S. 417, 430 (1984) ("Indeed, it was the invention of a new form of copying equipment—the printing press—that gave rise to the original need for copyright protection.").

5. There is an important historical link between innovations in technology and circulation of ideas among society. As one commentator expressed, "The fortunes of the law of copyright have always been closely connected with freedom of expression, on the one hand, and with technological improvements in means of dissemination, on the other. Successive ages have drawn different balances among the interest of the writer in the control and exploitation of his intellectual property, the related interest of the publisher, and the competing interest of society in the untrammelled dissemination of ideas." *Id.* at 431 n.12 (quoting BENJAMIN KAPLAN, *Foreword to AN UNHURRIED VIEW OF COPYRIGHT* vii-viii (1967)).

Although controversy regarding legal protection of computer technologies continues, there is broad international consensus among judges and legislators that, in general, copyright provisions are appropriate.⁶ Courts in the United States have explicitly classified computer programs as copyrightable literary works.⁷ Similarly, French tribunals have analogized computer programs to literary works and specifically concluded that original software constitutes a copyrightable *oeuvre de l'esprit*.⁸ While jurists⁹ in both systems have often criticized these classifications as being misguided or even fictitious,¹⁰ today they represent legal reality

6. Scholars and lawmakers primarily have debated whether copyright law or patent law should be used as the principal form of legal protection for computer programs. In the United States, although copyright remains the main form of protection, the courts also have allowed some patent protection for computer programs. The American patent statute protects "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35 U.S.C. § 101 (1988). Although this provision does not specifically include computer programs in patent's subject matter, it also does not exclude them. Accordingly, in the 1981 case of *Diamond v. Diehr*, 450 U.S. 174 (1981), the U.S. Supreme Court upheld the patentability of a machine which included a computer program as one of its component parts. Two years later, in *Paine, Webber, Jackson & Curti, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F. Supp. 1358 (D. Del. 1983), the United States District Court for the District of Delaware concluded that a Securities Brokerage-Cash Management System, comprised of several highly technical computer programs, was patentable. By contrast, the French statute governing patents specifically excludes computer programs from patentable subject matter. See French Law No. 68-1, art. 6 (1968), as modified by Law No. 78-742 (1978). In the 1981 *Schlumberger* case, however, the Paris Court of Appeals (*Cour d'appel*) held that a process may not be deprived of patent protection solely because it includes one or more procedures executed by a computer program. See B. PHELIP, *BREVETS D'INVENTION B7* (3d ed. 1989) (citing Judgment of June 15, 1981, Paris Cour d'appel, *Propriété Industrielle—Bulletin Documentaire*, 285 III 175).

7. See *infra* notes 96-102 and accompanying text.

8. The term "*oeuvre de l'esprit*," which describes the general category of works protected under France's law of artistic and literary property, does not have an exact equivalent in English. One might translate it as "work of authorship" or "intellectual work." See *infra* notes 189-205 and accompanying text.

9. The term "jurist" shall be used in this article to refer to persons "having a thorough knowledge of law," including lawyers, legislators, and judges. WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 655 (1986).

10. See P. Gaudrat, *La Protection des logiciels par le droit de la propriété littéraire et artistique*, 128 REVUE INTERNATIONALE DU DROIT D'AUTEUR [R.I.D.A.] 76, 121 (1986) (Under French law, software is not a copyrightable work of authorship although, relying on a legal fiction, it can be classified as such); see also Pamela Samuelson, *CONTU Revisited: The Case Against Copyright Protection for Computer Programs in Machine Readable Form*, 1984 DUKE L.J. 663, 741 ("In machine-readable form, the utility of computer programs cannot be separated from their non-utilitarian aspects, and for this reason . . . they ought to be deemed uncopyrightable."); Virginia R. Lyons, Note, *Carrying Copyright Too Far: The Inadequacy of the Current System of Protection for Computer Programs*, 12 HASTINGS COMM. & ENT. L.J. 81, 93 (1989) ("The fundamental reason why

not only in these nations, but in countries worldwide.¹¹ In fact, after entertaining broad transnational debate and considering several draft proposals, the Council of Ministers of the European Community [hereinafter Council] recently passed a directive calling upon member states of the European Community (EC) to provide protection to computer programs under uniform copyright provisions.¹² The Directive follows closely the case law of American courts, classifying computer programs as literary works,¹³ stating a minimal originality requirement,¹⁴ and setting the basic period of protection at life of the author plus fifty years, or at fifty years where a legal person is designated as the author under national legislation.¹⁵

While copyright protection for computer programs seems a clear international mandate, the required scope of protection remains, nonetheless, quite fuzzy. The chief uncertainty concerns the creative activity the law purports to protect. In particular,

copyright protection is inappropriate for software is that computer programs are utilitarian tools, rather than pure expression of information, like other copyrightable works.”).

11. Copyright is the principal form of legal protection for computer programs in many countries including, among others, Australia, Belgium, France, Germany, Great Britain, the Netherlands, Japan, the United States, Canada, Mexico, and Chile. See M. VIVANT ET AL., *LAMY DROIT DE L'INFORMATIQUE* 621 (1991).

12. See Commission Proposal for a Council Directive on the Legal Protection of Computer Programs, 1989 O.J. (C 91) 4; Commission Amended Proposal for a Council Directive on the Legal Protection of Computer Programs, 1990 O.J. (C 320) 22; Council Directive Concerning the Legal Protection of Computer Programs, 1991 O.J. (L 122) 42 [hereinafter Directive]. Pursuant to article 10 of the Directive, EC member states must conform their laws with the Directive before January 1, 1993. *Id.*

13. Directive, *supra* note 12, art. 1. “In accordance with the provisions of this Directive, Member States shall protect computer programs, by copyright, as *literary works*, within the meaning of the Berne Convention for the Protection of Literary and Artistic Works. For the purposes of this Directive, the term ‘computer program’ shall include their preparatory design material.” *Id.* (emphasis added).

14. *Id.* art. 1, ¶ 3. “A computer program shall be protected if it is original in the sense that it is the author’s *own intellectual creation*. No other criteria shall be applied to determine its eligibility for protection.” *Id.* (emphasis added).

15. *Id.* art. 8. “Protection shall be granted for the *life of the author and for fifty years* after his death or after the death of the last surviving author; where the computer program is an anonymous or pseudonymous work, or where a legal person is designated as the author by national legislation in accordance with Article 2(1), the term of protection shall be *fifty years* from the time that the computer is first lawfully made available to the public. The term of protection shall be deemed to begin on the first of January of the year following the above mentioned events.” *Id.* (emphasis added).

national laws remain imprecise about what aspects of a computer engineer's work constitutes protectable expression. What portion of a computer engineer's creative output can he call his own? Moreover, national laws provide inconsistent guidance to the engineer who, canvassing existing technologies, wonders which elements he may incorporate into his creation and which, if borrowed, would make him an infringer.

Software developers have long advised lawmakers that the process of creating computer technologies is accretive: computer engineers build progressively upon past works.¹⁶ As in any other technology-based industry, computer engineers rely on the existing art to develop their product. They study the existing repertory and then make improvements. They seek solutions that will maximize utility and conform to industry standards. Consumers desire highly efficient, compatible wares, and developers set out to produce them.

When undertaking to design a new software product, developers, like most other creators, have conflicting interests. Although developers seek freedom to study, imitate, and elaborate upon technologies with proven industry performances, they also seek to eliminate the threat of parasitic second comers. After investing significant resources to mastermind a computer innovation, developers desire guarantees that they will be able to claim ownership and exclusive rights in their creation.¹⁷ Striking a balance between a developer's need for both access to existing works and protection of his own creation is one of the primary roles of intellectual property law. Ideally, the law should clearly

16. See, e.g., Dennis S. Karjala, *United States Adherence to the Berne Convention and Copyright Protection of Information-Based Technologies*, 28 JURIMETRICS J. 147, 149 (1988) ("Advances in technology are usually made through incremental developments on an existing base.").

17. See, e.g., Judgment of Mar. 7, 1986, Cass. ass. plén., 1986 Dalloz-Sirey [D.S.] 405-12 conclusions Cabannes (quoting the French Senate report on legal protection of computer software) ("The software industry . . . often requires very heavy investments such that it is necessary to assure the protection of those who invest to conceive, manufacture and sell new software products.") ("*L'industrie du logiciel . . . nécessite souvent de très lourds investissements de sorte qu'il convient de veiller à assurer la protection de ceux qui investissent pour concevoir, fabriquer et vendre de nouveaux logiciels.*").

inform developers regarding when they may appropriate existing technologies without being punished, and when their own creative contribution will be rewarded by a state's grant of exclusive rights. The western world has decided that copyright law furnishes an appropriate set of guiding rules. Although computer programs are essentially utilitarian works, although the process of conceiving them is vastly different from the work of literary and artistic creation, and although the ultimate objectives of developers are primarily commercial rather than art-minded, lawmakers have generally voted for copyright protection. American and European lawmakers have rejected the claim that laws previously applied to artistic and literary works would be somehow denatured if applied to computer technologies. They also have rejected the belief that extending copyright protection would unduly limit the number of successful market participants or thwart progress in the industry.

This article will describe and discuss French law on *droit d'auteur* and American copyright law as presently applied to computer programs and to expert systems,¹⁸ focusing on originality, the basic criterion of protection under both systems. In particular, this article will examine whether the set of doctrinal requirements, which courts refer to generally as "originality," provide clear and appropriate guideposts to instruct developers as to which aspects of computer technologies may be protected. Do these legal criteria properly inform developers about when they can borrow from existing works and when they can obtain protection for their own creations? Do they provide reliable tests enabling courts to determine consistently whether particular works should be copyrighted and what the scope of such protection should be? Are these standards appropriate for assessing the copyrightability of the full range of today's computer technologies?

After highlighting distinctions between traditional copyright and *droit d'auteur*, this article will suggest that, in spite of these historic differences, French and American courts today often adopt

18. Expert systems are knowledge-based computer programs which model human expert perception to solve problems in a particular area of expertise. See *infra* notes 315-20 and accompanying text.

similar approaches to authors' rights. By comparing how courts in France and the United States evaluate the originality of computer technologies, this article will demonstrate that the stereotyped characterization of *droit d'auteur* as primarily author-centered, and copyright as obsessively business-minded, is no longer valid. Under both American and French law, the originality of a computer program is linked to the range of possible expression available to the creator. American and French courts recognize original expression where a developer has made independent creative choices in designing his product.

Despite this increasing similarity in how they analyze originality, both French and American courts still provide the public with unclear messages about what originality, in fact, entails. The language of French tribunals, for instance, seems to vacillate between stating the concept of originality as an author-centered principle, where protection is conditioned on the presence of personal authorial expression, and as a labor-oriented principle, where protection is linked, rather, to a demonstration of independent intellectual effort. When dealing with computer technologies, the courts in both systems seem unable to restrict their inquiry to traditional terms of copyright. They often flirt with notions such as novelty and obviousness, conventional locutions of patent law. Finally, neither American courts nor French courts have addressed the full set of technical and industry-related constraints which may limit the range of programming expression.

The present article proposes that the courts attend to the unique nature of computer technologies and develop clear guidelines by which to assess the proper ambit of protection. Such guidelines should enable courts systematically to separate a program's nonoriginal elements—stemming from technical requirements, conventions of computer programming, or industry-imposed standards—from a program's original elements, those which flow from a developer's unfettered creative thought. Courts may use such guidelines to measure the originality not only of conventional programs, but also of knowledge-based programs such as expert systems. This article concludes that, if such guidelines are agreed upon internationally, technological progress will be maximized

since differences between the scope of protection will be reduced, and computer developers will receive the information they need to make appropriate decisions in their work and compete fairly in the worldwide industry.

II. THE COMPUTER: A BRIEF DESCRIPTION OF THE MACHINE

The computer is a machine, and programs are necessary mechanical components of any such machine.¹⁹ While this characterization of the computer may now seem obvious to many jurists, others still appear to be mystified by the technology. The computer's numerous components—such as algorithms, object code, source code, software, hardware,²⁰ firmware, and compilers—though truly parts of a simple machine, strike them as being different from the nuts and bolts of other machines. Moreover, because computer engineers use programs, consisting of symbolic language, to instruct computers how, when, and what to do, jurists perceive a literary quality in the computer.²¹ In legal systems which distinguish between patent protection for technologic inventions and copyright protection for literary or

19. Exposition of a novel paradigm to explain the computer falls beyond the scope of the present article. Instead, part II relies largely on the virtual machine model as described by Richard L. Torczon. See Torczon, *supra* note 2, at 343. Under this model, the computer is viewed as being recursive and as having two basic elements, machine and language. *Id.* The machine component is a detached object which performs operations according to the rules of its language. Language, under this model, is nothing more than the set of rules obeyed by the machine. The recursion occurs when a language, at one level of the machine, is translated into a second language. As Torczon explains, "If the basic machine is M1 with language L1, and another language L2 is translated into L1 to make M1 perform some task, a new machine, M2 is created. M2 is defined by the rules of L2. Each machine and language constitute a level . . . This process can be repeated an infinite number of times theoretically." *Id.* at 344. See generally Computer Assoc. Int'l, Inc. v. Altai, Inc., 775 F. Supp. 544, 549 (E.D.N.Y. 1991) ("Computers are machines. . .").

20. Hardware refers to the tangible machinery of the computer, including all the elaborate electronic circuits which ultimately enable the computer to perform. The distinction traditionally made between software and hardware is de-emphasized under the virtual machine paradigm since the computer's hardware often includes components, such as programs, which would otherwise be categorized as software. Torczon, *supra* note 2, at 344.

21. See, e.g., Lucas, *Propriété Linéaire et Artistique*, JURIS CLASSEUR Fasc. 303-1, at 4 (1989) (Where the author, without conceding that computer programs are truly literary works, states that the decision to protect computer programs under French *droit d'auteur* stems from the fact that they are "works of language").

artistic works, jurists have most often classified computer programs as copyrightable literary works and, until recently,²² rejected patent protection for most aspects of these useful technologies.

No matter what the validity of comparing computer programs to literary works, understanding the computer as a machine, of which a program is an essential component, is crucial when analyzing which aspects of computer programs are original and thus protected by copyright.²³ Because computer programs are necessary to any computer's proper functioning, they will normally contain some elements which, rather than embodying a programmer's creative thought, reflect a standard programming solution dictated by mechanical considerations or by other external requirements. As the following sections of this article discuss, these aspects cannot be considered "original" under either American or French law.

In essence, the computer is a continuous chain of communication, beginning with the human programmer and ending with a useful function. This communicative chain is not driven by human-like power or intuition; that is, the computer never actually reads or interprets as would a truly literate entity. Rather, every link in the chain is concatenated by electricity. As one source states, "[A]ll work in a computer is a physical response to a series of electrical pulses that the hardware interprets as off or on

22. Although copyright is still the principal form of legal protection afforded to developers of computer software, the number of patents being granted for software technologies is fast increasing. In the United States, large corporations file dozens of applications each year and already hold far more computer-related patents than most smaller companies. According to one source, IBM has received twice as many software patents to date as any other company worldwide. See Evan I. Schwartz & Michele Galen, *The Coming Showdown Over Software Patents*, BUS. WK., May 13, 1991, at 63-64. For a compendium of comments submitted last year to the U.S. Patent and Trademark Office pertaining to patent protection for computer program-related inventions, see 14 COMPUTER LAW. 809, 809-81 (1992).

23. The term "software" is often incorrectly used as a synonym for "program." See Steven R. Englund, *Idea, Process, or Protected Expression?: Determining the Scope of Copyright Protection of the Structure of Computer Programs*, 88 MICH. L. REV. 866, 868 n.11 (1990). In the present article, "software" (in English) or "logiciel" (in French) shall be viewed as an all-inclusive term including "programs, procedures, rules, and any other associated documentation." *Id.* (citing AMERICAN NATIONAL DICTIONARY FOR INFORMATION PROCESSING SYSTEMS 367 (1984)). The primary topic of discussion in this article will be legal protection of programs and of technologies, such as expert systems, which incorporate them.

signals.”²⁴ Or, as another writer puts it, “Conceptually, the ‘brains’ of these machines are nothing more than the arrays of elements, each capable of being in an ‘on’ or ‘off’ state, like a lightbulb.”²⁵ Notably, the pulses (or ons and offs) required to make the computer perform can come from virtually any source, including a program, hardware, or even a manual operator.²⁶ The computer, thus, is simply a machine which, following predetermined rules, operates through a continuity of unintelligent electronic signals. Keeping in mind this macroscopic view of the computer as an integral machine, one can next identify some of its components in greater detail.

The chain of communication begins with computer programming.²⁷ A computer program is a set of instructions which causes the computer to perform a mathematical function or “algorithm.”²⁸ Programs can be written in either object code, a binary language comprised of varying combinations of zeros and ones, or in source code, an advanced or “high-level” language.²⁹ Object code can be directly executed by the computer. Thus, by programming the computer with complex series of zeros and ones, the programmer can directly trigger the computer’s ons and offs, thereby inducing the machine to carry out a useful function. However, most programmers use high-level languages when drafting a program because the symbols such languages employ are less difficult to work with. Since source code instructs the computer only indirectly, however, such language must be

24. Torczon, *supra* note 2, at 323 n.8 (citing HENRI W. HANNEMAN, *THE PATENTABILITY OF COMPUTER SOFTWARE: AN INTERNATIONAL GUIDE TO THE PROTECTION OF COMPUTER-RELATED INVENTIONS* 2 (1985) and TERRENCE W. PRATT, *PROGRAMMING LANGUAGES: DESIGN & IMPLEMENTATION* 19 (2d ed. 1984)).

25. LAWRENCE CLAPES, *SOFTWARE, COPYRIGHT & COMPETITION: THE “LOOK & FEEL” OF THE LAW* 47 (1989).

26. *Id.* at 48.

27. Computer programming is “the designing, writing, and testing of programs.” Englund, *supra* note 23, at 869.

28. See Jack Sholkoff, *Breaking the Mold: Forging a New and Comprehensive Standard of Protection for Computer Software*, 8 *COMPUTER L.J.* 389, 389-453 (1988).

29. In addition to being written in high-level languages such as FORTRAN, Pascal, COBOL, or BASIC, source code can also be drafted in assembly languages comprised of alphabetic symbols which programmers generally find easier to understand than the binary digits of object code.

converted into object code to produce the ultimate “on” and “off” signals that make the computer work.³⁰ Computer programs can be separated into two general categories: operating programs and applications. Operating programs (“system software” as they are sometimes dubbed) are programs which organize and operate the internal functions of the computer, such as input and output.³¹ In addition to permitting the computer to read other programs and manage data, operating programs monitor and control any application programs running on the computer.³² Application programs are programs that process information in a specific way or execute a particular function.³³ It is a technological implement or tool used to carry out a desired operation.³⁴ Examples of applications include games, financial spread sheets, word processing, or even programs that facilitate musical composition.

The tangible components of the computer which actually carry out the instructions provided by the programs might be broadly termed “hardware.” However, much hardware itself contains soft (i.e., intangible or programmed) elements. A good example is the central processing unit (CPU) where all of the apparatus enabling the computer to process information is found. The CPU contains not only internal memory where data may be stored for processing, but also program instructions which interpret data received from outside programs.³⁵ Likewise, the computer’s internal memory, stored on chips, contains soft, preprogrammed data.³⁶ Memory chips in which a modern computer’s permanent programming is stored are aptly termed “firmware” (i.e., having both “soft” and

30. This conversion, from source code to object code, is performed by a program called a “compiler” (when the source code is drafted in a high-level language) or an “assembler” (when the source code is in assembly language).

31. Sholkoff, *supra* note 28, at 395.

32. *Id.*

33. See Lyons, *supra* note 10, at 81-98.

34. *Id.*

35. HILARY E. PEARSON, *COMPUTER CONTRACTS: AN INTERNATIONAL GUIDE TO AGREEMENTS & SOFTWARE PROTECTION* 8-10 (1984).

36. The most common type of memory chip is a ROM which refers to “read-only memory.” The data contained in a ROM is preprogrammed during the chip’s manufacture and cannot later be altered.

“hard” qualities).³⁷ These examples of merger between the computer’s soft and hard elements again point to the reality of the computer as an integral machine and demonstrate that programs, whether embodied in software or hardware, are vital components of every computer.

In sum, programs are among the basic, constitutive elements of every computer. Computers are machines and programs are the sets of instructions which tell the computer what to do. As machine parts, programs often contain technologies developers find necessary to meet technical requirements or standard industry practice. In the following sections, this article proposes that such technologies rarely constitute a developer’s original expression and, thus, generally should not be protected under the laws of either France or the United States.

III. PROTECTING INNOVATIONS IN COMPUTER PROGRAMS: A COMPARATIVE VIEW

A. *The Evolution of Copyright and Droit d’Auteur Compared*

Analyzing the issue of originality under the American and French legal systems initially requires exploration of the basic distinctions between copyright and *droit d’auteur*. Simple etymological analysis of these two terms reveals the most fundamental disparity. Essentially, copyright is a body of law which grants a creator the right to decide, for a certain time, who may copy, publish or sell his work.³⁸ *Droit d’auteur*, by contrast, is a more general term encompassing a broad set of authors’

37. In fact, one source refers to firmware as “software embedded in electrical devices (i.e., hardware).” Torczon, *supra* note 2, at 323 (citing ANDREW S. TANENBAUM, STRUCTURED COMPUTER ORGANIZATION 11 (2d ed. 1984)).

38. See WEBSTER’S NINTH NEW COLLEGIATE DICTIONARY 289 (1986) (defining copyright as “the exclusive right to reproduce, publish and sell the matter and form of a literary, musical, or artistic work.”).

rights.³⁹ Specifically, France's Law No. 57-2987 of March 11, 1957 (hereinafter Law of 1957), in addition to recognizing an author's economic right (*droit pécuniaire*) to determine who may perform or reproduce his work, also attempts to protect the author's so-called "moral rights" (*droits moraux*).⁴⁰ These rights, considered to fall within the general category of personality rights (*droits de la personnalité*),⁴¹ include the author's rights of paternity,⁴² of maintaining the integrity of his work,⁴³ of divulging his work to the public, and of withdrawing his work from publication.⁴⁴ Thus, while copyright law generally focuses on a single set of financial interests, *droit d'auteur* addresses financial and moral interests.⁴⁵

This elementary difference between *droit d'auteur* and copyright law derives, in part at least, from the distinct historic evolutions of these two bodies of law.⁴⁶ American copyright

39. See GERARD CORNU, VOCABULAIRE JURIDIQUE 82 (1987) (Where *droit d'auteur* is defined as: (1) "rights of economic or moral nature to which literary and artistic works give rise" ("*droits de caractère patrimonial . . . ou moral . . . auxquels donnent prise les oeuvres littéraires et artistiques*"), and as (2) "expression used (often and incorrectly) to refer to authors' royalties" ("*expression employée (souvent et à tort) pour désigner les redevances d'auteurs.*")).

40. The moral right, under French law, is what legal scholar Eugène Pouillet once defined as "the right of the writer and the artist to create, and to have his thought respected." ("*le droit, pour l'écrivain et l'artiste de créer et de faire respecter sa pensée.*") E. POUILLET, TRAITÉ THÉORIQUE ET PRATIQUE DE LA PROPRIÉTÉ LITTÉRAIRE ET ARTISTIQUE 256 (3d ed. 1908); see R. PLAISANT, PROPRIÉTÉ LITTÉRAIRE ET ARTISTIQUE 14 (1985).

41. Rights of the personality under French law may be compared to privacy law under American law. Article 9, section 1 of France's Civil Code states the general principle: "Everybody has the right to the respect of his private life" ("*Chacun a droit au respect de sa vie privée*"). See C. COLOMBET, PROPRIÉTÉ LITTÉRAIRE ET ARTISTIQUE ET DROITS VOISINS 143 (3d ed. 1986).

42. The right of paternity is derived from article 6 of the Law of 1957 which states that an author "benefits from a right to the respect of his name, his authorship, and his work" ("*L'auteur jouit du droit au respect de son nom, de sa qualité, et de son oeuvre*"). In particular, the right of paternity requires that an author's work be published with his name on it (or without his name if the author so requests) and with the title he selected for it. PLAISANT, *supra* note 40, at 61.

43. Pursuant to article 6 of the Law of 1957, the right of integrity assures that no modifications of any kind will be made in an author's work without the author's prior approval. *Id.*

44. Article 19 of the Law of 1957 sets forth the right to divulge the work to the public, while article 32 permits the author, even after having assigned the work, to repent or withdraw it. *Id.*

45. See PLAISANT, *supra* note 40, at 14; see also *infra* note 67 and accompanying text (addressing moral interests).

46. A detailed study of the histories of copyright law in France and the United States falls beyond the scope of this article. Accordingly, Part III only highlights pertinent aspects, but does not cover every important historical fact.

doctrine has its legal basis in article I, section 8 of the U.S. Constitution⁴⁷ which states, "The Congress shall have Power . . . to promote the progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." American copyright law, following this constitutional grant to Congress, has evolved in linear fashion,⁴⁸ from the first statute promulgated in 1790 to the 1909 statute and present 1976 Copyright Act.⁴⁹ Congress drafted each of these statutes in order to encourage society's intellectual development by giving authors short-term monopolies over their works.

The theory behind these statutes, specifically, is that by conferring authors with a monopoly over their intellectual works, people will be motivated to do creative work and thus enhance society at large.⁵⁰ Assuming that an author does not assign his or her rights in a work, the Copyright Act confers upon the author, as owner, exclusive rights to reproduce the copyrighted work, prepare derivative works based on it, distribute copies of it, and perform or display it.⁵¹ The monopoly is for limited duration, thus assuring that the work to which it attaches will ultimately fall into the public domain. Courts view the primary purpose of granting such

47. See Sholkoff, *supra* note 28, at 396.

48. The term "linear" is used here to refer to the law's continuous development, through a process of accretion, wherein each successive statute evolved directly out of preceding legislation.

49. In particular, the 1790 statute protected maps, books, and charts. Congress amended it twelve years later to cover prints and, in 1831, added musical compositions to the list of protected works. In 1865, photographs were included and, in 1860, paintings, drawings, chromos, statuettes, statuary works, and models of fine art. Congress redrafted the statute in 1909. Motion pictures were provided protection five years later and, in 1971, Congress again revised the statute and indicated, among other things, that computer programs would be protected subject matter. See CLAPES, *supra* note 25, at 15.

50. See *Mazer v. Stein*, 347 U.S. 201, 219 (1953) ("The economic philosophy behind the clause empowering Congress to grant patents and copyrights is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare through the talents of authors and inventors in 'Science and useful Arts.' Sacrificial days devoted to such creative activities deserve rewards commensurate with the services rendered.").

51. 17 U.S.C. § 105 (1988). Note that, unlike French law, this statute fails to provide the author the right to paternity (i.e., to have his name appear as he wishes on his work) or the right to integrity (i.e., to prevent unconsented modifications of his work). See Deborah Ross, Comment, *The United States Joins the Berne Convention: New Obligations for Authors' Moral Rights?*, 68 N.C. L. REV. 363, 369-70 (1990).

a monopoly not as a reward to the author, but as an inducement for the author's creative production. In the phrase of one court, "[T]he immediate effect of our copyright law is to secure a fair return for an 'author's' creative labor. But the ultimate aim is, by this incentive, to stimulate artistic creativity for the general public good."⁵² Notably, this notion—that the fundamental goal of copyright law is to benefit the public (and not the author)—is today rarely set forth in French legal theory or jurisprudence.⁵³

Under American law, then, copyright is primarily an economic mechanism.⁵⁴ Courts applying copyright law seek an equilibrium between the needs of creators, who require incentives to be innovative and productive, and the needs of people in society, who benefit most when access to information, technology, and art is unencumbered. When courts provide expansive copyright protection and permit creators to maintain monopolies over their works for long periods of time, competition and innovation are thwarted.⁵⁵ This is because copyright holders can prohibit creators, whose works evince only marginal differences of creativity over previously copyrighted matter, from introducing their works into the marketplace.⁵⁶ By contrast, when courts excessively restrict the scope and duration of copyright, the theory goes, they eliminate

52. 1 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 1.03[A], at 1-32 (1990) [hereinafter NIMMER] (quoting *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975)); see *Mazer v. Stein*, 347 U.S. 201, 219 (1953) ("The copyright law . . . makes reward to the owner a secondary consideration. However, it is intended definitely to grant valuable, enforceable rights to authors, publishers, etc., without burdensome requirements; to afford greater encouragement to the production of literary (or artistic) works of lasting benefit to the world.").

53. However, at least one commentator challenges the supposition that French *droit d'auteur* is solely an author-centered corpus of law. See Jane C. Ginsburg, *A Tale of Two Copyrights: Literary Property in Revolutionary France and America*, 147 R.I.D.A., Jan. 1991, at 124, 155-77 (Contemporary French legal theorists have failed to document properly the perception of courts, legislators, and scholars during France's revolutionary period, that *droit d'auteur* was developed not only to protect authors' rights, but also to serve the public interest through intellectual enrichment).

54. The expression "economic mechanism" is used broadly here to refer to the ways in which the law affects the distribution of all of society's resources, including both material assets and intangible goods, such as the intellectual value of reading a book or listening to a piece of music.

55. Sholkoff, *supra* note 28, at 397.

56. *Id.*

incentives for ingenuity and production, thus reducing creative output and harming society in general.⁵⁷

Accordingly, courts in America have used copyright law, from its inception in 1790 to the present, to ascertain the point of economic equilibrium⁵⁸ at which creators will still remain motivated to labor while society's intellectual enrichment continues to be maximized. The paramount objective of the law, in accordance with the Constitution's grant of power to Congress, has been to strike this balance, and thus divide ownership and use of intellectual property fairly between individuals and the public.⁵⁹

French *droit d'auteur*, like American copyright law, evolved through a gradual piecing together of discrete legislation and judicial precedents. The Law of 1957, in force today, aggregates several laws originally passed as separate legislation and incorporates protection of authors' economic and moral rights under a single rubric.⁶⁰ Although publishers in France received privileges from the king as early as the sixteenth century,⁶¹ the true prototype of present-day *droit d'auteur* emerged following the French Revolution. France's government passed two laws, in

57. *Id.*

58. *See supra* note 54.

59. By contrast, French courts today rarely explain the goals of *droit d'auteur* in this way; that is, they rarely state that the ultimate objective of granting authors short-term monopolies is to further collective economic interests. However, in a recent and controversial case under French competition law, the Paris Court of Appeals applied a public benefit argument to uphold the right of a high technology company to prevent a nonapproved distributor from selling the company's products. In particular, the court held that the company's selective distribution network, notwithstanding competition rules under articles 85 and 86 of the Treaty of Rome, was permissible because it assured consumers would receive higher quality services and thus "contributed to the development of economic progress." Judgment of March 5, 1987 (S.A.R.L. Lasci Informatique v. Apple Computer Co.), *La Semaine Juridique* [J.C.P.] II, No. 14931 (emphasis added).

60. *See generally* R. Plaisant, *Propriété Littéraire et Artistique*, JURIS CLASSEUR CIVIL Fasc. 301, at 2-6 (1985). For a detailed historical analysis of French *droit d'auteur*, *see* POUILLET, *supra* note 40, at 1-23.

61. These privileges did not vindicate authors' rights. Rather, they protected publishers from competitors who, with reduced expenses, could print the same works at reduced cost. The French government did not actually recognize an author's right to his work until 1761, when the King's Council (*Conseil du Roi*) granted a privilege to the daughters of La Fontaine for publication of the Fables. COLOMBET, *supra* note 41, at 7.

1791⁶² and 1793,⁶³ disposing of the privileges system and instead setting forth specific rights of the author. According to one commentator, these postrevolutionary laws engendered two important legal concepts: (1) an exclusive property right in the author arising out of the author's intellectual creation, and (2) the notion that the author's exclusive right is of temporary duration since, ultimately, his work must fall into the public domain.⁶⁴

The laws of 1791 and 1793 remained in force, subject only to minor modifications, until the promulgation of the Law of 1957 which today, as amended under Law No. 85-660 of July 3, 1985 [hereinafter Law of 1985], governs issues of literary and artistic property.⁶⁵ The Law of 1957 integrated provisions of the 1791 and 1793 laws with provisions from other legislation introduced in the nineteenth and twentieth centuries.⁶⁶ More important, the Law of 1957 set forth the central notion that an author holds an intangible property right in his work which includes two salient aspects, one patrimonial (i.e., economic) and the other moral. Article 1, paragraph 1 of the Law of 1957 states:

The author of an intellectual work obtains an exclusive incorporeal property right upon this work, valid against all

62. The Decree of January 13-19, 1791 conferred performance rights upon playwrights and extended such rights to the playwright's heirs or assignees for five years following the playwright's death. *Id.* at 7.

63. The Decree of July 19-24, 1793 established the right of reproduction and instituted an exclusive right for writers, composers, painters, and designers to "sell, have sold, [or] distribute their works in the territory of the Republic and to assign [such] property in whole or in part" ("*vendre, faire vendre, distribuer leurs ouvrages dans le territoire de la République et d'en céder la propriété en tout ou en partie.*"). See *POUILLET, supra* note 40, at 23-24.

64. *COLOMBET, supra* note 41, at 8. See *Ginsburg, supra* note 53, at 155-77 (The 1793 law assured, not only that authors would receive exclusive rights in their works, but also that such rights would be granted solely to the extent they promoted the public interest).

65. The Law of 1957 was heralded as legislation which would take into account modern means of publishing and broadcasting literary and artistic works as well as an ever-expanding range of works begging legal protection. See *COLOMBET, supra* note 41, at 10-13.

66. This additional legislation included: (1) the Law of July 14, 1866 instituting the right of an author's spouse to inherit the author's rights in his work and extending the period of rights to 50 years following the author's demise, (2) the Law of March 11, 1902 stating the principle that a work may be protected no matter what its merit and intended purpose may be, (3) the Law of April 9, 1910 stating that an author who assigns his work still retains the right of reproduction, (4) the Law of May 20, 1920 introducing the *droit de suite*, and (5) the Law of May 29, 1925 positing the notion that a work is protected by the simple fact of its creation. *COLOMBET, supra* note 41, at 8-10.

third parties, by the sole fact of having created the work. This right includes intellectual and moral attributes, as well as an economic attribute, which are governed by the present law.⁶⁷

Under this two-layered scheme, the author acquires a set of freely alienable economic rights. In particular, the author holds the exclusive right to exploit his work under any form,⁶⁸ including the rights of performance and of reproduction.⁶⁹ The author also obtains a set of moral rights under the law.⁷⁰ Perpetual, inalienable, and irrevocable, these rights remain with the author notwithstanding his decision to sell or assign economic rights in his work.⁷¹ An author's moral rights are of practical significance because, being inalienable, they can always be raised as an ultimate defense against misappropriation or misuse of the author's work.⁷² Moreover, these rights are important, from a theoretic perspective, because they vindicate the belief that the law should protect an author's work not only as an economic commodity, but as a creation stemming from that author's personality, expressing his unique ideas and sentiment.⁷³ One commentator posits that, for purposes of protection under *droit d'auteur*, the work is the author.⁷⁴

This author-centered view, conceptualizing the protected work as an extension of the author's personality (or maybe even of his person), has had something of a dormant presence in American

67. Law of 1957, art. 1, ¶ 1 ("L'auteur d'une oeuvre de l'esprit jouit sur cette oeuvre, du seul fait de sa création, d'un droit de propriété incorporelle exclusif et opposable à tous. Ce droit comporte des attributs d'ordre intellectuel et moral ainsi que des attributs d'ordre patrimonial, qui sont déterminés par la présente loi.").

68. See Law of 1957, art. 21.

69. See Law of 1957, arts. 26-28.

70. The moral rights codified in the Law of 1957 derive from judicial law dating from the late nineteenth century. See POUILLET, *supra* note 40, at 256-59; H. DESBOIS, *LE DROIT D'AUTEUR EN FRANCE* 264-65 (3d ed. 1978).

71. See Law of 1957, art. 6.

72. PLAISANT, *supra* note 40, at 58.

73. *Id.*

74. See Edelman, *Droits d'auteur et droit voisins*, *Commentaire de la loi n° 85-660 du juillet 1985*, 1987-L DALLOZ; see also Edelman, *Création et Banalité*, 1983 DALLOZ ch. XIII, at 73-77.

copyright jurisprudence.⁷⁵ Perhaps the most vigorous judicial espousal of a personalist theory of authors' rights is found in a 1903 Supreme Court case in which Justice Holmes proposed that:

[The work] is the personal reaction of an individual upon nature. Personality always contains something unique. It expresses its singularity even in handwriting, and a very modest grade of art has in it something irreducible, which is one man's alone. That something he may copyright unless there is a restriction in the words of the act.⁷⁶

While Holmes's vision has received due attention from theorists,⁷⁷ American jurists have not further legitimated it through specific federal legislation or a recurrent judicial expression of rights of the personality. The United States Congress, although it recently passed the Berne Convention Implementation Act providing U.S. adherence to the Berne Convention for the Protection of Literary and Artistic Works,⁷⁸ has explicitly refused to recognize the moral rights required under article 6bis of the Berne Convention.⁷⁹ Congress determined that existing laws, such as the Lanham Act and state unfair competition laws, provide similar protection.⁸⁰ Scholars both in America and Europe⁸¹ appear skeptical about the

75. American copyright theory, as described above, focuses more on whether, by granting an author a copyright, certain collective economic benefits will ultimately inure to society rather than on whether the author's particular manifestation of his personality will be safeguarded properly.

76. *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 249-50 (1903).

77. See Jane C. Ginsburg, *Creation and Commercial Value: Copyright Protection of Works of Information*, 90 COLUM. L. REV. 1865, 1937 (1990) ("Since Holmes, the personality justification for copyright has enjoyed increasing vogue, to the detriment of the commercial value rationale.").

78. The Berne Convention Implementation Act of 1988, Pub. L. No. 100-568, 102 Stat. 2853 (1988).

79. *Id.* art. 6bis ("Independently of the author's economic rights, and even after the transfer of said rights, the author shall have the right to claim authorship of the work and to object to any distortion, mutilation, or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation.").

80. See Edward J. Damich, *The Right of Personality: A Common-Law Basis for the Protection of the Moral Rights of Authors*, 22 INTELL. PROP. L. REV. 547 (1990), reprinted from 23 GA. L. REV. 1 (1988) (citing *Final Report of the Ad Hoc Working Group on U.S. Adherence to the Berne Convention*, 10 COLUM.-VLA J.L. & ARTS 1, 35 (1986)).

81. *Id.*; see Edelman, *Entre copyright et droit d'auteur: l'intégrité de l'oeuvre de l'esprit*, 1990 D.S. ch. 295. Edelman argues that American law is not truly concerned with whether the personality of one author has been deformed by a subsequent author's derivative work, but instead with the economic issues of whether the first author's reputation has been injured or the value of his work undermined.

degree to which these provisions vindicate rights of the personality. Also, the terms American courts generally use to describe keystone copyright concepts, such as originality and original expression, are conspicuously devoid of references to the personality concept. French tribunals, by contrast, protect authors' moral rights broadly and systematically, and specifically link originality to the personality concept.

Yet, American copyright and French *droit d'auteur* appear to be slowly growing closer together. America's jurisprudence boasts some precedent which, coupled with passage of the Berne Convention Implementation Act, compel revival of a personalist approach to complement the economic bent of the present copyright doctrines. National legislation specifically protecting authors' moral rights may be on the horizon.⁸² Meanwhile, French jurists are trimming away many of the traditional moral rights in cases involving technological works of limited authorial personality. Under the Law of 1985, for instance, France's legislature specifically withdrew certain moral rights from authors of computer software, presumably to prevent software authors from using a moral rights theory to challenge subsequent modifications in their programs by end users.⁸³ Likewise, France's lower courts are increasingly adopting a narrow, economic outlook on authors' rights, capturing much of the pragmatic spirit of American copyright provisions.

This emerging confluence of French *droit d'auteur* and American copyright law may be perceived as an important symbol of international harmonization. As nations such as France and the United States eliminate differences between their laws, barriers to trade dissolve and economic productivity is ultimately maximized. Compelling as the need for such harmonization may be however,

82. On December 1, 1990, Congress took a small step in this direction by passing the Visual Artists Rights Act, Pub. L. No. 101-650, 104 Stat. 5089 (1990), an amendment of the Copyright Act of 1976 which provides limited protection of an artist's paternity and integrity rights in paintings, designs, engravings, and sculptures. See Jane C. Ginsburg, *Les Nouvelles Lois des Etats-Unis sur le Droit Moral des Artistes d'Art Plastique, sur la Protection des Oeuvres d'Architecture et sur la Location des Logiciels*, 147 R.I.D.A. 363, 363-65 (1991).

83. See *infra* notes 211-14 and accompanying text.

there is always the risk that abrupt changes may deform fundamental concepts of national law, breaking with legal tradition.

B. Finding Originality in Computer Programs Under American Law

1. Computer Programs as Works of Authorship Under the Copyright Act of 1976

The Copyright Act of 1976 states that copyright protection extends to "original works of authorship fixed in any tangible medium of expression."⁸⁴ This terse phrase includes three legal requirements,⁸⁵ two of which are essential to the present discussion: to be protected, a work must be both original and a work of authorship.⁸⁶ A work of authorship is construed broadly as referring to "such writings as are the result of intellectual labor."⁸⁷ Although the statute sets forth a list of works of authorship, the statute was intended to be illustrative and not limitative.⁸⁸ Thus, courts have deemed a cable wire code book, maps, and even the layout of court decisions in a legal reporter to be works of authorship within the statute's meaning.⁸⁹

Congress has never specifically included computer programs in its catalogue of works of authorship. However, in 1980, only twelve years after the U.S. Copyright Office accepted its first

84. 17 U.S.C. § 102(a) (1988) (listing seven categories of works of authorship including, literary works and audiovisual works).

85. The third requirement—that the work be "fixed in a tangible medium"—is not important to the present discussion.

86. As one court stated, "This language isolates two watermarks of a copyrightable work: it must be 'original'—i.e., a work of independent creation—and it must be a 'work of authorship'—i.e., the fruit of artistic expression and intellectual labor." *Atari Games Corp. v. Oman*, 693 F. Supp. 1204, 1205 (D.D.C. 1988), *rev'd on other grounds*, 888 F.2d 878 (D.C. Cir. 1989).

87. *Higgins v. Keuffel*, 140 U.S. 428, 431, (1891).

88. *See Lotus Dev. Corp. v. Paperback Software Int'l*, 740 F. Supp. 37, 48 (D. Mass. 1990) (citing H.R. REP. NO. 1476, 94th Cong., 2d Sess. 51, *reprinted in* 1976 U.S.C.C.A.N. 5659, 5664).

89. *Reiss v. Nat'l Quotation Bureau*, 276 F. 717 (C.D.N.Y. 1921) (code book); *C.S. Hammond & Co. v. Int'l College Globe, Inc.*, 210 F. Supp. 206 (C.D.N.Y. 1962) (map); *West Pub. Co. v. Mead Data Cent. Inc.*, 799 F.2d 1219 (8th Cir. 1986) (layout of court decisions), *cert. denied*, 479 U.S. 1070 (1987).

copyright registration for a computer program,⁹⁰ Congress amended the statute to include computer programs as copyrightable subject matter.⁹¹ The Copyright Act of 1976, somewhat ambiguously, had stated that computer programs would not receive any more protection than they had received under the 1909 copyright statute.⁹² Following recommendations made by the National Commission on New Technological Uses of Copyrighted Works (CONTU),⁹³ Congress, in 1980, introduced three provisions concerning protection of computer programs: (1) a definition of "computer program,"⁹⁴ (2) a provision stating that the owner of a copy of a copyrighted program could use the program in a computer or make an archival copy without risking infringement, and (3) an amendment deleting the provision in the 1976 Act which had limited protection to that furnished under prior law.⁹⁵ Thus, although Congress provided developers with a rubric under which protection of computer programs might be obtained, it chose not to state directly that computer programs constitute works of authorship under the statute.⁹⁶

Courts in America, nonetheless, have explicitly categorized computer programs as works of authorship or, more specifically, as literary works.⁹⁷ Rather than positing an elaborate analogy between computer programs, which are drafted in symbolic code

90. See Keplinger, *Computer Software—Its Nature and Protection*, 30 EMORY L.J. 483, 494 (1981).

91. *Id.*

92. CLAPES, *supra* note 25, at 15.

93. CONTU was established by Congress in 1974 "to study and compile data . . . concerning . . . the reproduction and use of copyrighted works of authorship . . . in . . . automatic systems capable of storing, processing, retrieving, and transferring information . . ." *Final Report of the National Commission on New Technological Uses of Copyrighted Works* 4 (1978) [hereinafter CONTU Report].

94. Computer program is defined as "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 (1988).

95. Keplinger, *supra* note 90, at 499-501.

96. *But see* H.R. REP. NO. 1476, 94th Cong., 2d Sess. 54 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659, 5667 ("The term 'literary works' . . . includes . . . computer programs"), *cited in Lotus Dev. Corp. v. Paperback Software Int'l*, 740 F. Supp. 37, 49 (1990).

97. *See, e.g.,* *Digital Communications Assoc. v. Softklone Distrib. Corp.*, 659 F. Supp. 445, 450-51 (N.D. Ga. 1987) (citing *Whelan Associates v. Jaslow Dental Lab., Inc.*, 797 F.2d 1222, 1234 (3d Cir. 1986)) ("It is now well-established . . . that a computer program is a 'work of authorship.' Under the Act, computer programs are classified as 'literary works' ").

and then read by a machine, and other literary works (such as poems or novels), which are perceived directly by human beings,⁹⁸ many courts have identified programs as literary works by simple reference to the statutory definition of that term.⁹⁹ “ ‘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.”¹⁰⁰ This definition is broad and thus easily encompasses computer programs written in symbols and embodied in various mediums, such as software, firmware, or hardware. Of course, the ease with which programs may be categorized as literary works under this statutory language does not transform programs into veritable literary works. As one commentator recently stressed, even if computer programs look like literary works in their outward form, they are conceived and ultimately used as technology, not as literary works or literature.¹⁰¹ But the majority of American courts appear to look beyond this line of argument, analogizing computer programs to conventional literary works.¹⁰² Accordingly, the analysis courts now use to determine the copyrightability of a particular computer technology generally focuses less on whether it should be classified

98. This distinction—between the human audience which enjoys true literary works and the electronic circuits which respond to a program’s machine code—was eloquently described by Commissioner Hersey, a dissenting participant in the CONTU hearings: “Congress should weigh most carefully the heavy responsibility of breaking with tradition and enabling, by law of the land, for the first time ever, copyright protection for communication, not with fellow human beings, but with machines—thus equating machines with human beings as intended recipients of the distribution that copyright was intended to foster.” CONTU Report, *supra* note 93, at 37.

99. See, e.g., *Lotus Dev. Corp.*, 740 F. Supp. at 49.

100. 17 U.S.C. § 101 (1988).

101. See Dennis S. Karjala, *Copyright, Computer Software and the New Protectionism*, 28 JURIMETRICS J. 33, 41 (1988) (“Programs resemble literary works only in form; in the substance of their creation and use they are technology—the technology for using computers.”).

102. See, e.g., *Whelan Associates v. Jaslow Dental Lab., Inc.*, 797 F.2d at 1234 (“Title 17 U.S.C. §102(a)(1) extends copyright protection to ‘literary work,’ and computer programs are classified as *literary works* for the purposes of copyright.”) (emphasis added); *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1249 (3rd Cir. 1983) (“[T]he category of ‘literary works’ . . . is not confined to literature in the nature of Hemingway’s *For Whom the Bell Tolls*. . . . Thus, a computer program, whether in object or source code, is a ‘literary work’ . . .”) (emphasis added).

as a work of authorship than on whether it embodies original expression.

2. The Originality and Creativity Requirements

Originality, as one court recently stated, is the “sine qua non of copyrightability.”¹⁰³ Nimmer calls it “the one pervading element prerequisite to copyright protection regardless of the form of the work.”¹⁰⁴ Under American case law,¹⁰⁵ a work is generally deemed original if it was created independently and was not copied.¹⁰⁶ This narrow conception of originality follows directly from the economic bias of American copyright law, viewing the grant of a limited monopoly as the most efficient way to spur authorial production. Specifically, it derives from the Constitution’s language granting “Authors . . . the exclusive Right to their respective Writings.”¹⁰⁷ An “author,” the Supreme Court once stated, is one “to whom anything owes its origin; originator; maker; one who completes a work of science or literature.”¹⁰⁸ “Original,” the U.S. Supreme Court has therefore deduced, “means that the particular work owes its origin to the author.”¹⁰⁹

American courts carefully distinguish originality, a cardinal requirement of copyright, from novelty, the essential criterion for patent protection. In *Alfred Bell & Co. v. Catalda Fine Arts*,¹¹⁰

103. *Kamar Int'l, Inc. v. Russ Berrie and Co.*, 657 F.2d 1059, 1061 (9th Cir. 1981).

104. NIMMER, *supra* note 52, § 2.01[A], at 2-6.

105. There is no statutory definition of “original” or “originality.”

106. *See* *L. Batlin & Son, Inc. v. Snyder*, 536 F.2d 486, 490 (2d Cir. 1976) (citing *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 102-03 (2d Cir. 1951)) (“Originality means that the work owes its creation to the author and this in turn means that the work must not consist of actual copying. . . .”); *see also* *Apple Computer, Inc. v. Microsoft Corp.*, 759 F. Supp. 1444, 1455 (N.D. Cal. 1991) (“[T]he originality requirement is simply a prohibition of actual copying by the copyright holder.”); *Synercom Technology, Inc. v. University Computing Co.*, 462 F. Supp. 1003, 1010 (N.D. Tex. 1976) (citing *Puddu v. Buonamici Statuary, Inc.*, 450 F.2d 401 (2d Cir. 1971) (“[O]riginality has been considered to mean only that the work owes its origin to the author, i.e., is independently created and not copied from other works.”)).

107. *See* *Miller v. Universal City Studios*, 650 F.2d 1365, 1368 (5th Cir. 1981).

108. *Id.* (citing *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 58 (1884)).

109. *See* *Alfred Bell & Co. v. Catalda Fine Arts*, 191 F.2d 99, 102 (2d Cir. 1951) (citing *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 57-58 (1884)).

110. 191 F.2d 99 (2d Cir. 1951).

the hallmark case on originality, the court differentiated the two concepts by comparing the terms “author” and “inventor.” The court stated: “The latter carries an implication which excludes the results of only ordinary skill, while nothing of this is necessarily involved in the former.”¹¹¹ If authors were required to demonstrate more than ordinary skill to obtain copyright, the court explained, courts would be placed in the inappropriate position of having to assess the literary or artistic merit of works.¹¹² Accordingly, the court rejected the proposition that a work must be “strikingly unique or novel” to secure copyright protection and concluded:

All that is needed to satisfy both the Constitution and the statute is that the ‘author’ contributed something more than a ‘merely trivial’ variation, something recognizably his own. Originality in this context means little more than a prohibition of actual copying. No matter how poor artistically the ‘author’s’ addition, it is enough if it be his own.¹¹³

Under this formulation, the work need not be new, demonstrate ingenuity, or represent an important advance over ideas expressed in the existing repertoire. It must simply have had its origin with the author. The threshold legal requirement of originality, then, is a bar against copying rather than a specific measure of an author’s creativity or innovation. However, the supposition that original under American law simply means “independently created” or “not copied” is somewhat misleading in the context of comparative legal analysis. American courts, it is true, generally employ the term in this narrow sense when referring to the initial inquiry of copyrightability, that is, the threshold determination of whether a work is a servile copy. Yet the courts have developed additional doctrines to evaluate the magnitude of an author’s personal contribution, including the creativity requirement and the

111. *Id.* at 102.

112. *Id.*

113. *Id.* at 102-03 (footnotes omitted); see *Key Publications, Inc. v. Chinatown Today Publishing Enterprises, Inc.*, 945 F.2d 509, 513 (2d Cir. 1991) (“[O]riginality is not synonymous with novelty. . .”).

idea versus expression dichotomy. Although neither American courts nor scholars formally dub them as such, these are truly doctrines of originality.¹¹⁴ They belong to what might be termed the issue of originality, a broad assessment of the authorial expression contained in a work; as contrasted with the legal requirement of originality, the narrow question of whether a work is a slavish copy.

Creativity, therefore, is another doctrine under which courts probe the issue of originality.¹¹⁵ The creativity requirement goes beyond the threshold question of whether a work demonstrates independent effort, calling for an additional albeit marginal quantum of authorial exertion.¹¹⁶ As the Seventh Circuit stated in *Baltimore Orioles, Inc. v. Major League Baseball Players Association*: "A work is original if it is the independent creation of its author. A work is creative if it embodies some modest amount of intellectual labor"¹¹⁷ Or, as another court recently advised, "There is a narrow class of cases where even admittedly independent efforts may be deemed too trivial or

114. In much of the existing legal literature, these doctrines are not discussed as being part of the originality inquiry. Instead, they are considered separately, as determinants of so-called "copyrightability" or the "scope of copyright." Although this classification may be appropriate in a separate discussion of American copyright law, it would likely lead to inaccurate conclusions in the present comparison of the French and American legal systems. In particular, while French courts discuss aspects of what American jurists call "copyrightability" under the originality rubric, American courts discuss aspects of what the French call "originality" under "copyrightability." Thus, superficial comparison between the French explanation of originality as the imprint of an author's personality, and the American independent creation standard, for instance, would lead to the exaggerated proposition that American courts require almost no authorial expression whereas French courts require substantial authorial expression. To avoid this kind of distortion, the present article posits a distinction, in American law, between the narrow legal *requirement* of originality and the broader issue of originality.

115. See *Baltimore Orioles, Inc. v. Major League Baseball Players Ass'n*, 805 F.2d 663, 668 (7th Cir. 1986), *cert. denied*, 480 U.S. 941 (1987) ("[O]riginality actually subsumes two separate conditions . . . the work must possess an independent origin and a minimum amount of creativity."); cf. NIMMER, *supra* note 52, § 2.01[B], at 2-14 ("It is of only semantic significance whether originality is defined as embodying such creativity or whether such creativity is regarded as a necessary adjunct to originality.").

116. NIMMER, *supra* note 52, § 2.01[B], at 2-14 ("[T]here is invoked at least a minimal requirement of creativity over and above the requirement of independent effort.").

117. 805 F.2d at 668 n.6.

insignificant to support copyright."¹¹⁸ Thus, even an author who has not copied his work will be unable to secure its copyright if he cannot also demonstrate that he invested a sufficient degree of creative effort in its conception.¹¹⁹

Until recently, however, many courts seemed to interpret the creativity criterion as requiring little more than an author's independent intellectual effort. In *Baltimore Orioles, Inc.*, for instance, the Seventh Circuit suggested that creativity refers to an author's exercise of brainpower rather than his use of artistic or literary imagination. The relevant issue in *Baltimore Orioles, Inc.*, was whether telecasts of baseball games could satisfy the legal requirement of originality.¹²⁰ Because the telecasts in question were not reproduced, the court found it clear they were independent creations and therefore original.¹²¹ As for the creativity of the broadcasts, the court looked to the thought involved in producing them: "The many decisions that must be made during the broadcast of a baseball game concerning camera angles, types of shots, the use of instant replays and split screens, and shot selection . . . supply the creativity required . . ." ¹²² The aesthetic merit of a work, the court insisted, is irrelevant to the creativity inquiry¹²³ which, instead, is simply a measure of an author's intellectual travails.

118. *Magic Mktg., Inc. v. Mailing Serv. of Pittsburgh, Inc.*, 634 F. Supp. 769, 771-72 (W.D. Pa. 1986) (Envelopes marked with short phrases such as "telegram" or "priority message" lacked requisite creativity).

119. *See, e.g.*, *Atari Games Corp. v. Oman*, 888 F.2d 878, 882 (D.C. Cir. 1989) ("To constitute a 'work of authorship,' the [work] . . . must pass a 'creativity' threshold, *i.e.*, it must embody 'some modest amount of intellectual labor.'"); *John Muller & Co., Inc. v. N.Y. Arrows Soccer Team*, 802 F.2d 989, 990 (8th Cir. 1986) (Logo comprised of four lines forming arrow and the word "arrow" written in cursive script displayed insufficient "creative authorship"); *L. Batlin & Son, Inc. v. Snyder*, 536 F.2d 486, 492 (2d Cir. 1976), *cert. denied*, 429 U.S. 857 (1976) (Plastic Uncle Sam banks copied from cast iron version in public domain did not demonstrate sufficient intellectual effort to satisfy creativity standard).

120. The case itself arose out of a lasting dispute between the Major League Baseball Clubs and the Major League Baseball Players Association concerning ownership of the broadcast rights to the games. 805 F.2d at 665-68.

121. *Id.*

122. *Id.*

123. The court stated: "Only a modicum of creativity is required for a work to be copyrightable . . . aesthetic merit is not necessary . . ." *Id.* at 669.

In fact, the best gauge of creativity, the court proposed, is whether an author's work has won commercial success in the public:

'[I]f . . . [certain works] command the interest of any public, they have a commercial value—it would be bold to say that they have not an aesthetic and educational value—and the taste of any public is not to be treated with contempt' That the [baseball player's] performances possess great commercial value indicates that the works embody the modicum of creativity required for copyrightability.¹²⁴

Consistent with the economic justification of American copyright, the Seventh Circuit treats the business value of baseball broadcasts as an appropriate calculus of their creativity. Likening a work's creativity to its marketability, the court's equation could not seem farther from the author-centered vision of French law which conditions protection on an author's display of personality in his oeuvre.

Yet, in *Feist Publications, Inc. v. Rural Telephone Service Co.*,¹²⁵ the United States Supreme Court recently gave new bite to the creativity requirement.¹²⁶ The main issue the Court reviewed was whether Rural's directory, a compilation of names, addresses, and phone numbers, was copyrightable. Rejecting Rural's argument that its effort in compiling the information met

124. *Id.* (quoting *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 252 (1903)).

125. 111 S. Ct. 1282 (1991).

126. The facts of the case, in brief, were as follows. A certified public utility with a monopoly franchise on telephone services in one area of Kansas, respondent Rural Telephone Service Company [hereinafter Rural] was required by regulation to publish an annual telephone directory. Feist Publications, Inc. [hereinafter Feist], a private company, published special telephone directories covering wide geographical areas. To obtain its white pages listings, Feist offered to pay various phone companies in Kansas for the right to use their listings. Of 11 companies Feist approached, only Rural refused to license its information. Unable to obtain the information in any other practicable way, Feist copied Rural's white pages listings without Rural's consent. Rural sued for copyright infringement in the District Court for the District of Kansas. The district court granted summary judgment to Rural, upholding the copyrightability of telephone directories. The Court of Appeals for the Tenth Circuit confirmed. *Id.* at 1286-87.

the threshold requirements of copyrightability,¹²⁷ the Supreme Court determined that, to be original under the Copyright Act of 1976, a compilation must also embody true authorial creativity. In the court's phrase, "copyright rewards originality, not effort."¹²⁸

"Original," the Court first specified, means that "the work was independently created by the author . . . and that it possesses at least some minimal degree of creativity."¹²⁹ Based on the statutory definition of "compilation," the Court determined that the creativity necessary to render a compilation "original" depends on the way an author selects, coordinates and arranges the facts contained in his compilation.¹³⁰ "Compilation" is defined under section 101 of the 1976 Act as "a work formed by the collection and assembly 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."¹³¹ Accordingly, the Court concluded that some compilers, even if they work independently, might not select, coordinate and arrange facts in such a way—i.e., in a sufficiently original way—to justify copyright protection.¹³² "There remains a narrow category of works," the Court stated, "in which the creative spark is utterly lacking or so trivial as to be virtually non-existent."¹³³

Based on the facts presented, the court determined that Rural had not imbued its directory with the modicum of creativity required. The phone company, the Court said, "expended sufficient

127. Rural's argument was based primarily on the "sweat of the brow" or "industrious collection" theory under which courts justify granting copyright to compilations based solely on the work involved in preparing them. *Id.* at 1291 (citing *Jewler's Circular Publishing Co. v. Keystone Publishing Co.*, 281 F. 83, 88 (2d Cir. 1922)).

128. *Id.* at 1297.

129. *Id.* at 1287.

130. 111 S. Ct. at 1293-94.

131. *Id.* at 1293 (citing 17 U.S.C. § 101).

132. *Id.* at 1294.

133. *Id.*

effort to make the white pages directory useful, but insufficient creativity to make it original.”¹³⁴ The Court explained:

This arrangement may, technically speaking, owe its origin to [the telephone company] But there is nothing remotely creative about arranging names alphabetically in a white pages directory. It is an age-old practice, firmly rooted in tradition and so commonplace that it has come to be expected as a matter of course. . . . It is not only unoriginal, it is practically inevitable. This time-honored tradition does not possess the minimal creative spark required by the Copyright Act and the Constitution.¹³⁵

By refusing to recognize originality based solely on labor invested in preparing a work and by conditioning copyright on an additional measure of authorial presence, the Supreme Court heightened the creativity component of the originality test.

To date, few copyright cases concerning computer technologies have emphasized the creativity requirement.¹³⁶ However, in future cases regarding computer technologies and other information-based works, the federal courts, following *Feist Publications, Inc.*, are likely specifically to examine not only whether a particular author has brought the work into existence, but whether he has infused his work with the requisite kernel of creativity.

3. *The Idea Versus Expression Dichotomy*

Even after deciding a work has satisfied the bottom-line originality and creativity requirements, American courts, pursuant to the so-called “idea versus expression dichotomy,” continue to probe the issue of originality, that is, whether the author has put

134. *Id.* at 1296.

135. *Id.* at 1297.

136. *But see* *Allen-Myland, Inc. v. Int'l Bus. Machines Corp.*, 770 F. Supp. 1004, 1010 (E.D. Pa. 1991) (“[T]he requisite level of creativity is extremely low . . . the vast majority of works make the grade quite easily. . . .”); *cf.* *Atari Games Corp. v. Oman*, 888 F.2d 878 (D.C. Cir. 1989) (holding that Copyright Office did not properly explain its application of the creativity requirement to refuse protection to a computer-generated video game).

sufficient imagination into his work to justify copyright.¹³⁷ Section 102(b) of the Copyright Act codifies the rule, stating that: “In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.”¹³⁸ Based on this provision, courts have concluded that copyright protects only the expression of ideas, not the ideas themselves.¹³⁹ By restricting copyright to specific, individualized, imaginative creations called “expression,” and refusing protection for more general, standard, or banal concepts dubbed “ideas,” the courts expand upon their initial inquiry to require not only an independent source of creation, but a specific *kind* of creation. In fact, the courts often explicitly state that only original expression may be protected, apparently employing the term “original” in the vernacular.¹⁴⁰ As the court stated in *Lotus Development Corp. v. Paperback Software International*, “[T]he issue of copyrightability

137. At least one court has made a doctrinal link between the idea versus expression dichotomy and the issue of originality, emphasizing that the very reason ideas are excluded from copyright protection is because they cannot be said to have originated with the author. See *Miller v. Universal City Studios, Inc.*, 650 F.2d 1365, 1368-69 (5th Cir. 1981) (“This dichotomy . . . derives from the concept of originality which is the premise of copyright law. . . . [S]ince [ideas] do not owe their origin to any individual, they may not be copyrighted and are part of the public domain available to every person.”). Also, in *Feist Publications, Inc.*, the United States Supreme Court explained that Congress, in order to clarify that originality is the central requirement for copyrightability, replaced section 3 of the 1909 Copyright Act—which did not identify originality as the basis for determining the copyrightability of a work’s components parts—with section 102(b) of the 1976 Act which specifically lists aspects of a work which are not original and therefore uncopyrightable. 111 S. Ct. at 1290-91.

138. 17 U.S.C. § 102(b) (1988).

139. See, e.g., *Herbert Rosenthal Jewelry Corp. v. Kalpakian*, 446 F.2d 738, 741-42 (9th Cir. 1971) (Copyright prohibits expression of an idea in a copyrighted work, but not use of the idea itself).

140. See, e.g., *Lotus Dev. Corp. v. Paperback Software Int’l*, 740 F. Supp. 37, 65 (D. Mass. 1990) (“The issue here is whether [plaintiff’s computer program] . . . includes substantial elements of expression, distinctive and *original*, which are thus copyrightable. . . .”); *Concrete Machinery Co. v. Classic Lawn Ornaments*, 843 F.2d 600, 606 (1st Cir. 1988) (quoting *Sooling Sys. & Flexibles v. Stuart Radiator*, 777 F.2d 485, 491 (9th Cir. 1985) (“An artist can claim to own only an *original* manner of expressing ideas. . . .”); *Kamar Int’l Inc. v. Russ Berrie & Co.*, 657 F.2d 1059, 1061 (9th Cir. 1981) (“Anyone can copyright anything, if he adds something *original* to its expression. . . .”); see also *Feist Publications v. Rural Tel. Serv.*, 111 S. Ct. 1282, 1290-91 (1991) (“The question that remains is whether [the respondent] selected, coordinated, or arranged these uncopyrightable facts in an *original* way.”) (emphasis added).

of a 'work' turns not on whether the work expresses ideas but instead on whether, in addition to expressing one or more ideas, in some material respect it does more, and in an original way."¹⁴¹ Under American law, therefore, even an author who toils independently will not generally receive protection for his or her prosaic rendering of common ideas.¹⁴² The author must convey the ideas through original expression.

This distinction between idea and expression takes on great importance in infringement actions. Specifically, because it is often difficult for the plaintiff in an infringement case to show with direct evidence¹⁴³ that the defendant copied the plaintiff's work, American courts permit such copying to be demonstrated inferentially through the comparison of works.¹⁴⁴ In particular, a plaintiff may show copying by demonstrating that the defendant had access to the plaintiff's work or that the defendant's work contained similarities to the plaintiff's work probative of copying.¹⁴⁵ Access to a work apparently is shown easily and, in many cases, admitted by the defendant.¹⁴⁶ The similarity or probative similarity inquiry, by contrast, requires the court to

141. 740 F. Supp. at 59-60 (emphasis added).

142. As one court stated, "Ideas are free to the world, and one person's idea can be appropriated by another with impunity." *Taylor v. Metro-Goldwyn-Mayer Studios*, 115 F. Supp. 156, 157 (S.D. Cal. 1953); see *Cable News Network v. Video Monitoring Serv.*, 940 F.2d 1471, 1478-79 (11th Cir. 1991) (stressing the importance of "public access to discussion, debate, and dissemination of information and ideas").

143. "Direct evidence" of copying would include, for instance, proof that the defendant had actually made a servile copy of the plaintiff's work, or the defendant's admission of having copied the plaintiff's work.

144. See David Nimmer et al., *Analyzing Substantial Similarity in Computer Software Infringement Cases*, 6 *COMPUTER LAW* 17, 17-18 (1989).

145. Some courts have held that a plaintiff can show copying by demonstrating access and substantial similarity. See, e.g., *Evans v. Wallace Berrie & Co.* 681 F. Supp. 813, 815-816 (S.D. Fla. 1988) ("[T]o prove, by way of inference, that a defendant copied [plaintiff's protected work, plaintiff must show that] defendants had access to the plaintiff's work and that the defendants' works are 'substantially similar' to plaintiff's. . ."). However, by requiring a finding of substantial similarity, this analysis conflates the initial inquiry of whether copying has occurred with the subsequent question of whether the copied material (if protected under copyright) was substantial and therefore infringing. See Alan Latman, "Probative Similarity" as Proof of Copying: Toward Dispelling Some Myths in Copyright Infringement, 90 *COLUM. L. REV.* 1187, 1204 (1990) (calling the initial inquiry regarding copying one of probative similarity and the subsequent question of infringement one of substantial similarity.).

146. Nimmer et al., *supra* note 144, at 17-18.

determine whether the defendant's work has enough in common with the plaintiff's work to conclude that copying has occurred.¹⁴⁷ Once a court establishes that copying has occurred, it must also determine whether the material the defendant copied was protectable under copyright and, if so, whether such material was substantial.¹⁴⁸ Since the defendant is free to use any noncopyrightable ideas, the court may not rely on similarities between ideas stated in the two works to demonstrate substantial similarity. Rather, the court must ascertain which aspects of the plaintiff's work constitute protected expression, and compare the material the defendant copied to these for substantial similarity.¹⁴⁹ The idea versus expression dichotomy is thus the principal doctrine American courts use to distinguish between those aspects of a work a second comer may imitate freely and those which he must recast with enough authorial flair to avoid an ultimate finding of infringement.

Venerable as its position in American jurisprudence may be,¹⁵⁰ the idea versus expression dichotomy is problematic, especially in its application to technologies such as computers. Even in cases pertaining to traditional literary works, American

147. See *Arnstein v. Porter*, 154 F.2d 464, 468-69 (2d Cir. 1946) ("If there is evidence of access and similarities exist, then the trier of facts must determine whether the similarities are sufficient to prove copying. . . ."); see also *Latman*, *supra* note 145, at 1193 ("This indirect proof or circumstantial evidence consists of 'similarities . . . sufficient to prove copying' which are 'usually' accompanied by proof of 'access'. . . .").

148. *Latman*, *supra* note 145, at 1189.

149. *Shaw v. Lindheim*, 919 F.2d 1353, 1360 (9th Cir. 1990) (quoting *Data East USA, Inc. v. Epyx, Inc.*, 862 F.2d 204, 208 (9th Cir. 1988) ("[N]o substantial similarity of expression will be found when the idea and its expression are inseparable, given that protecting the expression in such circumstances would confer a monopoly of the *idea* upon the copyright owner. . . ."); *Hoehling v. Universal Studios, Inc.*, 618 F.2d 972, 977 (2d Cir. 1980) ("Ordinarily, wrongful appropriation is shown by proving a 'substantial similarity' of copyrightable expression. . . ."); *Spectravest, Inc. v. Mervyn's, Inc.*, 673 F. Supp. 1486, 1491 (N.D. Cal. 1987) ("A finding of mere similarity of ideas, no matter how absolute the evidence of access, will lead to a determination of no infringement. A finding of similarity of expression will result in a finding of infringement. . . .").

150. Notably, the EC Council of Ministers too has recognized the idea versus expression distinction as an appropriate benchmark for the copyrightability of computer programs. "Protection in accordance with this Directive shall apply to the expression in any form of a computer program. Ideas and principles which underlie any element of a computer program, including those which underlie its interfaces, are not protected by copyright under this Directive." Directive, *supra* note 12, art. 1.

courts have long conceded that the threshold between idea and expression evades precise definition.¹⁵¹ A court's decision, as Judge Learned Hand once warned, will inevitably be ad hoc.¹⁵² Drawing the line, it turns out, does not involve an objective legal decision so much as a spontaneous policy judgment.¹⁵³ The courts enjoy great discretion: by characterizing the idea of a particular work broadly, they limit the scope of protection and assure extensive public access to the knowledge or information at stake; by describing a work's idea more narrowly, they grant an author liberal protection and restrict public access.¹⁵⁴ When computer technologies are the subject matter in question, the stakes for the industry may be high. A court's decision to identify key elements of a computer technology as original expression may restrict or even eliminate the industry's access to that technology.

4. Applying the Idea Versus Expression Dichotomy to Computer Programs

Although American courts recognize that the idea versus expression distinction is something of a clumsy doctrine by which to determine copyrightable elements, they have not forsaken the approach.¹⁵⁵ Instead, they have developed several specific

151. See, e.g., *Goodson-Todman Enter. v. Kellogg Co.*, 358 F. Supp. 1245, 1246 (C.D. Cal. 1973), *rev'd on other grounds*, 513 F.2d 913 (9th Cir. 1975) ("It has not been possible to develop an objective and articulable standard . . . [to determine] whether material in a creative work is an 'idea' or an 'expression.'"); see also Knowles & Palmieri, *Dissecting Krofft: An Expression of New Ideas in Copyright?*, 8 SAN FERN. V. L. REV. 109, 126 (1980) (contending that there is no meaningful difference between idea and expression).

152. *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960).

153. "Idea," in effect, becomes a judicial metaphor for the public pool of knowledge, whereas "expression" represents the stylized creation over which an author may obtain temporary dominion. See Paul Goldstein, *Infringement of Copyright in Computer Programs*, 47 U. PITT. L. REV. 1119, 1126 (1986) ("[I]n the copyright lexicon, 'idea' is no more than a metaphor for elements generally belonging in the public domain.").

154. See *Digital Communications Assoc. v. Softklone Distrib. Corp.*, 659 F. Supp. 449, 458 (N.D. Ga. 1987) ("The inherent problem with applying the idea . . . versus expression . . . distinction to any specific case is defining the underlying idea.").

155. See, e.g., *Steinberg v. Columbia Pictures Indus.*, 663 F. Supp. 706, 712 (S.D.N.Y. 1987) (citing *Durham Indus. v. Tomy Corp.*, 630 F.2d 905, 912 (1980)) (The idea versus expression "distinction, although an imprecise tool, has not yet been abandoned because we have as yet discovered no better way to reconcile the two competing societal interests that provide the rationale

guidelines to render their analysis less arbitrary. These guidelines include (a) the abstractions test, (b) the plurality of expressions test, and (c) the “functional/expressive” and “essential/non-essential” distinctions. While these may be appropriate criteria for separating idea from expression in conventional literary and artistic works, they do not cover the full range of policy issues courts must consider when analyzing copyright protection of computer technologies.

The abstraction test, conceived by Judge Hand in *Nichols v. Universal Pictures Corp.*,¹⁵⁶ separates idea from expression by describing a continuum of expression. At one end of the continuum, ideas are communicated in general fashion. At the other end, they are conveyed in specific form. The abstraction test enables courts to select a point along this continuum where the copyrightability of a work begins. Judge Hand wrote:

Upon any work and especially upon a play 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 play is about and at times consists only of its title, but there is a point in this series of abstractions where they are no longer protected since otherwise the playwright could prevent the use of his ideas to which apart from their expression his property never extended.¹⁵⁷

As this quotation reflects, the abstractions scale does not specify the point where copyright commences but, instead, provides a general index under which courts determine copyrightability on a case-by-case basis.¹⁵⁸ Even today, courts refuse to stipulate a rule

for the granting of and restrictions on copyright protection, namely, both rewarding individual ingenuity, and nevertheless allowing progress and improvements based on the same subject matter by others than the original author.”).

156. 45 F.2d 119 (2d Cir. 1960).

157. *Id.* at 121.

158. Nimmer et al., *supra* note 144, at 20.

which would establish an arbitrary *summa divisio* along Hand's scale of abstraction.¹⁵⁹

Although Judge Hand developed the abstraction test for analysis of traditional literary works, one court recently applied it to computer programs. In *Lotus Development Corp.*, a case in which several aspects of the defendants' VP-Planner electronic spreadsheet program were found to have infringed the plaintiff's 1-2-3 program, the court first noted that:

At the most general level of Hand's abstraction scale, the computer programs at issue in this case . . . are expression of the idea of a computer program. . . . [E]ven though programs like VisiCalc, 1-2-3, Multiplan, SuperCalc4, and Excel are very different in their structure, appearance, and method of operation, each is, at the most basic level, just a different way of expressing the same idea: the electronic spreadsheet.¹⁶⁰

Yet, the court refused to conclude that the basic concept of these programs—an accounting spreadsheet—was the idea and that all other aspects represented copyrightable expression. Rather, the court proposed that other characteristics of the programs, more specific than the concept of an accounting spreadsheet, might also represent noncopyrightable ideas. “These products,” the court explained, “also share some elements . . . at a more detailed or specific point along the abstractions scale.”¹⁶¹ Among such elements, the court considered the rotated “L” format of the spreadsheet screen display. To determine whether the format was idea or expression, however, the court could not rely solely on Hand's hypothetical abstractions scale.¹⁶² Instead, the court applied the plurality of expressions test. Under this test, the greater

159. See, e.g., *Lotus Dev. Corp. v. Paperback Software Int'l*, 740 F. Supp. 37, 60 (D. Mass. 1990) (“It seems the better part of wisdom, if not valor, not to press the search for a suitable bright-line test of copyrightability where Learned Hand, even after decades of experience in judging, found none.”).

160. *Id.* at 65.

161. *Id.* at 66.

162. The obvious shortcoming of the abstraction scale is that it simply provides courts another metaphor by which to visualize levels of specificity in a work. It is not instructive as to where along the scale an author's original expression begins.

the range of ways an idea might be expressed, the more probable an author's particular expression of it will receive protection. The converse of this test is the doctrine of merger: If an idea may be expressed in only one way, or in a limited number of ways, such expression cannot be copyrighted since, according to the doctrine, it has merged with the underlying idea.¹⁶³ In *Lotus Development Corp.*, since alternatives to the rotated "L" format were few, the court found merger: "[T]here is a rather low limit, as a factual matter, on the number of ways of making a computer screen resemble a spreadsheet. Accordingly, this aspect of electronic spreadsheet computer programs, if not present in every expression of such a program, is present in most expressions."¹⁶⁴ The rotated "L" format, the court therefore concluded, was a noncopyrightable idea.

Likewise, *Lotus Development Corp.* applied the plurality of expressions test to determine whether use of the "/" key to invoke the plaintiff's menu command system constituted copyrightable expression. Because most of the letter, number, and arithmetic keys had other specific purposes, using the "/" key to call up the menu, the court decided, was "one of very few practical options."¹⁶⁵ As it could only be expressed in a limited number of ways, the court concluded, this aspect of the plaintiff's work "merge[d] with the idea of having a readily available method of invoking the menu command system,"¹⁶⁶ and thus could not be protected.

163. In the context of computer litigation, the plurality of expressions test was first set forth by the Third Circuit in *Apple Computer Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984): "[I]f the same idea can be expressed in a plurality of totally different manners, a plurality of copyrights may result and no infringement will exist . . . If other methods of expressing that idea are not foreclosed as a practical matter, then there is no merger." *Id.* at 1253; see *Johnson Controls Inc. v. Phoenix Control Sys., Inc.*, 886 F.2d 1173, 1175 (9th Cir. 1989) (quoting *Herbert Rosenthal Jewelry Corp. v. Kalpakian*, 446 F.2d 738, 742 (9th Cir. 1971)) ("Where an idea and the expression merge or are inseparable, the expression is not given copyright protection.").

164. *Lotus Dev. Corp. v. Paperback Software Int'l*, 740 F. Supp. 37, 66 (1990).

165. *Id.*

166. *Id.*; cf. *Allen-Myland Inc. v. Int'l Bus. Machines Corp.*, 770 F. Supp. 1004, 1011 (E.D. Pa. 1991) (IBM's microcode tape was original since "IBM could have written [it] in a number of ways other than the particular mode of expression [IBM] ultimately selected.").

Despite these instances of merger, the court found that the menu command structure of Lotus 1-2-3 included other aspects which were “distinctive details of expression.”¹⁶⁷ For instance, the court noted that the program’s menu command line, reading “Command: BCDEFGIMPRSTVW,”¹⁶⁸ constituted protectable expression:

This particular expression of a menu structure is not essential to the electronic spreadsheet idea, nor does it merge with the somewhat less abstract idea of a menu structure for an electronic spreadsheet. The idea of a menu structure—including the overall structure, the order of commands in each menu line, the choice of letters, words, or “symbolic tokens” to represent each command . . . and the long prompts—could be expressed in a . . . literally unlimited number of ways.¹⁶⁹

Accordingly, the court concluded that, in spite of the program’s merged aspects, the Lotus 1-2-3 menu command structure, viewed as a whole,¹⁷⁰ was an “original and non-obvious way of expressing a command structure.”¹⁷¹

The plurality of expressions doctrine, as *Lotus Development Corp.* reflects, is closely linked to the notion of creative choice. If a computer developer selects a particular formulation of an idea from a broad range of alternatives, the resulting work will likely embody original expression or what one court recently termed “stylistic creativity.”¹⁷² Where only a singular expression is possible, by contrast, the courts find a lack of choice and, therefore, a lack of originality. Thus, in *Data East USA, Inc. v.*

167. 740 F. Supp. at 67.

168. Each of the capitalized letters, or “symbolic tokens” as Lotus termed them, referred to a specific command such as Blank, Clear, Delete, and Edit. *Id.*

169. *Id.*

170. “If particular characteristics not distinctive individually have been brought together in a way that makes the ‘whole’ a distinctive expression of an idea—one of many possible ways of expressing it—then the whole may be copyrightable.” *Id.*

171. *Id.* at 68.

172. See *Digital Communications, Inc. v. Softklone Distrib. Corp.*, 659 F. Supp. 449, 462 (N.D. Ga. 1987) (Status screen of plaintiff’s communications software deemed copyrightable because it included “considerable *stylistic creativity* and authorship above and beyond the ideas embodied in the status screen.”) (emphasis added).

Epyx, Inc.,¹⁷³ for instance, the Ninth Circuit found that similarities between defendant's World Karate Championship video game and plaintiff's Karate Champ¹⁷⁴ stemmed from conventions of the Karate game rather than from defendant's pirating of plaintiff's creative choices: "After careful consideration and viewing of these features, we find that they necessarily follow from the idea of a martial arts Karate combat game, or are inseparable from, indispensable to, or even standard treatment of the idea of the Karate sport. As such, they are not protectable."¹⁷⁵ As this decision indicates, where a court detects a narrow range of possible expression, such court is unlikely to find that a given author has made the kinds of creative choices which manifest originality and thus justify copyright.

Besides measuring the sphere of creative choices available to an author, American courts analyze the issue of originality by identifying particular constraints which may completely eliminate opportunities for authorial imagination.¹⁷⁶ If an author's choice is coerced, it obviously has not originated with the author and

173. 862 F.2d. 204 (9th Cir. 1988).

174. Examples of these similarities were that each game had fourteen moves, a two player option, a low kick, an upper-lunger punch, and one referee. *Id.* at 209.

175. *Id.*; see *Mason v. Montgomery Data*, 765 F. Supp. 353, 355 (S.D. Tex. 1991) (Land-ownership maps were not copyrightable since they were the "only pictorial presentation which could result from a correct interpretation of the legal description and other factual information"); *Secure Serv. Tech. v. Time & Space Processing*, 772 F. Supp. 1354, 1362-63 (E.D. Va. 1989) (general composition of protocol specifying content of binary signals for facsimile machine did not include "sufficient choice and selection to qualify for copyright protection.").

176. This doctrine—recognizing that a computer developer may emulate aspects of existing programs because of external constraints rather than his lack of imagination—is the heartland of the courts' originality analysis. In most copyright cases concerning computer programs today, the alleged infringer has not slavishly copied source code, the literal representation of the program in question. Instead, the alleged infringer has generally drafted separate code generating an exterior result which resembles nonliteral attributes of the plaintiff's program, such as its structure, sequence, and organization. The threshold originality requirement, therefore, is generally not in issue. Rather, the question is whether the defendant, by imitating nonliteral aspects of plaintiff's program, appropriated elements necessary to make the program work, or whether the infringer borrowed fanciful elements of expression. While the courts seem to agree that necessary elements should not be protected, they do not yet apply a consistent set of rules addressing the particular restraints on expression which affect computer programmers. In Part VI, such a set of rules is proposed for international application.

cannot be viewed as his or her own expression.¹⁷⁷ In the computer programming arena, courts have acknowledged that functional requirements may compel specific programming solutions, thwarting opportunities for individual expression. Where a particular aspect of a program is necessary to the program's proper functioning, courts treat it as an uncopyrightable idea.¹⁷⁸ These ideas, of course, are the building blocks upon which programmers rely to develop competitive programs.

One of the principal constraints on expression courts recognize derives from the useful article doctrine. Unlike France's Law of 1957, which does not explicitly state such a limitation on copyright,¹⁷⁹ the Copyright Act of 1976 specifies that purely utilitarian elements of a useful article's design cannot be copyrighted:

[T]he design of a useful article . . . shall be considered a pictorial, graphic, or sculptural work [which is copyrightable] . . . if, and only to the extent that, such design incorporates pictorial, graphic, or sculptural features that can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article.¹⁸⁰

177. See, e.g., *Apple Computer Inc. v. Franklin Comp. Corp.*, 714 F.2d 1240, 1253 (3d Cir. 1983), cert. dismissed, 464 U.S. 1033 (1984) ("[C]opyright protection will not be given to a form of expression necessarily dictated by the underlying subject matter.") (emphasis added).

178. See *Whelan Assoc. v. Jaslow Dental Lab.*, 797 F.2d 1222, 1236 (3d Cir. 1986), cert. denied, 479 U.S. 1031 (1987) ("[T]he purpose or function of a utilitarian work would be the work's idea, and everything that is not necessary to that purpose or function would be part of the expression of the idea.").

179. Although the Law of 1957 does not state such a rule, French courts, based on article 2, paragraph 2 of the Law of July 14, 1909 on drawings and models, have recognized an analogous doctrine under *droit d'auteur*. That provision states: "[I]f the elements constitutive of the novelty of the drawing or model are inseparable from those of the invention . . . such object may only be protected [under the law on patents]." ("[S]i les éléments constitutifs de la nouveauté du dessin ou modèle sont inséparables de ceux de l'invention . . . ledit objet ne peut être protégé que [par la loi sur les brevets]."). French courts have used the underlying principle of this provision to refuse protection, under the Laws of 1957 and 1985, to objects whose form or expression is inseparable from their useful function. See Bertrand, *La Protection Juridique des Interfaces en Droit Français*, 25 CAHIERS DU DROIT D'AUTEUR, Mar. 1990, at 1, 3.

180. *Lotus Dev. Corp. v. Paperback Software Int'l*, 740 F. Supp. 37, 52 (1990) (citing 17 U.S.C. § 101 (1988)) (defining pictorial, graphic, and sculptural works).

Courts have applied this provision to deny copyright for the design of a bicycle rack,¹⁸¹ of mannequins used to display clothing,¹⁸² and of a wire-spoked automobile wheel cover.¹⁸³ Apparently, these articles had certain aesthetic features which, because they were physically and conceptually inseparable from the useful or functional features of such articles,¹⁸⁴ were not viewed as incorporating the kind of creative choices copyright protects.¹⁸⁵

In *Lotus Development Corp.*, the court directly linked the useful article limitation to the idea versus expression dichotomy:

The expression of an idea is copyrightable only if it is original—that is, if the expression originated with the author.

Even then the expression of the idea is not copyrightable if the expression does no more than embody elements of the idea that are functional in the utilitarian sense.¹⁸⁶

The converse of this proposition, the court underscored, is that: “[T]hose elements of a useful article that can exist independently of the utilitarian aspects of the article are potentially copyrightable because those elements are elements of expression that can be distinguished from the utilitarian functions of the article.”¹⁸⁷ Thus, the court equated the utilitarian requirements of a program—those essential to its function—with ideas, and all other aspects, conceived independently of such constraints, as expression.

The difficulty courts have in applying this doctrine is two-fold. First, courts have not developed a dependable method for

181. *Brandir Int'l, Inc. v. Cascade Pac. Lumber Co.*, 834 F.2d 1142 (2d Cir. 1987).

182. *Carol Barnhart, Inc. v. Economy Cover Corp.*, 773 F.2d 411 (2d Cir. 1985).

183. *Norris Indus. v. Int'l Tel. & Tel. Corp.*, 696 F.2d 918 (11th Cir. 1983), *cert. denied*, 464 U.S. 818 (1983).

184. *See Carol Barnhart, Inc. v. Economy Cover Corp.*, 594 F. Supp. 364, 370 (E.D.N.Y. 1984), *aff'd*, 773 F.2d 411, 414 (2d Cir. 1985) (“A useful article may be copyrighted only to the extent that there is a physically or conceptually separable work of art embellishing it.”).

185. Notably, the useful article doctrine is not about the number of choices available to a creator, but about the kind of choice available to the creator. Even where a creator was able to choose among multiple design possibilities, a court applying the doctrine must determine whether such creator included certain features to express an aesthetic choice (copyrightable), or to implement a purely utilitarian design decision (not copyrightable). *See Brandir Int'l, Inc. v. Cascade Pac. Lumber Co.*, 834 F.2d 1142, 1145 (2d Cir. 1987) (“[C]opyrightability ultimately should depend on the extent to which the work reflects artistic expression uninhibited by functional considerations.”).

186. 740 F. Supp. at 58.

187. *Id.* at 52.

determining what a program's function is. The courts must select a definition for a program's function according to the same kind of abstraction scale they use in defining a work's idea. By way of example, the reader might imagine a program which enables a musician to compose music by tapping phrases into an electronic keyboard while observing the results of his playing notated on a personal computer screen. Now, suppose that International Business Machines Corp. (IBM) developed such a program for use on an IBM personal computer (PC) interfacing with a Casio piano. Suppose too that Samuel, a software developer, later created an improved version of the same program, with additional features. Finally, suppose that, although Samuel drafted his source code independently, Samuel found that, to achieve the proper interface between the piano and PC, he was obliged to use code substantially similar to the interface instructions in the existing IBM program. If a court were later required in an infringement case brought by IBM to determine the function of IBM's music writing program, the court might do so in a variety of ways. The function might be considered the efficient composition of music. Alternatively, it might be viewed as the efficient composition of music through the use of an electronic keyboard and a personal computer. More specific yet, the function might be deemed the efficient composition of music through the use of a Casio keyboard and an IBM PC. Each of these characterizations of the program's function would alter the court's ultimate conclusion as to which aspects of IBM's program were essential. Only in the last case would Samuel's use of substantially similar code likely be deemed permissible since it would probably be considered essential to making the Casio piano interface properly with the IBM PC.

The second problem courts have in applying the doctrine is determining the meaning of words such as "necessary" and "essential." These are subjective terms. Returning to the above example, suppose that IBM's music writing program had a scrolling feature allowing the musician to compose along a singular horizontal axis, so that as he composed, there would be absolutely no breaks in the notation which appeared on the screen display. Suppose also that Samuel independently drafted source code which

introduced the same scrolling feature into his program. Should this scrolling feature be considered necessary to the function, for instance, of efficient music composition on a personal computer? One court might decide this feature is not necessary to the program's function; traditionally, music was drafted on separate sheets of staff paper. Accordingly, Samuel had the option of creating a program that used a line-by-line approach wherein, after the musician types a certain number of lines of music, the computer would advance to a subsequent screen. By contrast, a second court might find that scrolling is an essential functional element of any music composition program; a musician must be able to compose continuously, without being interrupted even by momentary page breaks. The first court would categorize the scrolling feature as an element of protectable expression, whereas the second would view it as a necessary part of the program's function, that is, an uncopyrightable idea.

Absent a systematic approach to their analysis, the courts have inordinate latitude to define a program's function and discern those aspects of the program essential to its function. Undoubtedly, it is close to impossible for the courts to develop a bright-line test for identifying a program's function.¹⁸⁸ But there is no reason the courts should not apply an orderly set of guidelines to assist them in distinguishing essential, utilitarian components of a program from elements of authorial expression, the original creations copyright seeks to encourage and protect. Part III.C suggests that French courts also fail to distinguish carefully such protectable and nonprotectable program elements.

188. As explained above, defining a program's function is as elusive an undertaking as attempting to define its idea. Accordingly, this aspect of the analysis should probably be left to the wisdom of individual courts. *See supra* notes 151-54.

C. Finding Originality in Computer Programs Under French Law

1. Computer Programs as *Oeuvres de l'esprit* Under the Laws of 1957 and 1985

Under France's Law of 1957, legal protection is granted to so-called "*oeuvres de l'esprit*." Article 2 of the Law of 1957 states: "The provisions of the present law protect the rights of authors with respect to all *oeuvres de l'esprit*, regardless of their genre, the form of their expression, their merit, or their purpose."¹⁸⁹ Just as the term "work of authorship" is left undefined in the American copyright statute, the term "*oeuvre de l'esprit*" referred to in articles 1 and 2 of the Law of 1957 is never specifically explained.¹⁹⁰ However, in article 3 of the Law, a nonexhaustive¹⁹¹ list of works which constitute *oeuvres de l'esprit* is set forth. Originally, this list included books, brochures, and other literary, artistic, and scientific writings, cinematographic works, speeches, dramatic works, photographic works, lithographs, musical compositions, applied arts, and illustrations. Under the Law of 1985, the French legislature expanded the list specifically to include, along with several other categories of works,¹⁹² computer software.

Even after this list was expanded, however, courts have struggled to determine the precise meaning of "*oeuvres de l'esprit*" and ascertain when, and to what degree, such works should receive protection. Since the statute itself does not state what qualities render a work an *oeuvre de l'esprit*, courts have relied primarily on legal theory to make this determination.

189. Law of 1957, art. 2 ("*Les dispositions de la présente loi protègent les droits des auteurs sur toutes les oeuvres de l'esprit, quels qu'en soient le genre, la forme d'expression, le mérite ou la destination.*").

190. See DESBOIS, *supra* note 70, at 3-4.

191. The fact that the French legislature intended the list to be nonexhaustive is signaled by the term "notably" (*notamment*) placed before the list of protected works.

192. In particular, the legislature added protection for animated cinematographic works, circus acts, graphic and typographic works, enlarged the category of photographic works protected, and designated a new broad category of audiovisual works. Law of 1985, tit. 1, arts. I-V.

According to the minority position, an *oeuvre de l'esprit* is necessarily a literary or artistic work. One proponent of this position reasons that, because the title of the Law of 1957 indicates the Law covers literary and artistic property, a work must have a literary or artistic character to qualify as a protectable *oeuvre de l'esprit*.¹⁹³ To win the Law's protection, the theory goes, a work must be cultural or aesthetic.¹⁹⁴ Purely technical or commercial works, proponents of this position conclude, were not traditionally considered *oeuvres de l'esprit*, and therefore should not receive protection under the Law of 1957.¹⁹⁵

The majority of French scholars disagree with this characterization of *oeuvres de l'esprit* under the Law of 1957. The legislature, they argue, never explicitly stated that a work had to be aesthetic or cultural to be protected under the law.¹⁹⁶ Rather, in article 2 of the Law of 1957, the legislature made clear its indifference to the genre,¹⁹⁷ form,¹⁹⁸ merit,¹⁹⁹ and

193. See Plaisant, *supra* note 60, Fasc. 301, at 18.

194. *Id.* But cf. Judgment of March 7, 1986, Cass. ass. plén., 1986 D.S. 405 concl. Cabannes et note Edelman ("[L]egal protection extends to any work stemming from original intellectual creation independent of any aesthetic considerations.") ("[L]a protection légale s'étend à toute oeuvre procédant d'une création intellectuelle originale indépendamment de toute considération d'ordre esthétique."); DESBOIS, *supra* note 70, at 54-57 ("[T]he originality determination suffices: protection is assured whether the work has a utilitarian or cultural purpose.") ("[L]a constatation de l'originalité suffit: la protection est assurée, que l'oeuvre ait une destination utilitaire ou culturelle.").

195. Plaisant, *supra* note 60, FASC. 301, at 9-10.

196. In fact, the Law of 1957 does not even provide a definition of literary or artistic works.

197. "Genre" refers to the category of work. Under traditional theory, there were three possible genres: letters, music, and the fine arts. Or, as article 7 of the Law of 1790 stated: "[A]ny production of imagination or genius belongs to the *Beaux-Arts*." ("[T]oute production de l'esprit ou du génie appartenant aux *Beaux-Arts*."). See COLOMBET, *supra* note 41, at 32.

198. "Form" refers to the particular means through which a work is expressed. COLOMBET, *supra* note 41, at 32. For instance, a musical work will be protected whether written for instrument or voice; a sculpture whether created in marble or bronze; a literary piece whether drafted in writing or spoken. *Id.*

199. "Merit" refers to the intellectual, artistic, or aesthetic qualities of a work. *Id.* In theory, a judge must not evaluate such qualities in a work since, to do so, would be to impose his personal tastes upon the public and thus perpetrate a sort of censorship. However, some commentators suggest that the merit of a work must be assessed on some level since, otherwise, the scope of protection under the Law of 1957 would become excessively broad. See, e.g., PLAISANT, *supra* note 40, at 22.

purpose²⁰⁰ of a work, simply requiring that the work constitute an *oeuvre de l'esprit*, the creative production of an individual. Although most courts have accepted this expansive notion of *oeuvre de l'esprit*, a few courts have tried to limit it, requiring that works possess an obvious literary, artistic, or aesthetic quality.²⁰¹

More important, almost all French courts and commentators seem to agree that, in order to be a protectable *oeuvre de l'esprit*, a work must express its creator's personality. This additional requirement, springing from the same author-centered values from which authors' moral rights derive, is set forth under two doctrines. First, to be protected, a work must demonstrate originality.²⁰² Originality, for purposes of the Law of 1957, exists when a work incorporates its creator's unique personality.²⁰³ The work, it is generally said, must bear the "impress of the creator's personality."²⁰⁴ Second, only a creator's personal expression may be protected, not underlying ideas or thoughts which exist independent of the creator's personal output.²⁰⁵ This second concept is obviously analogous to the idea versus expression dichotomy set forth in the Copyright Act of 1976 and applied by American courts examining the issue of originality. However, as will be discussed further below, French courts rarely mention the dichotomy when analyzing whether specific elements of a work should be protected and do not generally attempt, as do American courts, to discern the fine line between idea and expression. Rather,

200. By eliminating the purpose restriction on copyrightable subject matter, the legislature codified the so-called "Unity of Art" doctrine. See Jane C. Ginsburg, *French Copyright Law*, 36 J. COPYRIGHT SOC'Y 269, 273 (1989). Under this doctrine, whether a work is pure art, or art integrated into an entity which will ultimately serve some utilitarian purpose, the work may be protected under the Law of 1957. *Id.*; see COLOMBET, *supra* note 41, at 34-35.

201. A classic example is the refusal of the Paris Appeals Court (*Cour d'appel*) to provide protection to the formula for a perfume scent which, the court decided, was an industrial creation lacking the requisite aesthetic attributes of an *oeuvre de l'esprit*. See Plaisant, *supra* note 60, Fasc. 303, at 10 (citing Judgment of July 3, 1975, Trib. of Paris, 1976 D.S., somm. 19; 91 R.I.D.A., Jan. 1977, at 108).

202. DESBOIS, *supra* note 70, at 86.

203. *Id.*

204. *Id.*

205. *Id.* at 22-31; C. Brossand & P. Durnerin, *L'absence de protection des idées par le droit d'auteur*, 1988 GAZETTE DU PALAIS [G.P.] 69-72 (1er sem.) (Fr.).

French courts rely almost exclusively on the notion of originality to determine what aspects of a work merit protection.

The provisions of the Law of 1985 extending legal protection to computer software reveal an awkward fit between the ideal of an *oeuvre de l'esprit*, creation emanating from an author's person, and the reality of mass-marketed high technologies. It should be noted that, before the law was passed, a government commission had recommended that computer software be protected pursuant to a *sui generis* or neighboring rights statute.²⁰⁶ However, the Special Committee of the French National Assembly which reviewed the proposal rejected the *sui generis* option,²⁰⁷ and instead set forth, on April 4, 1984, a set of amendments which would place computer software under the traditional rubric of *droit d'auteur*.²⁰⁸ The legislature made this decision in the face of considerable controversy, some of which still exists today.

In addition to the crucial provision in Title I of the Law of 1985 conferring protection to computer software²⁰⁹ under French *droit d'auteur*, Title V thereof, entitled "Software" ("*Les*

206. Specifically, the National Institute of Industrial Property (*L'institut National de la Propriété Industrielle*) proposed the implementation of a neighboring rights statute setting forth a high threshold of originality and calling for filing of software in order to establish the date of its creation. See LUCAS, *LE DROIT DE L'INFORMATIQUE* 214 (1987); Hoffman & Grossman, *Moral Rights and Computer Software; An International Overview*, 5 *COMPUTER LAW* 6, 9-16 (1989).

207. Although the National Assembly decided not to create separate legislation, it did incorporate many of the other suggestions made by the government commission. LUCAS, *supra* note 206, at 210-14; Hoffman & Grossman, *supra* note 206, at 9-16.

208. LUCAS, *supra* note 206, at 210-14; Hoffman & Grossman, *supra* note 206, at 9-16.

209. Interestingly, France's National Assembly did not indicate exactly what aspects of computer technology it sought to protect under the Law of 1985. Rather, the legislature simply referred to the subject matter as "logiciel," which translates roughly as "software." But see Decree (*Arrêté*) of Dec. 22, 1981 Pertaining to the Enrichment of Computer-Related Vocabulary, Issued by the Ministry of Industry and the Ministry of National Education, *Journal Officiel de la République Française* [J.O.] at 624 (Jan. 17, 1982) (defining "software" (*logiciel*) as "the group of programs, procedures and rules, and . . . documentation, involved in the functioning of an information processing system.") ("*[L]ensemble des programmes, procédés et règles, et . . . de la documentation, relatifs au fonctionnement d'un ensemble de traitement de l'information.*"). Without any definition of software included in the Law of 1985, some analysts question whether *logiciel* includes such elements as a program's flow charts, manual, the object or source code, or even the text on the packaging accompanying the software product. See Hoffman & Grossman, *supra* note 206, at 9-16. Furthermore, if one views the computer as an integral machine in which hardware and software elements often merge, the Laws of 1957 and 1985, by protecting software, arguably end up protecting some purely technologic aspects of the computer.

Logiciels''), introduced seven other significant modifications into the Law of 1957.²¹⁰ Several of these modifications broke measurably from traditional French legal doctrine pertaining to authors' rights, demonstrating the incongruities of protecting software products under provisions intended to protect conventional literary and artistic property. Perhaps the most astonishing provision is Title V, article 46 of the Law of 1985, basically eliminating the moral rights of a software developer: "Unless otherwise specified, the author may not contest the adaptation of software to the extent that the author has assigned rights therein, nor can the author exercise his right to repent or withdraw the work from publication."²¹¹ By taking away the software author's right to oppose changes in his work (i.e., the right to maintain the integrity of the work)²¹² as well as his right to repent or withdraw it, this provision differs measurably from traditional *droit d'auteur* and its emphasis on *droit de la personnalité*. Under the Law of 1957, the poet, the painter, and the sculptor, even after transferring economic rights in their works, can challenge and prevent so little as trivial alterations which might detract from the integrity of their personal creation. By contrast, under the Law of 1985, the software developer who assigns economic rights in his or her work, absent a prior agreement to the contrary, has no recourse

210. In summary, these modifications include: (1) a provision granting employers all rights in software created by their employees in the discharge of their duties, (2) a provision limiting the duration of protection for software to 25 years following the software's creation date, (3) a provision essentially eliminating an author's moral rights following assignment of his work, (4) a provision prohibiting a software user from making a copy (other than a back-up copy) of the software or using the software in any way not expressly authorized by the author, (5) a provision stating that rights in software can be assigned for a lump-sum price, (6) a provision instituting a procedure for enjoining infringement, and (7) a provision extending protection to those foreign software authors in France who are nationals or domiciliaries of a country which provides similar protection to French nationals or domiciliaries. Law of 1985, tit. V.

211. Law of 1985, tit. V, art. 46 ("*Sauf stipulation contraire, l'auteur ne peut s'opposer à l'adaptation du logiciel dans la limite des droits qu'il a cédés, ni exercer son droit de repentir ou de retrait.*").

212. See Bensoussan, *Droit d'Usage, Licence et Contrefaçon*, 129 EXPERTISES, July 1990, 221-25 (Article 46 eliminates an author's "right to the integrity of his work"); cf. Le Stanc, National Report (France) in *Actes du 57 Congrès de l'ALAI 183-96* (1990) (arguing that article 46 removes an author's "right to the respect of his work").

under a moral rights theory when the assignee subsequently alters (or even destroys) such work.

The legislature's decision to eliminate these moral rights is grounded primarily in its concern for the software user. Specifically, the legislature foresaw the plethora of practical problems that would follow if software users, before they could correct a bug in the software, alter the software to accomplish a new task, or perform simple maintenance operations, were obliged to obtain prior approval of the software's author.²¹³ In the legislature's view, the author's general discretion to grant or refuse such approval, free of court scrutiny,²¹⁴ would significantly conflict with the interests of the software user to modify and develop the work in accordance with his particular computing needs. Thus, the legislature chose essentially to withdraw moral rights from the author of software, eliminating, in this context, the set of rights which probably represents the most obvious difference between conventional *droit d'auteur* and American copyright law.

The Law of 1985 further modifies the distribution of rights created under the Law of 1957 by setting forth a special rule for software created by employees in the employment setting. In particular, Title V, article 45 of the Law of 1985 states: "Unless otherwise specified, software created by one or several employees in the exercise of their duties shall belong to the employer, to whom all of the rights conferred upon authors shall devolve."²¹⁵ In many respects, this rule is analogous to the work-made-for-hire doctrine codified in the 1976 Copyright Act.²¹⁶ However, no such

213. LUCAS, *supra* note 206, at 256-58.

214. According to at least one decision of France's highest court, a judge may not evaluate the legitimacy of an author's decision to exercise his moral rights. Judgment of June 5, 1984 (Maddalena et autres v. Raffin et autres) Cass. civ. 1re, 1984 Bull. Civ., No. 184, at 157 (holding that the *Cour d'appel* improperly evaluated the appellants' exercise of the right of paternity).

215. Law of 1985, tit. V, art. 45 ("Sauf stipulation contraire, le logiciel créé par un ou plusieurs employés dans l'exercice de leurs fonctions appartient à l'employeur auquel sont dévolus tous les droits reconnus aux auteurs.").

216. 17 U.S.C. § 101 (1988) (defining a "work made for hire" as "a work prepared by an employee within the scope of his or her employment."). "In the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title, and, unless the parties have expressly agreed otherwise in a written instrument signed by them, owns all of the rights comprised in the copyright." 17 U.S.C. § 201(b) (1988). Notably, these

provision has existed previously either in the Law of 1957 or under French jurisprudence pertaining to literary and artistic property.²¹⁷ By attributing software created in the work setting to the employer rather than to its true creator, article 45 departs radically from the well-established notion under French *droit d'auteur* that the person who authors a literary or artistic work remains somehow inexorably linked to his creation.²¹⁸ Article 45 instead confers all rights upon the employer, including both economic and, apparently, moral rights.²¹⁹ Arguably, this provision is in conflict with article 6 of the Law of 1957²²⁰ stating that the author of a work holds certain moral rights which are perpetual, inalienable, and imprescriptible, attached to the author's person.²²¹

Reading articles 45 and 46 of the Law of 1985 together, one detects an unmistakable metamorphosis. The law no longer seems

provisions explicitly attribute both ownership rights and authorship to the employer. *See generally* Devaney, *Supreme Court Clarifies Application of Work Made for Hire Doctrine*, SOFTWARE PROTECTION, June 1989, at 10-14. Article 45 of the Law of 1985 expresses the same idea more cryptically: software "shall belong" to the employer who shall obtain "all the rights conferred upon authors."

217. One might argue that some precedent for such a rule existed before 1985, in that the Law of 1957 confers property rights in collective works—i.e., works created by several authors at the initiative and under the control of either an individual or a corporate entity—to the individual or corporate entity in whose name such work is published (who, presumably, is often the authors' employer). *See* Law of 1957, arts. 9, 13. However, the Law of 1957 does not explicitly create a presumption of ownership in favor of the employer of a collective work's authors.

218. *See* Edelman, *supra* note 74; *see also* Edelman, *La Main et L'Esprit*, 1980 D.S. chs. 43-46.

219. However, some legal observers believe Article 45 only confers economic rights upon the employer, the moral rights remaining, in accordance with Article 6, with the employee himself. *See, e.g.*, Judgment of Mar. 7, 1986, Cass. ass. plén., 1986 J.C.P. II, No. 14713 observations Mousseron, Teyssié, and Vivant. Under this reading of the statute, the moral rights held by the employee would only be nominal; that is, they would not actually permit the employee to exercise any power over the work. *Id.*

220. *See* Bensoussan, *supra* note 212, at 226; Hoffman & Grossman, *supra* note 206, at 10. In addition, article 45 of the Law of 1985 deviates from the rule set forth in article 21 of the Law of 1957 stating that: "The author holds during his life the exclusive right to exploit his work in any form whatsoever and to obtain a pecuniary profit therefrom." ("*L'auteur jouit sa vie durant du droit exclusif d'exploiter son oeuvre sous quelque forme que ce soit et d'en tirer un profit pécuniaire.*").

221. However, one might also argue that any conflict between provisions of the Law of 1985 and those of the Law of 1957 is tempered by the language in article 3 of the Law of 1957 (as modified by the Law of 1985), granting computer programs status as *oeuvres de l'esprit* "according to the terms and conditions defined in [the Law of 1985]." ("*selon les modalités définies au titre V de la loi n° 85-660 du 3 juillet 1985*") (emphasis added).

to vindicate two ideals. Rather, the exigencies of economic logic²²² seem to have overwhelmed the law, the legislature having opted to trim away the personal, author-centered rights traditionally associated with French *droit d'auteur* and instead conceive a set of rules by which efficient transfer of economic rights in computer software can be carried out. Some commentators have lamented this evolution in the law as a threat to the unique and historic identity of *droit d'auteur*, while others warn that the law's new emphasis on economic rights may soon be "fatal to a proper protection for creators."²²³ Although it is debatable whether these provisions of the Law of 1985 do not, in certain instances, transgress the very fundamentals of French *droit d'auteur*, they surely bring French law closer to the essentially one-sided economic perspective of American law.

2. The Evolution of the Originality Requirement in French Jurisprudence

Just as France's legislature has modified basic provisions to assure an appropriate form of legal protection for computer software, French courts have also reshaped their traditional approach. Like American courts, French courts are still examining how best to distinguish protectable elements of authorship from nonprotectable technologies incident to or required by the computer art. The chief doctrine French courts apply is the originality requirement.

Although the Laws of 1957 and 1985 remain unclear on the question,²²⁴ courts and scholars specifically condition the legal protection of *oeuvres de l'esprit* on originality.²²⁵ They base their

222. See Legeais, *Le Droit D'Auteur Face aux Nouvelles Technologies*, 42 REVUE INTERNATIONALE DE DROIT COMPARÉ 677, 690 (1990).

223. *Id.*

224. Specifically, the term "original" is mentioned in articles 4, 5, and 14 of the Law of 1957. The Law of 1957 never states, however, that an *oeuvre de l'esprit* must be original to enjoy protection under the statute. See Gaudrat, *L'Originalité des logiciels*, 7 CAHIERS LAMY DU DROIT DE L'INFORMATIQUE, Oct. 1989, at 2-8.

225. See B. SHAMING & J. BURST, *LE DROIT DU LOGICIEL* 51 (1990) (stating that courts and commentators have required originality under French *droit d'auteur* for almost two centuries).

rule on a universal conviction that no work may be protected unless it manifests creation.²²⁶ So settled are they in this belief, they often recite the phrase of Henri Desbois²²⁷ proclaiming originality the “touchstone of copyright.”²²⁸

While most French scholars agree that *droit d'auteur* must include the requirement of originality, there is little consensus regarding what it actually should entail. As any legal theory fashioned without particular statutory constraints, the originality criterion has undergone multiple transformations. Legal commentators often describe it as something of a doctrinal blur.²²⁹

The classic definition of originality in France finds inspiration in the personalist conception of authors' rights. As one commentator explains, that French law grants an author moral rights (giving the author significant control over a personal creation) reveals the law's underlying assumption—or prerequisite—that such personal creation actually exists.²³⁰ Accordingly, a work is said to be original only when it “bears the imprint of the author's personality.”²³¹ Some scholars even call the concept “aesthetic originality,” emphasizing that originality stems from the personal character of an author's work, expressing his ideas, feelings, and sensibilities.²³²

When applying these traditional theories, courts evaluate originality subjectively.²³³ In particular, the courts scrutinize the work in isolation to see whether it evinces an imprint of the author's personality.²³⁴ The work need not demonstrate novelty, the objective criterion which inventions must satisfy under patent

226. *Id.*; COLOMBET, *supra* note 41, at 36.

227. Henri Desbois, who passed away in 1985, authored *LE DROIT D'AUTEUR EN FRANCE* (3d ed. 1978), probably France's most comprehensive and oft-quoted treatise on copyright.

228. *See, e.g.*, Gaudrat, *supra* note 224, at 2 (citing DESBOIS, *supra* note 70, at 11).

229. *See, e.g.*, COLOMBET, *supra* note 41, at 40 (“[L]’originalité . . . apparaît comme une notion plutôt floue. . .”).

230. Gaudrat, *supra* note 224, at 2.

231. DESBOIS, *supra* note 70, at 78; SCHAMING & BURST, *supra* note 225, at 58.

232. *See, e.g.*, PLAISANT, *supra* note 40, at 27-29.

233. DESBOIS, *supra* note 70, at 5-8; SCHAMING & BURST, *supra* note 225, at 58.

234. DESBOIS, *supra* note 70, at 5-8; SCHAMING & BURST, *supra* note 225, at 58.

law.²³⁵ Thus, as Desbois described, two artists can paint the same scene separately and later both receive protection for their works, even though the artist who finishes last will not have created something new or unique.²³⁶ Since both works express the personality of their creators, both will receive protection.

This subjective, author-centered view of originality is easily applied to literary, sculptural, and musical works.²³⁷ As one commentator remarked, with these kinds of creation, originality seems to “flow from its source.”²³⁸ In cases concerning works of a technical or scientific nature, by contrast, proof that an author has somehow imbued the work with his personality is far more difficult.²³⁹ Copyright litigation concerning computer software, at once literary and technological in nature, has tested the flexibility of this classic criterion of originality, cultivating its rapid evolution.

With the initiation of computer software into the subject matter of the Law of 1957, some French analysts claim the legal definition of originality is no longer appropriate. If originality requires an author to infuse his personality into his work, can a computer program, they ask, truly meet the test?²⁴⁰ Does the programmer, they inquire, actually express his personality through the source code he employs? Moreover, if originality also requires an author’s work to be aesthetic, that it appeal on some level to human

235. The emphasis French legal theory places on this subjective-objective distinction again points to the author-centered perspective of the law. Originality, when analyzed subjectively, can only be perceived in the work itself, not by comparing it to anterior works. Although in most cases French courts continue to analyze each work subjectively to detect evidence of the author’s original creation, in a growing minority of cases pertaining to protection of computer programs, the courts have moved toward objective analysis. See Lucas, *Propriété Littéraire et Artistique*, JURIS CLASSEUR Fasc. 303-1, at 6-8 (1986).

236. DESBOIS, *supra* note 70, at 5-6; cf. *Bleistein v. Donaldson Lithographing Co.*, 188 U.S. 239, 250 (1903) (concluding that while “[o]thers are free to copy the original . . . [t]hey are not free to copy the copy.”).

237. Lucas, *supra* note 235, Fasc. 303-1, at 5.

238. *Id.*

239. In particular, the theory goes, technical and scientific works provide less room for personal expression since their primary purpose is to convey factual information. *Id.* Critics might question whether such works of technology truly express less than traditional literary and artistic works, or whether this theory represents the reaction of technically illiterate jurists for whom the expressive content of such subject matter seems arcane.

240. See, e.g., Judgments of March 7, 1986, Cass. ass. plén., 1986 D.S. 405 note Edelman.

affections and perception, can machine code, which instructs the computer electronically rather than stimulating human senses, meet this criterion too?²⁴¹ Some commentators respond to these inquiries in the negative; they would conclude that *droit d'auteur* may not be applied to protect computer software without betraying the aesthetic, author-centered essence of the law.²⁴² However, the current trend in French legal theory rejects this view.²⁴³ The originality requirement, several commentators and France's highest court now agree,²⁴⁴ can be modified and applied to computer programs and other advanced technologies without departing improperly from basic French legal theory.

Several of the recent modifications French courts have made in the legal requirement of originality incorporate concepts similar to those American courts use to discuss the issue of originality. First, French courts have moved away from the personality theory of creation, acknowledging that sometimes a work may be original even when it does not readily bear the impress of its author's personality. In particular, courts now recognize originality where a work evidences an author's intellectual effort, intellectual work, or intellectual contribution.²⁴⁵ These standards, silent on the issue of personality, resemble the locutions of American courts equating originality with any manifestation of an author's independent intellectual labors. In a recent software infringement case, the Tribunal de grande instance of Paris concluded that the defendant's software product was not original and infringed the plaintiff's work because the defendant's product did not demonstrate sufficient

241. See, e.g., R. Plaisant, *La protection du logiciel par le droit d'auteur*, GAZ. PAL., Sept. 25, 1983.

242. VIVANT ET AL., *supra* note 11, at 628-32.

243. *Id.*

244. Notably, the *Société Babolat Maillot Witt v. Pachot* case, in which the *Cour de cassation* concluded that a computer program could be an original *oeuvre de l'esprit*, arose under the Law of 1957, prior to enactment of the Law of 1985. The *Cour de cassation* decided the case under the Law of 1957, without applying the newly passed 1985 amendments. In theory at least, therefore, the court made its decision to protect computer programs under the Law of 1957 independently of the legislative decision in this regard. See *infra* notes 255-61 and accompanying text.

245. See Lucas, *supra* note 235, at 6 (citing cases).

independent effort.²⁴⁶ The court apparently did not engage in close, subjective analysis of the defendant's work, but simply decided that the defendant "did not have the technical and financial capacity to realize, within one year, an original software product."²⁴⁷ Thus, instead of inspecting the defendant's work for signs of personal expression, the court relied on sheer pragmatism: the defendant's work could not have been original because the defendant had neither the resources nor the time necessary to have created such a work.

Second, when analyzing the quantum of authorship contained in computer programs, French lower courts have begun using terms traditionally considered to fall within the exclusive domain of patent law. Like American courts,²⁴⁸ the French courts seem tempted to analyze the originality of highly technical works by examining whether such technologies have comparable precedents in the existing art. For example, in *Société Isermatic France v. Société Gerber*,²⁴⁹ where the plaintiff alleged that the defendant sold infringing copies of the plaintiff's original R.O.M. modules, the *Cour d'appel* of Grenoble defined an original work as one which: "carries the mark of the intellectual contribution of the author, that is to say, in which one can recognize an individualized intellectual effort and an objective character of novelty."²⁵⁰

246. Judgment of Apr. 8, 1987, Paris Trib. gr. inst., 1989 J.C.P., II, No. 21, cited in Edelman, *Chronique de propriété littéraire et artistique*. This case shows the tendency of French courts to analyze whether the defendant infringed the plaintiff's original work by inquiring whether the defendant's work is original. Arguably, such analysis obfuscates the essential inquiries of whether the plaintiff's work is an original (and therefore protectable) *oeuvre de l'esprit* and whether the defendant has improperly copied original expression contained in plaintiff's work. See PLAISANT, *supra* note 40, at 140 ("[T]here is infringement in the case where characteristic and original elements of expression of the first work are found in the second work.") ("[I]l y a contrefaçon dans le cas où se retrouvent dans l'oeuvre seconde les éléments caractéristiques et originaux de l'oeuvre première en sa forme.").

247. Judgment of Apr. 8, 1987, 1989 J.C.P., No. 21, cited in Edelman, *Chronique de propriété littéraire et artistique*.

248. See *infra*, notes 310-13.

249. Judgment of Sept. 19, 1989, Grenoble Cours d'appel, 131 *Quotidien Juridique* (Nov. 6, 1990) at 8-10, *pourvoi rejeté*, Judgment of Apr. 16, 1991, Cass. civ. 1re, 139 *EXPERTISES*, May 1991, at 194-95.

250. *Id.*

The *Cour d'appel* determined that the plaintiff's modules constituted original *oeuvres de l'esprit* and that defendant's servile copies were therefore infringing.²⁵¹ Although the *Cour d'appel*'s finding of infringement was justified, its confusion of originality and novelty, according to the *Cour de cassation*, was not.²⁵² On appeal, the defendant argued, among other things, that since the originality of software is defined as "the synthesis of the creator's inventiveness and of novelty," the *Cour d'appel* should have determined whether plaintiff's work constituted a "protectable novelty."²⁵³ The *Cour de cassation*, upholding the *Cour d'appel*'s finding of infringement, rejected the defendant's attempt to introduce the concepts of novelty or inventiveness into the lexicon of *droit d'auteur*. The *Cour de cassation* concluded that the "notion of a novel invention" has no place in a case brought under the Law of 1957.²⁵⁴

Third, French courts are beginning to analyze the originality of computer programs, as do American courts, in terms of the freedom programmers enjoy to make imaginative choices when programming. In the landmark *Société Babolat Maillot Witt v. Pachot* case,²⁵⁵ the *Cour de cassation* set forth a new standard for originality based on a theory of choice.²⁵⁶ The court held that a programmer, like a translator, can manifest his personality through the decisions he makes: "[P]rogram analysts have to choose, like

251. The defendant admitted that it had directly copied the plaintiff's work. Thus, the court did not have to consider the issue of copying when assessing plaintiff's infringement claim. *Id.*

252. Judgment of Apr. 16, 1991, Cass. civ. 1re., 139 EXPERTISES, May 1991, at 194-95.

253. *Id.* ("[L]originalité du logiciel 'se définissant comme la synthèse de l'esprit inventif du créateur et de la nouveauté,' la cour d'appel devait rechercher si les modules mis au point par Gerber 'constituaient une nouveauté protégeable.' ").

254. *Id.*

255. Judgment of March 7, 1986, Cass. ass. plen., 1986 J.C.P. II, No. 83-10.477, 20631, note Mousseruon, Teyssié, and Vivant, 1986, J.C.P. II, No. 1, obs. Vivant and Lucas, D. 1986, 405, concl. Cabannes, and note Edelman.

256. The facts of *Pachot* are as follows: On his own free time, Jean Pachot, head accountant for Babolat Maillot Witt (BMW), designed an application program which he used to do accounting for BMW. When a member of BMW's management later requested to make a back-up copy of the program, Pachot refused and brought the only existing copy to his home. BMW subsequently dismissed Pachot from employment. In a subsequent case brought by Pachot challenging his dismissal, two important collateral issues were whether Pachot was owner of the program and whether the program constituted an original *oeuvre de l'esprit*. *Id.*

translators of written works, between diverse modes of presentation and expression . . . their choices thus carry the mark of their personality.”²⁵⁷ This doctrine follows the reasoning behind the plurality of expressions test posited in American jurisprudence. Where a computer programmer can choose between diverse manners of carrying out a particular operation, his particular choices embody original expression or, in the parlance of the France’s High Court, the author’s personality.²⁵⁸

The *Pachot* court also implied that the originality of a computer program may depend on whether its author has transcended those forms of expression which stem solely from constraints of programming logic. The program in question was original, the court concluded, because its author had “demonstrated a personalized effort going beyond the simple application of an automatic and constraining logic” and because the author’s effort “resided in an individualized structure.”²⁵⁹ Thus, the court associated a lack of originality with aspects compelled by programming “logic,” and the presence of originality with elements reflecting unconstrained, independent programming decisions.

The court’s conclusion—that originality exists where a programmer has made unfettered programming choices—has met the criticism of advocates for the traditional personalist approach to *droit d’auteur*. Indeed, there is little precedent in French copyright law suggesting that the freedom to choose is equivalent to expression of an author’s personality. As one commentator notes, not every choice that an individual makes necessarily is creative or suggestive of his or her personality.²⁶⁰

257. *Id.*

258. *Id.*; see Judgment of April 16, 1991 (*Société Isermatic France v. Société Gerber*), Cass. civ. 1re, 139 *EXPERTISES*, May 1991, at 194-95 (Plaintiff’s modules deemed original because they incorporated plaintiff’s “creative choices” and demonstrated plaintiff’s “personal contribution”).

259. *Id.* (emphasis added).

260. See Judgments of Mar. 7, 1986, Cass. ass. plén., 1986 D.S. 405, at 416 note Edelman. *But cf.* Judgment of May 21, 1975, Cass. civ. 1re, 1975 Bull. Civ. I, No. 171, at 145 (price index deemed original based on its conception, structure and the information presented); Judgment of May 9, 1984, Grenoble Trib. gr. inst., 1985 D.S., inf. rap. at 309, note Colombet (survey regarding prices in various department stores deemed original based on its methodology, size, and manner of presenting

The court's fusion of language reminiscent of the personality concept, such as "personalized" and "individualized," and language evoking the labor justification of copyright, such as "effort" and "contribution" begs further explanation.²⁶¹ Perhaps the court's conclusion can be given greater clarity by considering alternative definitions for personality. If personality is interpreted according to a vernacular definition—as meaning, for instance, "the peculiar character traits of a human being"—the court's theory, linking a programmer's choices to his or her "personality," would seem rather absurd. An engineer's programming choices obviously cannot reflect his character traits in the same way, for example, that the writings of a poet might mirror his unique traits. However, if the *Pachot* court's term "personality" is construed as meaning "that which owes itself to the person" or "coming from the person," then its theory seems less obscure. Under this second interpretation, a "personalized" or "individualized" work would signify something akin to an "original" work under American law, that is, a work owing its origin to a particular author. Under this second interpretation, therefore, the court is viewed as adopting a consonant, labor-oriented approach to *droit d'auteur*.²⁶²

Assuming the court in *Pachot* intended to state a low-level independent labor standard of originality, its analysis may prove troublesome in a second respect. Although it insinuated that the creative choices available to computer programmers may sometimes be limited, the *Cour de cassation* did not clearly enumerate what such limitations are likely to include. The court

information).

261. In decisions subsequent to *Pachot*, the *Cour de cassation* has continued to interweave the labor and personalist conceptions of originality. See Judgment of April 16, 1991 (*Société Isermatic France v. Société Gerber*), Cass. civ. I, 139 EXPERTISES 194-95 (May 1991) (concluding that the originality of the plaintiff's R.O.M. modules was demonstrated by the plaintiff's personal contribution).

262. However, in a recent case concerning a compilation of information regarding automobile companies, the *Cour de cassation* indicated that evidence of an author's labor does not itself attest to the originality of the author's work. In particular, the *Cour de cassation* held that the *Cour d'appel* of Douai improperly concluded that the compilation in question was original, failing to specify in what way its text or graphic form demonstrated the kind of intellectual authorial contribution which constitutes an original creation. Judgment of May 2, 1989 (*S.A.R.L. Les Publications pour l'expansion industrielle v. S.A. Coprosa*), Cass. civ. I, 1990 J.C.P., No. 1.

stated that a computer programmer demonstrates originality when he or she has gone “beyond the simple application of an automatic and constraining logic.” However, the court left it to future tribunals to determine the specific ways in which an automatic and constraining logic restrict the range of programming expression. For instance, should a court applying *Pachot* consider a computer program’s standard interface instructions an “application of an automatic and constraining logic?” If a court applying *Pachot* had to decide whether use of the customary L-shaped screen display in a spreadsheet program constitutes an original *oeuvre de l’esprit*, would the court be able to determine whether a constraint of logic compelled such screen display design? In short, because the *Cour de cassation* in *Pachot* refers broadly to the possible constraint of logic, it remains unclear whether future courts applying *Pachot* will consider additional limitations programmers face when developing software. As Part IV discusses, there are at least four such limitations courts should systematically consider when examining the originality of a particular computer technology. If future tribunals instead read *Pachot* narrowly and limit their analysis to the most obvious constraints of programming logic, they may recognize originality where truly there is none.

3. The Idea Versus Expression Dichotomy Under French Law

The idea versus expression dichotomy provides French courts the natural framework under which to broaden their analysis of originality in computer programs. Imperfect as the dichotomy may be, it is a central concept not only in American copyright law, but also in the laws of many member states of the EC. In its Directive, the Council of Ministers restates the idea versus expression distinction as an essential limitation on the protection of computer programs.²⁶³ Although French courts also recognize the

263. See Directive, *supra* note 12, art. 1 (setting forth the idea versus expression dichotomy); see also *supra* note 150. “[O]nly the expression of a computer program is protected . . . [I]deas and principles which underlie any element of a program, including those which underlie its interfaces,

distinction, they do not apply it in all cases. In fact, no French court has specifically distinguished components of a program which are "idea" from those that are "expression." In cases concerning computer technologies, French courts appear to have relaxed the originality requirement, shifting from a strict imprint of the personality standard to a minimal standard equating originality with a developer's unconstrained programming choices or personalized effort.²⁶⁴ The originality standard French courts apply has thus come to resemble closely the independent-effort standard American courts use when analyzing the narrow legal requirement of originality. As American courts, therefore, French courts arguably should also probe the issue of originality under the idea versus expression construct. Without applying the idea versus expression dichotomy, or a similar metaphor, French courts will likely extend protection to aspects of computer programs compelled by purely practical or technical concerns, aspects which should remain in the public domain.

Similar to American courts, French tribunals perceive a distinction between idea and expression. Desbois once wrote: "Ideas . . . taken in and of themselves, independently of the form in which they are conveyed, escape all appropriation. Only the form under which the idea has been presented, if such form is original, gives rise to an exclusive right."²⁶⁵ Desbois's use of the term "form" has been understood, by French theorists, as meaning "expression."²⁶⁶ Hence, if one replaces Desbois's term "form"

are not protected by copyright under this Directive . . . to the extent that logic, algorithms, and programming languages comprise ideas and principles, those ideas and principles are not protected . . . in accordance with the legislation and jurisprudence of the Member States and the international copyright conventions, the expression of those ideas and principles is to be protected by copyright." *Id.* pmb1.

264. *But see* Judgment of May 2, 1989 (S.A.R.L. Les publications pour l'expansion industrielle v. S.A. Coprosa), Cass. civ. 1re, 1990 J.C.P., No. 21392 (holding that, to demonstrate the originality of a compilation of information, a court must specify the textual and graphic elements reflecting the author's "intellectual contribution").

265. DESBOIS, *supra* note 70, at 4 ("(L)es idées, comme telles, prises en elles-mêmes, indépendamment de la forme dont elles ont été revêtues, échappent à toute appropriation. Seule, la forme, sous laquelle l'idée a été présentée, donne prise à une exclusivité, à condition d'être originale.").

266. Judgment of Sept. 21, 1983, Paris Trib. gr. inst., 1984 D.S. JUR. 77, note C. Le Stanc.

with that of "expression," one can frame a rule analogous to American law's idea versus expression distinction wherein only the expression of an idea, not the idea itself, may be copyrighted. Courts in France have invoked the doctrine to refuse protection of works embodying commonplace ideas,²⁶⁷ methods,²⁶⁸ or scientific theories.²⁶⁹ The doctrine, however, has not been codified under the Law of 1957.²⁷⁰ Moreover, French courts do not yet seem to apply the concept with the same regularity or in the same manner as American courts.

In many cases, instead of using the idea versus expression dichotomy to identify specifically the protectable aspects of a work, French courts apply the doctrine broadly to determine whether an allegedly infringing work has borrowed either ideas or expression of a prior work. Rather than describing a continuum of abstraction or a scale of particularity and trying to stipulate where the line between idea and expression should be drawn, the courts, in such cases, simply refuse protection to the generalized, trite material they construe as being "idea."

For instance, in *Galardi v. Mitterrand et autres*,²⁷¹ the Paris Appeals Court (*Cour d'appel*) rejected an infringement claim brought by the author of a television show scenario which, the court found, was based on a banal idea the alleged infringers were

267. See, e.g., *Plaisant*, *supra* note 60, Fasc. 301, at 19-21 ("Ideas must remain free," in French, "*L'idée doit être libre*") (citing Judgment of Nov. 29, 1960, *Cour de cassation*, *Annales de la propriété industrielle, littéraire et artistique* (Ann. prop. ind.) 1961, 309, note Mme. Nlaudstein); *GAZ. PAL.*, 1961, 1, 152 (Idea for a children's music book is not copyrightable).

268. *Id.* (citing Judgment of Aug. 2, 1870, Ann. prop. ind. 1870, 22) (An accounting method is not copyrightable); Judgment of May 4, 1911, *Paris Cour d'appel*, D. 1912, 2, 182 (A Swedish gymnastic method is not copyrightable); cf. *Baker v. Selden*, 101 U.S. 99 (1880) (The copyright of a book on accounting can give rise to copyright of description of the accounting method, but not of the method itself).

269. See *COLOMBET*, *supra* note 41, at 29; see also Judgment of Feb. 14, 1990, *Paris Cour d'appel*, 1990 D.S., I.R. 72 (holding that the author of a scientific work does not benefit from the same freedom of expression as the author of a fictional work and is obliged to borrow factual knowledge conveyed in earlier works).

270. The Law of 1957 has no provision analogous to 17 U.S.C. § 102(b) (1988). See *supra* note 137. However, some analysts believe article 2 of the Law of 1957, by stating that all works of authorship are protected under the law "whatever their form of expression," implies that ideas fall beyond the law's protection. See *COLOMBET*, *supra* note 41, at 27.

271. Judgment of Feb. 12, 1990, *Paris Cour d'appel*, 1990 D.S., *Informations Rapides*, 78-79.

free to imitate. The court first stated: “[T]his simple idea is not itself able to be protected. . . . [The author of the television program] would have a legitimate infringement claim only insofar as the elements of the program he put forth were found to have been copied servilely.”²⁷² Second, the court found that the appellant’s scenario—featuring young artists whose performances would be observed by other performing artists and a live television audience—was a commonplace idea which other television shows had already exploited.²⁷³ Finally, the court, by observing that the appellees’ proposed program included a biographical portrait of the guest star whereas appellant’s program did not, concluded that the work of the appellees was not a servile copy and therefore was not infringing.²⁷⁴ Notably, the court did not analyze which aspects of the appellant’s work were ideas and which embodied original expression. Rather, the court simply adjudged the appellant’s work to be hackneyed, hence a nonprotectable idea.

Yet, the idea versus expression analysis of French courts, in other instances, is far more detailed. For example, in *Chavanel v. Société des Editions Plon et autres*,²⁷⁵ another recent case decided by the Paris *Cour d’appel*, the court specifically differentiated ideas from expression. The case involved a literary work recounting the true stories of two news reporters who had observed meerkats (a type of mongoose) in Southwest Africa. The appellant alleged that the appellees’ writing infringed an original manuscript he had drafted and subsequently submitted to a publisher, based on testimony of the reporters. The court first set forth the general rule: “Infringement of a literary work . . . cannot result from the taking of an idea or a theme, but only from reproduction of the expression or form in which this idea or theme is found expressed”²⁷⁶

272. *Id.* (“[C]ette simple idée n’est pas elle-même susceptible d’être protégée. . . . [L’auteur du projet de télévision] ne serait fondé à agir en contrefaçon que dans la mesure où les modalités de l’émission par lui proposée se trouveraient servilement reproduites.”).

273. *Id.*

274. *Id.*

275. Judgment of Jan. 15, 1990, Paris *Cour d’appel*, 1er ch. A, 1990 D.S., I.R., 67-68.

276. *Id.* (“La contrefaçon en matière littéraire . . . ne peut résulter de la reprise d’une idée ou d’un thème, mais seulement de la reproduction de l’expression ou de la forme dans laquelle cette idée ou ce thème se trouvent exprimés”).

The court described the expression or form of a literary work as including: “the arrangement of the subject, the linking together of situations or scenes, and the original characteristics which give the work its own physiognomy and its specific traits.”²⁷⁷ General themes conveyed in the two works, the court underscored, constituted unprotectable ideas: “[T]he themes portrayed, such as the description of the meerkats, their life adventures, their relationships with the men, cannot themselves be appropriated . . . and must be considered as being in the public domain.”²⁷⁸ Such broad themes, the court concluded, could not be original since they corresponded to true experiences of the reporters which the appellant could only have learned about second hand.²⁷⁹ Finally, the court emphasized that while the works might have shared general themes or ideas, the authors’ expression of such ideas was distinct: “[T]he text of [the appellees’] work differed essentially from [the appellant’s] manuscript in its conception, spirit, and expression . . . while similar terms or definitions can be found in the two texts, their use is justified by the specificity of the situations described”²⁸⁰ Accordingly, the court found no infringement.

Unlike its approach in the *Galardi* case, the court here specifically separates ideas—the general themes of the work—from expression, the authors’ particular rendering of such themes. The court’s analysis, in fact, looks very much like that of American courts, delineating a scale of abstraction and refusing protection to elements dictated by the subject matter.

The detailed approach of the *Chavanel* case exemplifies how French courts should address the legal protection of computer technologies. Applying the idea versus expression distinction,

277. *Id.* (“la composition du sujet, l’enchaînement des situations ou des scènes, et des caractéristiques originales qui donnent à l’oeuvre sa physionomie propre et ses traits spécifiques.”).

278. *Id.* (“[L]es thèmes traités, comme la description des meerkats, les péripéties de leur vie, leurs rapports avec les hommes, ne sont pas en eux-mêmes susceptibles d’appropriation . . . et doivent être considérés comme ‘étant de libre parcours.’ ”).

279. *Id.*

280. *Id.* (“[L]e texte de l’ouvrage incriminé diffère essentiellement du manuscrit par sa conception, son esprit et son expression . . . si des termes ou des définitions semblables peuvent être relevés dans les deux textes, leur emploi se trouve justifié par la spécificité des situations décrites”).

French courts should relegate to the public domain any aspect of computer technologies which follows from inherent constraints of developing functional programs, or from industry-imposed standards. Such aspects, because they are required by the subject matter, can never be viewed as incorporating a programmer's personality. The present approach of French courts—linking originality to individual creative toil—omits this important analytic step. French courts, if they apply *Pachot's* formulation narrowly, may extend protection to conventional or compulsory elements of programming.²⁸¹ To avoid such excessive protection, the French courts, in accordance with the present trend in American cases as well as the clear mandate of the EC Directive, must thoughtfully and systematically distinguish a program's ideas from its original expression.

IV. DEVELOPING A SYSTEMATIC APPROACH UNDER AMERICAN AND FRENCH LAW

A. Introduction

Determining originality of computer technologies, whether under American or French law, requires courts to develop a refined understanding of the precise range of programming expression. The initial originality requirement under American law, calling for an author's independent effort, merely provides a check on servile copying. The creativity requirement, under the Supreme Court's reasoning in *Feist Publications*, calls for an additional, albeit marginal, showing of authorial ingenuity. Neither of these concepts assists courts in determining precisely which aspects of a

281. As explained above, it remains unclear how courts will apply the *Pachot* holding. In one recent case, the Tribunal de grande instance of Paris, invoking the familiar language of *Pachot*, upheld the originality of a series of computer programs developed by the plaintiff. The defendant had made multiple counterfeit copies. After studying only one of the plaintiff's several programs, the court noted that it was "the best product of its kind, because of its power and the originality of the solutions adopted for its functions." Based on its limited analysis, the court concluded broadly that the plaintiff's work demonstrated a "personalized effort going beyond the simple application of an automatic and constraining logic." See Judgment of July 8, 1987 (*Commande Electronique et autres v. Teixeira et autres*), Paris Trib. gr. inst., correctional chamber, 1989 D.S. I 3376.

technology stem from authorial imagination and which are compelled by utilitarian or other constraints. Rather, American courts rely on the idea versus expression dichotomy to discern a technology's protectable and nonprotectable aspects. In particular, American courts identify a program's function and ask whether specific attributes of the program are essential to such function.

French courts, by contrast, presently use a single originality standard to probe computer programs for signs of authorial personality. Although the French imprint of the personality criterion may, on the surface, seem stricter than the American independent effort standard, it probably is equally permissive. Personality, under the prevailing judicial concept of originality, is linked to an author's freely made choices. French courts, although they have referred to constraints of logic, do not appear to recognize all the ways in which a programmer's expressive freedom may be limited or eliminated. They also have not explicitly separated idea from expression in cases pertaining to computer programs. In the previous section, this article suggested that French courts should apply the idea versus expression distinction consistently and address the complete set of constraints which may curtail an author's possible range of programming expression.

In essence, the task facing jurists in both France and the United States is to identify all the ways in which programmers' creative choices may be restricted and formulate rules which account for these restrictions. To decide whether particular aspects of a computer program are essential to that program's function or logic, jurists ideally should comprehend all the limitations programmers encounter. Although program developers can probably recite a long list, there are at least four limitations courts should systematically consider, including (1) requirements of the end user, (2) requirements of the target hardware, (3) requirements of the target software, and (4) conventions of computer programming.²⁸² Where these constraints compel developers to design program

282. Similar guideposts have been suggested in David Nimmer et al., *Analyzing Substantial Similarity in Computer Software Infringement Cases*, 6 *COMPUTER LAW*, Feb. 1989, 1, 2-4.

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elements in a particular way, courts should treat such elements as unoriginal ideas and consign them to the public domain.

B. The Four Guidelines

1. Requirements of the End User

Courts should not identify as “expression” elements of a computer technology required to meet an end user’s practical business or technical needs. Some American courts have already applied this rule. The Fifth Circuit recognized that several aspects of a program designed to provide cotton farmers with data on cotton prices were mandated by “externalities of the cotton market.”²⁸³ Accordingly, the court considered these aspects to be part of the program’s uncopyrightable idea.²⁸⁴ In *Lotus Development Corp.*, as described above, the U.S. District Court for the District of Massachusetts refused protection to the rotated L-screen display, the computer-generated image of an accounting spreadsheet which most end users have grown accustomed to using.²⁸⁵ Likewise, in *Manufacturers Technologies, Inc. v. Cams, Inc.*,²⁸⁶ the U.S. District Court for the District of Connecticut refused protection to the internal navigation system of a cost-estimating program which, according to the court, was a noncopyrightable convention for computers assuring user comfort.²⁸⁷

An additional, hypothetical application of this rule is as follows. Suppose a developer designed a program that, interacting with an existing word processing system and a legal data base such as LEXIS or JURIS-DATA, could verify the accuracy of and make necessary corrections in legal citations contained in law review articles or legal briefs and memoranda. By comparing the names of

283. *Plains Cotton Coop. Ass’n v. Goodpasture Computer Serv.*, 807 F.2d 1256, 1262 & n.4 (5th Cir. 1987), *cert. denied*, 484 U.S. 821 (1987).

284. *Id.*

285. 740 F. Supp. at 66.

286. 706 F. Supp. 984 (D. Conn. 1989).

287. *Id.* at 995.

cases, statutes, and articles cited in a document to the proper citations stored in the data base, the program, as a spelling check, would alert the drafter to citation errors and propose corrections. Suppose, too, that the citation corrections the program made were based on the rules published by the Harvard Law Review Association in *A Uniform System of Citation*. Since citations in law journal articles, briefs and memoranda generally must conform to these rules,²⁸⁸ this feature of the program would be a requirement of end users and, therefore, a noncopyrightable idea.

In addition to such user requirements stemming from practical constraints within individual industries and businesses, courts must consider user requirements resulting from technological standardization within the computer industry.²⁸⁹ Unlike the case of conventional literary works, where protection of one author's particular expression does not usually hinder the creative production of subsequent authors, protecting aspects of a computer program which have become industry standards can significantly circumscribe subsequent development of noninfringing compatible programs.²⁹⁰

Computer products deviating even marginally from conventional equipment may fail to attract end users who have already invested in and attained familiarity with standard

288. See, e.g., 104 HARV. L. REV. ii (1991) ("Footnotes should conform to the 14th edition of *A Uniform System of Citation*."); 88 MICH. L. REV. (1990) ("Citations in manuscripts should follow the form prescribed in *A Uniform System of Citation*"); 43 STAN. L. REV. (1991) ("The text and citations of the *Review* generally conform to *A Uniform System of Citation* (14th ed. 1986).")

289. Standards are created in at least two ways. De facto standards arise without formal agreement where, for example, a central government authority or large company makes a particular choice in technology which other developers subsequently follow to assure compatibility. By contrast, de jure standards arise where a group of interested parties enter into discussions and then specifically agree to adopt a standard. See Joseph Farrell, *Standardization and Intellectual Property*, 30 JURIMETRICS J. 35, 39-42 (1989).

290. To understand why the computer industry often prefers standard technologies over new (and perhaps even better) variants, one need only contemplate why typewriter manufacturers have never replaced the rather clumsy QWERTY keyboard with Dvorak's more efficient keyboard or why car manufacturers have proposed few variants on the familiar H-shaped stick shift design. Obviously, there are many technologies end users count on exploiting, without having to master new skills or expend additional resources. To accommodate such "locked-in" users, manufacturers generally try to assure their goods will comply with existing technological standards. *Id.* at 47-48.

technologies.²⁹¹ For instance, because end users spend significant time mastering the interfaces of programs they use, they count on the functional details of such interfaces remaining basically the same in new or improved computing products.²⁹² Therefore, even if a developer, in theory, has several choices regarding the design of a particular interface feature, an industry standard might, as a practical matter, compel a single plausible choice. Likewise, once they grow accustomed to writing programs on a computer with specific operating system software, computer programmers rely on the developer of an improved operating system to design its interfaces and specify its functions in substantially the same way as did the original system. That is, to create an operating system which will meet the needs of most programmers, the developer is obliged to include certain standard program features. When a court determines that such a standard program feature is, in reality, required for the program to be useful, the court should generally treat that feature as a nonprotectable idea.

2. Requirements of the Target Hardware

Courts should treat as nonprotectable ideas any components of a computer program required for the program to operate properly in conjunction with particular hardware. Several American courts have already applied this rule, refusing to protect specific programming solutions dictated by design standards of particular hardware. For instance, in *Data East USA, Inc. v. Epyx, Inc.*,²⁹³ the Ninth Circuit rejected copyright protection for several aspects of a video game's screen display which, the court determined, were imposed by technological requirements of the hardware on which the game programs were to be run.²⁹⁴ Similarly, in *Manufacturers*

291. *Id.* See Michael A. Jacobs, *Copyright and Compatibility*, 30 JURIMETRICS J. 91 (1989) (Copyright law should allow for independent creation of compatible computer programs).

292. Moreover, even end users who are acquiring their first computer system may be reluctant to invest in a system which is incompatible with most existing technologies and which risks becoming obsolete. See Farell, *supra* note 289, at 36-39.

293. 862 F.2d 204 (9th Cir. 1988).

294. *Id.* at 208-09.

Technologies Inc. v. Cams, Inc., the district court found that mechanical constraints of Wang hardware compelled the plaintiff to assign certain screen display functions to particular keyboard locations.²⁹⁵ These aspects, the court concluded, should not receive copyright protection.²⁹⁶

Notably, the preamble of the EC Directive sets forth a similar guideline. The Directive recognizes that, where the purpose of a computer program is to “communicate and work together with other components of a computer system and with users,” a particular technology may be necessary to link the program, computer, and user.²⁹⁷ The Directive states: “[A] logical and where appropriate physical interconnection and interaction is required to permit all elements of software and hardware to work with other software and hardware and with users in all the ways they are intended to function.”²⁹⁸ Those aspects of a program which assure the proper link between software and hardware elements, the Directive indicates, may be termed “interfaces.”²⁹⁹ The Directive stresses, finally, that the technology underlying such interfaces may include noncopyrightable ideas: “[F]or the avoidance of doubt it has to be made clear that . . . ideas and principles which underlie any element of a program, including those which underlie its interfaces, are not protected by copyright under this Directive.”³⁰⁰ Hence, any part of a program required to achieve the proper interface between such program and the target computer’s hardware and software components would likely constitute a noncopyrightable idea under the Directive.

295. 706 F. Supp. 984, 995 (1989).

296. *Id.*

297. Directive, *supra* note 12, pmb1. “This functional interconnection and interaction,” the Directive explains, “is generally known as ‘interoperability’ . . . [that is] the ability to exchange information and to mutually use the information which has been exchanged.” *Id.*

298. *Id.*

299. *Id.* (“[T]he parts of the program which provide for such interconnection and interaction between elements of software and hardware are generally known as interfaces.”).

300. *Id.*

3. Requirements of the Target Software

Courts should treat components of computer programs necessitated by requirements of the software with which they will interface as part of the program's noncopyrightable idea. For a programmer to achieve compatibility or interoperability with particular software, he may be required to use source code which closely resembles that of existing programs. For instance, a developer designing a word processing program must assure that the instructions he uses will interface properly with the operating system of the computer upon which his program will run. An operating system, in many cases, will only recognize instructions stated in specific form. For example, the instructions a programmer uses to tell the operating system when and how to trap key strokes—that is, to read and process the characters an end user types into the computer—can be expressed in a limited number of ways. A programmer may be compelled to adopt an instruction set similar to one which other developers have previously used to carry out such trapping function. Such standard instruction sets, if part of independently created programs, should not be considered aspects of protectable expression.³⁰¹

Similarly, requisite elements of an otherwise independently designed operating system should remain in the public domain. A developer creating an improved operating system must design it to be compatible with application programs intended to run on similar predecessor systems. That is, the developer must assure that the operating system will understand standard instructions issued by the software which end users customarily employ to communicate with the prototype operating system. Obviously, an operating system requiring target programs to utilize an entirely new set of basic instructions would be of little value, since it would be useful only for new application programs specially designed to run on it.

301. For a recent case adopting this approach, see *Computer Associates Int'l, Inc. v. Altai, Inc.*, 775 F. Supp. 544, 561 (E.D.N.Y. 1991) (Parameter lists and macros of application programs, required to be written in a specific form to be readable by the target operating system, were not copyrightable).

Accordingly, courts should deem elements of an operating system program necessary to achieve compatibility with target application programs as nonprotectable ideas.

4. Conventions of Computer Programming

Courts should treat those aspects of a computer program which incorporate conventional programming methods and practices as part of such program's noncopyrightable idea. In the computer industry, developers have found that certain operations can be achieved far more efficiently through specific programming solutions.³⁰² For example, most students of computer science learn, early on, that there are a limited number of algorithms which one can use efficiently to sort³⁰³ a large quantity of data.³⁰⁴ Because programmers systematically use the most efficient or best sorting algorithms, the code instructions they use to implement such algorithms will necessarily have many similarities.³⁰⁵ Likewise, programmers often use standard date routines.³⁰⁶ These are the subroutines³⁰⁷ programmers use — in a wordprocessing program, for instance — to request that the operating system of the target computer generate the date. Programmers draft date routines in specific form not only because of technical requirements of the target operating system, but also because, as a matter of standard practice, programmers write date routines in a limited number of

302. Several commentators have proposed that, even if there are many ways of carrying out a certain computer function, there may be some ways which are significantly more efficient and therefore should not receive copyright protection. See, e.g., Peter S. Mennell, *An Analysis of the Scope of Copyright Protection for Application Programs*, 41 STAN. L. REV. 1045, 1053-55 (1989).

303. A simple example of a sorting problem is how to alphabetize a group of names which are presently in random order. A sorting algorithm would be the set of procedures one could use to solve the sorting problem.

304. Interview with Mordecai Golin, mathematician and computer scientist, in Paris, France (May 18, 1991).

305. *Id.* It should also be noted that the number of efficient programming solutions may be more limited when a particular programming language is used. If a programmer uses a formal high-level language, such as Pascal, for instance, he generally can make fewer independent programming decisions than if he used a less formal language, such as C. *Id.*

306. Interview with Joan Romejko, computer programmer, in Paris, France (Apr. 19, 1991).

307. Subroutines are blocks of code instructions which programmers use repeatedly in writing programs.

ways. Also, programmers almost systematically achieve the interface between programs and printers using a very specific language, developed by Adobe Corporation called "Postscript." Although the company claims to hold a copyright in the key words of Postscript, Adobe permits programmers to use the language freely, so long as they make appropriate mention of Adobe in the documentation accompanying their work. Therefore, programmers customarily use Postscript where instructions regarding printing are required, employing the same key words of Postscript to achieve similar functions. Such conventional programming techniques, which the industry comes to rely on as general practice, should not be viewed as original expression.

Apparently, no court, either in France or the United States, has yet applied this rule to determine the copyrightability of a specific programming technique. However, in cases pertaining to computer programs, several courts in the United States have applied the so-called "*scènes à faire*" doctrine to refuse protection to general attributes of programs which they found "indispensable or at least standard" to the central purpose of such programs.³⁰⁸ For instance, in *Frybarger v. International Business Machines Corp.*,³⁰⁹ the Ninth Circuit found that similarities between the litigants' video games stemmed from the fact that they were indispensable expressions of the basic idea of the games.³¹⁰ In *Lotus Development Corp.*, the court referred to the *scènes à faire* doctrine as precedent supporting the merger rule which, in turn, the court linked to an additional concept it called "obviousness."³¹¹

308. In *Whelan Associates, Inc. v. Jaslow Dental Lab., Inc.*, 797 F.2d 1222 (3d Cir. 1986), *cert. denied*, 479 U.S. 1031 (1987). The Third Circuit discussed the *scènes à faire* doctrine as providing a basis for the court's function versus idea analogy: "*Scènes à faire* are afforded no protection because the subject matter represented can be expressed in no other way than through the particular *scène à faire*. . . . This is merely a restatement of the hypothesis . . . that the purpose or function of a work or literary device is part of that device's 'idea' (unprotectable portion)." *Id.* at 1236.

309. 812 F.2d 525 (9th Cir. 1987).

310. *Id.* at 529-30.

311. 740 F. Supp. 37, 58-59 (1990). In particular, the court compared the notion of merger—where copyright is refused because there are so few ways of expressing a particular idea—to the concept of *scènes à faire* where granting a copyright "would give the first author a monopoly on the commonplace ideas behind the *scènes à faire*." *Id.* at 59 (citing *Landsberg v. Scrabble Crossword Game Players, Inc.*, 736 F.2d 485, 489 (9th Cir. 1984), *cert. denied*, 469 U.S. 1037 (1984)).

The court stated: "When a particular expression goes no farther than the obvious, it is inseparable from the idea itself. . . . If, however, the expression of an idea has elements that go beyond all functional elements of the idea itself, and beyond the obvious . . . then those elements of expression . . . are copyrightable."³¹² While the court correctly recognized that computer programs may include standard elements of expression which should not be protected, its use of the term "obvious" is ambiguous.

What did *Lotus Development Corp.* mean when it spoke of "obviousness"? The court neither defined the term nor explained it with relevant judicial precedent. For American jurists, the term would seem to come from patent law. For a work to be patentable, it must not only be novel and useful, but also non-obvious.³¹³ Specifically, the patent statute refuses a patent to the invention whose subject matter "would have been obvious at the time of the invention to a person having ordinary skill in the art."³¹⁴ By contrast, a work may be copyrighted, according to traditional doctrine, once, and to the extent, it embodies original expression. The Copyright Act of 1976 has never codified a nonobviousness requirement and the courts have not created one. In *Lotus Development Corp.*, the court's use of the terms "obvious" and "obviousness" may thus be interpreted as suggesting that computer programs should be protected under a patent-like rubric whereby courts would carefully test the obviousness of the technologies programs incorporate.

More likely, *Lotus Development Corp.* was simply enjoying an expansive use of English vocabulary. If so, "obviousness," in the copyright context, might instead be understood as meaning "standard" or "common practice in the industry." Under this interpretation, courts could reject copyright protection for those

312. *Id.* at 58-59.

313. See 35 U.S.C. § 103 (1988); see also *Cyclo Floor Mach. Corp. v. Nat'l Housewares, Inc.*, 296 F. Supp. 665, 681 (D. Utah 1968) ("Congress has particularized the standard of patentability by requiring that an invention be endowed with the qualities of novelty, utility and non-obviousness before being entitled to a legal monopoly.").

314. *La Maur, Inc. v. L.S. Donaldson Co.*, 190 F. Supp. 771, 781, *aff'd in part, rev'd in part on other grounds*, 299 F.2d 412 (8th Cir. 1961), *cert. denied*, 371 U.S. 815.

aspects of programming expression which do not stem so much from authorial imagination as from the “obvious” conventions and usages of contemporary computer programming.

C. Summary

In sum, when determining what aspects of computer programs are original and therefore protectable, both French courts and American courts must apply two basic principles. First, the courts must examine whether the program truly has its origin with the author. The work must be the author’s own creation, in other words, not copied. Whereas American courts state this requirement explicitly, French courts cloak it in the personality concept, stating that the program must “bear the impress of the author’s personality.” Arguably, this difference in terminology is unimportant where computer programs are the subject matter in question. Either the program came from the independent intellectual work of the author in question, or it did not.

Second, after confirming that a developer designed the program in question without copying protected works, both American and French courts must ask whether the developer’s product embodies autonomous, creative choices, or merely embraces standard or imperative programming solutions. The creativity requirement and idea versus expression dichotomy in American law, and the *Cour de cassation*’s recent holding in *Pachot*, link originality to the imaginative decisions a programmer makes when engineering a program. Program elements dictated by requirements of the end user, requirements of the target hardware or software, or conventions of computer programming cannot embody a developer’s creative expression nor reflect his unique personality. To encourage programmers to develop innovative programs and assure that programmers have access to the basic technologies they need to do this work, courts should systematically deem these elements unoriginal ideas and decline to protect them.

Part V demonstrates that the guidelines proposed above can also be used to assess the originality of expert systems, another fast-evolving computer technology. Expert systems can likely be

protected under the existing frameworks of copyright and *droit d'auteur*. Consistent with the discussion above, the work of jurists in both systems will be to measure the available range of expression and identify instances where industry expectations or technical constraints compel similar or standard programming solutions.

V. ORIGINALITY IN EXPERT SYSTEMS
UNDER AMERICAN AND FRENCH LAW

A. *The Technology*

Expert systems are knowledge-based computer programs which model human expert perception to solve problems in a specialized area of expertise.³¹⁵ Examples of expert systems include programs that help chemists determine the structure of complex organic molecules, assist physicians performing medical diagnosis, and direct geologists towards potential mineral deposits.³¹⁶ Unlike conventional software programs which, in general, only tackle problems and process data reducible to numbers and formulas, expert systems can engage in conceptual problem-solving, handling data which are not necessarily translatable into numeric logic.³¹⁷ Whereas conventional software programs, given any data set, furnish only one solution, expert systems are able to propose alternate solutions, and attach various certainty levels to such solutions.³¹⁸ Also, experts systems can often come to conclusions where the data available is sketchy or incomplete.³¹⁹ Conventional programs are usually unable to solve problems without perfect information.³²⁰

315. See McLellan, *Introduction to Artificial Intelligence and Expert Systems*, FOOD TECHNOLOGY, May 1989, at 120-24.

316. See A. GARNHAM, *ARTIFICIAL INTELLIGENCE: AN INTRODUCTION* 202-09 (1988).

317. See M. VAN HORN, *UNDERSTANDING EXPERT SYSTEMS* 48-49 (1986).

318. *Id.*

319. *Id.*

320. *Id.*

The underlying programming principles used to design expert systems derive from the discipline of computer science dubbed, perhaps inaccurately, as “artificial intelligence.”³²¹ In spite of the attention both scientists and fictionists have devoted to a futuristic world where computers would reason and intuit like humans, computers have attained only limited intellectual competence.³²² However, in their effort to anthropomorphize computers and develop so-called “intelligent machines,” computer scientists have made important advances in understanding how knowledge can be structured, analyzed, and interpreted by computers. Expert systems, perhaps the most important by-product of this research, are now commercially available as applications for standard hardware and software environments, including many which run on personal computers.³²³

Although they might be described generically as a type of computer program, expert systems are truly a composite of several technologies.³²⁴ Every expert system includes (1) a knowledge

321. “Artificial intelligence” is a catch-all term which encompasses diverse areas of research including mathematics, software engineering, linguistics, and psychology. Despite its broad relevance, artificial intelligence can be defined more narrowly as involving two basic intellectual undertakings: (1) the theoretical study of how the human mind works (using machine simulations), and (2) the study of useful applications, wherein computers are programmed to execute functions generally carried out by humans. See Schank, *What Is AI, Anyway?*, in THE FOUNDATIONS OF ARTIFICIAL INTELLIGENCE: A SOURCEBOOK 3-13 (Derek Partridge & Yorick Wilks eds. 1990). Part V is concerned with expert systems, an example of a useful application of artificial intelligence.

322. Although some scholars still contend that computers will ultimately be able to think in the same way humans do, the present literature indicates that computers can act intelligently only insofar as they are programmed to do so. Furthermore, the literature suggests significant gaps between the miraculous competencies of the human brain and the more humble achievements of computers. Computers lack the capacity to act consciously, use common sense, create ideas of their own, explain themselves and learn from experience. Computers provide “intelligent” solutions simply by manipulating symbols in the ways humans program them to do so. See Winograd, *Thinking Machines: Can There Be? Are We?*, in THE FOUNDATIONS OF ARTIFICIAL INTELLIGENCE: A SOURCEBOOK, *supra* note 321, at 167-89 (“Computers, with their foundations of cold logic, can never be creative or insightful or possess real judgment. No matter how competent they appear, they do not have the genuine intentionality that is the heart of human understanding.”); see also Gladwell, *Thinking Like Humans*, 29 APPLIED OPTICS, Aug. 10, 1990, at 3326-27; ROGER PENROSE, *THE EMPEROR’S NEW MIND: CONCERNING COMPUTERS, MINDS, AND THE LAWS OF PHYSICS* 1-466 (6th ed. 1989); WILLIAM A. TAYLOR, *WHAT EVERY ENGINEER SHOULD KNOW ABOUT AI* 1-24 (1988).

323. See Egol, *Expert Systems Come to the Desktop*, CHEMICAL ENGINEERING, Mar. 1990, at 157 (“[E]xpert systems have moved into the mainstream of the business environment . . .”).

324. See VIVANT ET AL., *supra* note 11, at 803-05.

base which stores the factual expertise the system accesses when solving problems, (2) an inference engine, a program which infers or reasons about how and when the knowledge base will be used, and (3) a natural-language interface which communicates between the system and the user.³²⁵ Notably, a knowledge base can provide the basis for several separate expert systems.³²⁶ By modifying the structure of the inference engine, the same knowledge base can be used to solve different types of problems. Similarly, in some cases, a carefully designed inference engine can be linked to different knowledge bases in order to execute similar operations upon distinct data.³²⁷

Whereas conventional programs are essentially comprised of algorithms—rigid, systematic procedures which, if followed, assure a specific solution or result—the basic building blocks of expert systems are heuristics. Heuristics, in essence, are rules of thumb.³²⁸ They represent the empirical knowledge of an expert as summarized by simple rules.³²⁹ The classic formulation of a heuristic is an “if . . . then” rule.³³⁰ For instance, a heuristic in a weather-predicting expert system might read: “IF : (1) nimbus cloud formation, (2) wind above 10 knots, (3) wind from northwest, (4) barometric pressure 29.85, falling, THEN : tomorrow there will be a 75% chance of rain.”³³¹ As this (fictional)

325. VAN HORN, *supra* note 317, at 97.

326. McLellan, *supra* note 315, at 121.

327. *Id.*

328. See Summers, *ES: A Public Domain Expert System*, BYTE, Oct. 1990, at 282-92.

329. Algorithms and heuristics represent separate ways of representing knowledge. Conventional programs, using algorithms, represent knowledge in procedural form, whereas expert systems, using heuristics, rely on declarative form. Jacques Pitrat, a French computer scientist, demonstrates this distinction by comparing a declarative statement of a rule of French grammar—“the article must agree with the gender and quantity of the noun”—with a procedural statement: “when one comes upon a noun, one must observe the article attached; one then verifies that the gender of the article is the same as the gender of the noun, and then that the quantity of the article is the same as the quantity of the noun.” See VIVANT ET AL., *supra* note 11, at 806 (citing Pitrat, *La Naissance de l'Intelligence Artificielle*, 16 LA RECHERCHE 1130, 1140-41 (1985)). Because an expert system includes an inference engine pre-programmed to manipulate whatever factual rules are contained in the knowledge base, factual rules can later be added to the base in simple declarative form. A conventional computer program, by contrast, would have to be modified with additional procedures. *Id.*

330. VAN HORN, *supra* note 317, at 27-28.

331. *Id.* at 55-75.

example demonstrates, heuristics do not reach firm, certain conclusions the way algorithms do. Rather, heuristics often reach conclusions qualified by a level of probability. The probability associated with a heuristic is generally termed a "certainty factor" or "confidence factor."³³²

Once an appropriate problem for an expert system has been identified,³³³ the task of developing the system involves two further steps. The first step is knowledge acquisition or transfer of expertise.³³⁴ This involves translating the knowledge of a human expert into heuristics comprehensible to the target computer. Because this process is generally achieved through a computer engineer's interviews with the qualified expert, it is also referred to as "knowledge engineering."³³⁵ The engineer's primary task is to condense the expert's knowledge into rules for the system's knowledge base and inference engine. Rules for the knowledge base concern the basic facts and relationships within the expert domain.³³⁶ Inference rules involve the ways in which the knowledge rules must be manipulated in order to solve a problem.³³⁷ Thus, through discussions with the expert, the engineer must not only transform the expert's knowledge into rules, but also determine whether particular rules should be assigned to the knowledge base or the inference engine.

The second step of developing the system is programming. An expert system is generally programmed using an AI language such as LISP, PROLOG, or C.³³⁸ These languages are based on

332. Certainty factors are often converted into numeric values and arranged along a continuum. For instance, one author puts forth the following example: 1.0 = absolutely true, .75 = almost certainly true, .50 = reasonably true, .25 = somewhat true, 0 = unknown, -0.25 = somewhat false, -0.75 = almost certainly false, -1.0 = absolutely false. See Summers, *supra* note 328, at 290.

333. Expert systems cannot be used in every domain. They are only effective at solving problems human experts themselves can resolve and for which experts can provide many relevant examples. Expert systems are generally inappropriate to handle problems requiring absolute answers. In such instances, conventional algorithmic programs may be more suitable. See VAN HORN, *supra* note 317, at 55-75; McLellan, *supra* note 315, at 121.

334. GARNHAM, *supra* note 316, at 200.

335. TAYLOR, *supra* note 322, at 155.

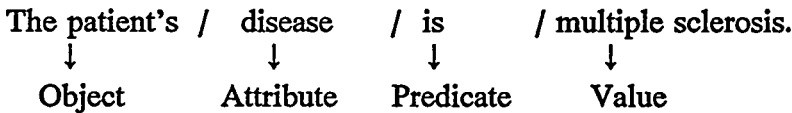
336. VAN HORN, *supra* note 317, at 92.

337. *Id.*

338. McLellan, *supra* note 315, at 121.

“predicate logic” which is more versatile and resilient than the propositional logic upon which conventional programming is generally based.³³⁹ In short, propositional logic only permits the computer to compare elements which are either true or false, or which can be reduced to numbers or formulas.³⁴⁰ That is, propositional logic assesses whether an entire statement or proposition, such as “Descartes was French” or “ $1 + 3 = 4$,” is true or false. The propositions are compared and measured with a limited number of logical operators which are ultimately processed by the computer through mathematic calculations. Predicate logic, by contrast, permits the computer to interpret and perform operations upon specific terms within a logical statement or proposition.³⁴¹

Perhaps the best way to understand predicate logic is to identify the component parts of a heuristic.³⁴² For instance, in an expert system designed to help diagnose disease, a hypothetical heuristic might be “IF the catscan shows myelin damage, THEN the patient’s disease is multiple sclerosis.” The second half of this statement can be broken down as follows:



As this diagram shows, the predicate is the action word or operational term of the IF - THEN statement.³⁴³ The object is the physical thing or concept which constitutes the subject or context of the inquiry.³⁴⁴ The attribute is some characteristic about the object, and the value is an assessment or specification of the attribute.³⁴⁵ In languages such as LISP or PROLOG, the predicate

339. See MIKE SHARPLES ET AL., COMPUTERS AND THOUGHT: A PRACTICAL INTRODUCTION TO ARTIFICIAL INTELLIGENCE 12 (1989); see also, VAN HORN, *supra* note 317, at 137-43.

340. VAN HORN, *supra* note 317, at 137-43.

341. *Id.*

342. *Id.*

343. *Id.*

344. *Id.*

345. VAN HORN, *supra* note 317, at 137-43.

states the relationship between the object, attribute, and value. In an expert system, the predicate instructs the computer how to treat the object, attribute, and value. Objects, attributes, and values, in reality, are variables the computer merely manipulates as symbols and does not understand.³⁴⁶ Because languages using predicate logic can express many relationships among such variables, they enable the computer to execute a variety of complex operations upon data.

The inference engine is the program in an expert system which, mediating between the user and the knowledge base, determines how objects, attributes, and values will be employed to solve the user's problem. Every inference engine includes two principal components: (1) a rule control structure that dictates which rule will be addressed next or what additional facts should be requested from the user, and (2) a rule interpreter which (a) examines whether conditions expressed in the rules have been satisfied by facts provided by the knowledge base, and (b) adds facts necessary to draw inferences.³⁴⁷

To determine the order in which inferences are made, the rule control structure uses two strategies. The first strategy pertains to the direction of the reasoning or inferencing process. In so-called "backward-chaining" systems, the inference engine begins with a conclusion or goal, and then tests it against the data received.³⁴⁸ Systems using such goal driven or top-down reasoning, usually produce a limited number of ultimate conclusions.³⁴⁹ Inference engines implementing a forward-chaining approach, by contrast, take the data provided and search through the knowledge base for relevant rules which might lead to a solution.³⁵⁰ This approach, also termed "data-driven" or "bottom-up" reasoning, generally

346. *Id.*

347. TAYLOR, *supra* note 322, at 154-56; McLellan, *supra* note 315, at 121-22; Summers, *supra* note 328, at 290; VAN HORN, *supra* note 317, at 102-10.

348. TAYLOR, *supra* note 322, at 154-56; McLellan, *supra* note 315, at 121-22; Summers, *supra* note 328, at 290; VAN HORN, *supra* note 317, at 102-10.

349. TAYLOR, *supra* note 322, at 154-56; McLellan, *supra* note 315, at 121-22; Summers, *supra* note 328, at 290; VAN HORN, *supra* note 317, at 102-10.

350. TAYLOR, *supra* note 322, at 154-56; McLellan, *supra* note 315, at 121-22; Summers, *supra* note 328, at 290; VAN HORN, *supra* note 317, at 102-10.

leads to a greater number of conclusions.³⁵¹ A simple illustration of the difference between forward and backward chaining is as follows. Suppose a system included the heuristic "if *Q*, then *Z*." Fact *Q* would be the premise of the rule, and *Z* the conclusion. If a backward-chaining expert system were trying to conclude *Z*, then it would conduct a search for fact *Q*, since *Q* would enable it to conclude *Z*. A forward-chaining system, if and when it learned fact *Q*, would automatically conclude *Z*, since fact *Q* infers that *Z* is true.³⁵² A real-life example of a backward-chaining expert system is Mycin, which assists physicians in diagnosing infectious blood disease.³⁵³ Mycin, after developing a hypothesis of what a patient's illness may be, moves backward through the rules in the knowledge base to test its hypothesis.³⁵⁴ An example of an existing forward-chaining system is Dendral which helps chemists identify chemical compounds.³⁵⁵ Dendral identifies compounds by taking all the facts about the unknown substance initially entered by the user and moving forward through the rules to find a chemical structure which matches the data.³⁵⁶

The second strategy inference engines use to control how an expert system reasons involves "depth of search," i.e., how far the system will search in the knowledge base before requesting additional information from the user. In a depth-first system, the inference engine requests information in small chunks, only requesting the data it needs for each subsequent phase of its search. Such a system establishes research sub-goals easily, and thus asks for data a little at a time. In a breadth-first system, by contrast, the inference engine requests much information from the start, moving forward to deeper research sub-goals reluctantly.

351. TAYLOR, *supra* note 322, at 154-56; McLellan, *supra* note 315, at 121-22; Summers, *supra* note 328, at 290; VAN HORN, *supra* note 317, at 102-10.

352. See TAYLOR, *supra* note 322, at 155.

353. VAN HORN, *supra* note 317, at 34.

354. *Id.* at 107.

355. *Id.* at 43-46.

356. *Id.* at 104-05.

B. *Determining the Originality of Expert Systems Under American and French Law*

1. *Introduction*

Under both American and French law, expert systems must be analyzed as a composite of three separate technologies: (1) the knowledge base, (2) the inference engine, and (3) the user interface. Since analyzing the originality of an expert system's user interface raises issues which differ little from those discussed above, the present section focuses on the originality of an expert system's knowledge base and inference engine. Because the same knowledge base can be associated with different inference engines and the same inference engine can be used to manipulate data in different knowledge bases, courts will likely be required to assess the originality of these two technologies separately. Indeed, in addition to selling prepackaged expert systems, developers can market knowledge bases and inference engines as distinct products. Rather than treating expert systems as a single copyrightable computer program, therefore, this section will examine them as embodying separate copyrightable components.

2. *Assessing Originality in Knowledge Bases*

Knowledge bases, like data bases, can probably be copyrighted as literary works under the Copyright Act of 1976.³⁵⁷ In particular, knowledge bases may be categorized as copyrightable compilations.³⁵⁸ Congress defined a compilation as: "a work

357. As discussed above, the statutory definition of "literary works" is broad, including "verbal or numerical symbols or indicia, regardless of the nature of the material objects . . . in which they are embodied." 17 U.S.C. § 101 (1988). H.R. 1476, *supra* note 88, at 54 (This definition encompasses both computer programs and data bases); *see* NIMMER, *supra* note 52, § 2.04[C], at 2-43.

358. 17 U.S.C. § 103(a) (The "subject matter of copyright . . . includes compilations."). Notably, the author of a compilation obtains protection only for his creative contribution to the work, not for the preexisting data he incorporates into it. *See* § 103(b) ("The copyright in a compilation . . . extends only to the material contributed by the author of such work, as distinguished from the preexisting material employed in the work, and does not imply any exclusive right in the

formed by the collection and assembling of preexisting materials and 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."³⁵⁹ While no U.S. court has yet settled the issue, *Nimmer on Contracts* suggests that data bases may be protected as compilations.³⁶⁰ Similarly, a knowledge base, which stores the factual rules a knowledge engineer collects through interviews with an expert, can be characterized as a "collection" or "assembling" of "preexisting material" or "data" within the statute's meaning.

As the Copyright Act itself indicates, not all collections of preexisting material or data are necessarily copyrightable compilations. To be copyrighted, such collection must be put together in such a manner that "the resulting work as a whole constitutes an original work of authorship."³⁶¹ In other words, the work must be "original," an author's independent intellectual creation.³⁶² Moreover, although compilations as a whole may be copyrighted, the ideas or facts they contain, whose origin cannot be attributed to an act of authorship, can never be original and thus fall beyond copyright's ambit.³⁶³

American courts determine the originality of compilations under two theories.³⁶⁴ The first theory links the originality of a compilation to the work an author invests in developing it.³⁶⁵ Dubbed by jurists as the "sweat of the brow" or "industrious collection" doctrine, this follows from John Locke's theory of property whereby a person obtains a property interest in something he did not previously own through the work he commits to

preexisting material.").

359. See § 101.

360. See NIMMER, *supra* note 52, § 2.04[B], at 2-41, § 2.04[C], at 2-43.

361. *Id.*

362. See, e.g., *West Publishing Co. v. Mead Data Cent., Inc.*, 799 F.2d 1219, 1223-24 (8th Cir. 1986), *cert. denied*, 479 U.S. 1070 (1987) (An arrangement of preexisting materials may qualify for copyright protection as an "independently produced work of intellectual creation").

363. *Feist Publications, Inc. v. Rural Tel. Serv. Co.*, 111 S. Ct. 1282 (1991).

364. See Ginsburg, *supra* note 77, at 1893-97; see also, Jane C. Ginsburg, *U.S. National Report, in L'INFORMATIQUE ET LE DROIT D'AUTEUR* 370-72 (1990).

365. Ginsburg, *supra* note 77, at 1893-97.

collecting or creating it.³⁶⁶ Thus, just as a court might find a computer program original because it reflects an author's independent effort, a court might deem a compilation original when it demonstrates a sufficient amount of authorial labor or "sweat of the author's brow."

Of course, this theory only assists the legal analyst in making the threshold determination of originality, that is, whether the compilation owes its origin to the author, or is copied. The analyst still must inquire whether the work embodies original expression. Even a compiler's most arduous toil might yield a banal compendium of ideas, lacking the requisite modicum of original authorship. This was among the recent lessons of the Supreme Court in *Feist Publications, Inc. v. Rural Telephone Service Company*.³⁶⁷ In the Court's view, the sweat-of-the-brow doctrine, by associating originality with the work compilers expend rather than with the authorship they contribute in selecting and arranging material creatively, "eschew[s] the most fundamental axiom of copyright law—that no one may copyright facts or ideas."³⁶⁸ The Court concluded: "[O]riginality, not 'sweat of the brow,' is the touchstone of copyright protection in . . . fact-based works."³⁶⁹

The second theory links the originality of a compilation to the choices an author makes in collecting and laying out the data the compilation contains. To the extent the selection, coordination, and arrangement of data reflects an author's subjective judgment, the theory goes, the resulting compilation will be original.³⁷⁰ In *Feist Publications, Inc.*, the Supreme Court concluded that the statutory definition of "compilation" solely supports this second theory of originality. The Court explained:

Not every selection, coordination, or arrangement will past muster. This is plain from the statute. It states that, to merit

366. *Feist Publications, Inc.*, 111 S. Ct. at 1291; Ginsburg, *supra* note 77, at 1883; Pamela Samuelson, *Information as Property: Do Ruckelshaus and Carpenter Signal a Changing Direction in Intellectual Property Law?*, 38 CATH. U. L. REV. 365, 369 (1989).

367. *See supra* note 126 (stating the facts of the *Feist* case).

368. 111 S. Ct. at 1291.

369. *Id.* at 1295.

370. Ginsburg, *supra* note 77, at 1896 (citing *Rural Tel. Serv. Co. v. Feist Publications, Inc.*, 663 F. Supp. 214 (D. Kan. 1987), *aff'd without opinion*, 916 F2d 718 (10th Cir. 1990)).

protection, the facts must be selected, coordinated, or arranged 'in such a way' as to render the work as a whole original. This implies that some 'ways' will trigger copyright, but that others will not.³⁷¹

Moreover, the court stressed, compilers must show at least a small amount of creativity in their work. The court stated: "[S]election and arrangement of facts cannot be so mechanical or routine as to require no creativity whatsoever. The standard of originality is low, but it does exist."³⁷² Following this reasoning, American courts likely will not recognize original expression in an author's compilation if the author has adhered to some standard or automatic system of selecting, coordinating, and arranging the information the compilation contains.

French jurists have also recognized that not all independently created compilations will necessarily be original. Although the Law of 1957 does not specifically include compilations in its list of protectable *oeuvres de l'esprit*, it states that authors of anthologies and collections of works will receive the Law's protection. In particular, article 4 of the Law of 1957 states:

Authors of translations, adaptations, transformations, or arrangements of *oeuvres de l'esprit* benefit from the protection provided by the present law, without prejudice to the rights of the author of the original work. This applies also for authors of anthologies or collections of diverse works which, by the choice and arrangement of the materials, constitute intellectual creations.³⁷³

Because this provision specifically protects anthologies and collections, and because the useful purpose of an author's work does not affect whether it may be protected under the Law of

371. 111 S. Ct. at 1294.

372. *Id.* at 1296.

373. Law of 1957, art. 4 ("*Les auteurs de traductions, d'adaptations, transformations ou arrangements des oeuvres de l'esprit jouissent de la protection instituée par la présente loi, sans préjudice des droits de l'auteur de l'oeuvre originale. Il en est de même des auteurs d'anthologies ou recueils d'oeuvres diverses qui, par le choix et la disposition des matières, constituent des créations intellectuelles.*").

1957,³⁷⁴ jurists in France have concluded that compilations too are protectable *oeuvres de l'esprit*.³⁷⁵

Moreover, jurists have determined that data bases, as a specific kind of compilation, constitute protectable subject matter under the Law of 1957. In 1987, in the noted *Société Microfor v. S.A.R.L. (Le Monde)* decision,³⁷⁶ the *Cour de cassation* overruled an appellate decision which had refused protection to a data base under the Law of 1957.³⁷⁷ The *Cour de cassation* held that the appellant's work, a computerized data base providing references to articles on current topics of interest, was a protectable work of information under article 41 of the Law.³⁷⁸ Article 41, by allowing subsequent authors to refer to prior works with short quotations, creates an

374. See *supra* note 189 and accompanying text (quoting Law of 1957, art. 2); see also *supra* notes 193-201 and accompanying text.

375. Lucas, *supra* note 235, Fasc. 303-1, at 11.

376. Judgment of Oct. 30, 1987, Cass. ass. plén., 1988 J.C.P. II No. 20932 report by X. Nicot and note by C. Colombet.

377. The facts and procedural history of the case are as follows. Microfor, the appellant, developed a computerized data base designed to assist in the research of current events. The data base contained references to diverse French journals and newspapers, including references to *Le Monde* and *Le Monde Diplomatique*, works published by the appellee. Each reference included the title of the article, the author's name, the publication in which the article appeared, and the article's bibliographical reference. Also, for most references, the data base provided an associated "descriptive summary" (*résumé signalétique*) providing highlights of the primary source material. When Microfor first approached *Le Monde* regarding the data base, *Le Monde* suggested the two companies develop a joint project. Microfor ignored *Le Monde's* proposal and instead made its data base available to the public. In 1981, *Le Monde* initiated a suit before the *Tribunal de grande instance* of Paris, claiming that Microfor's use of original titles from *Le Monde's* publications constituted both copyright infringement and unfair competition. The *Tribunal de grande instance* rejected the unfair competition claim. However, the court held that Microfor's index references constituted partial copying of *Le Monde's* original work which, absent *Le Monde's* prior consent, was impermissible under the Law of 1957. After the *Cour d'appel* of Paris confirmed this decision in 1982, the *Cour de cassation's Première chambre civile* found several errors in the appellate court's reasoning, and returned the case to the *Cour d'appel* to be heard by a new panel. In 1986, the *Cour d'appel* again held for *Le Monde*. Subsequently, Microfor alleged that the *Cour d'appel* had again decided incorrectly on several questions of law. Accordingly, in 1987, the Plenary Assembly of the *Cour de cassation* accepted jurisdiction and rendered a final decision. *Id.*

378. "When the work has been disclosed, the author may not prohibit . . . (3) Provided that the author's name and source are clearly indicated: [a]nalyzes and short quotations justified by the critical, polemical, pedagogic, scientific or informational character of the work in which they are incorporated" Law of 1957, art. 41 ("Lorsque l'oeuvre a été divulguée, l'auteur ne peut interdire . . . (3) Sous réserve que soient indiqués clairement le nom de l'auteur et la source: [I]es analyses et courtes citations justifiées par le caractère critique, polémique, pédagogique, scientifique ou d'information de l'oeuvre à laquelle elles sont incorporées . . .").

exception to the general rule, set forth in article 40, which forbids unconsented copying of an author's original writing.³⁷⁹ The court stated: "[W]hen the work has been disclosed, the author cannot prohibit short quotations justified by the informational character of the work in which they are incorporated, so long as the name of the author and the source are clearly indicated."³⁸⁰ The court stressed that Microfor had properly attributed the source and authorship of the articles it cited and had only used brief quotations in summarizing them. According to the court, Microfor had not copied so much content from the primary sources that people would rely on Microfor's summaries instead of reading the actual primary sources.³⁸¹ The court concluded that Microfor's limited copying was proper and that the excerpts contained in Microfor's data base, taken as a whole, constituted a protectable work of information under the Law of 1957.³⁸²

Notably, the court conceded protection for Microfor's data base without considering the amount of authorship entailed in its creation or analyzing whether Microfor's work included any original expression. The court did not discuss, for instance, whether Microfor's data base reflected authorial personality or an independent intellectual effort. Rather, the *Cour de cassation* appeared to conclude that works of information such as Microfor's data base are protectable per se, so long as they include only minimal excerpts from the original works to which they refer.

However, in the 1989 *SARL les Publications pour l'Expansion Industrielle v. S.A. Coprosa* decision,³⁸³ the *Cour de cassation*

379. Law of 1957, art. 40, ¶ 1 ("Any integral or partial performance or reproduction executed without the consent of the author or of his successors in interest or heirs is illegal." ("Toute représentation or reproduction intégrale ou partielle faite sans le consentement de l'auteur ou de ses ayants droit ou ayants cause est illicite.")).

380. Judgment of Oct. 30, 1987, Cass. ass. plén., 1988 J.C.P. II No. 20932 report by X. Nicot and note by C. Colombet ("[L]orsque l'oeuvre a été divulguée, l'auteur ne peut interdire, sous réserve que soient indiqués clairement le nom de l'auteur et la source, courtes citations justifiées par le caractère d'information de l'oeuvre à laquelle elles sont incorporées.").

381. *Id.* ("[T]he 'summaries' only constituted short quotations from the work which did not spare the reader from relying on such work . . ." ("[L]es 'résumés' constitués uniquement de courtes citations de l'oeuvre ne dispensant pas le lecteur de recourir à celle-ci . . .")).

382. *Id.* ("[C]ette ensemble avait le caractère d'une oeuvre d'information . . .").

383. Judgment of May 2, 1989, Cass. civ. 1re, 1990 J.C.P. II 21392 note A. Lucas.

revived originality as the essential criterion of protection for works of information, finding error in a lower court's decision which had failed to identify specifically the original elements in a compilation. The work in question was a flow chart published in a trade journal, which diagrammed the world's principal automobile companies. The *Cour d'appel* of Paris had decided that the appellant's work was original because of "the research effort [the appellant expended] to assemble the information" and because of "the new arrangement through which the appellant presented such information."³⁸⁴ The *Cour de cassation* rejected the *Cour d'appel*'s holding, stating that a compilation of information "is not protected in and of itself."³⁸⁵ In particular, the court concluded that the lower court "did not specify in what way the text or the graphic form of [the appellant's] publication comprised an author's intellectual contribution characterizing an original creation."³⁸⁶ By reproaching the lower court for not having indicated precisely what aspects of the appellant's work rendered it original, the *Cour de cassation* underscored that French courts may not protect a compilation automatically. Rather, the courts must clearly identify those elements of the work which evidence original authorial expression.

Although *S.A. Coprosa* clearly rejected the reasoning of the *Cour d'appel* of Paris linking originality to the compiler's research effort and novel presentation of information, the *Cour de cassation* did not explain what originality actually means where a compilation of information is the work in question. Presumably, the analysis French courts use to assess the originality of works of information—such as compilations, data bases, or knowledge bases in an expert system—should follow the same principles the courts use to determine the originality of similar works of low authorship, such as computer programs. As a general rule, therefore, the courts

384. *Id.* ("[L]'effort de recherche pour réunir leurs éléments et de la composition nouvelle sous laquelle ils ont été présentés. . .").

385. *Id.*

386. *Id.* ("[U]n travail de compilation d'informations n'est pas protégé en soi . . . l'arrêt ne précise pas en quoi le texte ou la forme graphique de cette publication comporterait un apport intellectuel de l'auteur caractérisant une création originale.").

should measure the original authorship in a compilation, following the rationale of the *Pachot* decision, by identifying the creative choices an author has made in developing it.³⁸⁷ The language of article 4 of the Law of 1957 supports this approach, indicating that the “choice and arrangement” of the materials in an anthology or collection determine whether it is a protectable “intellectual creation.”³⁸⁸ Moreover, the courts should refuse protection to “ideas” or “facts” contained in a work of information.³⁸⁹ Like American courts, French courts should analyze whether the author was able to select, arrange, and present the information in a variety of ways, or whether external constraints required the author to execute his work in a specific way.

The range of expression available to the author of an expert system’s knowledge base may be limited in several ways. In addition to technical constraints imposed by the hardware and software technologies with which a knowledge base will interface,³⁹⁰ end user requirements and constraints imposed by the target system’s inference engine may narrow the author’s opportunities for creation. End user requirements circumscribe the author’s expressive range in at least two ways. First, many domains have a standard way of organizing information. The developer of a knowledge base may find it necessary to arrange and coordinate data in conformity with such an end user convention. For instance, a knowledge base containing detailed information on the chemical elements—such as their atomic numbers, crystal structures, boiling point, melting point, and density—might be organized in conformity with the Periodic Table of the Elements.³⁹¹ A knowledge base storing facts regarding the peculiar traits of human chromosome pairs might, by necessity, include twenty-three consecutively-

387. See Judgment of Mar. 7, 1986 (*Société Babolat Maillot Witt v. Pachot*), Cass. ass. plén., 1986 J.C.P. II, No. 14713 (83-10.477) and 1986 J.C.P. II, No. 20631 note Mousseruon, Teyssié, and Vivant, 1986 J.C.P. No. 15791 obs. Vivant and Lucas, D. 1986, 405, concl. Cabannes and note Edelman.

388. See *supra* note 373.

389. See *supra* notes 265-80 and accompanying text.

390. Because these hardware and software constraints differ little from those considered in Part IV, Part V will not discuss them further.

391. See RANDOM HOUSE COLLEGE DICTIONARY 428 (rev. ed. 1982).

ordered data structures. A knowledge base with information intended to help ambulance drivers find the quickest route to a given location might require an alphabetized list of street names or a standard map drawn to scale. Where a developer has arranged data according to such a user convention, the court should not protect the resulting arrangement since it is not the product of the developer's creative decisions, and thus does not constitute original expression under either French or American law.

Second, courts generally should refuse to protect the exhaustive knowledge base, since its developer usually will not have exercised creative judgment in selecting data from the expert's store of knowledge. For instance, in an expert system pertaining to medical diagnosis, the knowledge engineer might not be able to exercise discrimination in selecting which rules of diagnosis to add into the knowledge base. The expert and engineer would probably try to include every relevant fact rather than select facts according to subjective criteria. Similarly, an expert system designed to assist brokers making investment decisions might include all information about the stock market the expert could possibly produce. The knowledge engineer, in that case, would not choose creatively from the expert's repertory of knowledge, but would simply amass all available information. Although creators of exhaustive data bases previously may have received protection for the independent effort or "sweat of the brow" they expended, the Supreme Court's outlook in *Feist Publications, Inc.* and the *Cour de cassation's* approach in *S.A. Coprosa* suggest this is no longer appropriate. Accordingly, courts in the United States and France should probably deem an engineer's decision to create an exhaustive knowledge base an unprotectable idea and disallow protection absent other evidence of the engineer's creative arrangement or organization of data.

Besides designing a knowledge base to meet such end user requirements, the knowledge engineer may structure a knowledge base specifically to satisfy technical requirements of the inference engine with which it will interface. In particular, the programmer may have to place the knowledge base rules in an arbitrary order so that the inference engine can manipulate them according to its

own rule control structure and rule interpreter. The order in which knowledge rules are examined, the direction of the inferencing process, and the "depth of search" are all generally governed by the inference engine. Therefore, a knowledge engineer designing a knowledge base for use with a particular inference engine may lack the freedom to be creative or exercise subjective judgment in arranging the data. He may be required to arrange the objects, attributes, and values in a highly structured way so that the predicate operators, contained in the inference engine, can gain efficient access to them. Where rules in a knowledge base are organized specifically to meet technical requirements of an associated inference engine, the resulting arrangement probably should not be copyrighted since it would not embody authorial expression.

3. Assessing Originality in Inference Engines

Under American law, the originality of an inference engine may be determined pursuant to many of the same principles governing the originality of conventional computer programs. Indeed, inference engines fall squarely within the statutory definition of "computer program." The Copyright Act of 1976 states: "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."³⁹² Although the heuristic programming languages used to develop inference engines are based on predicate logic and thus do not use procedures to instruct the computer in the same way algorithm-based languages do, they certainly involve statements and instructions a computer uses to produce a specific result. Therefore, inference engines may be classified as computer programs within the meaning of the Copyright Act, and copyrighted as literary works under settled American case law analogizing programs to literary works.³⁹³

392. 17 U.S.C. § 101.

393. See *supra* notes 97-102 and accompanying text.

Similarly, inference engines may be classified as “software” and as protectable *oeuvres de l’esprit* under France’s Laws of 1957 and 1985. As discussed above, neither the Law of 1957 nor the Law of 1985 defines “software.”³⁹⁴ Based on technical definitions and on a definition included in an administrative decree,³⁹⁵ most legal scholars agree, nonetheless, that inference engines are software within the statutory meaning of that term.³⁹⁶ However, some theorists contend that courts should classify expert systems as “software” and treat inference engines and knowledge bases as component parts of such software.³⁹⁷ Under this approach, the Law of 1985 would be applicable to the entire expert system. Yet, because an expert system truly contains separate protectable components, most jurists have aptly concluded that legal protection of “non-software” components, such as the knowledge base, should be governed by the Law of 1957, whereas the inference engine, truly a separate computer program, should be treated as software under the Laws of 1957 and 1985.³⁹⁸

Because inference engines may be sensibly categorized as “computer programs” under American law and as “software” under French law, courts may determine whether they are original based on the same doctrinal guideposts the courts use to analyze conventional computer programs. In other words, the courts must first confirm that the inference engine is the product of a developer’s independent creative efforts, and then examine the work closely to determine which aspects constitute ideas, and which protectable expression. In particular, the courts must carefully distinguish facets of the inference engine embodying the developer’s creative programming decisions from those necessitated by external requirements.

394. See *supra* note 209 and accompanying text.

395. See *supra* note 209.

396. *Id.* at 803-05; see Bourcier et al., *Interactions des Aspects Juridiques et des Aspects Techniques des Systèmes Experts*, 25 CAHIERS LAMY DU DROIT DE L’INFORMATIQUE, Apr. 1991, at 1, 1-4.

397. VIVANT ET AL., *supra* note 11, at 803-05 (citing C. BERNAD, LE STATUT DES SYSTÈMES-EXPERTS: DES LOGICIELS SPÉCIFIQUES (1990)).

398. *Id.*

The range of expression available to the developer of an inference engine is limited by many of the same constraints which affect conventional programming expression. First, requirements of the end user may compel the developer of an inference engine to design the program in a specific way. In particular, practical or technical requirements of end users may lead the developer to employ a certain kind of rule control structure or rule interpreter. For instance, an expert system designed to assist military pilots in firing missiles at enemy targets might require an inference engine which uses a "data driven," forward-chaining inferencing strategy. Based on information fed into it (and on the rules contained in its knowledge base), the system would conclude when and where the missiles should be fired. The developer's decision to use that crucial inferencing strategy, since it is dictated by an external constraint, probably would not constitute protectable expression. Likewise, our hypothetical missile firing system might require a feature wherein, when certain attributes and values were presented to the inference engine, the inference engine would automatically send a warning to the user. If a court subsequently decided such a warning capacity was a necessary feature of any missile firing expert system, the court should treat the inferencing rules used to achieve that feature as unprotectable ideas.

Second, because the inference engine must be compatible with the knowledge base with which it will interface, it may contain standard code instructions governing how data in the knowledge base will be located and processed. As stated above, developers may create a variety of inference engines to operate in conjunction with the same knowledge base. For instance, several inference engines might be designed for use with a knowledge base storing information on meteorological patterns. One inference engine might be designed to make general weather predictions for public dissemination, while a second inference engine might be engineered to provide highly technical information to pilots flying airplanes. The reasoning process, depth of search, and other inferencing strategies employed by these programs might be very different. The programmers implementing these strategies might therefore make numerous creative decisions regarding precisely how data in the

target knowledge base should be utilized. However, the developers would also have to use certain standard instructions to gain access to information stored in the knowledge base. Just as most dictionaries require readers to use a standard technique to find the definition of an unknown word, many knowledge bases may require an inference engine's search inquiries to adhere to a specific form. Since such standard search inquiries result from technical constraints of the target knowledge base rather than from a developer's creative programming decisions, courts should treat the code instructions used to implement them as nonprotectable ideas.

Finally, courts should deny protection to components of an inference engine included to meet technical requirements of the target hardware or software environments with which the program will interface. Developers may often design an inference engine to be employed in settings where end users already possess a specialized computer system. For example, a developer designing an expert system to help attorneys formulate litigation strategies might want to assure compatibility with the software and hardware products used most often by attorneys. The developer of an expert system designed to assist hospitals conducting billing might desire to achieve compatibility with the computer systems hospitals exploit most often.³⁹⁹ Since expert systems, by definition, are designed to simulate decision making in a specific domain, the inference engine of any expert system must be capable of operating in conjunction with the software and hardware environments end users in that domain customarily employ. Accordingly, courts should treat elements of the inference engine designed for compatibility with these standard software and hardware technologies as nonprotectable ideas.

399. Many expert systems already on the market are designed for use in specific hardware or software environments. For instance, Megaknowledge Inc. developed "Kappa"—an expert system designed to assist engineers and other scientists—for use solely with the MS/DOS operating system and with Microsoft's Windows. See Egol, *supra* note 323, at 160. Likewise, Dresser Industries, Inc. recently created an expert system to assist industrial manufacturers select among Ashcroft pressure gauges. This system operates solely in conjunction with IBM or IBM-compatible hardware. See Stoddard, *Expert System Guides Gauge Selection*, INDUSTRIAL TECHNOLOGY, Dec. 1990, at 42-44.

VI. CONCLUSION

As computer technologies evolve and become increasingly complex, jurists worldwide toil to provide sensible legal protection. Because the computer industry is international, jurists concentrate on eliminating differences in national laws which might curtail or abolish incentives for the development, production, and trade of computer technologies. Comparison of French *droit d'auteur* and American copyright law pertaining to computer programs demonstrates that, at least in some cases, these differences can be reconciled.

Scholars customarily distinguish the dual set of moral and pecuniary interests protected under *droit d'auteur* from the single set of economic interests protected by copyright. Moreover, scholars generally differentiate between France's author-centered concept of originality, requiring works to bear the "impress of the author's personality," and the United States more pragmatic, more permissive independent-effort standard. While these doctrinal differences are real, they may also be shallow. American jurists have begun to implement laws expanding protection of authors' moral rights, while French jurists have eliminated most of these rights for developers of computer programs. Further, the courts' analyses of originality in both countries now evidence significant similarity, especially where works of information are the subject matter in question. In both France and the United States, courts first examine whether the legal requirement of originality has been satisfied, that is, whether the author in question worked independently, without copying. Second, the courts explore the issue of originality, inquiring whether the work incorporates sufficient authorial imagination to merit the law's protection. Where computer programs are the work in question, the courts investigate whether developers have made creative programming decisions and, in some cases, whether external constraints have interfered with those decisions.

End-user requirements, requirements of the target hardware and software, and conventions of computer programming are among the principal constraints which narrow the range of expression

available to computer engineers. As a practical matter, these constraints frequently render necessary the use of certain standard elements in both algorithmic programs and works adopting heuristic programming solutions. Whether developing conventional programs or expert systems, computer engineers require complete access to these technologies, the building blocks of their creations. In the lexicon of both *droit d'auteur* and copyright, these basic technologies constitute "ideas" which the law relegates to the public domain. Although both French and American courts appear to recognize the importance of preserving these program elements to the public, they do not yet systematically address the constraints which make such access imperative.

Ideally, courts should thoroughly and conscientiously analyze the range of programming expression not only in France and the United States, but in all countries which apply copyright provisions to computer programs. As jurists worldwide develop a refined understanding of computer technology and, in particular, of the programming science, they will become better arbiters of which program elements merit legal protection and which should remain available for free use in the industry. If they apply uniform guidelines which address the limitations inherent in developing computer programs, jurists will strike an appropriate balance between providing incentives to private production and fostering broad transnational exchanges of information and technology.

