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Japan's Retreat from Reverse Engineering: An Unnecessary Surrender

Crystal D. Talley*

Introduction

In July, 1993, the Japanese Agency of Cultural Affairs formed an advisory committee to reevaluate the status of Japanese copyright protection for computer software.¹ In response to two United States Circuit Court decisions² and recently adopted European Community legislation,³ the Japanese Council for Examination and Research suggested relaxing copyright protection laws to permit decompilation,⁴ a type of reverse engineering.⁵

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1. R.R. Reid & Peter Behr, *A Software Fight's Blurred Battle Lines: U.S. Computer Companies Are on Both Sides as Japan Considers Copyright Law Changes*, WASH. POST, Jan. 11, 1994, at D1. See *infra* text accompanying notes 45-63.

2. *Atari Games Corp. v. Nintendo of America Inc.*, 975 F.2d 832 (Fed. Cir. 1992) (finding that interim copies for reverse engineering can be a fair use exception to copyright infringement); *Sega Enter. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1527-28 (9th Cir. 1992) (“[w]here disassembly is the only way to gain access to the ideas and functional elements embodied in a copyrighted computer program and where there is a legitimate reason for seeking such access, disassembly is a fair use of the copyrighted work, as a matter of law”). See *infra* text accompanying notes 145-71. For an explanation of disassembly, referred to in this Note as reverse engineering or decompilation, see *infra* Part I.A.

3. Council Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs, art. 6, 1991 O.J. (L 122) 42 [hereinafter Directive]. Commentators have argued that the *Sega* and *Atari* decisions effectively harmonized U.S. and EC law. See Charles R. McManis, *Intellectual Property Protection and Reverse Engineering of Computer Programs in the United States and the European Community*, 8 HIGH TECH. L.J. 25, 48 (1993).

4. *Agency for Cultural Affairs Considering Revising Copyright Law to Legalize Reverse Engineering*, JAPANESE GOV'T WKLY. DIGITIZED INFO., July 23, 1993, available in Westlaw, Jpgovt Database, 1993 WL 2474454; John Espenshade Titus, Comment, *Right to Reverse Engineer Software: Is Japan Next and Does It Really Matter?*, 19 N.C. J. INT'L L. & COM. REG. 491, 492 (1994).

5. The Supreme Court has defined reverse engineering as “starting with the known product and working backward to divine the process which aided in its development or manufacture.” *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 476 (1974). In *Kewanee*, the Court found that trade secret law provides no protection against reverse engineering. However, the Supreme Court has never considered the permissibility of reverse engineering in the context of copyright protection for computer software. See *infra* text accompanying notes 125-30.

29 CORNELL INT'L L.J. 807 (1996)

However, despite the apparent unity of international principles, the United States denounced the Japanese proposal, proclaiming that it was "contrary to international norms" and would "set a dangerous precedent."⁶ Succumbing to U.S. pressure, the Council abandoned its proposal.⁷

Despite U.S. Commerce Department opposition, the Japanese Council's proposal to authorize reverse engineering for the exclusive purpose of discovering underlying ideas⁸ is consistent with emerging trends in international copyright law.⁹ Although the U.S. Copyright Act¹⁰ does not specifically address reverse engineering, two recent appellate court cases held that decompilation used to extract only the underlying idea is permitted under the doctrine of fair use.¹¹ Moreover, the European Community has enacted legislation specifically authorizing reverse engineering for this limited purpose.¹² Hence, Japan's proposal to authorize decompilation was not the renegade attempt to circumvent international custom that the United States portrayed it to be; rather, the proposal was legally defensible and Japan need not have retreated.

Part I of this Note will explore the factual background underlying Japan's proposal. It will examine the technical process of decompilation and analyze Japan's proposal and the international response to it. Part II will canvass the spectrum of international law and custom behind the emerging trend to permit limited decompilation. It will analyze relevant U.S. and European copyright law within the framework of the Berne Convention, which provides the international basis for copyright law in the United States, Europe, and Japan.¹³ Part III will examine the structure of Japanese copyright law and analyze Japan's recent proposal in light of Japa-

6. *Software Reverse Engineering Under Review in Japan*, 6 J. PROPRIETARY RTS. 32 (1994).

7. *Japanese Panel Changes Course on Authorizing Reverse Engineering*, BNA PATENT, TRADEMARK & COPYRIGHT L. DAILY, June 8, 1994, available in LEXIS, Bna Library, Ptcjnl File. The Cultural Affairs Agency explained its decision: "We do not see any necessity to amend the law because there is no [pending legal] dispute among computer companies on the reverse assembly. . . . Whether reverse engineering is legal or not will be left to the courts to decide on specific cases." NIKKEI WKLY., June 6, 1994, at 8, discussed in Betsy E. Bayha, *Reverse Engineering of Computer Software in the United States, the European Union, and Japan*, in ALL-ABA COURSE OF STUDY: ANITRUST/INTELLECTUAL PROPERTY CLAIMS IN HIGH TECHNOLOGY MARKETS: LITIGATING AND ADVISING IN AN ERA OF UNCERTAINTY 175, 191 (Jan. 26, 1995).

8. The Japanese proposal was limited to revealing ideas behind copyrighted products, and thus did not authorize outright "copycat" reproduction. *Japanese Panel Changes Course on Authorizing Reverse Engineering*, *supra* note 7, at 897.

9. Bayha, *supra* note 7, at 179.

10. 17 U.S.C. § 101 (1988).

11. "Fair use" is a specific provision of the United States Copyright Act. 17 U.S.C. § 107 (1988). However, the term is also used more generally to include the doctrine of fair use. See *infra* text accompanying notes 119-79.

12. Directive, *supra* note 3, art. 6.

13. Berne Convention for the Protection of Literary and Artistic Works, Sept. 9, 1886, revised, Paris, July 24, 1971, 25 U.S.T. 1341, in UNFAIR COMPETITION, TRADEMARK, COPYRIGHT AND PATENT: SELECTED STATUTES AND INTERNATIONAL AGREEMENTS 331 (Paul Goldstein et al. eds., 1994) [hereinafter Berne Convention].

nese law and emerging international trends. Part IV will explore the implications of Japan's retreat for the international future of reverse engineering.

I. Background

A. Decompilation

The scope of protection to be given to computer software is one of the most difficult legal issues in intellectual property.¹⁴ Software is most useful when it can interact with the software and hardware of other manufacturers, that is, when the software is interoperable.¹⁵ In order to achieve interoperability, programs must fit the specifications of other programs,¹⁶ but specifications are often available only as encoded within the programs themselves.¹⁷ Consequently, programmers seeking to create software that is most useful to most computer users must be able to ascertain the specifications of other programs with which the software will operate by decoding the programs as they are released to the public.¹⁸

1. Forward Engineering

Reverse engineering is best understood as the reversal of the software development process, sometimes known as forward engineering.¹⁹ When developing software, a programmer begins with a goal for the computer; he decides what he wants the computer to do.²⁰ The goal may be as simple as averaging a series of numbers or as complex as analyzing the composition of DNA.²¹

Next, the programmer conceives of a method for the computer to perform the desired goal or task. This conception, the most abstract level of programming, is referred to as an algorithm.²² Generally an algorithm is merely an idea in the mind of the programmer, but it may physically exist in the form of notes or an outline.²³ The programmer then converts the algorithm into a computer language such as BASIC, Pascal, or FORTRAN—otherwise known as source code.²⁴ At this stage, the programmer typically

14. McManis, *supra* note 3, at 26.

15. Interoperable is defined as "capable of being used or operated reciprocally." *RANDOM HOUSE DICTIONARY OF THE ENGLISH LANGUAGE* 997 (2d ed. 1987). See Bayha, *supra* note 7, at 177; Gary R. Ignatin, *Let the Hacker's Hack: Allowing the Reverse Engineering of Copyrighted Computer Programs to Achieve Compatibility*, 140 U. PA. L. REV. 1999, 2003 (1992).

16. Jaap H. Spoor, *Copyright Protection and Reverse Engineering of Software: Implementation and Effects of the EC Directive*, 19 U. DAYTON L. REV. 1063, 1063 (1994).

17. See *infra* text accompanying notes 36-44.

18. Spoor, *supra* note 16, at 1079; Ignatin, *supra* note 15, at 2009.

19. Forward engineering involves several phases of development and translation, although in actuality they are not as separate or distinguishable as the following description may imply. Titus, *supra* note 4, at 496-97; James Canfield, Note, *The Copyrightability of Object Code*, 59 NOTRE DAME L. REV. 412, 414 (1984).

20. Canfield, *supra* note 19, at 413-14.

21. *Id.*

22. *Id.* at 413.

23. Titus, *supra* note 4, at 495.

24. Canfield, *supra* note 19, at 417.

inserts comments and instructions to assist later programmers in updating the source code.²⁵ These commands are intended to explain the intended logic and organizational structure the programmer had in mind when he wrote the commands.²⁶

The microprocessor of a computer does not understand natural language or even programming commands as written in computer languages; the only information a computer registers is the presence or absence of an electronic impulse, similar to the on-off of a light switch.²⁷ When there is an electrical impulse the computer registers a one (1), and when there is no impulse the computer registers a zero (0).²⁸ Consequently, a computer program must enter the microprocessor as a stream of ones and zeroes, or "binary code."²⁹

Because a computer cannot operate a program written in source code, the source code must be translated from the text of the computer language into object code, the requisite stream of ones and zeroes. A special program, either a compiler or an assembler, is used to accomplish this conversion.³⁰ Thereafter, the computer executes the commands as instructed by the program until it encounters an instruction indicating that the program has been completed.³¹ In summary, the purpose of forward engineering is to turn the original algorithm or idea into electrical impulses of binary object code which order the computer to perform specific tasks.³²

2. Reverse Engineering

Reverse engineering, or decompilation, is the inversion of the initial programming process just described. It entails reconverting a program from its binary object code into source code.³³ The reverse engineer accomplishes this translation by grouping segments of the binary code, conducting the appropriate analysis, and converting the resulting groups of data into source code.³⁴ Because it would be impossible to perform this task using only human memory, a computer must copy the original object code before translation is possible.³⁵

25. For example, comments assist programmers in upgrading WordPerfect 6.0 to 6.1.

26. Andrew Johnson-Laird, *Software Reverse Engineering in the Real World*, 19 U. DAYTON L. REV. 843, 857 (1994).

27. Canfield, *supra* note 19, at 414.

28. *Id.*

29. *Id.*

30. *Id.* at 417.

31. *Id.*

32. Titus, *supra* note 4, at 495-96.

33. *Id.* See also Andrew Pollack, U.S. *Protesting Japan's Plan to Revise Software Protection*, N.Y. TIMES, Nov. 22, 1993, at D2; *Software Reverse Engineering Under Review in Japan*, *supra* note 6, at 32.

34. Titus, *supra* note 4, at 495; William S. Coats & Heather D. Rafter, *The Games People Play: Sega v. Accolade and the Right to Reverse Engineer Software*, 15 HASTINGS COMM. & ENT. L.J. 557, 558 (1993).

35. Coats & Rafter, *supra* note 34, at 559; Pollack, *supra* note 33; Bayha, *supra* note 7, at 177. See also *MAI Systems Corp. v. Peak Computer, Inc.*, 991 F.2d 511 (9th Cir. 1993), *cert. dismissed*, 510 U.S. 1033 (1994) (holding that the loading of a computer

It is important to note what reverse engineering does *not* do. The instructions and comments inserted by the original programmers into the source code cannot be translated into object code and typically are not preserved in the marketed programs.³⁶ As a result, the true secrets of the organizational structure and inner workings of a program cannot be discovered through traditional reverse engineering methods.³⁷ "Reverse engineering is almost entirely an additive process, with the reverse engineer adding his or her knowledge and experience to meager information contained within the object code."³⁸ Because of the complexity of the process, reverse engineering often fails.³⁹ In fact, it is often easier and more cost-efficient for competitors to develop new software than to reverse engineer existing object code.⁴⁰

The structure of computer programs presents a unique problem for copyright law. Traditional copyright law, such as in the United States, protects expression but not ideas.⁴¹ In a computer program, the object code effectively encrypts both the ideas behind the program and the expression of those ideas.⁴² Often the only way to expose the legally exploitable ideas underlying computer software is to decompile the program.⁴³ Thus, the legal dilemma presented by reverse engineering is that decompilation requires making an exact copy of the program—precisely what traditional copyright law prevents.⁴⁴

operating system into the random access memory of a computer constitutes the making of an infringing copy when performed by someone other than the licensee). Subsequent district court decisions have held that loading a program into RAM constitutes making an infringing copy. See, e.g., *Advanced Computer Serv. of Mich., Inc. v. MAI Sys. Corp.*, 845 F. Supp. 356, 362-63 (E.D.Va. 1994); *Triad Systems Corp. v. Southeastern Express Co.*, 1994 WL 446049 (N.D.Cal. 1994).

36. Johnson-Laird, *supra* note 26, at 896-97.

37. *Id.* at 896.

38. *Id.* at 897.

39. Coats & Rafter, *supra* note 34, at 559.

40. Spoor, *supra* note 16, at 1078; Pamela Samuelson et al., *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308, 2341 (1994).

41. 17 U.S.C. § 102(a), (b) (1988). See *Harper & Row, Publishers, Inc. v. Nation Enter.*, 471 U.S. 539, 547 (1985). See also Pollack, *supra* note 33.

42. Copyright law is typically based on a distinction between ideas themselves and the expression of ideas. While the expression of an idea can be copyrighted (e.g., CHARLES DARWIN, *ON THE ORIGIN OF THE SPECIES* (1958)), an idea itself cannot (e.g., "survival of the fittest"); anyone can, as many have, analyze and criticize Darwin's theory. See *infra* text accompanying notes 81-85. See also Ignatin, *supra* note 15, at 2008-09.

43. *Sega Enter. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1524 (9th Cir. 1992) ("Computer programs pose unique problems for the application of the 'idea/expression distinction' that determines the extent of copyright protection.")

44. See, e.g., 17 U.S.C. § 102(a). The U.S. Copyright Act does provide for exemption from copyright liability if the copy is made for a fair use or for archival purposes. 17 U.S.C. §§ 107, 117 (1988). See *infra* text accompanying notes 102-24. See also Japanese Copyright Act, Law No. 48, amended as of June 1993 (Law No. 89) at art. 113, *reprinted* in *Statutory Material: Index Volume DOING BUSINESS IN JAPAN* app. 9B (Zentaro Kitagawa ed., 1996) [hereinafter Japanese Copyright Act].

B. Japan's Proposal

Japan, whose copyright law is grounded in the idea/expression distinction, faces the same legal dilemma. Prompted by the apparent authorization of reverse engineering by two U.S. cases and recently enacted EC legislation,⁴⁵ Japan began to consider reformulating its own copyright law to permit decompilation. The dispute began when Japan's Ministry of Education, which oversees copyright issues, formed a committee to analyze Japanese law on software copying to ensure that Japan's protection of computer software paralleled that of the United States and Europe.⁴⁶ In July, 1993, the Japanese Agency of Cultural Affairs formed an advisory committee, the Council of Researchers for Examination and Research, led by Zentaro Kitagawa,⁴⁷ to review software copyright law and develop suggestions for future legislation. Contrary to its earlier proposals to increase restrictions on the use of computer software,⁴⁸ the Council announced the possibility of allowing software users to decompile computer programs.⁴⁹ The Council favored allowing reverse engineering for the limited purpose of extracting "ideas" behind products, but not for making "copycat products."⁵⁰

A number of factors contributed to the timing of Japan's proposal. First, Japan has recently experienced an economic recession.⁵¹ Japan has dealt with economic downturns in the past by increasing exports.⁵² Because of the increasing global demand for software products and Japan's relatively insignificant supply of such products, legalization of reverse engineering could provide Japanese programmers with the information they need to compete in the global software market.⁵³ Second, Japan's proposal was in response to an apparent international trend to legalize reverse engineering in a limited context. After the passage of the Directive⁵⁴ in the European Community and the decisions of two U.S. appellate courts in *Sega Enterprises Ltd. v. Accolade, Inc.*⁵⁵ and *Atari Games Corp. v. Nintendo*

45. See Directive, *supra* note 3.

46. Reid & Behr, *supra* note 1.

47. *Japanese Panel Changes Course on Authorizing Reverse Engineering*, *supra* note 7. The Keidanren (the Federation of Economic Organizations of Japan) considered similar proposals. *Negotiators Make No Progress in Intellectual Property Talks*, INT'L TRADE REP. Jan. 5, 1994, at 10, available in LEXIS, Intlaw Library, Intrad File.

48. *Japan Government Weighs Restrictions on Software Copying by Individuals*, INT'L TRADE REP., July 7, 1993, at 1128, available in LEXIS, Intlaw Library, Intrad File.

49. *Software Reverse Engineering Under Review in Japan*, *supra* note 6, at 32.

50. *Japanese Panel Changes Course on Authorizing Reverse Engineering*, *supra* note 7. See also *Negotiators Make No Progress in Intellectual Property Talks*, *supra* note 47.

51. *Labour Pains*, ECONOMIST, Feb. 12, 1994, at 74, available in LEXIS, News Library, Txtmws File.

52. *Special Report Trade Negotiators Turn Eastward*, INT'L TRADE REP., Jan. 19, 1994, at 102, available in LEXIS, Intlaw Library, Intrad File.

53. Japan's best computer software, Ichitaro, was written more than ten years ago. *Japan to Draft Guidelines on Computer Software Copyrights*, INT'L TRADE REP., Feb. 10, 1993, available in LEXIS, Intlaw Library, Intrad File.

54. Directive, *supra* note 3.

55. 977 F.2d at 1510.

of America, Inc.,⁵⁶ it seemed clear that reverse engineering, at least in the limited context articulated in both the Directive and the American cases, was legal.⁵⁷

Japan's proposal threatened to affect directly U.S. and international trade. The United States accounts for seventy-eight percent of worldwide software sales.⁵⁸ Of the 140 million personal computers in the world, ninety percent use either Microsoft's DOS or Windows operating systems.⁵⁹ Despite the significance of the proposal, both the U.S. government and industry were slow to respond.⁶⁰ The United States made no response until November, when Secretary of Commerce Ron Brown and U.S. Trade Representative Mickey Kantor wrote a letter to Japanese Trade Minister Hiroshi Kumagai complaining that the proposal was contrary to the spirit of trade negotiations between the two countries held in July.⁶¹ U.S. Ambassador to Japan Walter Mondale personally called Education Minister Ryoko Akamatsu to say that "the U.S. is strongly opposed to any weakening in Japan's copyright law."⁶² Assistant Commissioner for External Affairs at the U.S. Patent and Trademark Office, Michael K. Kirk, argued that the new proposal would be contrary to "international norms" and would "set a dangerous precedent."⁶³

In response to these concerns, the Japanese Cultural Affairs Agency held a hearing on the issue, at which several members of the U.S. Patent and Trademark Office testified.⁶⁴ Although several representatives of U.S. industry spoke, opinion on the legalization of reverse engineering was split.⁶⁵ On June 7, 1994, an official of the Japanese Cultural Affairs Agency announced that the panel agreed that Japan should not legalize reverse engineering of computer software.⁶⁶ The official cited U.S. pressures as the reason for the shift in direction, and admitted that the panel had withdrawn the proposal.⁶⁷

56. 975 F.2d at 832.

57. Titus, *supra* note 4, at 510.

58. *Negotiators Make No Progress in Intellectual Property Talks*, *supra* note 47, at 10.

59. *USA: Reinventing Microsoft: Mark II*, *ECONOMIST*, Mar. 19, 1994, at 81, available in LEXIS, World Library, Txdne File.

60. Reid & Behr, *supra* note 1. IBM first found out about the proposal through a Japanese industry association and alerted the U.S. government. *Id.*

61. Titus, *supra* note 4, at 493-94. This hearing occurred in the context of "economic framework talks" between the United States and Japan, which were generally successful. The talks on intellectual property and the U.S.-Japanese Economic Summit, which followed in February, 1994, however, were failures. *Id.* at 494-95.

62. Reid & Behr, *supra* note 1.

63. *Software Reverse Engineering Under Review in Japan*, *supra* note 6, at 32.

64. *Japanese Software Update*, *J. PROPRIETARY RTS.*, Feb. 1994, at 31.

65. Titus, *supra* note 4, at 494. "At a time when we are engaged in a process to provide greater access for U.S. and other foreign goods and services to the Japanese market, it is a matter of grave concern to learn of this activity that has the potential of having just the opposite effect." Pollack, *supra* note 33.

66. *Japanese Panel Changes Course on Authorizing Reverse Engineering*, *supra* note 7.

67. *Id.* This was not the first time Japan had foregone a plan to loosen software protection. A similar strategy was abandoned as a result of pressure from the United States and some segments of the Japanese software industry. Pollack, *supra* note 33; *Software Reverse Engineering Under Review in Japan*, *supra* note 6, at 32.

II. International Law

Although Japan surrendered to U.S. charges that its proposal to permit decompilation violated existing international norms, an examination of relevant international law reveals that Japan need not have been so quick to retreat. The Berne Convention, which provides the backdrop to copyright law for the United States, the European Community, and Japan, leaves the door open for decompilation.⁶⁸ Moreover, recent U.S. case law and EC legislation have taken the position that limited decompilation is permissible.⁶⁹ Thus, Japan's proposal was consistent with emerging trends in international law.

A. The Berne Convention

The Berne Convention,⁷⁰ first enacted in 1886, offers the broadest basis for international copyright protection.⁷¹ Its general purpose is to protect the rights of authors of literary and artistic works.⁷² However, such works are not protected by the Convention itself, but rather by legislation in the country of original publication.⁷³ Signatories may create separate agreements among themselves if those agreements meet minimum standards established by the Convention.⁷⁴

The three guiding principles of the Berne Convention are national treatment, automatic protection, and independent protection. First, individuals are accorded national treatment in that both citizens and non-citizens qualify for identical treatment.⁷⁵ Second, protection is automatic rather than dependent upon observation of formalities.⁷⁶ Finally, a base level of protections is available in all member countries.⁷⁷

While the Berne Convention creates a number of specific rights for the

68. See *infra* Part II.A.

69. See Directive, *supra* note 3.

70. Berne Convention, *supra* note 13.

71. Anne Moebes, *Negotiating International Copyright Protection: The United States and European Community Positions*, 14 LOY. L.A. INT'L & COMP. L.J. 301, 305 (1992). The United States, Japan, and all Member States of the European Community are signatories of the Berne Convention.

72. Berne Convention, *supra* note 13, art. 1.

73. *Id.* art. 5(4)(a).

74. Moebes, *supra* note 71, at 303. For example, the United States is a party to the North American Free Trade Agreement, Dec. 17, 1992, US.-Can.-Mex., 32 I.L.M. 605 (1993) [hereinafter NAFTA]. NAFTA not only meets all the requirements of the Berne Convention, but also goes further by providing additional enforcement mechanisms. See Michelle Bodine-Keely, Comment, *Software Protection in the NAFTA and Berne Regimes: A Comparative Analysis of U.S. and Canadian Copyright Law*, 1 TULSA J. COMP. & INT'L L. 375, 377 (1994). Although NAFTA explicitly deals with many aspects of copyright protection for computer software, it leaves the issue of reverse engineering to applicable national law. *Id.* at 383.

75. Berne Convention, *supra* note 13, art. 5(1).

76. *Id.* art. 5(2) ("The enjoyment and exercise of these rights shall not be subject to any formality."). Examples of such formalities are: the deposit of a copy of a work, registration with some official body, or payment of registration fees. WORLD INTELLECTUAL PROPERTY ORGANIZATION, GUIDE TO THE BERNE CONVENTION FOR THE PROTECTION OF LITERARY AND ARTISTIC WORKS (PARIS ACT, 1971), at 33 (1978).

77. Berne Convention, *supra* note 13, art. 2.

author of a creative or artistic work,⁷⁸ it does not explicitly address the issue of reverse engineering. Although computer programs are not specifically listed in the Berne Convention, they are clearly protected as literary works.⁷⁹ The Convention does contain a limited fair-use provision, but it has not been interpreted so broadly as to permit decompilation.⁸⁰

B. United States Law

1. Foundations of Copyright Law

The constitutional language that is the source of U.S. copyright law sheds light on the law's fundamental purposes and indicates the limited nature of a copyright holder's rights.⁸¹ While the immediate purpose of copyright law is to protect the exclusive rights of the creator, its concomitant goal is to benefit society as a whole by encouraging production.⁸² Thus, there is a dual nature to a copyrighted work: its expression is privately owned while its underlying ideas and certain derivative uses are simultaneously open to the public. This inherent limitation on any copyrighted work is a result of the special nature of precisely what is owned.⁸³ The creative process—knowledge itself—depends on access to prior thought.⁸⁴ Therefore, unlike a privately owned plot of land or a bicycle, from which an owner can

78. The Berne Convention protects unpublished as well as published works, *id.* art. 4(2), and grants authors the exclusive right to make and authorize translations of their work. *Id.* art. 8. The Convention further grants authors exclusive control over the reproduction of their works with the narrow exception of certain reproductions by the press. *Id.* art. 9. Authors also retain control over any adaptations, arrangements, and other alterations of the work. *Id.* art. 12.

79. Marc A. Ehrlich, Comment, *Fair Use or Foul Play? The EC Directive on the Legal Protection of Computer Programs and Its Impact on Reverse Engineering*, 13 *PACE L. REV.* 1003, 1020 (1994). The computer industry was in its infancy when the Berne Convention was last amended in 1971. *Id.*

80. Berne Convention, *supra* note 13, art. 10. That the Berne Convention contains a fair-use provision is of great significance given the fact that fair use is the theory U.S. courts have used to authorize reverse engineering. See *infra* text accompanying notes 119-79. The fair-use provision of the Berne Convention provides:

(2) It shall be a matter for legislation in the countries of the Union, and for special agreements existing or to be concluded between them, to permit the utilization, to the extent justified by the purpose, of literary or artistic works by way of illustration in publications, broadcasts or sound or visual recordings for teaching, provided such utilization is compatible with fair practice.

Berne Convention, *supra* note 13, art. 10.

81. "The Congress shall have the 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." U.S. CONST. art. I, § 8, cl. 8.

82. The grant of copyright "is intended to motivate the creative activity of authors and inventors by the provision of a special reward. . . . The monopoly created by copyright thus rewards the individual author in order to benefit the public." *Harper & Row, Publishers, Inc. v. Nation Enter.*, 471 U.S. 539, 546 (1985), quoting *Sony Corp. of America v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984). "The 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." *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975).

83. Thus, it is not as if a right is being taken away. Rather, the copyright owner never possessed the right to exclude the ideas from the public domain.

84. As Judge Kozinski noted,

exclude others for any reason or no reason at all, public access to copyrighted property is often permitted.⁸⁵

2. Statutory Protection

The Copyright Act addresses this dual concern for public and private interests by distinguishing between ideas and expressions: it explicitly protects only the expression of ideas, and not ideas themselves.⁸⁶ Were it otherwise, the first individual to write about an idea would have the last word on the subject; future discussion of the idea would be a copyright violation.⁸⁷ Because copyright protection is limited to expression, however, subsequent authors are free to use ideas or general concepts from a previous work. In addition, where an idea and its expression are "inseparable," the expression encompassing the idea is not protected by the Copyright Act.⁸⁸

Although not specifically mentioned in the text of the Copyright Act, computer programs are clearly included within the scope of protection.⁸⁹ Section 102 of the Copyright Act protects "original works of authorship fixed in any tangible medium of expression, now known or later devel-

Overprotecting intellectual property is as harmful as underprotecting it. Creativity is impossible without a rich public domain. Nothing today, likely nothing since we tamed fire, is genuinely new. Culture, like science and technology, grows by accretion, each new creator building on the works of those who came before. Overprotection stifles the very creative process it's supposed to nurture.

White v. Samsung Elec. America, Inc., 989 F.2d 1512, 1513 (9th Cir. 1993) (Kozinski, J., dissenting).

85. See, e.g., 17 U.S.C. §§ 107, 117 (1988).

86. 17 U.S.C. § 102(b) (1988). This conception first emerged in *Baker v. Selden*, 101 U.S. 99, 103, (1879). See also *Harper & Row Publishers, Inc. v. Nation Enter.*, 471 U.S. 539, 547 (1985).

87. Thus, John Grisham can copyright *The Firm*, but not the concept of legal fiction; any of us is free to try her hand at it. Wayne A. Ely, Note, *Copyright and Trademark Protection of Computer Software—Reverse Engineering of Competitor's Computer Game Software, Required to Comprehend Work, and Resulting in Display of "False Trademark," Not Violative of Copyright Act or Lanham Act—Sega Enterprises, Ltd. v. Accolade, Inc.*, 12 TEMP. ENVTL. L. & TECH. J. 137, 148 (1993). See also *supra* note 42.

88. Ely, *supra* note 87 at 148. *Idea* is broadly defined in 17 U.S.C. § 102(b) to include "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." The Supreme Court has observed that

[t]he primary objective of copyright is not to reward the labor of authors, but "[t]o promote the Progress of Science and useful Arts." Art. I, § 8, cl. 8. To this end, copyright assures authors the right to their original expression, but encourages others to build freely upon the ideas and information conveyed by a work. This principle, known as the idea/expression or fact/expression dichotomy, applies to all works of authorship. . . . This result is neither unfair nor unfortunate. It is the means by which copyright advances the progress of science and art.

Feist Publications, Inc. v. Rural Tel. Serv. Co., Inc., 499 U.S. 340, 349-50 (1991) (citations omitted).

89. Peter A. Wald et al., *Standards for Interoperability and the Copyright Protection of Computer Programs*, in PRACTICING LAW INSTITUTE, PATENTS, COPYRIGHTS, TRADEMARKS, AND LITERARY PROPERTY COURSE HANDBOOK SERIES, PLI Order No. G4-3920 (1994), available in Westlaw, 390 PLI/Pat. 481, 499.

oped,"⁹⁰ and specifies that "works of authorship" include "literary works."⁹¹ Rather than creating a *sui generis* form of protection,⁹² the courts have analyzed computer programs under the rubric of copyright law by recognizing computer programs in either source or object code as literary works.⁹³

Legislative history makes it clear that Congress intended the idea/expression dichotomy to apply to computer programs.⁹⁴ Specifically, the Computer Software Copyright Act,⁹⁵ an amendment to the Copyright Act⁹⁶ based on the recommendation of the National Commission on New Technological Uses of Copyrighted Works (CONTU),⁹⁷ defines a *computer*

90. 17 U.S.C. § 102(a) (1988). Thus, the Act imposes an originality requirement that the work be the author's own intellectual creation. See Becki Fahle, Comment, *The Effect of the Directive on the Legal Protection of Computer Programs on Copyright Law in the EC*, 14 Hous. J. INT'L L. 659, 676 (1992) (discussing the idea/expression dichotomy within the context of the EC Directive).

91. 17 U.S.C. § 102(a)(1) (1988).

92. *Sui generis* is defined as being "of its own kind or class." BLACK'S LAW DICTIONARY 1434 (6th ed. 1990). Congress could have created an independent source of protection for computer programs, *sui generis*, but instead chose to protect software within the existing copyright framework.

93. *Apple Computer, Inc. v. Formula Int'l Inc.*, 725 F.2d 521, 525 (9th Cir. 1984) (section 102 applies to computer programs and protects ideas but not expressions); *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1248 (3d Cir. 1983), *cert. dismissed*, 464 U.S. 1033 (1984) (both source and object code protected); *Stern Elec., Inc. v. Kaufman*, 669 F.2d 852 (2d Cir. 1982) (source code protected); *Williams Elec., Inc. v. Arctic Int'l, Inc.*, 685 F.2d 870 (3d Cir. 1982) (object code protected). The 1976 House Report states that the definition of "literary works . . . includes computer data bases and computer programs to the extent that they incorporate authorship in the programmer's expression of original ideas as distinguished from the ideas themselves." H.R. REP. NO. 94-1476, at 54 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659, 5667.

94. Legislative history reveals that

[s]ome concern has been expressed lest copyright in computer programs should extend protection to methodology or processes adopted by the programmer, rather than merely to the 'writing' expressing his ideas. Section 102(b) is intended, among other things, to make clear that the expression adopted by the programmer is the copyrightable element in a computer programmer, and that the actual process or methods embodied in the program are not within the scope of the copyright law.

H.R. REP. NO. 94-1476, at 26 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659. See also United States Copyright Office, *Copyright Registration for Computer Programs*, Circular 61 (1987) ("copyright protection is not available for ideas, program logic, algorithms, systems, methods, concepts, or layouts"). While Congress did intend to grant computer software copyright owners exclusive rights to their works under 17 U.S.C. § 106(1) (1988), it chose to postpone enacting specific copyright legislation for computer software in 1976.

95. 17 U.S.C. §§ 101, 107 (1988).

96. The Act was so amended on December 12, 1980. Pub. L. No. 96-517, § 10(a), 94 Stat. 3015, 3028 (1980).

97. H.R. REP. NO. 96-1307, at 23 (1980), *reprinted in* 1980 U.S.C.C.A.N. 6460, 6482. Congress created CONTU in 1976 to study computers and other technological advancements and to advise Congress whether these technologies should be integrated into the existing copyright scheme. CONTU has been the subject of much criticism from those who would like to see a separate legal structure for computer issues. The central fear of those who seek reformation is overprotection. Arthur R. Miller, *Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?*, 106 HARV. L. REV. 978, 978 (1993).

program as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."⁹⁸ When viewed in combination with section 102(a),⁹⁹ this language clearly illustrates that even a program in object code is subject to copyright protection.¹⁰⁰ However, the ideas embodied in a computer program are not protected for the same reasons ideas in any other work are not protected.¹⁰¹

The process of decompilation necessarily entails a number of copyright violations. First, the software engineer will make at least one copy of the object code in the computer's memory, which is then translated into source code.¹⁰² In addition, the final source code will be an unauthorized derivative of the original object code, so that recording the results in any way, even manually on paper, constitutes the production of further unauthorized copies.¹⁰³ Given that multiple copyright violations may occur, the only way decompilation would be permissible is if an affirmative defense excused the violations. The Copyright Act provides two potential affirmative defenses: archival copy¹⁰⁴ and fair use.¹⁰⁵

a. Archival Copy

Section 117 of the Copyright Act allows software owners to make backup copies of legitimately purchased computer programs. It provides:

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

- (1) that such a new copy or adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner, or
- (2) that such new copy or adaptation is for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.¹⁰⁶

Although Congress did contemplate extending this statute to cover decompilation, the silent legislative history has been interpreted to imply that Congress did not intend for reverse engineering to be lawful per se.¹⁰⁷

98. 17 U.S.C. § 101 (1988).

99. The Act protects works that can be "perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device." 17 U.S.C. § 102(a) (1988).

100. See H.R. 94-1476, at 54 (1976) *reprinted in* 1976 U.S.C.C.A.N. 5659, 5667. See, e.g., *Johnson Controls, Inc. v. Phoenix Control Sys., Inc.*, 886 F.2d 1173, 1175 (9th Cir. 1989).

101. See, e.g., *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1252-53 (3d Cir. 1983).

102. Ignatin, *supra* note 15, at 2011.

103. *Id.* at 2011-12.

104. 17 U.S.C. § 117 (1988).

105. 17 U.S.C. § 107 (1988).

106. 17 U.S.C. § 117 (1988).

107. See Joe L. Gage, Jr., Comment, *Copyright Law and Reverse Engineering: Have Recent Decisions Taken the Fair Out of Use?*, 46 BAYLOR L. REV. 183, 187 (1994).

In *Vault Corp. v. Quaid Software Ltd.*,¹⁰⁸ the Fifth Circuit interpreted section 117 to include the copying used in decompilation as “an essential step in the utilization of the computer program.”¹⁰⁹ The court construed section 117(2) to authorize a program owner to copy it “for any reason so long as the owner uses the copy for archival purposes only and not for an unauthorized transfer.”¹¹⁰ In holding that copying for decompilation was an “archival purpose” which was “necessary to the utilization of the program,”¹¹¹ the Fifth Circuit has been the only U.S. court to extend section 117 to protect reverse engineering.

In *Sega*, the Ninth Circuit explicitly rejected the use of section 117 to authorize decompilation,¹¹² holding instead that *Accolade's* use was beyond the intended scope of section 117.¹¹³ Although the Copyright Act does not define *archival purpose*,¹¹⁴ Black's Law Dictionary defines *archives* as “place[s] where old books, manuscripts, records, etc. are kept.”¹¹⁵ Thus, the plain meaning of *archival* implies retaining information in a passive sense. Copying for purposes of decompilation is outside the scope of the Act.¹¹⁶ Allowing copying for decompilation purposes effectively reads section 117(2) out of the Copyright Act by rendering meaningless the requirement that a copy be for “archival purposes only.” A careful analysis of the Fifth Circuit's opinion in *Vault Corp.* supports this interpretation. In that case, Quaid decompiled Vault Corp.'s copy-protected program to override the copy protection¹¹⁷—clearly not an archival purpose.¹¹⁸

The archival-purpose provision of the Copyright Act thus offers no support for the legalization of decompilation. As a result, courts turned to the only other statutory provision which could encompass reverse engineering—section 107's fair-use provision.

b. Fair Use

Because the purpose of copyright law is not only to reward the author of a work, but also to encourage the exploration of ideas,¹¹⁹ the Copyright Act establishes a limited privilege for individuals to use copyrighted work in a reasonable manner without the permission of the copyright owner.¹²⁰ Thus, fair use is an affirmative defense to an allegation of copyright infringement.¹²¹ It “serves as a means of balancing the public's interest in

108. 847 F.2d 255, 261 (5th Cir. 1988).

109. *Id.* at 266.

110. *Id.*

111. *Id.*

112. *Sega Enter. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1518 (9th Cir. 1992).

113. *Id.* at 1520.

114. See 17 U.S.C. § 101 (1988).

115. BLACK'S LAW DICTIONARY 106 (6th ed. 1990).

116. See McManis, *supra* note 3, at 85.

117. *Vault Corp.*, 847 F.2d at 255, 257.

118. See Gage, *supra* note 107, at 187.

119. See *supra* text accompanying notes 81-85.

120. 17 U.S.C. § 107 (1988).

121. Ely, *supra* note 87, at 149.

exchange against the copyright holder's rights in his or her work."¹²² Section 107 provides that four factors determine whether the use made in a particular case is fair:

- (1) The purpose and character of the use, including whether such use is of a commercial nature or is for non-profit educational purposes;
- (2) the nature of the copyrighted work;
- (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
- (4) the effect of the use upon the potential market for or value of the copyrighted work.¹²³

A traditional analysis of these factors would condemn reverse engineering to the realm of illegal infringement. First, competitive, commercial gain is the purpose and character of the use. Second, the nature of the work is the creative product of a programmer who seeks monetary reward for his efforts. Since decompilation necessarily involves an absolute copy of the original program, the third factor, the "amount and substantiality of the portion used," clearly cuts against a finding of fair use. Finally, allowing absolute copying of a program could destroy the author's potential market and thus decrease the incentive to produce.¹²⁴ Consequently, if fair use were to present an affirmative defense for reverse engineering, the inherent nature of computer software would compel courts to expand the traditional application of the four-factor test.

3. Case Law

The Supreme Court has never addressed the issue of reverse engineering.¹²⁵ Consequently, U.S. appellate court decisions currently provide the only guidance on the prospect of fair use as an affirmative defense in computer software reverse engineering. The Supreme Court has never been inclined to hear cases on technical issues, and decompilation of computer software is a complex area of technology.¹²⁶ Perhaps more importantly, because losing a copyright infringement case often means losing the right to produce a line of products, litigants are generally unwilling to take a case to the Supreme Court.¹²⁷ If the Court were to issue an injunction, a product line or even an entire corporation could be destroyed.¹²⁸ Furthermore, the current players in the computer software industry have little desire to resolve the issue definitively.¹²⁹ Companies often simultaneously decompile the programs of others and seek injunctions to prevent the decompilation of their own works.¹³⁰

122. *Id.*

123. 17 U.S.C. § 107 (1988).

124. Gage, *supra* note 107, at 191.

125. *See supra* note 5.

126. *See supra* Part I.A.

127. Gage, *supra* note 107, at 184-85.

128. *Id.*

129. *Id.*

130. *Id.*

a. The Unique Nature of Computer Software

Computers pose a unique problem for copyright law.¹³¹ First, when a computer program exists in object code, the function, or idea, of the program is effectively hidden in a tremendous amount of incomprehensible expression. Second, any use of a computer program requires making a copy of the program in the memory of the computer. As such, a broad interpretation of "reproduction" effectively precludes discovery of the ideas underlying a computer program.¹³²

Although copyright protection extends to expression only and not to ideas, where an idea and its expression are "inseparable," the expression encompassing the idea is not protected by the Copyright Act.¹³³ Therefore, emphasis on the idea/expression dichotomy has resulted in reduced protection for computer software.¹³⁴ When expression of the underlying idea effectively encrypts the idea, protection of the expression necessarily restricts access to the idea.¹³⁵ In this sense, ideas are inadvertently protected. Thus, if the only way to expose ideas is to copy the expression, courts are faced with a choice: either they can provide a defense to illegal copying, or they can extend copyright protection to ideas *de facto*.

Unlike a novel or a musical composition, the expression in computer software does not reveal the underlying idea. Assume, for example, that we have no idea how to average numbers. Someone programs a computer to perform this task. The program asks us to enter numbers, and when we have finished, it calculates the average. The programmer who created this software can copyright the program itself—the expression. Yet, he cannot copyright the underlying idea, or algorithm, that to average numbers one must add all of the numbers together and divide the sum by the total number of figures added together. Since computer software is comprehensible to a computer only when it is incomprehensible to a human, ideas are effectively protected in the process of protecting the expression.¹³⁶

When a court seeks to determine whether there has been a copyright infringement,¹³⁷ it examines only the expression of the copyrighted work—not the idea. Courts look at the purpose and character of the use of the expression, the nature of the expression, the amount of the expression used, and the effect of the use of the expression. In contrast, ideas may be taken and used wholesale. Whether the ultimate use of the product of reverse engineering is fair is an analytically distinct issue from the fairness

131. Wald, *supra* note 89, at 487.

132. *Id.* See also Spoor, *supra* note 16, at 1077.

133. Ely, *supra* note 87, at 148.

134. Titus, *supra* note 4, at 499.

135. Ignatin, *supra* note 15, at 2015; see Bayha, *supra* note 7, at 192.

136. I choose this example because it is one everyone can understand. Do not, however, be misled by the fact that one could learn the idea of averaging numbers from many other sources. Suppose, for example, that the first expression of Einstein's theory of relativity had been in the form of a computer program. Unless decompilation were authorized, the idea would be effectively encrypted with the expression.

137. 17 U.S.C. § 106 (1988).

of the process of reverse engineering.¹³⁸

The inescapable fusion of ideas and expression in a computer program results in either underinclusive or overinclusive copyright protection. Reverse engineering is either actionable in all instances, in which case ideas would necessarily be wrongly protected, or the expression is inadequately protected in order to expose the ideas. As the issue is complex, policy considerations cut both ways. An individual who develops an interoperable, or compatible, product is not exposed to the initial market risks borne by the original innovator. She has greater assurance of a successful product before production.¹³⁹ Moreover, a clone developer does not have to compensate the innovator for the value of the successful market.¹⁴⁰ Clearly contrary to the "dissemination of ideas" purpose of the Copyright Act, this "free rider" situation may discourage creative individuals from entering the market.¹⁴¹ On the other hand, the competition resulting from the opportunity to clone products requires the original inventor to continue to improve.¹⁴² As in other areas of the economy, increased competition reduces prices and increases accessibility for consumers.¹⁴³ Capitalism plays a strong role in policy preferences.¹⁴⁴

b. Expansion of the Four-Factors Test

As discussed above, a traditional fair-use analysis probably would not permit decompilation. However, the unique nature of computer software has persuaded some courts to expand the traditional reading to compensate for the impracticality of discovering the ideas underlying a program. Consequently, courts have expanded the application of the four-factors test even beyond computer software.

i) Atari v. Nintendo

The idea that copying is a fair use if it is necessary to reveal the underlying ideas was first expressed by the Federal Circuit in *Atari v. Nintendo*.¹⁴⁵ The Nintendo Entertainment System is designed to operate only with Nintendo game cartridges. The system is equipped with a program that

138. McManis, *supra* note 3, at 73. See also *Hoehling v. Universal City Studios, Inc.*, 618 F.2d 972, 980 (2d Cir. 1980) (one "may make significant use of prior work, so long as he does not bodily appropriate the expression of another").

139. John T. Soma et al., *Software Interoperability and Reverse Engineering*, 20 RUTGERS COMPUTER & TECH. L.J. 189, 200 (1994).

140. *Id.*

141. *Id.*

142. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 160 (1989) ("the competitive reality of reverse engineering may act as a spur to the inventor, creating an incentive to develop inventions that meet the rigorous requirements of patentability.").

143. Soma, *supra* note 139, at 201.

144. Wald, *supra* note 89, at 512 ("Our society favors free commerce in compatible products"). This sentiment is reflected in recent caselaw emphasizing the importance of defining protectable elements of a work to avoid excluding competitors from lines of commerce. See, e.g., *Cooling Sys. and Flexibles, Inc., v. Stuart Radiator, Inc.*, 777 F.2d 485, 492 (9th Cir. 1985).

145. *Atari Games Corp. v. Nintendo of America, Inc.*, 975 F.2d 832 (Fed. Cir. 1992).

locks access to the operating system. Thus, a game cartridge will not operate unless it contains a program which unlocks the system. Every Nintendo game cartridge is designed with a key chip which unlocks this "LONES lock" program. In hopes of entering the game cartridge market, Atari decompiled the "key" program and used it to create a program to successfully unlock the LONES lock program.¹⁴⁶

Since Atari was unable to translate the object code it copied from the Nintendo program into readable source code, it fraudulently obtained a copy of the program from the Copyright Office under the guise of preparing for litigation. The *Atari* court analyzed the four factors of fair use, and found that "[r]everse engineering, untainted by the purloined copy of the LONES program and necessary to understand LONES, is a fair use."¹⁴⁷

Because in this case Atari had obtained the original copy fraudulently, the Court's analysis of reverse engineering is dicta. Nevertheless, the court's analysis is persuasive. When analyzing the second factor, the "nature of the copyrighted work," the court announced that a work's nature supports fair use when it "requires intermediate copying to understand the ideas and processes."¹⁴⁸ Although the *Atari* court cited no authority for the seemingly new proposition, the principle is clearly consistent with the idea/expression dichotomy at the basis of copyright protection.¹⁴⁹

ii) *Sega v. Accolade*

The Ninth Circuit adopted *Atari's* dicta as its holding in *Sega v. Accolade*.¹⁵⁰ In *Sega*, Accolade purchased a Genesis console and three Sega game cartridges and wired an electronic decompiler into the console.¹⁵¹ Accolade developed a manual which contained the functional descriptions of the interface requirements, but did not contain the actual source code found in the Sega program.¹⁵² Accolade developers then used this manual to develop game cartridges compatible with the Sega Genesis console.¹⁵³

To reach its conclusion that decompilation may be a fair use where there is no other way to unravel the ideas behind the program, the court analyzed each of the fair use factors. First, the court discussed the "purpose and character of a use, including whether or not such use is of a commercial nature or is for nonprofit educational purposes."¹⁵⁴ Since the copy was made for commercial purposes, the first factor presumptively favored Sega. However, the court noted that "the commercial nature of a

146. *Id.* at 836.

147. *Id.* at 844.

148. *Id.*

149. *See supra* text accompanying notes 81-101.

150. *Sega Enter. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1527-28 (9th Cir. 1992).

151. *Id.* at 1514-15.

152. *Id.* at 1515.

153. *Id.*

154. 17 U.S.C. § 107(1) (1988).

use is a matter of degree, not an absolute."¹⁵⁵ Although the ultimate purpose of copying was commercial, the immediate purpose of copying was to study Sega's program.¹⁵⁶ In fact, the court implicitly concluded that creating compatible products was a legitimate and "non-exploitative" purpose.¹⁵⁷ The court further observed that the public benefit resulting from a commercial use may be considered.¹⁵⁸ "[G]iven the purpose and character of Accolade's use of Sega's video game programs," the court concluded, "the presumption of unfairness has been overcome and the first statutory factor weighs in favor of Accolade."¹⁵⁹

The second factor is the "nature of the copyrighted work."¹⁶⁰ The court recognized that because copyright law protects ideas, but not expressions, computer programs pose unique problems for the application of traditional copyright rules.¹⁶¹ A computer program is a useful article, one having "an intrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information."¹⁶² While a computer program is expressive, it is a purely "useful article" because it comprises the steps a computer uses to complete a task.¹⁶³ Since computer programs contain unprotected ideas that could not be examined without copying, the Ninth Circuit found that the second factor also weighed in Accolade's favor.

The third statutory factor, "the amount and substantiality of the portion used in relation to the copyrighted work as a whole,"¹⁶⁴ clearly weighed in Sega's favor. As is necessary for reverse engineering, Accolade copied the program in its entirety.¹⁶⁵ Due to the limited use of the copies, however, the court assigned the third factor little weight.¹⁶⁶ Furthermore, the Court found that copying the entire work does not preclude a fair-use defense, especially where the "ultimate (as opposed to direct) use is as limited as it was here."¹⁶⁷

155. *Sega*, 977 F.2d at 1522 (quoting *Maxtone-Graham v. Burtchaeil*, 803 F.2d 1253, 1262 (2d Cir. 1986)).

156. *Coats & Rafter*, *supra* note 34, at 566.

157. *Sega*, 977 F.2d at 1523.

158. *Id.* The Court concluded that the commercial use was indirect and that the public benefitted from the dissemination of new creative works.

159. *Id.*

160. 17 U.S.C. § 107(2) (1988).

161. *Sega*, 977 F.2d at 1524.

162. 17 U.S.C. § 101 (1988). See *Baker v. Selden*, 101 U.S. 99, 102-04 (1879) (recognizing that works having a strong functional element, such as accounting textbooks, are not entitled to the same degree of protection as non-functional works). See also *McManis*, *supra* note 3, at 69.

163. *Sega*, 977 F.2d at 1524-25 ("Computer programs are, in essence, utilitarian articles—articles that accomplish tasks. As such, they contain many logical, structural, and visual display elements that are dictated by the function to be performed, by considerations of efficiency, or by external factors such as compatibility requirements and industry demands.").

164. 17 U.S.C. § 107(3) (1988).

165. *Sega*, 977 F.2d at 1526.

166. *Id.* at 1526-27.

167. *Id.*

Finally, the court considered "the effect of the use upon the potential market for or value of the copyrighted work."¹⁶⁸ In contrast to the defendant who directly usurped the market in *Harper & Row*,¹⁶⁹ Accolade used the copy to create an original product and become a legitimate competitor. Moreover, Accolade did not directly commercially exploit any of the protected elements. The *Sega* court elevated the "ultimate" use of developing compatible programs over the "direct" use of copying *Sega's* code.¹⁷⁰ When viewed through the lens of the purpose of promoting creative expression, the fourth factor favored Accolade.¹⁷¹

iii) *Campbell v. Acuff-Rose*

The Ninth Circuit's approach in *Sega* was implicitly approved by the Supreme Court in *Campbell v. Acuff-Rose*.¹⁷² The Supreme Court has continued the expansion of the four-factors test outside the context of decompilation and computer software. In its most recent treatment of fair use, the Court employed a very expansive reading of the four factors to find that fair use presented a valid affirmative defense to commercial parody.

In 1964, Roy Orbison and William Dees wrote a rock ballad entitled "Oh, Pretty Woman" and assigned their rights in it to Acuff-Rose, which registered the song for copyright protection.¹⁷³ 2 Live Crew, a rap group, wrote a song in 1989 entitled "Pretty Woman" which Campbell, the writer, described as intended "through comical lyrics, to satirize the original work."¹⁷⁴ One year after the song's release, Acuff-Rose sued 2 Live Crew for copyright infringement.¹⁷⁵ In a long-awaited Supreme Court decision on parody, the Court announced that commercial use is *not* presumptively unfair and does *not* presumptively harm the relevant market, and declared that parody is entitled to fair-use analysis under the section 107 factors as criticism.¹⁷⁶

The *Campbell* decision significantly altered the way the Supreme Court approached fair use. First, the Court explicitly put to rest the presumption originally articulated in *Sony* that commercial use is unfair.¹⁷⁷ Second, the Court limited the *Sony* presumption of market harm in commercial cases to

168. 17 U.S.C. § 107(4) (1988).

169. *Harper & Row, Publishers, Inc. v. Nation Enter.*, 471 U.S. 539, 562 (1985).

170. *Sega*, 977 F.2d at 1526-27.

171. "By facilitating the entry of a new competitor, the first lawful one that is not a *Sega* licensee, Accolade's disassembly of *Sega's* software undoubtedly 'affected' the market," *Id.* at 1523, but it did so positively, leading to "an increase in the number of independently designed video game programs offered for use with the Genesis console." *Id.* *Sega's* attempt to exclude competitors was indirectly characterized as an effort "to monopolize the market by making it impossible for others to compete." *Id.* at 1523-24. See also *Soma*, *supra* note 139, at 219.

172. *Campbell v. Acuff-Rose Music, Inc.*, 114 S. Ct. 1169-71 (1994). See *Wald*, *supra* note 89, at 486.

173. *Campbell*, 114 S. Ct. at 1168.

174. *Id.*

175. *Id.*

176. *Id.* at 1178-79.

177. *Campbell*, 114 S. Ct. at 1174. The *Campbell* Court criticized the appellate court for transforming the presumption set out in *Sony* into a *per se* rule.

verbatim copying of the original.¹⁷⁸ The Court disposed of the near-dispositive weight given to factor four by the *Harper & Row* Court by recognizing that "market harm is a matter of degree, and the importance of this factor will vary, not only with the amount of harm, but also with the relative strength of the showing on the other factors."¹⁷⁹ Thus, although the *Campbell* Court cited neither *Sega* nor *Atari*, its expanded application of the four-factors test makes decompilation a much easier case for fair use.

Consequently, American case law evidences a trend toward the authorization of decompilation. Based on the crucial idea/expression distinction, the fair-use test provides an affirmative defense for the copying necessary for decompilation. Thus, Japan's assessment that its proposal authorizing limited decompilation was consistent with existing U.S. law was correct.

C. European Law

The European Community has been concerned with the inconsistencies in the intellectual property laws of its Member States since its inception.¹⁸⁰ Each of the EC member states has its own domestic approach to the protection of computer software.¹⁸¹ In its white paper, *Completing the Internal Market*, intended as a blueprint for a single integrated internal market in Europe, the European Commission stressed that the variation in intellectual property regimes had a "direct and negative impact on intra-Community trade and on the ability of enterprises to treat the common market as a single environment for their economic activities."¹⁸² Officials were concerned that variations in protection resulted in uncertainties and distorted competition.¹⁸³ A brief analysis of the laws of the individual Member States as they existed prior to recent legislation provides a helpful background to the provisions of the recent EC legislation, the Council Directive of 14 May 1991 on the Legal Protection of Computer Programs (Directive).¹⁸⁴

The Court of Appeals's elevation of one sentence from *Sony* to a *per se* rule runs as much counter to *Sony* itself as to the long common-law tradition of fair use adjudication. Rather, as we explained in *Harper & Row*, *Sony* stands for the proposition that the "fact that a publication was commercial as opposed to non-profit is a *separate* factor that tends to weigh against a finding of fair use."

Id. (quoting *Harper & Row, Publishers, Inc., v. Nation Enter.*, 471 U.S. 539, 562 (1985)).

178. *Id.* at 1177 ("When . . . the second use is transformative, market substitution is at least less certain, and market harm may not be so readily inferred.").

179. *Id.* at 1177 n.21.

180. *Completing the Internal Market: White Paper from the Commission to the European Council*, COM(85)310 final at 37 [hereinafter *Completing the Internal Market*].

181. See *infra* Part II.C.1.

182. *Completing the Internal Market*, *supra* note 180, § 145. See Explanatory Memorandum to the Proposal for a Council Directive on the Legal Protection of Computer Programs: COM(88)816 final—SYN 183, 1989 O.J. (C 91) 4, 6-7 [hereinafter *Explanatory Memorandum*], discussed in Christopher Voss, *The Legal Protection of Computer Programs in the European Economic Community*, 11 *COMPUTER/L.J.* 441, 442 n.12.

183. Voss, *supra* note 182, at 444.

184. Directive, *supra* note 3. The Commission submitted its original proposal to the Council on January 5, 1989. Commission Proposal for a Council Directive on the Legal

European law established two threshold prerequisites for copyright protection: (1) fixation of the expression in a permanent form and (2) originality.¹⁸⁵ Because all Member States either explicitly recognized or claimed to recognize that computer programs are fixed in a permanent form,¹⁸⁶ the source of disparity among the various European laws centered on the originality requirement.¹⁸⁷ Originality is a decisive factor in determining the scope of protection since one must establish that the part copied was original before copyright protection is invoked.¹⁸⁸

1. *Copyright Law of Member States*

a. The United Kingdom

The United Kingdom recently adopted legislation which extends copyright protection to computer programs as literary works.¹⁸⁹ Case law has also found copyright protection for computer software in both object and source code.¹⁹⁰ The Copyright, Designs, and Patents Act of 1988 (CDPA) defines copying as reproducing the work in any material form, including storing the work in any medium by electronic means and making intermediate copies that are incidental to some other use of the work.¹⁹¹ Hence, the CDPA would almost certainly designate reverse engineering as an infringement.

The originality requirement in the United Kingdom is similar to that

Protection of Computer Programs, COM(88)816 rev. final—SYN 183, 1989 O.J. (C 91) 4 [hereinafter Proposal], discussed in Voss, *supra* note 182, at 446 n.32. Pursuant to the Community's legislative cooperation procedure, which is governed by Article 149 of the Treaty Establishing the European Economic Community, Mar. 25, 1957, art. 149, 298 U.N.T.S. 1, 70, discussed in Voss, *supra* note 182, at 441 n.2, the Economic and Social Committee delivered its opinion on the Proposal on October 18, 1989, Opinion on the Proposal for a Council Directive on the Legal Protection of Computer Programs, 1989 O.J. (C 329) 4, and the European Parliament voted in support of the proposal, as amended, on July 11, 1990. Legislative Resolution Embodying the Opinion of the European Parliament on the Proposal from the Commission to the Council for a Directive on the Legal Protection of Computer Programs, 1990 O.J. (C 231) 83. In light of the modifications proposed by the Parliament, the commission submitted an amended proposal to the Council on October 18, 1990, Amended Proposal for a Council Directive on the Legal Protection of Computer Programs, COM(90)509 final, which shortly thereafter adopted a common position on the legislation. Common Position Adopted by the Council on 13 December 1990 with a view to the Adoption of a Directive on the Legal Protection of Computer Programs, Document 10652/1/90 (14 Dec. 1990). The Council formally adopted the Directive on 14 May 1991. See generally Voss, *supra* note 182.

185. Paul G. Hidalgo, *Copyright Protection of Computer Software in the European Community: Current Protection and the Effect of the Adopted Directive*, 27 INT'L LAW. 113, 115 (1993).

186. Spoor, *supra* note 16, at 1065.

187. *Id.*

188. *Id.*

189. Copyright, Designs, and Patents Act, 1988, § 3(1)(b) (Eng.), discussed in Ehrlich, *supra* note 79, at 1017.

190. *Sega Enter. Ltd. v. Richards and Another*, [1983] F.S.R. 73 (1982).

191. Copyright, Designs, and Patents Act, 1988, § 17(2), (6) (Eng.). Cf. 17 U.S.C. § 117 (1988). See *supra* text accompanying notes 119-79. In addition to complete control over reproduction, the author has exclusive control over authorizing adaptations to the program. Copyright, Designs, and Patents Act, 1988, § 21 (Eng.).

in the United States.¹⁹² Although not specifically defined in the CDPA, case law has set the standard at a low level.¹⁹³ The CDPA is similar to U.S. copyright law in several additional respects. Although the idea/expression distinction has never been recognized by statute, U.K. case law clearly makes the distinction.¹⁹⁴ Moreover, the CDPA contains a "fair dealing" provision¹⁹⁵ which allows copying literary works for the purposes of research, private study, criticism, review, or reporting a current event, provided that sufficient acknowledgment of the work is included.¹⁹⁶ It is doubtful that this provision would have provided the basis for an affirmative defense to a charge of reverse engineering infringement.¹⁹⁷ The U.S. fair-use provision is more flexible than is the U.K. notion of fair dealing, and therefore provides more room for balancing and an expansion of relevant factors.¹⁹⁸

b. Germany

Germany amended its Copyright Act in 1985 to extend copyright protection to computer programs as literary works.¹⁹⁹ The German Copyright Act does not explicitly address the reverse-engineering issue. It does, however, require the permission of the author for any reproduction, exploitation, or publication of a protected work.²⁰⁰ Because authors are granted such broad exclusive rights and there are no statutory provisions, such as archival copy or fair use, to permit even limited use without the author's permission, it is unlikely that reverse engineering would be protected under German law.

Article 2(2) of the German Copyright Act specifies that writings are protected by copyright only if they meet the originality requirement of "personal intellectual creatio[n]."²⁰¹ Recent cases from the Federal Supreme Court of Germany have interpreted this to mean that the skills needed to develop a program must be higher than those of an average

192. In *Feist*, the Supreme Court observed that the originality requirement in the United States is low, but it is not nonexistent. The Court held that the compilation of an alphabetized list of names accompanied by addresses and telephone numbers was so mechanical as to be void of any originality. *Feist Publications, Inc. v. Rural Tel. Serv. Co., Inc.*, 499 U.S. 340, 352-54 (1991).

193. See *Interlego A.G. v. Tyco Indus. Inc.*, [1989] 1 App. Cas. 217 (P.C. 1988) (appeal taken from H.K.) (holding that copyright law protects the independent product of an author, which involves skill, labor, or other experience, and which is not a mere copy of another work, with no significant additional features), discussed in Ehrlich, *supra* note 79, at 1017.

194. See, e.g., *Hollinrake v. Truswell*, [1894] 3 Ch 420.

195. Copyright, Designs, and Patents Act, 1988, §§ 29, 30 (Eng.). Cf. 17 U.S.C. § 107 (1988). See *supra* text accompanying notes 119-79. The U.K. fair-dealing provision appears to be more limited than the U.S. fair-use doctrine, and probably would not have encompassed decompilation.

196. Copyright, Designs, and Patents Act, 1988, §§ 29, 30 (Eng.).

197. Ehrlich, *supra* note 79, at 1017-18.

198. Spoor, *supra* note 16, at 1083.

199. Act Dealing with Copyright and Related Rights, § 2(1) (F.R.G.).

200. *Id.* §§ 15(1), 16.

201. *Id.* § 2(2).

programmer.²⁰² More recent opinions have reduced this standard to a demonstration of intellectual effort.²⁰³ Imposition of such a standard makes it unlikely that reverse engineering could be recognized as an affirmative defense to a charge of infringement.

c. France

France also amended its Copyright Act to include computer programs among copyrighted works,²⁰⁴ but the rights accorded to software differ from those accorded to other copyrighted material. Although in the past originality has required only "an intellectual creative process,"²⁰⁵ cases have required that the program be both novel and inventive in order to receive protection.²⁰⁶ Consequently, it is unlikely that reverse engineering would be permitted under French law.

d. Other Member States

Spain recently adopted a comprehensive copyright statute dealing with the protection of computer software.²⁰⁷ Protection extends explicitly to both object and source code.²⁰⁸ Although reverse engineering is not specifically mentioned, the Spanish provisions parallel those of the EC Directive.²⁰⁹

Statutory law in Italy does not explicitly protect software, but courts have held that "creative" software is protected.²¹⁰ Denmark recently added computer protection to its copyright statute.²¹¹ Belgium's current copyright law does not discuss computer software, but Belgium has stated that it would be in favor of using copyright law to protect computer software.²¹² Neither Luxembourg nor Portugal has statutes or case law on the subject.²¹³

This variation in the theory and extent of copyright protection for

202. E.g., BGHZ 94, 276 (Judgment of May 9, 1985, concerning *Sudwestdeutsche Inkasso KG v. Bappert & Burker Computer GmbH.*), discussed in Ehrlich, *supra* note 79, at 1016. See Fahle, *supra* note 90, at 667 n.81.

203. Ehrlich, *supra* note 79, at 1016.

204. Copyright Statute, Law No. 57-298, J.L. 4143 (Fr.), as amended by art. 1-V, Law No. 85-660 O.J. 7495, translated in U.N. EDUC., SCIENTIFIC AND CULTURAL ORG., ET AL., *COPYRIGHT LAWS AND TREATIES OF THE WORLD* (1992).

205. Hidalgo, *supra* note 185, at 123-24.

206. E.g., Cass. ass. plen., Mar. 7, 1986, *Revue Internationale du Droit d'Auteur (R.I.D.A.)* 1986, 130 (concerning *S.A. Babolat Maillot Witt v. Jean Pachot*), discussed in Fahle, *supra* note 90, at 668 n.92.

207. *Ley de Propiedad Intelectual*, (B.O.E., 1987, 27), arts. 10(1)(i), 96(1), 96(2), (Sp.) translated in *COPYRIGHT AND NEIGHBORING RIGHTS, LAWS AND TREATIES* (1988).

208. *Id.*

209. Directive, *supra* note 3.

210. Cass., 24 Nov. 1986, *Giur. It. II*, [1989] 1 F.S.R. 559 (concerning *Societa Italiana Degli Autori ed Editori (SIAE) v. Domenico Pompa*) (noting that simple originality is not enough), discussed in Fahle, *supra* note 90, at 669 n.99.

211. Copyright Amendment Act No. 378 of June 7, 1989 (Den.).

212. Green Paper on Copyright and the Challenge of Technology: Copyright Issues Requiring Immediate Action, COM(88)172 final, § 5.3.9 [hereinafter Green Paper]. A green paper is a working document drafted by the Commission addressing and seeking commentary on a substantive issue of the proposed directive.

213. *Id.*

software thwarts the goals of the common market.²¹⁴ Inconsistent copyright protection for computer software discourages innovation and investment because the protection within the EC is only as strong as that provided by the least protective Member State.²¹⁵ Consequently, the European Community sought to harmonize the laws of the Member States.²¹⁶

2. Prelude to the Adoption of the EC Directive

When differences in the domestic laws of the Member States have a negative effect on the Community as a whole, the Council of Members may issue a Directive to be implemented by each Member State.²¹⁷ In June, 1988, the Commission issued a Green Paper on Copyright and the Challenge of Technology.²¹⁸ Emphasizing the importance of software to the Community's economic development, the Commission explained the need to unify protection of software.²¹⁹ After receiving and considering much commentary, the Commission issued a Proposal for a Council Directive on the Legal Protection of Computer Programs (Proposal).²²⁰ Although the Proposal was silent on the issue of reverse engineering, explicit restrictions on software copying signaled disapproval of decompilation.²²¹ The Propo-

214. Proposal, *supra* note 184, pmb., para. 5. "Certain differences in the legal protection of computer programs offered by the laws of the Member States have direct and negative effects on the functioning of the common market." Directive, *supra* note 3, pmb.

215. See Proposal, *supra* note 184, pmb., para. 5. "[P]hysical 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 ways in which they are intended to function." Directive, *supra* note 3, pmb.; "Computer programs are playing an increasingly important role in a broad range of industries and computer program technology can accordingly be considered as being of fundamental importance for the Community's industrial development." *Id.*

216. *Id.*

217. Treaty Establishing the EEC, Mar. 25, 1957, art. 189, 298 U.N.T.S. 1, 78. The purpose of the European Community is "to promote throughout the Community a harmonious development of economic activities, a continuous and balanced expansion, an increased stability, an accelerated raising of the standard of living, and closer relations between its Member States." *Id.* art. 2.

There are three legislative bodies of the EC: the Commission, the European Parliament, and the Council of Ministers. The Commission is a seventeen-member body with one representative from each Member State and five additional representatives. It is divided into Directorates General of varying size, which individually cover matters concerning the EC, such as external relations and competition. The Commission initiates EC action by submitting proposals to the Council, which is comprised of representatives from the Member States and votes on legislation proposed by the Commission. The Parliament is composed of 519 Members of the European Parliament, and this body generally consults with the Commission and Council. PENELOPE KENT, EUROPEAN COMMUNITY LAW (THE M+E HANDBOOK SERIES) 10-18 (1992).

218. Green Paper, *supra* note 212. The Green Paper recognized the shift in economic activities away from the production of goods such as staple commodities toward the production of technological goods. *Id.*

219. *Id.* at § 5.2. The Commission was as concerned with divergent judicial doctrines controlling the protection of software as with divergent national legislation. Adoption of a Community Directive effectively preempts national courts from interpreting national laws. See *id.* at §§ 5.3.11, 5.6.2.

220. Proposal, *supra* note 184.

221. *Id.*

sal left open the possibility that some computer specifications might not constitute ideas, but rather expressions, and consequently could not be protected under copyright.²²²

Expected to be on the "fast track" to approval,²²³ the Proposal instead sparked an explosive debate in both the political and business arenas.²²⁴ The computer industry split along size lines. Small and medium-sized companies, fearing a competitive disadvantage if reverse engineering were to be prohibited, formed the European Committee for Interoperable Systems (ECIS).²²⁵ Representatives from large software manufacturers joined in the Software Alliance Group for Europe (SAGE).²²⁶ ECIS argued that smaller companies would be at a competitive disadvantage if they were not allowed to use decompilation to analyze existing software and create interoperable counterparts.²²⁷ SAGE responded that larger software producers were economically benefitted by the creation of interoperable products, and that private agreements between companies ensured that smaller companies had the necessary information to create interoperable software.²²⁸ Furthermore, SAGE contended that the unlimited copying authorized by reverse engineering would reduce investment and discourage the development of new software products.²²⁹

3. Provisions of the Directive

After much debate, the Council adopted the Directive of 14 May 1991 with the full support of the Commission.²³⁰ The Directive, which consists of ten articles and a preamble, specifies that computer programs are protected by copyright as literary works within the meaning of the Berne Convention.²³¹

222. Voss, *supra* note 182, at 457.

223. *Id.* at 446.

224. Ehrlich, *supra* note 79, at 1007-08.

225. *Id.* at 1008.

226. *Id.* at 1008-09.

227. *Id.*

228. *Id.*

229. *Id.* See also E. Brendan Magrab, Note, *Computer Software Protection in Europe and the EC Parliamentary Directive on Copyright for Computer Software*, 23 L. & POL'Y INT'L BUS. 709, 714 (1992).

230. Directive, *supra* note 3. One of the goals of the adoption of the Directive was to align European software law with that of the United States. Pamela Samuelson, *Comparing U.S. and EC Copyright Protection for Computer Programs: Are They More Different Than They Seem?*, 13 J.L. & COM. 279, 279 (1994). The European Community consulted the United States when it debated the decompilation question. Acknowledging that the Copyright Act does not specifically address reverse engineering, the U.S. government stated that copying or reproducing a computer program without the permission of the owner is not permitted unless excused by either the fair-use doctrine or as an archival copy and that no court had found decompilation to be a fair use. Robert J. Hart, *Interfaces, Interoperability and Maintenance*, 13 EUR. INTELL. PROP. REV. 111, 113 (1991). The U.S. government's response was prior to the *Atari* and *Sega* decisions.

231. Directive, *supra* note 3, art. 1(1); Berne Convention, *supra* note 13. The term *computer program* is not defined in the Directive. Rather than risk obsolescence, the Commission chose to recognize an evolving concept of the general subject matter. Explanatory Memorandum, *supra* note 182, at (C 91) 5, 9. The Commission stated that the term "should be taken to encompass the expression in any form, language, notation or code of a set of instructions [both humanly perceivable and machine readable], the

The only originality requirement is that the work be the author's own intellectual creation.²³² The author is granted the exclusive right to authorize restricted acts such as reproduction, translation, adaptation, arrangement, or any other alteration of a computer program, as well as the distribution of the program.²³³

The Directive clearly mirrors U.S. copyright law.²³⁴ It recognizes the idea/expression distinction;²³⁵ grants the copyright owner the exclusive rights of reproduction, adaptation, and distribution;²³⁶ contains a first-sale provision (which does not extend to the right of rental);²³⁷ and allows the user to make a copy of the program necessary for its use.²³⁸ However, the Directive does not contain a general fair-use provision.²³⁹ Moreover, the Directive does not mention moral rights.²⁴⁰

Article 6 of the Directive explicitly authorizes reverse engineering in limited circumstances.²⁴¹ The Directive allows the rightful possessor of software to decompile it "to achieve interoperability."²⁴² This right, how-

purpose of which is to cause a computer to execute a particular task or function." *Id.* at (C 91) 9. *Cf.* Green Paper, *supra* note 212, § 5.1 (stating that a computer program is a "set of instructions the purpose of which is to cause an information processing device, a computer, to perform its functions").

Although substantively the provisions remained the same, the Commission changed some of the language in the Proposal to conform to the language of the Berne Convention. Hidaglo, *supra* note 185, at 136.

232. Directive, *supra* note 3, 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.")

233. *Id.* art. 4.

234. The EC is "fully committed to the promotion of international standardization." *Id.* pmbl. para. 9. U.S. law tends to be the most influential in matters of computer software. "Governments in these countries look to the United States as a leader in this area because our law is better developed; we've been pursuing case law in the software protection area for much longer than most other [nations]." Hon. John M. Walker et al., *Copyright Protection: Has Look and Feel Crashed?*, 11 CARDOZO ARTS & ENT. L.J. 721, 749 (1993).

235. Directive, *supra* note 3, art. 1(2). *Accord* 17 U.S.C. § 102(b) (1988) ("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.")

236. Directive, *supra* note 3, art. 4. *Accord* 17 U.S.C. § 106 (1988).

237. Directive, *supra* note 3, art. 4(c). *Accord* 17 U.S.C. § 109(a) (Supp. III 1991) ("the owner of a particular copy or phonorecord lawfully made under this title, or any person authorized by such owner, is entitled, without the authority of the copyright owner, to sell or otherwise dispose of the possession of that copy or phonorecord")

238. Directive, *supra* note 3, art. 5(1). *Accord* 17 U.S.C. § 117(2) (1988).

239. Voss, *supra* note 182, at 452. *See also* Explanatory Memorandum, *supra* note 182, at (C 91) 11, which incorrectly characterizes the concept as permissible copying of "insubstantial parts" of a work.

240. Voss, *supra* note 182, at 443 n.13. *Cf.* Japanese Copyright Act, *supra* note 44, at § 3, art. 18 (recognizing moral rights of an author).

241. Directive, *supra* note 3, art. 6. The limited authorization of reverse engineering was the product of extensive debate within the European Community. Critics claim that it is an ineffective compromise. *See* Vanessa Marsland, *Copyright Protection and Reverse Engineering of Software—An EC/UK Perspective*, 19 U. DAYTON L. REV. 1021, 1042 (1994).

242. Directive, *supra* note 3, art. 6(1)(b). Interoperability is "defined as the ability to exchange information and mutually to use the information which has been exchanged"

ever, is limited. First, the rightful possessor has no right to decompile where the information necessary to achieve the interoperability is readily available.²⁴³ Second, decompilation may not "be used for goals other than to achieve the interoperability of the independently created computer program."²⁴⁴ Third, the right to decompile is limited to "obtain[ing] the information,"²⁴⁵ which may not then "be used for the development, production, or marketing of a computer program substantially similar in its expression" to the original (decompiled) program.²⁴⁶ Significantly, the Directive does not define the term "substantially similar."²⁴⁷

Much of the wording of Article 6 is the product of political compromise, and thus determination of disputed provisions is left to the European Court of Justice.²⁴⁸ Understandably, European courts have been extremely reluctant to apply the reverse engineering section of the Directive. The Council's failure to define the key factors used to determine whether reverse engineering is permitted (e.g., "substantial similarity") makes it difficult for courts to know where to begin. In fact, when a recent case presented the issue of decompilation of computer software, the court ignored the Directive entirely, even though it had gone into effect two months prior to the decision.²⁴⁹ Instead, the court relied on both the *Sega* and *Atari* decisions for guidance.²⁵⁰

Despite the uncertainty of application, the EC Directive is strikingly consistent with emerging U.S. law. The restrictions imposed on decompilation by the Directive essentially mirror the guidelines set out by the Ninth Circuit in *Sega*: that the information be necessary and not otherwise available.²⁵¹ Thus, the pillars of international copyright law, the United States and the European Community, as guided by the Berne Convention, indicate an increasing acceptance of decompilation within the international community.

and refers to "functional interconnection and interaction," *Id.* pmbl. para. 12, which is necessary for "all elements of software and hardware to work with other software and hardware." *Id.* pmbl. para. 10.

243. *Id.* art. 6(1)(b). Note that this is the same restriction upon which the court in *Sega* relied.

244. Directive, *supra* note 3, art. 6(2)(a).

245. *Id.* art. 6(1).

246. *Id.* art. 6(2)(c).

247. In U.S. copyright law, the term *substantial similarity* is a term of art. When a plaintiff cannot show that a defendant copied directly, he may prove infringement by showing (1) that the defendant had access to the plaintiff's work and (2) that defendant's work is "substantially similar" to plaintiff's original work. See, e.g., *Feist Publications, Inc. v. Rural Tel. Serv. Co., Inc.*, 499 U.S. 340 (1991).

248. *Spoor*, *supra* note 16, at 1070-71.

249. *John Richardson Computers, Ltd. v. Flanders and Another*, [1993] F.S.R. 497 (1993).

250. *Id.*

251. *Sega Ent. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1527 (1993). See *supra* text accompanying notes 150-71. In contrast to U.S. copyright law, however, the Directive explicitly prohibits reverse engineering limitation clauses in contracts. Directive, *supra* note 3, pmbl., para. 26 ("any contractual provisions contrary to Article 6 . . . should be null and void"). The U.S. Copyright Act contains no similar provision. See generally 17 U.S.C. §§ 101 et seq. (1988).

III. Japan's Position on Reverse Engineering

A. The Japanese Approach

1. Cultural Background

Any attempt to compare Japanese and Western²⁵² law must begin by observing the legal implications of the different social structures. Despite Western influence over a democratic Japan for more than a century, Japan has resisted the extreme legalization that Western cultures, such as the United States, have undergone.²⁵³ Because litigious individuals are perceived as disrupting social harmony in Japan, public disputes are discouraged and controversies are often resolved privately.²⁵⁴ Thus, results of legal battles in Japan are more uncertain, particularly if one of the participants is more highly respected than the other, giving the first an obvious advantage in any legal proceeding.²⁵⁵ This aversion to controversy is reflected in Japan's Copyright Act, which emphasizes codification over judicial construction to resolve conflict over the extent of protection for computer software.²⁵⁶ Consequently, while the Japanese Copyright Act specifically lists protections and exceptions from protections, it provides little direction for courts deciding questions that do not fall clearly within a rule.²⁵⁷ Despite this incongruity in approach, Japan and Western states have adopted strikingly similar methods for protecting computer software.²⁵⁸ For example, consistent with Western law, Japanese copyright law is based on the idea/expression dichotomy.²⁵⁹

2. Japanese Copyright Law

Japan promulgated its first Copyright Law in 1899, the year in which it became a party to the Berne Convention.²⁶⁰ In 1962 the Ministry of Education set up a committee to discuss the copyright system,²⁶¹ and in 1971 the Copyright Act was amended for the purpose of protecting the rights of authors and providing for cultural enrichment.²⁶² The Japanese government and computer industry began debating intellectual property protection for computer software in the 1970s.²⁶³ A special committee was appointed by Japan's Ministry of International Trade and Industry (MITI)

252. For purposes of this Note, "Western" includes American and Western European nations.

253. Mark S. Lee, *Japan's Approach to Copyright Protection for Computer Software*, 16 *LOY. L.A. INT'L & COMP. L.J.* 675, 677 (1994).

254. *Id.*

255. *Id.*

256. See generally Japanese Copyright Act, *supra* note 44.

257. Lee, *supra* note 253, at 696.

258. *Id.*

259. Zentaro Kitagawa, *Legal Protection of Computer Program: An Outline*, in 4 *DOING BUSINESS IN JAPAN* Pt. VI, Ch. 9, § 9.02[4] (Zentaro Kitagawa ed., 1996).

260. MASAOKIRA KATSUMOTO, *DAS NEUE JAPANISCHE URHEBERRECHTSGESITZ: THE NEW JAPANESE COPYRIGHT LAW 117* (1975), discussed in Kitagawa, *supra* note 259.

261. This committee subsequently became a separate department, the Agency for Cultural Affairs. KATSUMOTO, *supra* note 260, at 120.

262. *Id.* at 121.

263. Lee, *supra* note 253, at 690.

in December 1983 to explore the issue.²⁶⁴ Meanwhile, Japanese courts began to give protection to computer software.²⁶⁵

Japan amended its Copyright Act in 1985, and these amendments clarified the copyright protection provided to computer software.²⁶⁶ The amendments defined *program work* as "an expression of combined instructions given to a computer for the purpose of obtaining a specific result by operating the computer."²⁶⁷ Like the European Directive, the Japanese Act proscribes infringement in the case of "substantial similarity," but fails to articulate a standard for evaluating expression within this framework.²⁶⁸

The Japanese Copyright Act gives authors of protected works more rights than are specified in the U.S. Copyright Act, including: (1) a reproduction right; (2) a performance right; (3) a broadcast right; (4) a recitation right; (5) an exhibition right; (6) a distribution and public showing right for cinematographic works; (7) a rental right for copies of a work, except for cinematographic copies; and (8) a translation right.²⁶⁹

The Japanese Act also provides that the protection provided for a "program work" does not extend to the programming language, rules, or algorithms used to create it.²⁷⁰ Article 10 specifies three limitations on the protection provided to software:

The protection granted by this Law to [program] works . . . shall not extend to any programming language, rule or algorithm used for making such works. In this case, the following terms shall have the meaning hereby assigned to them respectively

- (1) "Programming language" means characters and other signs and the system thereof which are used as the means to express a program.
- (2) "Rules" mean the special conventions in a specific program with regard to the use of the programming language referred to in the preceding item.

264. *Id.*

265. Japanese courts extended the protection of the Copyright Act to computer programs while the debate continued. The cases found computer software to be a "work" within the meaning of the Act, and that the definition of *reproduction* under Article 2(1)(xv) of the Act was broad enough to cover reproductions of computer source code. See Judgment of Dec. 6, 1982, Tokyo District Court (Taito Co. v. I.N.G. Enters.), 1060 HANJI 18; Judgment of Mar. 30, 1983, Yokohama District Court (Taito Co. v. Makoto Denshikogyo Co.), 1081 HANJI 125; Judgment of Jan. 26, 1984, Osaka District Court (Konami Kogyo Co. v. Daiwa Co.), 1106 HANJI 134. See Lee, *supra* note 253, at 690.

266. Bayha, *supra* note 7, at 190.

267. Japanese Copyright Act, *supra* note 44, art. 2.

268. Kitagawa, *supra* note 259, at § 9.02[4].

269. Japanese Copyright Act, *supra* note 44, arts. 21-27. Cf. 17 U.S.C. § 106 (1988), which lists four rights protected under the U.S. Copyright act: rights to (1) reproduction; (2) distribution; (3) derivative work right as to all copyrights; and (4) public performance and public display rights for certain types of works. In general, the Japanese Act contains a greater specification of rights.

270. Japanese Copyright Act, *supra* note 44, art. 10, para. 3.

U.S. copyright law does not contain any similar statutory restrictions. Instead, the United States relies on case law or U.S. Copyright Office policy to guide application of copyright law to these specific elements of computer programs.

- (3) "Algorithm" means the method to combine instructions to the computer in respect to a program.²⁷¹

The Japanese Copyright Act contains a limited fair-use provision. It allows copying or modification for personal use, but does not extend to research, study, or commercial use.²⁷² Instead, the Act identifies a number of specific limitations and compulsory licenses. Specified limitations include:

1. reproduction for private use, unless the reproduction is made by an automatic reproduction machine placed for public use;
2. reproduction of library materials for certain non-profit activities;
3. limited quotations;
4. limited reproductions or broadcasts in schools, school textbooks, or school education programs;
5. reporting of current events;
6. reproduction for judicial proceedings; and
7. other matters.²⁷³

3. Application

Consistent with the language of the Act, several Japanese cases have held that literally copying code infringes a program's copyright.²⁷⁴ Japan's courts have confirmed that copyright protection in a program work does not extend to the algorithms used in making the programs. In *System Science v. Japan Technato*, the Tokyo High Court indicated that the algorithm exception means that there is no copyright protection for the basic structural design revealed by examination of the program.²⁷⁵

Although the "rules" provision of Article 10 has not been construed by the courts, Government officials have interpreted it to "eliminate protection for interface information and methods."²⁷⁶ A representative of the Cultural Affairs Agency stated:

In making a program, in addition to the conventions applicable to the program language, it is sometimes necessary to follow specific conventions for the purpose of using the program in connection with a different program in the same computer or with a program in another computer through the medium of communication circuits. All these conventions are included within the term "rules."²⁷⁷

271. Japanese Copyright Act, *supra* note 44, art. 10, para. 3.

272. Lee, *supra* note 253, at 695.

273. Japanese Copyright Act, *supra* note 44, arts. 30-49. "Other matters" refers to the narrow exceptions created for certain types of uses, such as broadcast station's right to make ephemeral recordings of works they have a right to broadcast, *Id.* art. 44, or advertising for exhibition of artistic works. *Id.* art. 47. These provisions do not affect the author's moral rights in the works being copied. *Id.* art. 50.

274. See, e.g., Judgment of Mar. 31, 1989, Tokyo District Court (*System Science Corp. v. Japan Technato, Co.*), 130 HANJII, *aff'd in part, rev'd in part*, Judgment of Tokyo High Court, June 20, 1989, *discussed in* Lee, *supra* note 253, at 693.

275. *Id.*

276. Lee, *supra* note 253, at 694.

277. K. Bandou, *The Copyright Law Amendments—Clarifying the Protections of Computer Programs*, 334 MBL 18, 20 (1985), *quoted in* Lee, *supra* note 253, at 694.

Thus, much like the situation in the European Community, the status of reverse engineering is unclear under existing law.

B. Legality of Japan's Proposal

As an analysis of the Berne Convention and U.S. and EC law makes clear, the emerging trend in international law is the authorization of limited decompilation. Like the United States and the EC, Japan is a signatory of the Berne Convention and, by treaty as well as national legislation, provides copyright protection for computer software as a literary work.²⁷⁸ Japan also bases copyright protection on the distinction between ideas and expressions, the theory used by both the United States and the EC for authorizing decompilation.²⁷⁹ Thus, the limited form of decompilation proposed by Japan was consistent with existing international norms.

By compelling Japan to withdraw its proposal to authorize decompilation, the United States has disrupted a clearly emerging international trend. In light of the fact that one of the purposes of both the EC Directive and the Japanese proposal was to harmonize international law on the protection of computer software, the United States has effectively sanctioned its own advantage in the international software market.

The U.S. concern that decompilation might become a widespread activity is understandable, particularly given recent technological innovations. Although many commentators argue that decompilation will never be widespread because of the investment of skill, time, and money necessary to successfully decompile a program,²⁸⁰ new technology calls this presumption into question. New tools, such as computer-aided software engineering, may permit inexpensive and efficient graphic analysis of programs.²⁸¹

Moreover, the lack of certainty over precisely when decompilation would be permitted creates a dangerous climate for the mass legalization of decompilation across the globe. Although the Directive and the *Sega* decision set forth similar tests for permitting decompilation, neither distinctly sets forth when decompilation would or would not be permitted. Consequently, software developers have no clear guidance as to when their actions would be protected. Given the novelty of the issue and the scarce case law, it is doubtful that courts will develop a consistent approach for some time.²⁸²

Nevertheless, given that Japan's proposal was clearly within the limits established by both U.S. case law and the EC Directive, such pointed opposition to the proposal only serves to increase the confusion. It is true that for the United States there is much to lose in a more open software market,

278. See *supra* text accompanying notes 260-77.

279. See *supra* text accompanying notes 260-77.

280. See Johnson-Laird, *supra* note 26, at 901. See also *supra* text accompanying notes 36-40.

281. Ehrlich, *supra* note 79, at 1039-1040; Samuelson, *supra* note 40, at 2342.

282. Ehrlich, *supra* note 79, at 1037. It is unlikely that Japan will consider the decompilation issue again in the near future. Bahya, *supra* note 7, at 191.

but there is much at stake for other nations as well. The United States should not seek to prevent others from what it allows for itself.

Conclusion

Japan's retreat from its proposal to authorize limited decompilation was unnecessary. U.S. and EC copyright law, under the umbrella of the Berne Convention, permit reverse engineering in the limited context proposed by Japan. Moreover, Japan's Copyright Act contains the same theoretical constructs used by the United States and the European Community to authorize reverse engineering. The United States may have succeeded in blocking the proposal, but its opposition was clearly wrong.