

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

AN ALTERNATIVE STORY

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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.<sup>1</sup>

## I INTRODUCTION

The decision to provide copyright protection for computer programs was controversial. It was driven by a desire to provide some kind of legal protection for digital works in the face of a growing international dependence upon the digital economy. Legal cases of the 1970s and 1980s dealing with actions for the unauthorised use or taking of computer programs demonstrate judicial attempts to grapple with the intricacies of new technology, often leading to conflicting decisions.<sup>2</sup> Drawing, however, upon certain commonalities emerging from the early decisions that acknowledged that of all areas of intellectual property law, copyright appeared to provide the best fit, while carefully ignoring the ongoing debate amongst a small group of specialists who could claim expertise in the fields of both intellectual property law and in the technicalities of computer software, about precisely which aspect of a computer program should be copyrightable, by the late 1980s the international legal regime had achieved a broad consensus. Thus, international conventions, including the 1994 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), the 1991 European Economic Council Directive on the Legal Protection of Computer

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<sup>1</sup> Per Reed J. *Apple Computer Inc. v Macintosh Computers Ltd.* (1987) 44 DLR (4th) 74, para 66.

<sup>2</sup> See in the United States, *Apple Computer Inc. v Franklin Computer Corp.* 714 F.2d 1240 (3<sup>rd</sup> Cir. 1983); in Australia, *Computer Edge Pty Ltd. v Apple Computer Inc.* (1986) 65 ALR 33; 6 IPR 1; in Canada, *Apple Computer Inc. v Macintosh Ltd.* 44 DLR (4th) 74 and, in New Zealand, *International Business Machines Corp. v Computer Imports Ltd.* [1989] 2 NZLR 395; (1989) 14 IPR 225.

Programs (“the EC Directive”)<sup>3</sup>, and many national legislatures, including the New Zealand Copyright Act 1994 (“the Copyright Act”), provide that the computer program is a literary work for the purposes of copyright law and should therefore be protected as such.

The protection of “a computer program” as a category of literary works in copyright law is, I argue, problematic. One cause of the problem is that such a broad provision fails to differentiate between different facets of a computer program. These are respectively, the idea 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.

Another more profound cause is that to categorise a computer program as a literary work and therefore protected under the auspices of copyright law is to alter 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 1886 (the Berne Convention)<sup>4</sup> into the domain of industrial property laws.<sup>5</sup> While there is undeniably a level of intellectual creation involved in the making of computer programs it is much less obvious

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<sup>3</sup> 91/250/EEC.

<sup>4</sup> 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.”

<sup>5</sup> For enlargement upon 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 (1991-1992).

that this is the kind of intellectually creative work envisaged by the Berne Convention.<sup>6</sup>

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 categorised as literary, or artistic in the way that the Berne Convention envisages those categories.<sup>7</sup>

The consequences of the decision to provide copyright protection for the computer program as a category of literary works have become apparent in at least three ways.

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.<sup>8</sup> The problems that arise from this situation are becoming more significant as time passes and the earliest computer programs are becoming obsolete.

Secondly, traditional fair use and fair dealing provisions in copyright law are all but meaningless in relation to literary works that are computer programs. In

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<sup>6</sup> The establishment of the World Intellectual Property Organisation 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 1883, which relates to patents, trade marks and industrial designs.

<sup>7</sup> 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, 25 (1991-1992).

<sup>8</sup> 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. See further Susan Corbett, *Digital Heritage: the Legal Barriers to Conserving New Zealand's Early Digital Games*, 13 N. Z. BUS, L. QU. (MARCH 2007).48, 55.

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).<sup>9</sup> Unlike the United States copyright legislation, the Copyright Act does not contain any express right to reverse engineer computer programs.<sup>10</sup> In essence, therefore, a combination of technology and law has succeeded in outweighing the public good side of the traditional copyright balance in favour of strengthening the rights of the author and producer of a copyright work.

Thirdly (admittedly, somewhat tongue in cheek) it has permitted learned judges from several jurisdictions to represent themselves as experts in another field hitherto unconnected to jurisprudential reasoning. That field is cookery. 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. 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 independently of that recipe. The recipe analogies could have been usefully and more tellingly extended in order to explain that providing copyright protection as a literary work for object code is comparable to providing copyright protection for the physical activities of the cook in making the final product. That is providing protection for the functional instead of merely the expression of the function.

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<sup>9</sup> See Ian J Lloyd, *INFORMATION LAW*, 458 et seq. (4<sup>th</sup> edn 2004).

<sup>10</sup> Indeed, the fair dealing provisions of the Copyright Act are markedly less generous in all aspects than the United States copyright legislation.

This essay 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.

## II 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 strength and corporal application” is the foundation for modern intellectual property laws.<sup>11</sup>

From the earliest days, however, there was a division between the main genres of intellectual property, patents and copyright. Broadly speaking, this division was manifested by the terms of its relationship with particular intangible objects. Thus, literary property was concerned with books, and patents with machines.<sup>12</sup> 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.<sup>13</sup> Patents protected the principle or utility of manufactured objects.<sup>14</sup> It was not possible to invent certain principles of nature, although they could be discovered. 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

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<sup>11</sup> Brad Sherman and Lionel Bentley, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, 15 (2002).

<sup>12</sup> Brad Sherman and Lionel Bentley, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, 47 (2002).

<sup>13</sup> Brad Sherman and Lionel Bentley, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, 45 (2002).

<sup>14</sup> Brad Sherman and Lionel Bentley, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, 87 (2002).

design, but for the way the style was expressed.<sup>15</sup> In other words it protected the form that objects took.<sup>16</sup>

The establishment of the World Intellectual Property Organisation 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 1883, which relates to patents, trade marks and industrial designs. These treaties epitomise the 19<sup>th</sup> 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.<sup>17</sup>

## B Is a computer program a “work” under the Berne Convention?

Early debates about the appropriateness of copyright protection for the computer program considered whether a computer program fulfils the conditions of a copyrightable “work” as described in the Berne Convention.<sup>18</sup> Article 2(1) of the Berne Convention states:

“The 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 .....”.

Unsurprisingly given its date the Berne Convention and its amendments do not refer specifically to the computer program. However, the computer program may

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<sup>15</sup> Brad Sherman and Lionel Bentley, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, 66 (2002).

<sup>16</sup> Brad Sherman and Lionel Bentley, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, 86 (2002).

<sup>17</sup> Brad Sherman and Lionel Bentley, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760-1911*, 219 (2002).

<sup>18</sup> 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).

be thought of as a hybrid of a scientific work (which the Berne Convention expressly protects) and a work that serves a useful purpose (which the Berne Convention does not mention). In his analysis of the intent of the drafters of the Berne Convention, Sam Ricketson explains “ 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 emphasise that works on scientific subjects were to be included in the Convention itself”.<sup>19</sup>

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.<sup>20</sup> In New Zealand for instance the courts have allowed copyright in taxi log books (as a literary work),<sup>21</sup> an instruction pamphlet regarding herbicides (as a literary work),<sup>22</sup> plastic kiwifruit trays (as three-dimensional copies of artistic works),<sup>23</sup> and in woollen sweaters and cardigans (as works of artistic craftsmanship).<sup>24</sup>

### C Is a computer program “a material form” under Berne?

Another aspect of the computer program which caused concern was its format (or, often, its lack of tangible format). The nature of the computer program is such that it is 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

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<sup>19</sup> 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, 10 (1991-1992).

<sup>20</sup> Christian Le Stanc, *Copyright Protection of Computer Software in Civil Law Countries*, in THE LEGAL PROTECTION OF COMPUTER SOFTWARE 92, 94 (Hugh Brett & Lawrence Perry eds., 1981).

<sup>21</sup> *Land Transport Safety Authority of New Zealand v Glogau* [1999] 1 NZLR 261 (CA).

<sup>22</sup> *Elanco v Mandops (Agrochemical Specialists) Ltd* [1980] RPC 213 (EWCA).

<sup>23</sup> *Plix Products v Frank M Winstone (Merchants) Ltd* (1984) 3 IPR 390 (HC).

<sup>24</sup> *Bonz Group (Pty) Ltd v Cooke* [1994] 3 NZLR 216 (HC).

affirmed that many works which are not readily understandable, such as coded messages and dictation recorded in shorthand, are copyright.<sup>25</sup>

The requirement for material form before copyright protection is available for a literary artistic or musical work is an optional requirement under the Berne Convention,<sup>26</sup> although it has become mandatory in many legislatures including New Zealand. "Writing" in the 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".<sup>27</sup> Similarly the requirement that a literary work be recorded in "material form" is defined to mean "in writing or otherwise".<sup>28</sup> 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 Berne appropriate for the computer program?

The Berne convention provides that the minimum term of protection for literary works is the lifetime of the author and a further fifty years. Many jurisdictions including the United States, Australia and the United Kingdom have extended this period to life of the author and a further 70 years. Such a lengthy term of

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<sup>25</sup> Christian Le Stanc, *Copyright Protection of Computer Software in Civil Law Countries*, in THE LEGAL PROTECTION OF COMPUTER SOFTWARE 92, 96 (Hugh Brett & Lawrence Perry eds., 1981).

<sup>26</sup> Article 1(2) provides: "[i]t shall 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".

<sup>27</sup> Copyright Act 1994 s 2(1) (NZ).

<sup>28</sup> See the Copyright Act 1994 s 15(1) (NZ) and the Copyright Designs and Patents Act 1988 s 3(1) (UK).

protection is already proving to be problematic in for instance situations of out-of-print books where copyright owners cannot be located or, typically in situations where copyright has passed to the author's heir, will not, give consent for republication. The term seems even less appropriate when applied to the computer program which has a relatively short commercial life. Conversely, however, 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.<sup>29</sup>

### III THE NEW ZEALAND POSITION

New Zealand's contribution to the international debate<sup>30</sup> was, arguably, minimal. The decision of the New Zealand High Court in *International Business Machines Corporation v Computer Imports Limited*.<sup>31</sup> was made under earlier copyright legislation which did not specifically mention computer programs. The case provided the first (and last) opportunity for the New Zealand courts to consider the question of whether copyright was appropriate protection for computer software,<sup>32</sup> since it has now been overtaken by international developments. The current 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.

In *International Business Machines* the Court was required to consider (amongst other issues) whether the object code for a computer program, which was stored

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<sup>29</sup> See REPORT OF THE COMMITTEE TO CONSIDER THE LAW ON COPYRIGHT AND DESIGNS, Chairman The Hon. Mr Justice WHITFORD, London, HMSO, 1977, para 512.

<sup>30</sup> See Appendix for the debates in the United States and the United Kingdom respectively.

<sup>31</sup> [1989] 2 NZLR 395; (1989) 14 IPR 225.

<sup>32</sup> The Copyright Act 1962 has been repealed and replaced with the Copyright Act 1994 (NZ).

in a silicon chip, was a form of literary work and as such was protected by copyright. The Court began by presuming that copyright was indeed appropriate protection for source code, since it could be slotted within “the fairly general wording of the Act” as a written compilation, whether or not first written down or, alternatively, keyed directly on to a computer terminal and displayed on a screen.<sup>33</sup>

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.*<sup>34</sup> a 1986 decision from The High Court of Australia, and *Apple Computer Inc. v Macintosh Ltd.*,<sup>35</sup> a 1987 decision from the Canadian Federal Court of Appeal. These decisions were in conflict with regard to the question of whether there could be copyright in the object code of a computer program.

Both Courts agreed that the source code of a computer program is an original literary work, since it is comprehensible by the human brain. 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

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<sup>33</sup> *International Business Machines Corporation v Computer Imports Limited*[1989] 2 NZLR 395, 409.

<sup>34</sup> (1986) 65 ALR 33; [1986] F.S.R. 537, 6 IPR 1.

<sup>35</sup> (1987) 44 DLR (4<sup>th</sup>) 74.

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.<sup>36</sup>

Furthermore, His Honour explained, neither could the object code be a translation and therefore an adaptation of the source code as an original literary work. This was because the source code was not turned into another language, even another computer language, but into electrical impulses, which, as discussed ante, could not be described as a literary work in copyright law.<sup>37</sup>

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.<sup>38</sup>

Conversely, in a decision later affirmed by the Supreme Court of Canada,<sup>39</sup> Reed J. in the Canadian Federal Court ruled that the object code was a translation of the source code. Although the translation was embodied in a silicon chip it was nevertheless a translation of an original literary work expressed in a material form. Unauthorised reproduction of the object code was therefore an infringement of copyright.

A copy of a reproduction, which reproduction existed in a different material form from the original, was still an infringement of copyright in the original.<sup>40</sup>

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<sup>36</sup> *Computer Edge Pty. Ltd. v Apple Computer Inc.* (1986) 65 ALR 33; [1986] F.S.R. 537 at 547 and 549.

<sup>37</sup> *Computer Edge Pty. Ltd. v Apple Computer Inc.* (1986) 65 ALR 33; [1986] F.S.R. 537 at 547, 548.

<sup>38</sup> *Computer Edge Pty. Ltd. v Apple Computer Inc.* (1986) 65 ALR 33; [1986] F.S.R. 537 at 548.

<sup>39</sup> *Apple Computer, Inc. v Mackintosh Computers Ltd.* [1990] 2 S.C.R. 209, 110 N.R. 66, 30 C.P.R. (3d) 257, 71 D.L.R. (4th) 95.

<sup>40</sup> Per Reed J. *Apple Computer, Inc. v Mackintosh Computers Ltd.* (1987) 44 DLR (4th) 74, para 52.

Reed J 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.

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.<sup>41</sup>

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 therefore an infringement of copyright if unauthorised by the copyright owner. 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.<sup>42</sup>

This essay 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, I suggest, most unlikely that object code would be found to have no protection in intellectual property law. The following parts of the essay examine two alternative forms of protection. These are respectively patent law and sui generis protection as a category of layout design.

#### IV WHAT IF OBJECT CODE WERE PROTECTED BY A PATENT?

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<sup>41</sup> Per Reed J. *Apple Computer, Inc. v Mackintosh Computers Ltd.* (1987) 44 DLR (4<sup>th</sup>) 74, para 62.

<sup>42</sup> Per Smellie J in *International Business Machines Corporation v Computer Imports Limited*[1989] 2 NZLR 395; 416.

The patent systems of many jurisdictions do of course now provide for the patenting of certain computer-related inventions – that is, “innovations where novelty resides primarily or exclusively in software components”.<sup>43</sup> Several stages must be satisfied by an applicant before their invention will be patented. In brief, these are: novelty, an inventive step, and the capability of industrial application. These requirements need to be read in conjunction with the explicit exclusion from patentability of entities such as discoveries, scientific theories, laws of nature, literary, dramatic, musical, and other aesthetic creations, schemes rules or methods for performing a mental act, playing a game or doing business, and (in Europe) a program for a computer.

It is clear that, in Europe, the computer program itself is not patentable but the presence of a computer program within an invention which qualifies in other respects will not prevent that invention from receiving patent protection. Other jurisdictions, including the United States and Australia are more generous and allow patenting of programs which produce a “useful, concrete and tangible final result”<sup>44</sup> or, in New Zealand, “some commercially useful effect”.<sup>45</sup>

But is patent law treatment of “the computer program” as a single entity rational from a theoretical perspective (although it is of course entirely justifiable from a practical perspective)? This essay has described the composite nature of the computer program and has argued that different laws should apply to different components of the program.

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<sup>43</sup> Ian J Lloyd, *INFORMATION LAW*, 372 (4<sup>th</sup> edn 2004).

<sup>44</sup> *State Street Bank & Trust Co. v Signature Financial Group Inc.* (1998) 149 F 3d 1368, 1373 (Fe. Cir.) per Rich J; and *CCOM Pty. Ltd. V Jiejing Pty. Ltd.* (1994) 28 IPR 481 (FCA).

<sup>45</sup> *Hughes Aircraft Application* (3 March 1995), Commissioner Popplewell, Patent Application Nos. 221147, 233797, and 233798.

The main difficulties are practical. There is the question of whether adequate library and related resources exist to allow claim to novelty to be adequately assessed.<sup>46</sup> In addition there is the typically-lengthy time period required for Patent Offices to consider an application for a patent to be taken into account. In an area of fast moving technological change this situation (which already exists but which would be exacerbated if separate components of a program had to be assessed separately) 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 patent law provides monopoly protection for up to 20 years and has no public good provisions such as fair dealing.

The next part of the essay looks at a more practicable solution: providing protection for object code as a category of layout design.

## V WHAT IF OBJECT CODE WERE PROTECTED UNDER A *SUI GENERIS* SYSTEM BASED ON LAYOUT DESIGNS LEGISLATION?

### A The Layout Designs Act 1994.

The New Zealand Layout Designs Act 1994 (“the Layout Designs Act”) is similar to comparable overseas legislation. Section 2 of the Layout Designs Act defines “Layout designs” 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.

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<sup>46</sup> Ian J Lloyd, *INFORMATION LAW*, 372 (4<sup>th</sup> edn 2004).

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 on a piece of material and that is intended to perform an electronic function.<sup>47</sup>

The Layout Designs Act pre-empts any potential copyright in semi-conductors and integrated circuits (computer chips) and provides *sui generis* protection for the intellectual property in computer chips.<sup>48</sup>

The advantages for providing protection for object code as a separate category of work under the Layout Designs Act are that the Layout Designs Act is sufficiently similar to copyright protection to provide a practicable alternative. Importantly, however, there are 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. Under the Layout Designs Act protection arises automatically either from a layout design being first commercially exploited in an eligible country, or the layout design being made by a resident of an eligible country.

The owner of a layout design right has the exclusive right to copy the design, directly or indirectly, and to commercially exploit the design. Unauthorised

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<sup>47</sup> Layout Designs Act 1994, s 2.

<sup>48</sup> New Zealand lagged behind other jurisdictions in enacting the as Australia, where the Circuits Layout Act 1989 (Cth) has been considered specifically in relation to the games industry (see for example *Nintendo Co Ltd v Centronics Systems Pty* (1994) 121 ALR 577 (HCA).). See further Susy Frankel and Geoff McLay INTELLECTUAL PROPERTY IN NEW ZEALAND (2002), 700-701.

copying or exploitation of the whole or a substantial part of the layout design are infringements of the owner's rights.<sup>49</sup>

The term of protection is much shorter than that of copyright protection. If a layout design is commercially exploited within five years of being made, then the period is 10 years from that date. If a design is not exploited within 10 years (arguably most unlikely in the case of computer software) then protection lasts for 15 years from when first made.

Finally, the Layout Designs Act contains generous provisions for "public good" uses of protected designs. These include the right to copy for private use,<sup>50</sup> for research and teaching purposes<sup>51</sup>, and to reverse engineer for the purposes of "evaluation or analysis".<sup>52</sup>

Each of the problems described in the introduction as having resulted from protecting object code as literary work is now 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, is intertwined with the issue of legal protections for computer software.<sup>53</sup>

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<sup>49</sup> It is also an infringement to "make integrated circuits 'in accordance with' the design right": Layout Designs Act 1994, s 13.

<sup>50</sup> Layout Designs Act 1994, s 16.

<sup>51</sup> Layout Designs Act 1994, s 17.

<sup>52</sup> Layout Designs Act 1994, s 18.

<sup>53</sup> See further Susan Corbett, Digital Heritage: the Legal Barriers to Conserving New Zealand's Early Digital Games, N. Z. BUS, L. QU. (2007).

The United Nations Educational, Scientific and Cultural Organisation'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 as traditional culture is preserved for future generations.<sup>54</sup> International policymakers, heritage institutions, and scholars alike are considering ways that this can be achieved.<sup>55</sup>

Effective digital archiving practice, however, 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. The technical procedures of emulation and migration must be carried out at regular intervals. Copying and making an adaptation of an electronic game are each essential parts of the emulation and migration processes. Each is an infringement of copyright if carried out without the consents of the copyright owners.<sup>56</sup>

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. Arguably the most significant effect is the continuing term of copyright in

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<sup>54</sup> Charter on the Preservation of the Digital Heritage, adopted at the 32nd session of the General Conference of UNESCO, 17 October 2003.

<sup>55</sup> SEE, FOR EXAMPLE, K. D. Idris, *Digital Agenda for WIPO*, INTERNATIONAL CONFERENCE ON ELECTRONIC COMMERCE AND INTELLECTUAL PROPERTY, GENEVA (1999).; ON PRESERVING TOMORROW'S MEMORY – PRESERVING DIGITAL CONTENT FOR FUTURE GENERATIONS, EUROPEAN COUNCIL RESOLUTION 2002/C 162/02 (2002); AND THE NEW ZEALAND GOVERNMENT'S POLICY DOCUMENT, "THE DIGITAL STRATEGY: CREATING OUR DIGITAL FUTURE" <http://www.digitalstrategy.govt.nz> (last visited 15 August 2006)

<sup>56</sup> Copyright Act 1994, ss 30, 34.

the earliest digital works. For example, a video game is a computer program in New Zealand copyright law and is therefore protected as a literary work. Its copyright currently lasts for the lifetime of the author and a further 50 years. While computer programs, video games and other digital works are physically deteriorating, many of the authors are unable to be traced so that licences to emulate and preserve the programs cannot be obtained.

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. It appears that emulation and migration of digital works can be achieved without accessing the source code of computer programs but 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 another alternative technological platform. The requirements of digital archivists would thereby be satisfied.

### C Fair Dealing

As explained above the fair dealing provisions of the Layout Designs Act are much more generous than those of the Copyright Act. In particular they expressly include a right to reverse engineer a protected work.

### D Recipe Analogies

In New Zealand's leading reverse engineering decision *Plix Products Ltd v Frank M Winstone (Merchants) Ltd & Ors*.<sup>57</sup> a 1984 decision from the High Court of New Zealand, concerning indirect copyright infringement of plastic kiwifruit

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<sup>57</sup> (1984) 1TCLR 176, (1984) 2 IPR 390

packaging, the Court employed the analogy of a recipe book. Justice Pritchard explained the analogy as follows, “A recipe for rice pudding might be susceptible of literary copyright. But no-one would suggest that to make a rice pudding by following the recipe would infringe the literary copyright in the recipe”.<sup>58</sup>

In *Apple Computer Inc. v Macintosh Computers Ltd*, Reed J 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<sup>59</sup>

A more recent example can be found in the 2005 UK case *Navitaire Inc. v Easyjet Airline Company and Bulletproof Technologies Inc*,<sup>60</sup> in which Pumfrey J 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. 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. 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.<sup>61</sup>

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<sup>58</sup> *Plix Products Ltd v Frank M Winstone (Merchants) Ltd & Ors*. [1986] F.S.R. 63 at 89.

<sup>59</sup> Per Reed J. *Apple Computer Inc. v Macintosh Computers Ltd*. (1987) 44 DLR (4<sup>th</sup>) 74, para 66.

<sup>60</sup> *Navitaire Inc. v Easyjet Airline Company and Bulletproof Technologies Inc*. [2005]

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In order to analyse 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 granting 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 and 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.
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 prove 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 is thus analogous with 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. The whole idea of a rabbit pie is thereby protected (apart from fair use) for Mrs Beeton's lifetime and a further 50 years.

4. The end result- the rabbit pie and the GUI or other output of the computer program. Each of these I suggest 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.
5. 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 copyright in the first program.<sup>62</sup>

Following the above reasoning one would not grant any protection for object code of a computer program as it would be similar to granting protection for 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".<sup>63</sup>

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<sup>62</sup> See for example Megarry J. in *Thrustcode Ltd v WW Computing Ltd* [1983] FSR 502, 506.

<sup>63</sup> *Beckmann v Maceys Confectionary Ltd* (1996) 33 IPR 543.

Fortuitously the generous public good user provisions of the Layout Designs Act 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.

## VI CONCLUSION

Procedures and algorithms, whether or not expressed in material form, are considered to 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”.<sup>64</sup> I suggest a better analogy might be “that natural scientific process, upon following which the pie will be the inevitable end result”. In other words they exist independently of both the human brain and of whether or not they are discovered by humans and put to practical use. Yet it is of relevance when considering appropriate protection for object code that algorithms can and are expressed in a kind of numerical code that is understandable by human experts in the field. Furthermore they also “afford information and instruction”. Yet it has not been suggested that they be afforded copyright protection as a literary work. Why is the situation different for object code?

I believe 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, symbols-based secret codes, knitting patterns, and so on. It is not controversial that such works are considered to be literary works for the purposes of copyright

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<sup>64</sup> Ken Moon, *Software Copyright*, in COPYRIGHT AND DESIGN (LexisNexis) para [2202].

law, for each is capable of providing “...either information and instruction, or pleasure in the form of literary enjoyment”.<sup>65</sup> So too should the source code for the computer program, which 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 compiler), although it can be and in the past nearly always was written by humans, sometimes without utilising the prior stage of source code. It is therefore both readable and understandable by human experts in the field.<sup>66</sup> 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. It can be stored in any device capable of recording binary states, such as a magnetic disc, an optical disc, magnetic core memory and electro-mechanical switches. 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.

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<sup>65</sup> *Exxon Corp v Exxon Insurance Consultants International Ltd* [1981] 3 All ER 241, 248 (EWCA) per Stephenson J.

<sup>66</sup> Ken Moon, *Software Copyright*, in *COPYRIGHT AND DESIGN* para [2204].

## APPENDIX

### INTERNATIONAL ARGUMENTS *FOR* COPYRIGHT IN A COMPUTER PROGRAM

#### A United States

As early as 1964 computer programs produced in the United States which demonstrated originality of authorship, had achieved first publication in the copyright sense, and which were available in human readable form were able to be registered with the US Copyright Office.<sup>67</sup> 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 had 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 this time the primary mode of protection used by the computer programming industry in the United States was the law of trade secrecy.<sup>68</sup> The major disadvantage of such reliance is that the work must 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. In addition there is a loss to the public interest since long term or indefinite secrecy is likely to hamper ongoing developments in the general field. Congress therefore set up the National Commission on New Technological Uses of Copyright Works (CONTU) for three

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<sup>67</sup> Copyright Act 1909 (U.S.)

<sup>68</sup> 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).

years from 31 December 1974 to make recommendations on (*inter alia*) the most appropriate protection for computer programs.<sup>69</sup>

The CONTU Report was published in 1978 and recommended that computer programs are a proper subject for copyright protection and, indeed, that copyright was the most logical and acceptable mode of protection for computer programs.<sup>70</sup>

The Report explains, however, that the main concerns of the Commission were that copyright in a computer program should not prevent the free use of ideas, that it should not inhibit the lawful uses of computer programs by others, that it should not prevent others from contributing to the development of the art, and that it should grant no more economic power than necessary to the developer.<sup>71</sup>

For these reasons the Commission recommended that the legislation should 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 of the original program being 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.<sup>72</sup>

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<sup>69</sup> Public Law 93-573 established CONTU.

<sup>70</sup> REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS (31 July 1978). The recommendation was not unanimous; see the discussion in the following Part of this article on the dissenting view of Commissioner John Hersey.

<sup>71</sup> REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS (31 July 1978).

<sup>72</sup> For summary and analysis of the CONTU REPORT see Bernard C Dietz, *Copyright in Computer Software: Current US Proposals*, in THE LEGAL PROTECTION OF COMPUTER SOFTWARE 115, 121 et al. (Hugh Brett & Lawrence Perry eds., 1981).

## 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 secrets law.<sup>73</sup> Only a few years later, the industry had expanded to become a major economic player and the corresponding expansion in the amount of computer program piracy led to calls for legal protection for the intellectual property in a computer program.

The 1977 Report of the Whitford Committee (“the Committee”) recommended that the proposed new copyright legislation should provide specific protection for computer software.<sup>74</sup> The Committee observed that it was likely that copyright law already afforded some protection to computer programs. In particular, in its opinion there was almost certainly the potential for a programmer to bring an action for infringement by copying a literary work for unauthorised reproduction of their original program written in programming language (“higher level language”) and possibly also if the program was written in machine language (“computer readable language” or object code). The question was however, whether copyright would also be found to subsist over programs punched as holes in cards or paper tape, or stored as recordings on magnetic tapes, discs or

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<sup>73</sup> Reported in Gerald Dworkin, *The Nature of Computer Programs*, in INFORMATION TECHNOLOGY: THE CHALLENGE TO COPYRIGHT 89 (James Lahore, Gerald Dworkin & Yvonne M Smyth eds., 1984).

<sup>74</sup> See REPORT OF THE COMMITTEE TO CONSIDER THE LAW ON COPYRIGHT AND DESIGNS, Chairman The Hon. Mr Justice WHITFORD, London, HMSO, 1977, para 520.

cards and indeed whether it should subsist over programs expressed in these forms.<sup>75</sup>

The Committee recommended that all computer programs and other items of software should be protected as literary works provided they have involved a sufficient degree of skill and/or labour to be considered as works “in the normal copyright sense”,<sup>76</sup> and provided also that they have been reduced to writing or other material form from which they can be reproduced. “In short, items of computer software should be treated as works and enjoy protection as such”.<sup>77</sup> 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”.<sup>78</sup> Furthermore, the Committee emphasised that all formats of computer program should be protectable, (in the same way as a more traditional literary work is protectable whether it is written in a recognisable language or in a code)<sup>79</sup> and observed that, in its view “...it is immaterial that a program may not be visible to or readable by the human eye or be directly understandable by the human brain.”<sup>80</sup>

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<sup>75</sup> See REPORT OF THE COMMITTEE TO CONSIDER THE LAW ON COPYRIGHT AND DESIGNS, Chairman The Hon. Mr Justice WHITFORD, London, HMSO, 1977, para 479

<sup>76</sup> The requirement that a work should demonstrate a degree of skill and/or labour in its creation to qualify for copyright protection was, until recently, the fundamental test for originality in English copyright jurisprudence: see for example *Ladbroke (Football) Ltd v William Hill (Football) Ltd* [1964] All ER 465 (HL).. It remains the test in New Zealand and Australia but has been changed in the United Kingdom to comply with European Union requirements.

<sup>77</sup> See REPORT OF THE COMMITTEE TO CONSIDER THE LAW ON COPYRIGHT AND DESIGNS, Chairman The Hon. Mr Justice WHITFORD, London, HMSO, 1977, para 520.

<sup>78</sup> See REPORT OF THE COMMITTEE TO CONSIDER THE LAW ON COPYRIGHT AND DESIGNS, Chairman The Hon. Mr Justice WHITFORD, London, HMSO, 1977, para 471.

<sup>79</sup> In *Pitman v Hine* (1884) 1 T.L.R. 39, the court held that “literary work” includes a code and symbols in shorthand.

<sup>80</sup> See REPORT OF THE COMMITTEE TO CONSIDER THE LAW ON COPYRIGHT AND DESIGNS, Chairman The Hon. Mr Justice WHITFORD, London, HMSO, 1977, para 492.

One of the rationales for the Committee's recommendation was that the likely scenario if legislative protection was not provided would be that the computer programming industry would reduce the amount of research (with a corresponding loss of benefit to the national economy and the public interest), the industry might instead rely upon contract law and the law of trade secrets, each of which laws 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 the public interest in research, education and eventually the public domain.

#### INTERNATIONAL ARGUMENTS AGAINST COPYRIGHT IN A COMPUTER PROGRAM

##### A United States

The CONTU Report contained a dissenting opinion from Commissioner John Hersey.<sup>81</sup> 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.

The Commissioner argued that the next stage of computer programming did not meet the criterion for copyright protection. The creation of object code or low level machine readable by compiler or assembler programs already installed in the computer was a mechanical task and no longer a work of authorship and

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<sup>81</sup> Summarised in REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS (31 July 1978) 69.

therefore “.. on Constitutional grounds and for reasons of social policy ought not to be copyrighted”.<sup>82</sup>

## 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.<sup>83</sup> 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. Professor Dworkin notes, however, that:

“.. the 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 recognisable two dimensional drawings.”<sup>84</sup>

Despite some dilution of the idea-expression tenet, the protection of format and expression remains fundamental to copyright law and is in contrast to patent law which protects mechanical devices and industrial processes.

The copyright protection for source code of a computer program which is the expression of the idea behind the program is therefore a ready and uncontroversial fit with copyright law. The object code of a computer program is

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<sup>82</sup> See REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS (31 July 1978) 69.

<sup>83</sup> Gerald Dworkin, *The Nature of Computer Programs*, in INFORMATION TECHNOLOGY: THE CHALLENGE TO COPYRIGHT 89, 95 (James Lahore, Gerald Dworkin & Yvonne M Smyth eds., 1984).

<sup>84</sup> Gerald Dworkin, *The Nature of Computer Programs*, in INFORMATION TECHNOLOGY: THE CHALLENGE TO COPYRIGHT 89, 95 (James Lahore, Gerald Dworkin & Yvonne M Smyth eds., 1984).

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: not only does it interpret the source coded instructions that constitute the higher level language program for the computer thereby instructing the computer how it should perform, but in addition it performs a utilitarian function of controlling the activity of the computer, as a part of the machine itself. That is, it is “purely and simply a mechanical substitute for human labour”.<sup>85</sup> To allow copyright in the object code of a computer program is therefore 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). 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.

“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 classified them as literary works.”<sup>86</sup> Although it is possible for humans to “read” or perhaps more appropriately “interpret” both source code and object code, the

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<sup>85</sup> Gerald Dworkin, *The Nature of Computer Programs*, in *INFORMATION TECHNOLOGY: THE CHALLENGE TO COPYRIGHT* 89, 96 (James Lahore, Gerald Dworkin & Yvonne M Smyth eds., 1984).

<sup>86</sup> 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).

readability is secondary to the functionality of code, "... which is intended to "convert hard-wired digital circuitry into a general purpose computer".<sup>87</sup>

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<sup>87</sup> D.S. Karjala, Copyright, Computer Software, and the New Protectionism, [1987] *Jurimetrics Jnl*, 1, cited in Sean E. Gordon, The Very Idea! Why Copyright Law is an Inappropriate Way to protect Computer Programs, 20(1) *E.I.P.R.* 10, 11 (1998).