

WHAT IF OBJECT CODE HAD BEEN EXCLUDED
FROM PROTECTION AS A LITERARY WORK IN
COPYRIGHT LAW? A NEW ZEALAND
PERSPECTIVE*

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A computer program is a creation in the same way that an instruction book is a creation. “While copyright would not prevent someone making Mrs. Beeton’s rabbit pie (indeed it was to encourage people to do so that Mrs. Beeton’s Book of Household Management was first published), it does prevent someone copying the book itself.”¹

INTRODUCTION

The decision to provide copyright protection to computer programs was controversial.² It was driven by a perceived urgent need to provide an appropriate legal framework for digital works, in the face of a growing international dependence upon the digital economy.³ The ability of international judiciaries and legislatures to comply with this need was, unfortunately, in many instances, not matched by an ability to comprehend the technicalities of digital works.

Legal cases of the 1970s and 1980s dealing with actions for the unauthorized use or taking of computer programs demonstrate judicial attempts to grapple with the intricacies of new technology, often leading to conflicting decisions.⁴ Certain commonalities emerging from the early decisions acknowledged, however, that of all areas of intellectual property law, copyright appeared to provide the best fit. Drawing upon this, while carefully ignoring the ongoing debate among a small group of specialists who could claim expertise in both intellectual property law and the technicalities of computer software, the international legal regime had achieved a broad con-

1. *Apple Computer, Inc. v. Mackintosh Computers Ltd.*, [1986] 28 D.L.R. (4th) 178, 203 (Fed. Ct.).

2. For examples of this controversy, see Gerald Dworkin, *The Nature of Computer Programs*, in *INFORMATION TECHNOLOGY: THE CHALLENGE TO COPYRIGHT* 89, 108-11 (James Lahore, Gerald Dworkin & Yvonne M. Smyth eds., 1984), and *FINAL REPORT OF THE NAT’L COMM’N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS* 69 (July 31, 1978) (John Hersey, Comm’r., dissenting), available at http://www.eric.ed.gov/ERICDocs/data/eric-docs2sql/content_storage_01/0000019b/80/38/bf/45.pdf [hereinafter CONTU Report].

3. See *COPYRIGHT AND DESIGNS LAW: REPORT OF THE COMMITTEE TO CONSIDER THE LAW ON COPYRIGHT AND DESIGNS* (1977) [hereinafter Whitford Committee Report].

4. See *Apple Computer, Inc. v. Franklin Computer Corp.*, 714 F.2d 1240 (3d Cir. 1983); *Computer Edge Pty. Ltd. v. Apple Computer, Inc.* (1986) 161 C.L.R. 171 (Austl.); *Apple Computer*, [1986] 28 D.L.R. (4th) at 178; *Int’l Bus. Machs., Corp. v. Computer Imports Ltd.*, [1989] 2 N.Z.L.R. 395 (H.C.).

sensus by the late 1980s.⁵ Thus, international conventions, including the 1994 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)⁶ and the 1991 European Economic Council Directive on the Legal Protection of Computer Programs (the EC Directive),⁷ and (in order to comply with the requirements of TRIPs) much national legislation, including the New Zealand Copyright Act of 1994 (the New Zealand Copyright Act),⁸ provide that computer programs are literary works for the purposes of copyright law and should therefore be protected as such.⁹

This Article, however, will argue that the protection of “a computer program” as a category of literary works in copyright law is problematic. One reason for this is that such a broad provision fails to differentiate between different facets of a computer program. These are, respectively, the ideas for the program, the procedures and algorithms that constitute the process for the idea in recorded form (often a flow chart), the source code, the object or machine code, and the output of the program, or its “look and feel,” which is sometimes, but not always, a graphical user interface (GUI).

Another more profound reason that classifying software as a literary work is problematic is that it alters copyright law itself by shifting its boundaries away from its original authorial provenance as described in the Berne Convention for the Protection of Artistic and Literary Works of 1886 (the Berne Convention)¹⁰ and into the domain of industrial property laws.¹¹ While there is undeniably a level of intellectual creation involved in the making of computer programs, it is much less obvious that this is the kind

5. See SUSY FRANKEL & GEOFF MCLAY, *INTELLECTUAL PROPERTY IN NEW ZEALAND* 672 (2002).

6. Agreement on Trade-Related Aspects of Intellectual Property Rights 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, App. 9, Computer Programs and Compilations of Data, art. 10(1) [hereinafter TRIPs].

7. Council Directive 91/250/EEC, 1991 O.J. (L 122) 42-46 (EC), available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31991L0250:EN:HTML>.

8. Copyright Act 1994, 1994 S.N.Z. No. 143 § 2 (N.Z.), available at <http://gpacts.knowledge-basket.co.nz/gpacts/reprint/text/2005/an/060.html> (providing that a literary work includes a computer program).

9. Including, for example, the Copyright, Designs and Patents Act, 1988, c. 48, § 3(1) (U.K.), available at http://www.opsi.gov.uk/acts/acts1988/Ukpga_19880048_en_1.htm; Copyright Act, 1968, Act No. 63 of 1968 as amended, § 10 (Austl.), available at [http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/CF0F41E18CD27484CA257323002077E3/\\$file/Copyright1968.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/CF0F41E18CD27484CA257323002077E3/$file/Copyright1968.pdf); and Copyright Act, R.S., ch. C-42 § 2 (1985) (Can.), available at <http://laws.justice.gc.ca/en/ShowFullDoc/cs/C-42/en>.

10. 1161 U.N.T.S. 3, available at http://www.wipo.int/treaties/en/ip/berne/pdf/trtdocs_wo001.pdf [hereinafter *The Berne Convention*]. Article 1 provides: “The countries to which this Convention applies constitute a Union for the protection of the rights of authors in their literary and artistic works.” *Id.* art. 1.

11. For elaboration of this theme, see Sam Ricketson, *The 1992 Horace S. Manges Lecture—People or Machines: The Berne Convention and the Changing Concept of Authorship*, 16 COLUM.-VLA J.L. & ARTS 1 (1991).

of intellectually creative work envisaged by the Berne Convention.¹² Traditionally, other areas of intellectual property law, such as patent law and industrial designs, exist to protect intellectual creativity in the kinds of works that cannot or should not be categorized as literary or artistic in the way that the Berne Convention envisages those categories.¹³

There are at least three negative consequences of the decision to provide copyright protection for computer programs as a category of literary works. First, enormous difficulties have been created for cultural archivists. Ironically, as cultural property law is struggling to accommodate the ever-increasing body of digital culture, copyright law has diverged from its former links with cultural property law and is preventing the archiving of early digital culture for cultural heritage purposes.¹⁴ The problems that arise from this situation are becoming more significant as time passes and as the earliest computer programs become obsolete.

Second, traditional fair use and fair dealing provisions in copyright law are all but meaningless in relation to literary works that are computer programs. In particular, it is impossible to use a computer program without making a copy (which means the lawful owner of the program may not lend it to a friend as she could a book), and it is all but impossible to copy minimal portions of the program (as is required for fair dealing for research and study purposes).¹⁵ Unlike the United States copyright legislation, the New Zealand Copyright Act does not contain any express right to reverse-engineer computer programs.¹⁶ In essence, therefore, a combination of

12. The establishment of the World Intellectual Property Organization in the late nineteenth century was the impetus for the negotiation and ratification of two international treaties: the Berne Convention, which relates to copyright, and the Paris Convention for the Protection of Industrial Property of 1883, which relates to patents, trademarks, and industrial designs.

13. See Ricketson, *supra* note 11, at 25.

14. Internationally, there is a strong historical link between copyright in a published literary work and the legal obligation to deposit one or more copies of that published work in a prescribed library or archive. For example, all English copyright legislation from 1709 until 1988 also contained the provisions for compulsory legal deposit. Susan Corbett, *Digital Heritage: Legal Barriers to Conserving New Zealand's Early Video Games*, 13 N.Z. BUS. L.Q. 47, 53 (Mar. 2007).

15. See IAN J. LLOYD, *INFORMATION TECHNOLOGY LAW* 458 (4th ed. 2005).

16. Indeed, the fair dealing provisions and educational and library exceptions in Part 3 of the Copyright Act appear markedly less generous in all aspects than the United States fair use provision (§ 107). Geoff McLay explains that the exceptions in the New Zealand Copyright Act

are narrowly drawn and often arbitrary—a situation not helped by judicial interpretation that often emphasises that the rights of the users to derogate from copyright owners' interests are to be limited, rather than the rights of the copyright owners. This approach contrasts with [§] 107 of the Copyright Act of 1976 which provides a 'general rule of reason' against which all uses are measured.

technology and law has succeeded in outweighing the public good side of the traditional copyright balance in favor of strengthening the rights of the author and producer of a copyrighted work.

Third (admittedly, somewhat tongue in cheek), providing copyright protection to computer programs by treating them as a category of literary works has permitted learned judges from several Commonwealth jurisdictions to represent themselves as experts in another field hitherto unconnected to jurisprudential reasoning—cooking. In the course of ruling over disputes about computer programs, judges have frequently employed recipe book analogies as a useful device for explaining the way copyright protects instructions.¹⁷ I suggest, however, that these analogies are apt only so far as they have been used to explain the difference between copying a written recipe and creating the final product—by either following the recipe or working independently of that recipe. The recipe analogies could have been usefully and more tellingly extended in order to explain that providing copyright protection for object code as a literary work is comparable to providing copyright protection for the physical activities of the cook in making the final product—that is, providing protection for the function, instead of merely the expression of the function. This Article will enlarge upon these themes and will consider alternative outcomes that might have resulted had the object code of a computer program not been found to be protectable by copyright as a category of literary work.

I. BACKGROUND: INTELLECTUAL PROPERTY GENERALLY AND REQUIREMENTS OF THE BERNE CONVENTION

A. Intellectual Property

The historical belief “that mental labour—that which flows from the intellectual labours of the mind and the exertion of genius and thought—[is] fundamentally different from manual labour—the mere exertion of bodily

Geoff McLay, *Being Fair to Users: The Welcome Arrival of a New, More Liberal Approach to Fair Dealing*, 2 N.Z. INTELL. PROP. J. 135, 135 (1999). Conversely, however, Anna Kingsbury criticizes the tendency of the U.S. courts to give considerable weight to “market harm,” the fourth factor of section 107, and observes that the New Zealand courts do not limit fair use to “non-commercial use.” Anna Kingsbury, *Finding the Copyright Balance: Originality, Authorisation and Fair Dealing in Canadian and New Zealand Law*, 4 N.Z. INTELL. PROP. J. 68, 73-74 (2005).

17. See *Plix Prods. Ltd. v. Frank M. Winstone (Merchants)*, [1986] F.S.R. 63, 89 (H.C.); *Apple Computer, Inc. v. Mackintosh Computers Ltd.*, [1987] 44 D.L.R. (4th) 74 (Can.); *Navitaire Inc. v. Easyjet Airline Co.* [2004] E.W.H.C. 1725 (Ch). All of these cases are discussed in more detail in Part IV.C *infra*.

strength and corporal application”¹⁸—is the foundation for modern intellectual property laws.¹⁹

From the earliest days, however, there was a division between the main genres of intellectual property—patent and copyright.²⁰ Broadly speaking, this division was manifested by the terms of its relationship with particular intangible objects.²¹ Thus, literary property was concerned with books, and patents with machines.²² Literary property rights were found to exist not in ideas but in the way that ideas were reduced to writing, that is, the author’s style or mode of expression, while patentable inventions were juxtaposed against non-patentable discoveries.²³ Patents protected the principle or utility of manufactured objects.²⁴ It was not possible to invent certain principles of nature, although they could be discovered.²⁵ Design law, acknowledging that a design was the unique creation of an individual, did not grant a property right for the idea or style that lay behind the design, but for the way the style was expressed.²⁶ In other words, it protected the form that objects took.²⁷

The establishment of the World Intellectual Property Organization in the late nineteenth century was the impetus for the negotiation and ratification of two international treaties: the Berne Convention for the Protection of Artistic and Literary Works of 1886, which relates to copyright, and the Paris Convention for the Protection of Industrial Property of 1883, which relates to patents, trade marks, and industrial designs.²⁸ These treaties epitomize the nineteenth century separation model of intellectual property laws, which continues to shape contemporary law.

“The romantic image of a copyright law which is beyond the remit of commerce or trade . . . plays an important part in shaping the arguments which focus on the question of the proper place for computer programs within intellectual property law.”²⁹

18. BRAD SHERMAN & LIONEL BENTLY, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, at 15 (1999).

19. *Id.* at 18.

20. *Id.* at 44.

21. *Id.* at 43.

22. *Id.* at 47.

23. *Id.* at 45.

24. *Id.*

25. *Id.*

26. *Id.* at 66.

27. *Id.* at 86.

28. See FRANKEL & MCLAY, *supra* note 5, at 25.

29. *Id.* at 219.

B. Is a Computer Program a “Work” under the Berne Convention?

Early debates about the appropriateness of copyright protection for computer programs considered whether computer programs fulfilled the conditions of a copyrightable “work” as described in the Berne Convention.³⁰ Article 2(1) of the Berne Convention states that “[t]he expression ‘literary and artistic works’ shall include every production in the literary scientific and artistic domain, whatever may be the mode or form of its expression”³¹

Unsurprisingly, given its date, the Berne Convention and its amendments do not refer specifically to computer programs. However, computer programs may be thought of as a hybrid of a scientific work (which the Berne Convention expressly protects)³² and a work that serves a useful purpose (which the Berne Convention does not mention).³³ In his analysis of the intent of the drafters of the Berne Convention, Sam Ricketson explains that “the drafters obviously did not intend to extend protection to subject matter already protected by other intellectual property rights, such as inventions, but rather to emphasize that works on scientific subjects were to be included in the Convention itself.”³⁴

In most jurisdictions, therefore, the purpose of a work—that is, whether it is for instructional, informational, aesthetic, or artistic purposes—is not a factor in ruling upon its eligibility for copyright protection.³⁵ In New Zealand, for instance, the courts have allowed copyright protection for taxi log books (as a literary work),³⁶ an instruction pamphlet regarding herbicides (as a literary work),³⁷ plastic kiwifruit trays (as three-dimensional copies of artistic works),³⁸ and woollen sweaters and cardigans (as works of artistic craftsmanship).³⁹

30. Christian Le Stanc, *Copyright Protection of Computer Software in Civil Law Countries*, in *THE LEGAL PROTECTION OF COMPUTER SOFTWARE* 92, 93 (Hugh Brett & Lawrence Perry eds., 1981).

31. The Berne Convention, *supra* note 10, art. 2(1).

32. *Id.*

33. Ricketson, *supra* note 11, at 10.

34. *Id.*

35. Le Stanc, *supra* note 30, at 94.

36. *Land Transp. Safety Auth. of N.Z. v. Glogau*, [1999] 1 N.Z.L.R. 261, 271 (C.A.).

37. *Elanco Prods. Ltd. v. Mandops (Agrochem. Specialists) Ltd.*, [1980] R.P.C. 213 (C.A.).

38. *Plix Prods. Ltd. v. Frank M. Winstone (Merchants)*, [1986] F.S.R. 63 (H.C.).

39. *Bonz Group (Pty.) Ltd. v. Cooke*, [1994] 3 N.Z.L.R. 216 (H.C.).

C. Is a Computer Program a “Material Form” under the Berne Convention?

Another aspect of computer programs that caused concern was their format (or, often, their lack of tangible format).⁴⁰ The nature of computer programs is such that they are not necessarily available in writing or in a version that the human brain can comprehend. So far as the latter is concerned, judicial rulings have affirmed that many works which are not readily understandable, such as coded messages and dictations recorded in shorthand, are nonetheless copyrightable.⁴¹

The requirement that a literary, artistic, or musical work exist in material form before copyright protection is available is an optional requirement under the Berne Convention,⁴² although it has become mandatory in many jurisdictions, including New Zealand.⁴³ “Writing,” in the New Zealand Copyright Act, is defined broadly to include “any form of notation or code, whether by hand or otherwise and regardless of the method by which, or medium in or on which, it is recorded; and written has a corresponding meaning.”⁴⁴ Similarly, the requirement that a literary work be recorded in “material form” is defined in the New Zealand legislation to mean “in writing or otherwise.”⁴⁵ The breadth of these provisions encompasses the source code and other preparatory software of a computer program and indicates that they, at least, may be a proper subject for copyright protection as “literary works.”

D. Is the Term of Protection under the Berne Convention Appropriate for Computer Programs?

The Berne Convention provides that the minimum term of protection for literary works is the lifetime of the author plus fifty years.⁴⁶ Many jurisdictions, including the United States, Australia, and the United Kingdom, have extended this period to the life of the author plus seventy years.⁴⁷ Such

40. Le Stanc, *supra* note 30, at 95.

41. *Id.* at 96.

42. The Berne Convention, *supra* note 10. Article 2(2) provides: “It shall, however be a matter for legislation in the countries of the Union to prescribe that works in general or any specified categories of works shall not be protected unless they have been fixed in some material form.” *Id.* art. 2(2).

43. Copyright Act 1994, 1994 S.N.Z. No. 143 § 15 (N.Z.), available at <http://gpacts.knowledge-basket.co.nz/gpacts/reprint/text/2005/an/060.html>.

44. *Id.* § 2(1).

45. *Id.* § 15(1).

46. The Berne Convention, *supra* note 10, art. 7(1).

47. See, respectively, Copyright Act of 1976, 17 U.S.C. § 302 (1976); Copyright Act, 1968, Act No. 63 of 1968 as amended, § 33 (Austl.), available at <http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/CF0F41E18CD27484CA25732300207>

a lengthy term of protection is already proving to be problematic. For instance, difficulties have arisen in the situation of out-of-print books where copyright owners cannot be located or, typically, in situations where copyright has passed to the author's heir, and the heir will not give consent for republication.⁴⁸ These lengthy terms seem even less appropriate when applied to computer programs, which have a relatively short commercial life. Conversely, however, it is noteworthy that many traditional literary works such as letters, lists, and compilations, are also of an ephemeral nature, but nevertheless receive the full term of copyright protection.⁴⁹

II. THE NEW ZEALAND POSITION

New Zealand's contribution to the international debate⁵⁰ has arguably been minimal. The decision of the New Zealand High Court in *International Business Machines Corp. v. Computer Imports Ltd.*⁵¹ was made under earlier copyright legislation that did not specifically mention computer programs.⁵² The case provided the first (and last) opportunity for the New Zealand courts to consider whether copyright protection was appropriate for computer software,⁵³ since the decision has now been overtaken by international developments. The current New Zealand Copyright Act complies with Article 10 of TRIPs, and provides that a computer program is a category of literary work for the purposes of copyright protection.⁵⁴

In *International Business Machines*, the court was required to consider (among other issues) whether the object code for a computer program, which was stored in a silicon chip, was a form of literary work and as such was protected by copyright.⁵⁵ The court began by presuming that copyright was indeed appropriate protection for source code, since it fell within the scope of "the fairly general wording of the Act" as a written compilation,

7E3/\$file/Copyright1968.pdf; Copyright, Designs and Patents Act, 1988, c. 48, § 3(1) (U.K.), available at http://www.opsi.gov.uk/acts/acts1988/UKpga_19880048_en_1.htm.

48. "Stephen James Joyce, the grandson of James Joyce and the controversial executor of Joyce's estate, has brought numerous lawsuits or threats of legal action against scholars, biographers, and artists attempting to quote from Joyce's literary work or personal correspondence." Wikipedia, The Free Encyclopedia, Stephen Joyce, http://en.wikipedia.org/wiki/Stephen_James_Joyce (last visited May 5, 2008).

49. Whitford Committee Report, *supra* note 3.

50. See APPENDIX, *infra*, for the debates in the United States and the United Kingdom, respectively.

51. [1989] 2 N.Z.L.R. 395 (H.C.).

52. Copyright Act 1962, 1962 S.N.Z. No. 37.

53. The Copyright Act of 1962 has been repealed and replaced with the Copyright Act 1994, 1994 S.N.Z. No. 143.

54. 1994 S.N.Z. No. 143 § 2(1).

55. *Int'l Bus. Machs., Corp. v. Computer Imports Ltd.*, [1989] 2 N.Z.L.R. 395, 411 (H.C.).

whether or not first written down, or, alternatively, keyed directly onto a computer terminal and displayed on a screen.⁵⁶

In considering the much more complex question of copyright protection for object code, the court turned for guidance to the only two Commonwealth decisions in existence at that time on the subject of copyright protection for computer programs. These were, respectively, *Computer Edge Pty. Ltd. v. Apple Computer Inc.*,⁵⁷ a 1986 decision from the High Court of Australia, and *Apple Computer Inc. v. Mackintosh Computers Ltd.*,⁵⁸ a 1987 decision from the Canadian Federal Court of Appeal. These two decisions were in conflict with regard to the question of whether copyright protection extended to the object code of a computer program.⁵⁹

Both courts agreed that the source code of a computer program is an original literary work, since it is comprehensible by the human brain.⁶⁰ In *Computer Edge*, however, Chief Justice Gibbs chose not to follow existing authorities from the United Kingdom, Canada, South Africa, and the United States, when he ruled that object code was not a literary work.

It seems to me a complete distortion of meaning to describe electrical impulses in a silicon chip, which cannot be perceived by the senses and are not intended to convey any message to a human being and which do not represent words, letters, figures or symbols as a literary work; still less can a pattern of circuits be so described.⁶¹

Furthermore, Justice Gibbs explained, neither could the object code be a translation. Therefore, object code could not be considered an adaptation of the source code as an original literary work, thus further barring copyright protection.⁶² His rationale was that the source code was not turned into another language, even another computer language, but rather into electrical impulses which, as discussed *supra*, could not be described as a literary work in copyright law.⁶³

“Just as a person does not (except in a metaphorical sense) translate the instructions for the working of a machine, when, following those instructions, he sets the machine in motion, so the electrical charges in the ROMs effectuate, but do not translate, the instructions in the source program.”⁶⁴

56. *Id.* at 409.

57. (1986) 161 C.L.R. 171 (Austl.).

58. [1986] 28 D.L.R. (4th) 178 (Fed. Ct.).

59. See *Computer Edge Pty. Ltd.* (1986) 161 C.L.R. 171; *Apple Computer*, [1986] 28 D.L.R. (4th) 178.

60. See *Computer Edge Pty. Ltd.*, (1986) 161 C.L.R. 171; *Apple Computer*, [1986] 28 D.L.R. (4th) 178.

61. *Computer Edge Pty. Ltd.*, (1986) 161 C.L.R. 171, ¶ 13.

62. *Id.*

63. *Id.*

64. *Id.*

Conversely, in a decision later affirmed by the Supreme Court of Canada,⁶⁵ Judge Reed, in the Canadian Federal Court, ruled that object code was a translation of source code.⁶⁶ Although the translation was embodied in a silicon chip, he held that it was nevertheless a translation of an original literary work expressed in material form.⁶⁷ Unauthorized reproduction of the object code was therefore an infringement of copyright.⁶⁸ “[A] copy of a reproduction which reproduction exists in a different material form from the original is still an infringement of copyright in the original.”⁶⁹ In so holding, Justice Reed rejected the alternative argument that object code should not be protected by copyright because copyright protects the expression and not the idea, whereas object code represents a merger of both the idea and the expression of the idea.⁷⁰ “Counsel argues that in copying the ROM the defendants are doing no more than following the recipe prescribed by the program, i.e. making Mrs Beeton’s apple pie. I think a closer analogy is that what they are doing is copying the recipe book.”⁷¹

In *International Business Machines*, the New Zealand High Court followed Canadian reasoning and ruled that although object code is not an original literary work in its own right, it is a reproduction of source code in material form and is therefore an infringement of copyright if unauthorized by the copyright owner.⁷² So long as it was possible to compare the original source code with the reproduction—for example, by a printout—there was no requirement that the reproduction be in a form readable by humans.⁷³

This Article will now consider what might have transpired if the New Zealand High Court had followed the High Court of Australia in *Computer Edge* and ruled against the existence of copyright protection for object code. In light of the economic value of computer programs, it is argued that it is most unlikely that object code would be found to have no protection whatsoever in intellectual property law.⁷⁴ The following parts of this Article, therefore, will examine two alternative forms of protection. These are, respectively, patent law and *sui generis* protection for object code as a category of layout design.

65. *Apple Computer, Inc. v. Mackintosh Computers Ltd.*, [1990] 2 S.C.R. 209 (Can.).

66. *Apple Computer, Inc. v. Mackintosh Computers Ltd.*, [1986] 28 D.L.R. (4th) 178 (Fed. Ct.).

67. *Id.*

68. *Id.* ¶ 88.

69. *Id.* ¶ 83.

70. *Id.* ¶ 61.

71. *Id.* ¶ 62.

72. *Int’l Bus. Machs. Corp. v. Computer Imports Ltd.*, [1989] 2 N.Z.L.R. 395, 417 (H.C.).

73. *Id.* at 416.

74. *See supra* note 3 and accompanying text.

III. WHAT IF OBJECT CODE WAS PROTECTED BY A PATENT?

The patent systems of many jurisdictions now provide for the patenting of certain computer-related inventions—that is, “innovations where novelty resides primarily or exclusively in software components.”⁷⁵ Several stages must be satisfied by an applicant before his invention, which must be a “manner of manufacture” and not a “mere discovery” or “law of nature,”⁷⁶ will be patented. In brief, these are the establishment of novelty, an inventive step, and the capability of industrial application.⁷⁷ On the basis that computer programs are mathematical algorithms and therefore are laws of nature, or alternatively because computer code is “a writing that does not fall within one of the enumerated categories of invention,”⁷⁸ their patentability has been controversial. Indeed the European Patent Convention provides explicitly that a patent may not be awarded for “programs for computers.”⁷⁹ Nevertheless, in Europe the presence of a computer program within an invention that qualifies for patent protection in other respects will not prevent that invention from receiving such protection.⁸⁰ Other jurisdictions, including the United States and Australia, allow patenting of programs that produce “a useful, concrete and tangible [final] result,”⁸¹ or, in New Zealand, “some commercially useful effect.”⁸²

But is patent law’s treatment of “the computer program” as a single entity a rational solution? This Article has described the composite nature

75. LLOYD, *supra* note 15, at 372.

76. The requirement that an invention cannot be patented unless it is a “manner of manufacture” has its foundation in section 6 of the Statute of Monopolies of 1624, which granted an exception to the prohibition against monopolies to such entities. Conversely, it was thought to be contrary to public policy to grant anyone a monopoly over a law of nature, or a mere discovery of such a law. For a detailed examination of the origins of the patent system, see SAM RICKETSON & MEGAN RICHARDSON, *INTELLECTUAL PROPERTY: CASES, MATERIALS AND COMMENTARY* 652-75 (3d ed. 2005).

77. See TRIPS, *supra* note 6, art. 27(1).

78. See BRUCE A. LEHMAN, *INTELLECTUAL PROPERTY AND THE NATIONAL INFORMATION INFRASTRUCTURE: THE REPORT OF THE WORKING GROUP ON INTELLECTUAL PROPERTY RIGHTS* 166 (1995).

79. See Convention on the Grant of European Patents art. 52, Oct. 5, 1973, *available at* <http://www.epo.org/patents/law/legal-texts/html/epc/1973/e/ma1.html> [hereinafter European Patent Convention].

80. Article 52 of the European Patent Convention continues as follows: “The provisions of [the foregoing paragraph limiting what is considered to be an invention] shall exclude only patentability of the subject-matter or activities referred to in that provision only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.” *Id.*; see also LLOYD, *supra* note 15, at 381.

81. *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998); *CCOM Pty. Ltd. v. Jiejing Pty. Ltd.* (1994) 51 F.C.R. 260 (Austl.).

82. Commissioner Popplewell, *Hughes Aircraft Application*, Patent Application Nos. 221147, 233797, and 233798 (filed Mar. 3, 1995).

of computer programs and has argued that different laws should apply to different components of such programs.⁸³

Other difficulties in an area of such rapid technological change are practical. The lengthy time period required for patent offices to consider an application for a patent would be exacerbated if separate components of a program had to be assessed separately, and could result in a patent eventually being awarded for a computer program that had already been updated and become available in a new version. In addition, there is the question of whether adequate library and related resources exist to allow novelty claims to be adequately assessed.⁸⁴

Furthermore, and most importantly, patent law provides monopoly protection for up to twenty years⁸⁵ and has no public good provisions such as fair dealing. The possibility of computer programs *per se* (as opposed to the protection for inventions that represent a commercial outcome of certain programs) receiving this monopoly protection is controversial, due to the potential impact upon innovation in such a rapidly changing field.⁸⁶ The next part of this Article will assess a more practicable and conceptually acceptable solution: the provision of *sui generis* legal protection for object code as a category of layout design.

IV. WHAT IF OBJECT CODE WAS PROTECTED UNDER A *SUI GENERIS* SYSTEM BASED ON LAYOUT DESIGNS LEGISLATION?

A. The Layout Designs Act of 1994

The New Zealand Layout Designs Act of 1994 (the Layout Designs Act) was passed as a result of the obligations imposed on New Zealand by TRIPs,⁸⁷ and is similar to comparable overseas legislation.⁸⁸ Section 2 of the Layout Designs Act defines a “layout design” as “the three-dimensional disposition, however expressed, of the elements, at least one of which is an active element, and of some or all of the interconnections, of an integrated circuit; and includes such a three-dimensional disposition prepared for an integrated circuit intended for manufacture.”⁸⁹ The term “integrated circuit” is defined as “a circuit, in its final or intermediate form, in which the elements . . . and some or all of the interconnections are integrally formed in or

83. See *supra* INTRODUCTION.

84. LLOYD, *supra* note 15, at 372.

85. See TRIPs, *supra* note 6, art. 33.

86. See, e.g., LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD 208-11 (2002).

87. See TRIPs, *supra* note 6, arts. 35-38.

88. See Circuit Layouts Act, 1989 (Austl.); Semiconductor Chip Protection Act of 1984, Pub. L. No. 98-620, 98 Stat. 3347 (1984).

89. Layout Designs Act 1994, 1994 S.N.Z No. 116 § 2.

on a piece of material and that is intended to perform an electronic function.”⁹⁰ The Layout Designs Act preempts any potential copyright in semiconductors and integrated circuits (computer chips) and provides *sui generis* protection for the intellectual property in computer chips.⁹¹

The advantage of providing protection for object code as a separate category of work under the Layout Designs Act is that the provisions of this Act are similar to copyright protection and thus provide a practicable alternative. Importantly, however, there are also significant differences between the Layout Designs Act and the Copyright Act that can address some of the problems arising from allowing object code to claim copyright protection as a literary work.

Similarly to copyright protection, protection under the Layout Designs Act arises without any formality, thus overcoming one of the main objections to the patent system.⁹² Under the Layout Designs Act, protection arises automatically, either from a layout design being first commercially exploited in an eligible country, or from the layout design being made by a resident of an eligible country.⁹³ The owner of a layout design right has the exclusive right to copy the design, directly or indirectly, and to commercially exploit the design. Unauthorized copying or exploitation of the whole or a substantial part of the layout design constitutes infringement of the owner’s rights.⁹⁴

The term of protection is much shorter than that of copyright protection.⁹⁵ Section 2 of the Layout Designs Act of 1994 defines the protection period under the Act as follows:

“Protection period”, in relation to an eligible layout design, means the period beginning on the day on which the layout design was made and ending, —

(a) If the layout design is first commercially exploited within 5 calendar years after the calendar year in which the layout design was made, at the end of the tenth calendar year after the calendar year in which the layout design was first commercially exploited; and

90. *Id.*

91. New Zealand lagged behind other jurisdictions such as Australia, where the Circuits Layout Act of 1989 (Cth) has been considered specifically in relation to the games industry. *See, e.g.,* Nintendo Co. Ltd. v. Centronics Sys. Pty. Ltd. (1994) 181 C.L.R. 134 (Austl.); *see also* FRANKEL & MCLAY, *supra* note 5, at 700-01.

92. *See infra* discussion Part III.

93. Layout Designs Act 1994, 1994 S.N.Z No. 116 § 12.

94. It is also an infringement “to make an integrated circuit in accordance with the layout design . . .” *Id.* § 13.

95. Copyright Act 1994, 1994 S.N.Z. No. 143 § 22 (N.Z.), *available at* <http://gpacts.knowledge-basket.co.nz/gpacts/reprint/text/2005/an/060.html> (providing that the term of protection for a literary work (which includes a computer program) expires at the end of fifty years after the death of the author).

(b) In any other case, at the end of the period of 15 calendar years after the calendar year in which the layout design was made.⁹⁶

Finally, the Layout Designs Act contains generous provisions for “public good” uses of protected designs. These include the right to copy for private use,⁹⁷ research and teaching purposes,⁹⁸ and reverse-engineering for the purposes of “evaluation or analysis.”⁹⁹ Each of the problems described in the Introduction as having resulted from protecting object code as a literary work will now be examined using the alternative supposition that object code is protected by *sui generis* legislation as a category of layout design.

B. Digital Culture

The issue of appropriate preservation mechanisms for the world’s ever-increasing body of digital culture—that is, cultural entities that have originated in digital form—are intertwined with the issue of legal protections for computer software.¹⁰⁰ The United Nations Educational, Scientific and Cultural Organization’s Charter on the Preservation of Digital Heritage urges nations to preserve their digital culture heritage as part of the world’s cultural heritage, in the same way that traditional culture is preserved for future generations.¹⁰¹ International policymakers, heritage institutions, and scholars alike are considering ways that this can be achieved.¹⁰²

Effective digital archiving practice involves several stages, each of which has copyright implications. The digital entity must be stored in a modern storage system that is more stable for preservation purposes than its original medium.¹⁰³ The technical procedures of emulation and migration must be carried out at regular intervals. For example, copying and making

96. Layout Designs Act 1994, 1994 S.N.Z No. 116 § 2.

97. *Id.* § 16.

98. *Id.* § 17.

99. *Id.* § 18.

100. See also Corbett, *supra* note 14, at 48.

101. U.N. EDUC. SCIENTIFIC & CULTURAL ORG. (UNESCO), Charter on the Preservation of the Digital Heritage, Gen. Conference, 32d Sess., Oct. 17, 2003, available at http://portal.unesco.org/ci/en/ev.phpURL_ID=13366&URL_DO=DO_TOPIC&URL_SECTION=201.html.

102. See, e.g., Press Release PR/99/185 (rev.), WIPO, WIPO Outlines “Digital Agenda” (Oct. 31, 1999), available at http://www.wipo.int/edocs/prdocs/en/1999/wipo_pr_1999_185.html; Council Resolution 2002/C 162/02, On Preserving Tomorrow’s Memory—Preserving Digital Content for Future Generations, 2002 O.J. (C 162) 4-5 (EC), available at <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2002:162:00-04:0005:EN:PDF>; N.Z. GOV’T POL’Y DOC., THE DIGITAL STRATEGY: CREATING OUR DIGITAL FUTURE (May 2005), available at http://www.digitalstrategy.govt.nz/upload/-documents/MED11706_Digital%20Strategy.pdf.

103. U.N. EDUC., SCIENTIFIC & CULTURAL ORG. INFO. SOC’Y DIV., GUIDELINES FOR THE PRESERVATION OF DIGITAL HERITAGE, CI-2003/WS/3, at 35 (Mar. 2003), available at <http://unesdoc.unesco.org/images/0013/001300/130071e.pdf>.

an adaptation of the computer program underlying the digital entity are each essential parts of the emulation and migration processes. Each is an infringement of copyright if carried out without the consent of the copyright owners.¹⁰⁴

The problems encountered by digital archivists are therefore caused by several factors, including physical deterioration of the technological platform, lack of commercial investment in upgrading versions of the programs, or a combination of both.¹⁰⁵ The most significant effect, however, is arguably the continuing term of copyright in the earliest digital works. As explained *supra* in accordance with TRIPs requirements, a computer program in New Zealand copyright law is protected as a literary work.¹⁰⁶ Its copyright currently lasts for the lifetime of the author plus fifty years. While computer programs, video games, and other digital works are physically deteriorating, many of the authors are unable to be traced, and, as a result, licenses to emulate and preserve the programs cannot be obtained.¹⁰⁷

Had object code been protected by *sui generis* legislation as a category of layout design, the term of protection for many early digital works would now have expired. Emulation and migration of digital works can be achieved without accessing the source code of computer programs, and is possible working solely with object code. In other words, object code provides sufficient information to convert an original computer program into another form that is suitable for an emulator or other alternative technological platform. The requirements of digital archivists would thereby be satisfied.

C. Recipe Analogies

Commonwealth judges have seized with alacrity upon the field of cookery to explain the technicalities of computer programs to their lay-audiences. Unfortunately, some of their explanations are erroneous and in fact, as will be discussed *infra*, appear to have contributed to an overall misunderstanding of the technicalities of the computer. The United States judiciary has wisely avoided this risky field. Yet, perhaps this avoidance is not so much due to wisdom as to the fact that a recipe in the United States is

104. Copyright Act 1994, 1994 S.N.Z. No. 143 §§ 30, 34 (N.Z.), available at <http://gpacts.knowledge-basket.co.nz/gpacts/reprint/text/2005/an/060.html>.

105. Corbett, *supra* note 14, at 48, 51, 52.

106. See TRIPs, *supra* note 6, art. 10; Copyright Act 1994, 1994 S.N.Z. No. 143 § 2.

107. This situation has resulted in international calls for national legislation to be put in place that would permit the rights of the copyright owners of such "orphan works" to be suspended in order that the works may be preserved for cultural heritage purposes. See Corbett, *supra* note 14, at 48, 68-69.

not considered to be sufficiently original to be protected by copyright.¹⁰⁸ This situation is in contrast to Commonwealth jurisdictions, where a very low level of originality or “sweat of the brow”¹⁰⁹ is sufficient to qualify for copyright protection.¹¹⁰

In New Zealand’s leading reverse-engineering decision, *Plix Products Ltd v. Frank M. Winstone (Merchants) Ltd & Ors.*,¹¹¹ a 1984 case from the High Court of New Zealand concerning indirect copyright infringement of plastic kiwifruit packaging, the Court employed the analogy of a recipe book. Justice Pritchard explained the analogy as follows: “A recipe for a rice pudding might be susceptible of literary copyright. But no one would suggest that to make a rice pudding by following a recipe would infringe the literary copyright in the recipe.”¹¹²

In the Canadian decision *Apple Computer Inc. v. Mackintosh Computers Ltd.*, discussed *supra*, Justice Reed stated:

[A computer program] is a creation in the same way that an instruction book is a creation. While copyright would not prevent someone making Mrs Beeton’s rabbit pie (indeed it was to encourage people to do so that *Mrs Beeton’s Book of Household Management* was first published), it does prevent someone copying the book itself. The order in which the recipes are listed, the form and expression in which they are couched are properly the subject of copyright. This order, form, pattern of expression of the plaintiff’s program is retained in the ROM and is copied when the defendants copy the ROM.¹¹⁵

A more recent example can be found in the 2005 United Kingdom case of *Navitaire Inc. v. Easyjet Airline Company and Bulletproof Tech-*

108. A work needs to display “a modicum of creativity” to qualify as sufficiently original for copyright protection in the United States. *See Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 362 (1991).

109. New Zealand judges consider the “sweat of the brow” standard to describe a level of originality, albeit low. *See Univ. of Waikato v. Benchmarking Servs. Ltd.*, [2004] 8 N.Z.B.L.C. 101, 561 (C.A.); Alexandra Sims, *Arrangements and Originality in Copyright Law*, 4 N.Z. INTELL. PROP. J. 286 (Feb. 2007) (discussing *Henkel KgaA v. Holdfast N.Z. Ltd.* [2006] N.Z.S.C. 102, available at http://www.courtsofnz.govt.nz/from/decisions/documents/HengelKGAAvHoldfastNewZealandLimited_000.pdf). The decision in *Henkel KgaA v. Holdfast N.Z. Ltd.*, however, affirmed that the less original a work is, the lower its level of copyright protection.

110. *See, e.g., Land Transp. Safety Auth. of N.Z. v. Glogau*, [1999] 1 N.Z.L.R. 261, 271 (C.A.) (holding that taxi log books warranted copyright protection). New Zealand judges (rightly or wrongly) consider the “sweat of the brow” standard to describe a level of originality. *See Univ. of Waikato*, [2004] 8 N.Z.B.L.C. at 561; Sims, *supra* note 109 (discussing *Henkel KgaA*, [2006] N.Z.S.C. 102, available at http://www.courtsofnz.govt.nz/from/decisions/documents/HengelKGAAvHoldfastNewZealandLimited_000.pdf).

111. [1986] F.S.R. 63 (H.C.).

112. *Plix Prods. Ltd. v. Frank M. Winstone (Merchants)*, [1986] F.S.R. 63, 89 (H.C.).

113. *Apple Computer, Inc. v. Mackintosh Computers Ltd.*, [1987] 44 D.L.R. (4th) 74, 97 (Can.).

*nologies, Inc.*¹¹⁴ In that case, Justice Pumfrey was required to consider whether an action for infringement of copyright of a computer program would lie for “non-textual copying,” or reproduction of the “look and feel” of a computer program without access to the computer code of that program.¹¹⁵ His Honour rejected the argument that a computer program could be likened to a literary plot and instead preferred the analogy of a chef inventing a new pudding:

After a lot of work he gets a satisfactory result, and thereafter his puddings are always made using his written recipe, undoubtedly a literary work. Along comes a competitor who likes the pudding and resolves to make it himself. Ultimately, after much culinary labour, he succeeds in emulating the earlier result, and he records his recipe. Is the later recipe an infringement of the earlier, as the end result, the plot and purpose of both (the pudding) is the same? I believe the answer is no.¹¹⁶

In order to evaluate these analogies, it is necessary to break down both the computer program and the recipe into their respective component parts:

1. The idea for the program or the rabbit pie. This exists only in the creator’s mind, and since it is not recorded in a tangible form it is not protectable by copyright. To protect this idea would be to grant a monopoly over the very idea of the program or rabbit pie.
2. The recorded process for the program or the rabbit pie. In relation to the program, this process consists of preliminary flow charts, diagrams, and source code. Provided it is recorded in some material form, the process is protectable by copyright (although admittedly, some elements of the process, such as algorithms, are not). In relation to the rabbit pie, the recorded process consists of the written recipe. Again, provided it is recorded in some material form, the recipe is protectable by copyright.¹¹⁷
3. The running of the program and the making of the rabbit pie. These are mechanical processes and should not be protectable by copyright. If one were to grant copyright protection to the physical actions of reading the recipe, chopping up rabbit, rolling out pastry, and placing the pie dish in the oven, once again, one would be creating a monopoly in the idea of a rabbit pie. In fact, the monopoly would be broader and would prevent the making of any pie. The running of the program involves the translation of source code into object code. Copyright protection as a literary work for object code

114. *Navitaire, Inc. v. Easyjet Airline Co.*, [2004] E.W.H.C. 1725 (Ch.).

115. *Id.* ¶¶ 112-20.

116. *Id.* ¶ 127.

117. For the discussion of the low “creativity” threshold in Commonwealth jurisdictions, see *supra* note 109 and accompanying text.

is thus analogous to protection for the activities of chopping up the rabbit meat, stirring in the herbs and spices, rolling out the pastry, etc. In other word, a nonsense. If treated as such, then, the whole idea of a rabbit pie would thereby be protected (apart from fair use) for Mrs. Beeton's lifetime plus fifty years.

4. The end result—the rabbit pie and the GUI or other output of the computer program. Each of these is protected by copyright and would be infringed if copied directly. The rabbit pie is, if made correctly, an artistic work, as is the GUI. Other output of a computer program is likely to be a literary work. That is not to say, however, that one should not be able to reverse-engineer the final product and begin once again. Similarly, if a computer program produces substantially the same end result as another computer program, but uses a different form of code to arrive at the end result, it will not be an infringement of the first program's copyright.¹¹⁸

Following the above reasoning, one would not grant any protection to the object code of a computer program, as it would be similar to granting protection to the functional design of an industrial design. “[W]here features of a copyright work are dictated by function, other creators of copyright works may use their own expression of those same functional features.”¹¹⁹ Fortunately, the generous public-good-user provisions of the Layout Designs Act¹²⁰ will assist the cook when making the rabbit pie for public-good uses, and will permit the reverse-engineering of the rabbit pie itself for evaluation and analysis.

CONCLUSION

Procedures and algorithms, whether or not expressed in material form, are considered to be state laws of nature and should not be protectable by copyright. They are independent of any computer and are not expressed in source or machine code. Ken Moon describes them as the “recipe for the task of baking the pie.”¹²¹ A more accurate analogy might be “that natural scientific process, upon following which the pie will be the inevitable end result.” In other words, procedures and algorithms exist independently of both the human brain and do not depend on whether they are discovered and put to practical use.

118. See, e.g., *Thrustcode Ltd v. W.W. Computing Ltd.*, [1983] F.S.R. 502, 506 (Can.).

119. *Beckmann v. Mayceys Confectionery Ltd.*, [1996] 33 I.P.R. 543 (N.Z.C.A.).

120. See *Layout Designs Act 1994*, 1994 S.N.Z. No. 166 §§ 16-18.

121. Ken Moon, *Software Copyright*, ¶ 2202, in *COPYRIGHT AND DESIGN* 204, 001 (2007).

It is of relevance, when considering appropriate protection for object code, that algorithms can be expressed in a kind of numerical code that is understandable by human experts in the field.¹²² Furthermore, they also “afford information and instruction.”¹²³ It has not been suggested, however, that they be afforded copyright protection as literary works. Why is the situation different for object code?

It is possible that, in coming to the conclusion that a program is aptly described by the term “literary work,” we may have been misled by the terminology used in computer programming. Intuitively, the word “code” leads us to think of entities such as written works transcribed into Morse code or shorthand symbols, symbol-based secret codes, knitting patterns, and so on. It is not controversial that such works are considered literary works for the purposes of copyright law, since each is capable of providing “either information, instruction or pleasure in the form of literary enjoyment.”¹²⁴ So, too, should the source code for computer programs be considered a literary work, since such code is usually written in numerical symbols and alphabetical words, can be understood by the human brain, and is in any event usually the work of a human creator.

The term “object code,” however, is more complex. It represents the computer program in machine-readable form. It is nearly always created by a machine from the source code (a process performed by a compiler), although it can be and in the past nearly always was written by humans, sometimes without utilizing the prior stage of source code.¹²⁵ It is therefore both readable and understandable by human experts in the field.¹²⁶ Object code can be written on paper, but is more frequently stored as a series of electrical impulses embedded in a silicon chip—that is, a semiconductor chip.¹²⁷ It can be stored in any device capable of recording binary states, such as a magnetic disc, an optical disc, magnetic core memory, or an electro-mechanical switch.¹²⁸ Significantly, however, object code also motivates the computer into running the program. It is a mechanical device more properly the subject of a patent, or at the very least, a limited grant of *sui generis* protection such as that available under New Zealand law for a layout design.¹²⁹

122. *Id.*

123. *Id.*

124. Exxon Corp v. Exxon Ins. Consultants Int'l Ltd., [1982] Ch. 119, 120 (E.W.C.A.).

125. Moon, *supra* note 121, ¶ 2203.

126. *Id.* ¶ 2204.

127. *Id.*

128. *Id.*

129. See Layout Designs Act 1994, 1994 S.N.Z. No. 116.

APPENDIX

INTERNATIONAL ARGUMENTS *FOR* COPYRIGHT IN A COMPUTER PROGRAM

A. United States

As early as 1964, computer programs produced in the United States that demonstrated originality of authorship, had achieved first publication in the copyright sense, and that were available in human readable form, were able to be registered with the U.S. Copyright Office.¹³⁰ Such registration did not, however, mean that the programs were worthy of copyright protection, any more than a grant of a patent is a guarantee of an invention's patentability. There has been no litigation on the subject of copyright in a computer program.

For this reason, to avoid the uncertainty of potential litigious challenge to copyright registrations, at that time the primary mode of protection used by the computer programming industry in the United States was the law of trade secrecy.¹³¹ The major disadvantage of such reliance was that the work had to be kept secret—reliance upon contractual arrangements with employees is essential, and breach of contract, although actionable in court by the employer, is also likely to mean a complete end to the protection.¹³² In addition, there was a loss to the public interest, since long-term or indefinite secrecy is likely to hamper ongoing developments in the general field.¹³³ For these reasons, Congress set up the National Commission on New Technological Uses of Copyright Works (CONTU) for the three years beginning December 31, 1974, to make recommendations on, *inter alia*, the most appropriate protection for computer programs.¹³⁴

The CONTU Report was published in 1978, and recommended “that computer programs, to the extent that they embody an author's original creation, are proper subject matter of copyright.”¹³⁵ The CONTU Report further found that copyright was the most logical and acceptable mode of protection for computer programs.¹³⁶ The Report explains, however, that the main concerns of the Commission were that copyright in a computer pro-

130. Copyright Act of 1909, 60th Cong., 2d Sess., 35 Stat. 1075.

131. Bernard C. Dietz, *Copyright in Computer Software—Current US Proposals*, in *THE LEGAL PROTECTION OF COMPUTER SOFTWARE* 115, 117 (Hugh Brett & Lawrence Perry eds., 1981).

132. CONTU Report, *supra* note 2, at 17.

133. *Id.*

134. CONTU was established by Public Law 93-573.

135. CONTU Report, *supra* note 2, at 2.

136. *See id.* at 17-26. The findings were not unanimous—see the discussion *infra* on the dissenting view of Commissioner John Hersey.

gram should not prevent the free use of ideas,¹³⁷ that it should not inhibit the lawful use of computer programs by others,¹³⁸ that it should not prevent others from contributing to the development of the art,¹³⁹ and that it should grant no more economic power than necessary to the developer.¹⁴⁰ For these reasons, the Commission recommended that the legislation permit the lawful owner of a computer program to copy the program in order to make it compatible with the particular computer hardware owned by the user; to create additional archival copies for safekeeping in the event the original program is accidentally damaged; and to adapt the program to suit the user's needs, provided this does not harm the economic interests of the producer, and provided any such adapted version of the program is not transferred or sold to a third party.¹⁴¹

B. United Kingdom

In 1971, the United Kingdom representative at the meeting of the Advisory Group of Governmental Experts on the Protection of Computer Programs declared that the industry was happy with the protection afforded by contract and trade secret law.¹⁴² Only a few years later, the industry had expanded to become a major economic player, and the corresponding increase in the amount of computer program piracy led to calls for legal protection of the intellectual property in a computer program.¹⁴³

The 1977 Report of the Whitford Committee (the Committee) recommended that the proposed new copyright legislation provide specific protection for computer software.¹⁴⁴ The Committee observed that it was likely that copyright law already afforded some protection to computer programs.¹⁴⁵ In particular, in the Committee's opinion, there was almost certainly the potential for a programmer to bring an action for unauthorized reproduction of his original program written in programming language (higher level language), and possibly also a program written in machine language (computer readable language or object code).¹⁴⁶ The question was, however, whether copyright would also be found to subsist in programs punched as holes in cards or paper tape, or stored as recordings on magnetic

137. *Id.* at 19-21.

138. *Id.* at 19.

139. *Id.* at 20.

140. *Id.* at 23-25.

141. For summary and analysis of the CONTU Report, see Dietz, *supra* note 131, at 121.

142. Dworkin, *supra* note 2, at 89.

143. See Whitford Committee Report, *supra* note 3, ¶ 486.

144. See *id.* ¶ 520.

145. See *id.* ¶ 479.

146. See *id.*

tapes, discs, or cards, and, indeed, whether it should subsist in programs expressed in these forms.¹⁴⁷

The Committee recommended that all computer programs and other items of software be protected as literary works, provided they involved a sufficient degree of skill and/or labor to be considered works “in the normal copyright sense,”¹⁴⁸ and provided they had also been reduced to writing or other material form from which they could be reproduced.¹⁴⁹ “In short, items of computer software should be treated as works and enjoy protection as such.”¹⁵⁰ The Committee was careful to point out that the term “computer software” includes “not only programs but also the supporting papers, operating manuals and documentation relating to the programming and operation of a computer.”¹⁵¹ Furthermore, the Committee emphasized that all formats of a computer program should be protectable (in the same way a more traditional literary work is protectable, whether it is written in a recognizable language or in a code),¹⁵² and observed that, in its view, “it is quite immaterial that a program may not be visible to or readable by the human eye or be directly understandable by the human brain.”¹⁵³

One of the rationales for the Committee’s recommendation was that if legislative protection was not provided, it was thought likely that the computer programming industry would reduce the amount of its research (with a corresponding loss of benefit to the national economy and the public interest).¹⁵⁴ Furthermore, the industry might instead rely upon contract law and the law of trade secrets, each of which is capable of supporting monopoly interests in works, as compared with some of the “public good” uses permitted under traditional copyright legislation, and this again would be a loss to

147. *See id.*

148. The requirement that a work should demonstrate a degree of skill and/or labor in its creation to qualify for copyright protection is the fundamental test for originality in English copyright jurisprudence. *See, e.g.,* *Ladbroke (Football), Ltd. v. William Hill (Football), Ltd.*, [1964] All E.R. 465 (UKHL). It remains the test in New Zealand and Australia. *See Univ. of Waikato v. Benchmarking Servs. Ltd.*, [2004] 8 N.Z.B.L.C. 101, 561 (C.A.); *Henkel KgaA v. Holdfast N.Z. Ltd.* [2006] N.Z.S.C. 102; *Desktop Mktg. Sys. Pty. Ltd. v. Telstra Corp.* (2002) 55 I.P.R. 1 (Austl.). However, it has been changed specifically with regard to databases in the United Kingdom to comply with European Union requirements. *See Copyright, Designs and Patents Act, 1988, c. 48, § 3A(2)* (U.K.), *available at* http://www.opsi.gov.uk/acts/acts1988/Ukpga_19880048_en_1.htm (inserted by the Copyright and Rights in Databases Regulations of 1997).

149. *See* Whitford Committee Report, *supra* note 3, ¶ 520.

150. *See id.*

151. *See id.* ¶ 471.

152. *Pitman v. Hine*, (1884) 1 T.L.R. 39 (Q.B.) (holding that “literary work” includes a code and symbols in shorthand).

153. *See* Whitford Committee Report, *supra* note 3, ¶ 492.

154. *See id.* ¶ 487.

the public interest in research, education, and eventually the public domain.¹⁵⁵

INTERNATIONAL ARGUMENTS *AGAINST* COPYRIGHT IN A COMPUTER PROGRAM

A. United States

The CONTU Report contained a dissenting opinion from Commissioner John Hersey.¹⁵⁶ Commissioner Hersey's argument, in essence, was that the source documents for a computer program, including the source code, were already copyrightable as literary, artistic, or musical works, provided they displayed sufficient originality.¹⁵⁷

The Commissioner argued that the next stage of computer programming did not meet the criteria for copyright protection.¹⁵⁸ The creation of object code or low-level machine-readable code by compiler or assembler programs already installed in the computer was a mechanical task and no longer a work of authorship, and therefore on constitutional grounds and for reasons of social policy, ought not to be copyrighted.¹⁵⁹

B. United Kingdom

Commissioner Hersey's arguments received strong support from Professor Gerald Dworkin in the United Kingdom. The Commissioner's arguments, observed Professor Dworkin, touch upon the "idea-expression dichotomy" which, although somewhat diluted today, was once a fundamental principle of copyright law.¹⁶⁰ The principle provides that copyright law protects not the idea or concept behind a work but simply the form or expression of that idea or concept.¹⁶¹ Professor Dworkin notes, however, that:

[T]he Copyright Act itself has watered down this distinction to ensure that the author of a copyright work has protection against a wider range of activities than simple reproduction of a work itself. Adaptations or translations of works are unlawful as also is the manufacture of three dimensional products from recognizable two dimensional drawings.¹⁶²

Despite some dilution of the idea-expression tenet, however, the protection of format and expression remains fundamental to copyright law, and is in

155. *See id.*

156. *See* CONTU Report, *supra* note 2, at 27-37.

157. *See id.* at 28.

158. *See id.*

159. *See id.* at 27-37.

160. Dworkin, *supra* note 2, at 95.

161. *See id.* at 95-96.

162. *See id.* at 95.

contrast to patent law, which protects mechanical devices and industrial processes.¹⁶³

Copyright protection for the source code of a computer program which is the expression of the idea behind the program is therefore a ready and uncontroversial fit within copyright law. The object code of a computer program is, however, more than the “expression of an idea,” nor can it be described accurately as “the expression of the source code,” for it serves *two* separate functions.¹⁶⁴ Not only does object code interpret the source-coded instructions that constitute the higher-level language program instructing the computer how it should perform, it also performs a utilitarian function by controlling the activity of the computer, as a part of the machine itself.¹⁶⁵ As such, object code is “purely and simply a mechanical substitute for human labour.”¹⁶⁶ To allow copyright in the object code of a computer program is to allow copyright in a mechanical device, which is more properly the subject of a patent.

Other United Kingdom commentators take a more extreme stance, and would not provide copyright protection in either the object or the source code of a computer program (as opposed to the accompanying software, concerning which there is no real debate).¹⁶⁷ Their arguments are founded on the premise that copyright law exists to protect a certain kind of content, and that although the format of a computer program may appear on a superficial level to be similar to other copyright works, and therefore appropriate for copyright protection, the content of a computer program is not.¹⁶⁸

“Simply by virtue of the fact that they can be symbolically represented in a way which resembles the written word, judicial bodies and legislatures alike have categorised [computer programs] as literary works.”¹⁶⁹ Although it is possible for humans to “read,” or perhaps more appropriately “interpret,” both source code and object code, the readability is secondary to the functionality of the code, “which . . . is intended to ‘convert hard-wired digital circuitry into a general purpose computer.’”¹⁷⁰

It is evident from the content of the preceding Appendix that the debate over whether or not copyright is an appropriate means of protection for object code is far from over.

163. *See id.* at 96.

164. *See id.* at 95-96.

165. *See id.* at 96.

166. *Id.*

167. Sean E. Gordon, *The Very Idea!: Why Copyright Law is an Inappropriate Way to Protect Computer Programs*, 20(1) E.I.P.R. 10 (1998).

168. *See id.* at 11.

169. *See id.* at 10.

170. *Id.* at 11 (citing Dennis S. Karjala, *Copyright, Computer Software, and the New Protectionism*, 28 JURIMETRICS J. 1, 33 (1987)).