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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
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**LEGAL PROTECTION FOR COMPUTER
PROGRAMS UNDER THE UNITED KINGDOM,
MALAYSIAN AND SINGAPOREAN
LEGISLATIONS**

PUTERI NEMIE BINTI JAHN KASSIM

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PREFACE

We have been informed by the sociologists that we are moving into a post-industrial society; into an information age. It is certainly not surprising that it has been suggested that the tripartite division of the constitution between the legislature, the executive and the judiciary should be enhanced to incorporate "computerocracy".

Today, we live in a world of technology which is advancing at a bewildering pace; and life in this century has been transformed by it, perhaps nowhere has the change been more spectacular than in the field of computer technology. Computer based technology has become so sophisticated and far-reaching that the term "computer" can mean any one of a myriad different kinds of equipment. Computer has certainly become an indispensable tool in the life of modern society, whether it be in a developed or developing country. It is vital to the efficient operation of industry; to the functioning of modern financial institutions such as banking, insurance, stock exchanges, accounting, production and distribution of newspapers, operation of railway systems and airlines including the provision of efficient library services. In addition to its indispensability to large scale operations, in miniaturised forms through integrated circuits and micro-chips, the computer is an essential component in mini-calculators, word processors, video games, digital watches, ovens, washing machines and a host of

electronic and other apparatus in everyday use. In short, the computer in one form or the other, is an integral part of virtually every section of the infrastructure of contemporary society.

Computers need programs to operate them; programs also come in different forms, but basically they constitute a set of instructions devised by human beings for the purpose of activating and controlling a computer so as to produce a desired result. Today, there is an enormous and growing investment of resources, whether human or financial in the production of computer programs. As a result of this rapid advancement, the law has been caught off-guard and it is unclear whether appropriate legal protection exists for those who legitimately devise and use computer programs. If protection is inadequate, what sort of reform should take place or indeed, has any reform been introduced or advocated? There was intense debate amongst lawyers in the technologically advanced countries as to whether computer programs should be protected by patent or copyright law or whether a separate regime for the protection of computer programs is more apposite. The advantages and disadvantages of each system were carefully considered. The result of the international consensus is that computer programs are best protected by copyright law. One can see that the advantage of using copyright law instead of patent protection is protection is available from the moment of creation, whereas patent law involves lengthy and expensive application and registration procedure before patent protection is granted. But is copyright protection suitable and

adequate to protect computer programs? Various aspects of the program still remain to be critically analysed to determine whether they fall within the scope of protection. For instance, is an object code protectable expression of the computer or part of its electrical circuitry? Is microcode a computer program or part of the computer hardware? Is the "look and feel" of a computer program an "idea", to which copyright law does not extend, or an expression which is copyrightable? These and other questions have baffled the courts elsewhere and in the search for solutions, legislative definitions are but at best useful guideposts. The challenge to the courts will continue to exist so long as computer technology grows and improves incrementally. By all accounts, the courts are certainly doomed to face that challenge for the rest of the century. If copyright law is inadequate to provide full protection, what sort of protection should be introduced? Should a separate regime of protection which means totally different legal tool be introduced to specially protect computer programs? This is what the dissertation will focus on and hope to provide a solution to.

In Chapter 1, an introduction to the computer systems will be discussed in order to provide the reader with the minimum knowledge on computer program in order to understand the workings of the legal regime connected to it. There will also be a discussion on the aim and the need to protect these programs and the legal possibilities that are available. The advantages and disadvantages of each system will be discussed.

Chapter 2 opens with an introduction to the application of copyright law to computer programs in various countries, namely, the United Kingdom, Malaysia and Singapore. Subsequently, various problems concerning the scope of copyright protection will be highlighted.

Chapter 3 will discuss on the major problem of computer program protection, that is, infringement of copyright in computer programs. There has been uncertainty and dubiousness in what actually constitutes infringement as far as computer program is concerned. The problems concerning infringement with regards to the United Kingdom, Malaysian and Singaporean Acts will be discussed.

In Chapter 4, an introduction to the international scene will be the focus in order for the reader to be informed that the problem of protection of computer programs is an international issue in which International Conventions play a vital role too.

Chapter 5 will concentrate on the European Community Directive as in the writer's opinion, the Directive is the closest form of legal provisions that may provide effective protection for computer programs. The Directive can be used as a starting point to formulate a new legal tool for the protection of computer programs.

Chapter 6 will then conclude with the solution to the problems highlighted earlier.

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CHAPTER 1

INTRODUCTION TO THE COMPUTER SYSTEMS

1.0 INTRODUCTION

Computer systems are commonly classified as hardware and software. Hardware consists of the actual machinery, or the physical units which make up a computer system, that is, the apparatus as opposed to the programs. Protection for new and inventive forms of hardware usually falls within the province of patent law.

Basically, everything that has to do with the computer that is not hardware is termed software. The term software is used to describe the instructions written by a computer programmer and which direct a computer in its operation and analysis of data.¹ It also includes documentation such as flow charts, instruction manuals and other supportive materials that accompany the program. When all of these materials relate to one operating scheme or system, they are called a package or software package.²

Recently, a new term, "firmware" has been coined to refer to hybrid programs which are in between a hardware and a software such as a semi-conductor chip. These devices control machine functions and are intended to be permanent parts of the computer hardware. At the same time they also contain instructions and are

¹ Lahore, J., Dworkin, G. and Smyth, Y.M., *Information Technology: The Challenge to Copyright*, London: Sweet and Maxwell, 1984, at p. 90.

² Salone, M.J., *How to Copyright Software*, St. Berkeley, California: Nolo Press, 1984, at p. 8.

programmed in the same manner as other software.³ This dissertation is mainly concerned with software and firmware.

1.1 DEFINITION OF A COMPUTER PROGRAM

A program has been described in a variety of ways, as a particular expression of an idea set out in the flow chart, as an instruction manual for humans in machine readable form, as a process for controlling a result in a computer, as the completion of an incomplete machine, and as an accessory used in computing or data processing systems.⁴ The *Penguin Computing Book*⁵ states a computer program to be:

"Man's interpretation of the actual or potential activities of a computer system, in terms of arithmetic logic and control operations (or combinations of these in a higher level)."

The Australian Federal Court in the case of Apple Computer Inc. & Another v. Computer Edge Pty Ltd & Suss⁶ preferred a more functional description:

³ Firmware comprises "software instruction or data that are stored in a fixed or 'firm' way, usually implemented in a ROM, PROM, or EPROM (see Glossary for further definition), as opposed to software programs stored on paper or magnetic media and which must be entered into the RAM memory of the computer to be used. Changes can often be made by exchanging the memory chip for an alternate unit. Firmware is built into the computer to make its operation simpler for the user to understand." Spencer, D., *Computer Dictionary*, London: Pitman Publishing, (2nd ed., 1977).

⁴ Carr, H., and Arnold, R., *Computer Software: Legal Protection in the United Kingdom*, 2nd ed., London: Sweet and Maxwell, 1992, at p. 1.

⁵ The authors of the book are Curran, S., and Curnow, R., and it was published in London by Allen Lane and Penguin Books in 1983. The following quotation is cited from p. 139.

⁶ (1984) FSR 481; per Lockhart J at p. 509.

"A program is a concise set of instructions that directs the computer to do the tasks required of it step by step and to produce the desired result."

A useful definition has been provided by the World Intellectual Property Organisations (WIPO):⁷

"Computer program means a set of instructions capable, when incorporated in a machine-readable medium, of causing a machine having information-processing capabilities to indicate, perform or achieve a particular function, task or result."

The Whitford Report on Copyright and Designs Law⁸ stated:

"Essentially...we understand "program" to mean a series of instructions for controlling or conditioning the operation of a computer so as to make it perform certain desired tasks. A computer is a device for storing and processing information. We understand the term 'software' to embrace not only programs but also the supporting papers, operating manuals and documentation relating to the programming and operation of a computer."

However, the accuracy of these definitions have to be assessed against the operation and the development of the computer program. The broader and wider the definition, the more likely for it to be able to cope with the rapid technological development of the computer industry.

⁷ WIPO Model Provisions, section 1.

⁸ CMND. 6732 (1977) para. 471.

1.2 FUNCTIONAL CLASSIFICATION OF COMPUTER PROGRAM

Programs are loosely classified within the computer industry as Application Programs or Operating System Programs.

1.2.1 Application Programs

Application Programs are instructions specifically designed to carry out the specific task. They allow the computer to balance checkbooks, write letters, play games, and operate transit systems, under the direction of the user.⁹ For example, an application program such as Wordstar turns a computer into a word processor. Pac Man makes it into an audio-visual game.

1.2.2 Operating System Programs

In contrast to Application Programs, Operating Systems Programs are essentially to regulate the communications between the human operator and the different parts of the computer hardware. Operating Systems are comprised of electronic instructions which are either fed (loaded) into the computer from the external source, or contained in Read Only Memory (ROM)¹⁰ chips. Common examples of Operating Systems include TurboDos, MS Dos, CP/M, OS/MVS and Unix. In essence, Operating Systems are the traffic controllers, organizers, housekeepers and sometimes

⁹ Salone, M.J., *op.cit.*, at p. 8.

¹⁰ See Glossary for definition.

rulers of how the computer actually functions. For example, when a user tells his Word Processing program (an Application Program) to "save" a file (usually by pushing the "save" key), the Operating System springs into operation and determines how the information is pulled out of RAM¹¹ and put on to the disk for permanent storage.

Thus, the Application Program has to be able to communicate with the Operating System Program. If both of them are unable to communicate then the computer will not be able to function as the machine will be unable to respond to its instructions. Thus, the Operating System is usually a major factor in determining whether microcomputers will "run" a particular Application Program and whether they are compatible with certain other microcomputers. In other words, computers with the same Operating Systems commonly are able to use the same general software.¹²

1.3 PREPARATION AND OPERATION OF COMPUTER PROGRAMS

1.3.1 Preparation

Before examining the legal issues, it is essential that one has a minimum understanding of how computer programs are prepared and operate. The stages and mental processes involved in preparing a computer program are much like those in preparing or drafting a scientific thesis or novel.

¹¹ *Ibid.*

¹² Salone, M.J., *op.cit.*, at p. 9.

The idea or notion of the program must first germinate in the mind of the author or programmer. There should be an objective in mind or a problem to be solved. Bearing in mind the objective of the problem, the programmer will define the sequence of logic which it is intended that the machine execute. The programmer develops a skeleton of such sequential logic operations, the requirements of the language in which the program is to be written, and the capabilities of the hardware in which the program is intended to operate. This skeleton is known as "algorithm", and it is basically the plan or concept of the program.

A more developed form of the logic of the program may then be produced, known as the "flow chart". A flow chart is a schematic representation of the problem to be solved, graphically presenting the steps involved in its solution.¹³ These together with diagrams and other forms of instructions will comprise the source documents. From this he will then go on to prepare a "specification" (sometimes accompanied by a manuscript for a musical score if, for example, it is in connection with a game) to enable him to prepare the "source code". This source code is written in a "high level" language, for example, BASIC, FORTRAN, COBOL, that is, one which can be read and understood by the programmer and others. In other words, it is human readable and in actual fact, it has a faint resemblance of the simple English language. This is stored or fixed on magnetic disc or other

¹³ Carr, H., and Arnold, R., *op.cit.*, at p. 2.

permanent input medium.¹⁴

However, while the source code is comprehensible to the human programmer, it is not directly intelligible to the computer. The source code will have to be translated by a compiler or assembler program into an "object code" (machine code) which is also known as the low level language and this operates the computer. This object code consists of code values and numbers and, although it can be printed out, this machine language is not readily comprehensible to the human eye as it is written in the form of binary numeric form (zeroes and ones).¹⁵ Like the source code, the object code can be represented on various media such as a magnetic disc, punched cards, silicon chips, etc. A clear description can be seen in Diagram 1 in the following page.

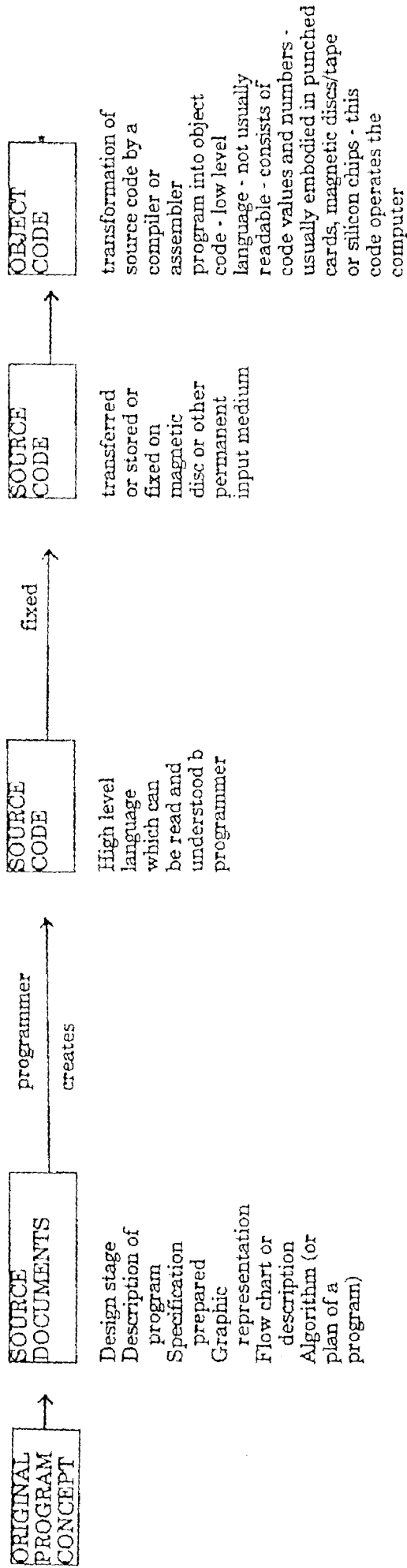
However, at times, the translation of source code to a machine-readable form is done by an interpreter without an intermediate object code step. This is known as "machine code form". In many situations, this translated form of the source code cannot be saved, as it exists only while the computer is performing the assigned task.¹⁶

¹⁴ Lahore, J., *et.al.*, *op.cit.*, at p. 91.

¹⁵ *Ibid.*

¹⁶ Salone, M.J., *op.cit.*, at p. 12. This is important as when one cannot physically save the code, one cannot copyright it. This means that with some software, you can only copyright the source code because there is functionally no object code.

DIAGRAM 1*



* J. Lahore, G. Dworkin and Y.M. Smyth, *Information Technology: The Challenge*

A computer program is manifested only in its object code version stored on storage devices such as a diskette. The diskette (also known as "floppy disc") is an auxiliary storage device consisting of a flexible magnetic disc resembling a 45rpm phonograph record. It can be inserted into the computer from which data or instructions can be read.¹⁷

After the diskette is inserted in the computer, the program will be executed by the centre of control for arithmetical and logic operations within the microprocessor (CPU). The CPU consists of an arrangement of electronic circuits which are activated by impulses of electric current. The present or absence of pulses of current is represented by binary digits ("bits"). The CPU recognises "1" as indicative of the presence of a pulse and "0" as indicative of its absence.

A computer program is a series of bits, each bit representing the presence or absence of a pulse. The program operates within the CPU as a series of pulses in a pre-arranged sequence in accordance with the order of bits devised by the computer programmer which will direct the machine to perform pre-defined functions. Each function is held in a memory location within the computer, which has an address, by which the location

¹⁷ Tan Tee Jim, "Legal Problems in the Transfers of Technology, Trademarks and Computer Programs (Singapore)" - Paper presented during workshops of the Assembly at the 4th General Assembly and Conference Asean Law Association (Nov. 15-19, 1986 in Bangkok, Thailand), at pp. 129-130.