COPYRIGHT PROTECTION OF COMPUTER PROGRAMS AND DATABASES

A dissertation submitted in partial fulfillment
of the requirements for the degree of
MASTER OF LAWS
(Faculty of Shari'ah and Law)
in the International Islamic University, Islamabad.

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138-FSL/LLMCL/F06

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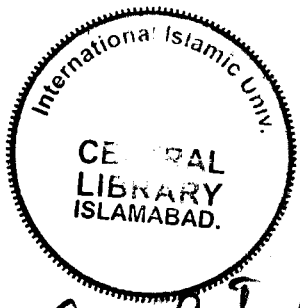

بسم الله الرحمن الرحيم

For the glory of Allâh, most merciful and most compassionate.

FINAL APPROVAL

It is certified that we have evaluated the dissertation submitted by Mr. Aamar Latif, registration No 138-FSL/LLMCL/F06 on "Copyright Protection of Computer Programs and Databases" in Faculty of Shari'ah & Law. It is our judgment that this dissertation is of sufficient standard and scope to warrant its acceptance by the International Islamic University for the award of LL.M. Corporate Law degree.

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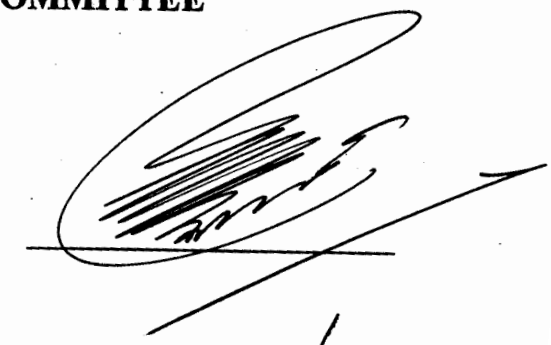

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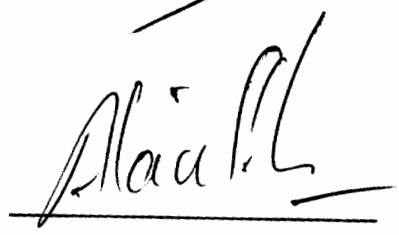

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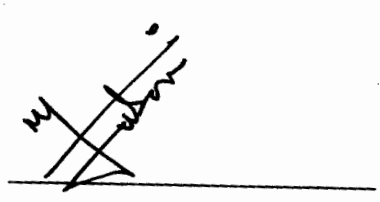

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DECLARATION

I, *Aamar Latif*, hereby declare that this dissertation is original and has never been presented in any other institution. I also declare that any secondary information used has been duly acknowledged in this dissertation.

Aamar Latif

DEDICATION

To my parents who, of all that walk the earth, are most precious to me.

ACKNOWLEDGEMENT

First and foremost, I offer my sincerest gratitude to the *Almighty Allah* for bestowing me with an opportunity to conduct a research oriented job of presenting this dissertation. Then, I would like to express my thanks to the people who saw me through this thesis; to all those who provided support, talked things over, and assisted in the editing and proofreading.

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The Management of Intellectual Property Organisation (IPO-Pakistan), who most generously encouraged me by allowing me access to their offices and collection. I thank them for the help they gave me; all my doubts, queries, suppositions and mistakes are known to them.

At the end, I implore forgiveness of all those who have been with me over the course of the years and whose names I have failed to mention.

Aamar Latif
December 2009
Islamabad, Pakistan.

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LIST OF ABBREVIATIONS

API	Application Programming Interface
BSA	Business Software Alliance
CPU	Central Processing Unit
DSM	Dispute Settlement Mechanism
EPC	European Patent Convention
EPO	European Patent Office
EU	European Union
EULA	End-User License Agreement
FDI	Foreign Direct Investment
FIA	Federal Investigation Agency
GDP	Gross Domestic Product
GUI	Graphical User Interface
HDD	Hard Disk Drive
HTML	Hyper Text Markup Language
ICT	Information and Communication Technology
IDE	Integrated Development Environment
IIPA	International Intellectual Property Alliance
IP	Intellectual Property
IPO-Pak	Intellectual Property Organization of Pakistan
IPRs	Intellectual Property Rights
ISO	International Organization for Standardization
JDBC	Java Database Connectivity
MMI	Man-Machine Interface
ODBC	Open Database Connectivity
OEM	Original Equipment Manufacturer
OOP	Object-Oriented Programming
OSS	Open-Source Software
R&D	Research & Development
RDBMS	Relational Database Management System

SAM	Software Asset Management
SHAIP	Strengthening of Health Services Academy in Pakistan
TRIPS	Trade Related Aspects of Intellectual Property Rights
TWN	Third World Network
UK	United Kingdom
UNESCO	United Nations Educational, Scientific, and Cultural Organization
US	United States of America
USPTO	United States Patent and Trademark Office
VIPs	Visually Impaired Persons
WCT	WIPO Copyright Treaty
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

LIST OF CASES

* Dr. Syed Iqbal Raza Vs. Siemens AG, a sub-judice case during the study analysis being done.

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ABSTRACT

Copyright is a legal term describing the economic rights given to creators of literary and artistic works, including the right to reproduce the work, to make copies, and to perform or display the work publicly. Copyrights offer essentially the only protection for music, films, novels, poems, architecture, and other works of cultural value. As artists and creators have developed new forms of expression, these categories have expanded to include them. Computer programs and sound recordings are now protected, too. For the purposes of copyright protection, the term "literary and artistic work" is understood to include every original work of authorship, irrespective of its literary or artistic merit. The ideas in the work do not need to be original, but the form of expression must be an original creation of the author.

The Berne convention (1886), Article 2, provides a list of works to be protected under the domain of 'literary, scientific and artistic' works. The list, however, is not exhaustive as computer programs are not included in the list, but which is undoubtedly included in the notion of a production in the literary, scientific and artistic domain within the meaning of Article 2. Indeed, computer programs are protected under the copyright laws of a number of countries, as well as under the TRIPS Agreement (1995) and WIPO Copyright Treaty (1996).

In present era, the computer programs / software are very important segment of national economy and development of a country. Their use is increasing day-by-day and, now, we rely on computer based technology in every field of our life. The investments needed for the creation of computer programs are often very high. On the other hand, once created, it is generally possible to reproduce the same computer programs easily at very low cost. Therefore, without appropriate protection against unauthorized copying and use, producers of computer programs would not be able to regain their investments and thus, the creation and development of this technology may be hampered. Their widespread use and critical importance necessitate some sort of legal protection against their misappropriation.

Copyrights and Patents are the two main forms of intellectual property protection accorded to computer software. The copyright is a widely accepted and suitable system for software industry because of its unique structure and requirements. It is evident from software history that software industry thrived in a patent less system and it will flourish and will work more efficiently without patents.

This work is intended to analyze our national laws on protection of computer programs and databases vis-à-vis a comparative analysis of international conventions and treaties on the subject. It would be a comparative study in a sense that different international systems for the protection of computer programs / software will be discussed. Given the nature of research it would be a qualitative research work coupled with comparative methodology involving literature survey, comprising books, reports, articles and statutes and a coherent analytical framework will be developed.

The whole thesis is divided into six chapters. Chapter I briefly introduces the basic concepts, definitions, history and importance of the protection of computer software and databases. Chapter II provides an overview on the protection of computer programs granted by our national statute. Chapter III deals with the safeguard provided by international conventions and treaties i.e. Berne Convention, TRIPS Agreement, WIPO Copyright Treaty and EU Directives. Chapter IV is a comparative analysis of two major IP systems of software protection prevailing in the world i.e. copyright and patent. Chapter V is about enforcement of copyrights in Pakistan with a special reference to computer programs. Chapter VI contains the conclusion and recommendation on the subject. The end result of the whole discussion is forwarded to the concerned authority, IPO-Pakistan, to amend the national legislation on protection of computer programs and databases, in order to bring it to international standards and to eradicate any loopholes / shortcoming.

CHAPTER I

INTRODUCTION AND FUNDAMENTAL CONCEPTS

1.1 INTRODUCTION

The increased sophistication of computer programs / software and databases has made them invaluable tools for a range of uses.[1] At the same time unprecedented advances in computer technology have helped to stimulate growth in the computer information industry. As computers have become more powerful, they have also become more affordable. As a result, systems previously found only in research labs are now standard fixtures in offices and homes. Increased accessibility has created vast numbers of users demanding additional products and services, and this has been a further push for expansion in the computer information industry as a whole. Computer programs and databases now assume vital importance in virtually every segment of the economy.[2] Their widespread use and critical importance necessitate some sort of legal protection against their misappropriation.

The investments needed for the creation of computer programs are often very high. On the other hand, once created, it is generally possible to reproduce the same computer programs easily at very low cost. Therefore, without appropriate protection against unauthorized copying and use, producers of computer programs would not be able to regain their investments and thus, the creation and development of this technology may be hampered. This is why, during the 1970s and the first half of the 1980s, intensive international discussions regarding the protection of computer programs took place, mainly aiming at resolving the question of whether such protection should be provided under copyright law or patent law, or possibly under a *sui generis*[3] system of protection.[4]

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[1] Tools such as LEXIS and Westlaw and their impact on legal research exemplify databases expanded role.

[2] *See also* Priscilla A. Walter, *Databases: Protecting An Asset; Avoiding a Liability,* 8 COMPUTER LAW. 10, 10 (Mar. 1991) (positing that "[v]irtually all businesses, and most individuals, own or use one or more forms of database regularly").

[3] *Sui generis* is a Latin expression, literally meaning *of its own kind / genus* or unique in its characteristics. Generally speaking, protection for intellectual property is extended to matter depending upon its characteristics. The main types of intellectual property law – copyrights, patents, and trademarks – define characteristics and any matter that meets such criteria are extended protection. However, there exist statutes in many countries that extend IP-type protection to matter that do not meet traditional definitions of protected intellectual property. For example, U.S. law creates special protection for vessel hull designs, French law protects fashion designs, and some countries protect databases. These are referred to as "sui generis" protection laws. The United States, Japan, and many EU countries protect the topography of semiconductor chips and integrated circuits under *sui generis* laws, some of whose aspects are borrowed from patent or copyright law.

We can credit 17th century England with the concept of a "copyright," a law that protects the creative products of authors, artists, singers, and, to reflect developments since the 1600s, filmmakers and software developers. This concept even has been enshrined in the Cultural Policy of Pakistan, whose features state that "the existing Copyrights Acts will be updated to protect the intellectual property rights of national and international films, music, drama, videos, CDs, DVDs, printed material and other intellectual property"[5] which includes computer program / software as well.

Until the late Twentieth Century, copyright was not regarded as being of much relevance to the sale of products other than traditionally "artistic" products such as books and gramophone records. Today, however, in addition to these traditional areas, copyright has become an extremely important weapon in preventing piracy of computer software[6] and preventing copying of various useful items to which "art" has been applied.[7]

1.2 COPYRIGHT BASICS

Copyright is a legal term describing the economic rights given to creators of literary and artistic works, including the right to reproduce the work, to make copies, and to perform or display the work publicly. Copy-rights offer essentially the only protection for music, films, novels, poems, architecture, and other works of cultural value. As artists and creators have developed new forms of expression, these categories have expanded to include them. Computer programs and sound recordings are now protected, too.[8]

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[4] http://www.wipo.int/edocs/mdocs/sme/en/wipo_ip_bis_ge_03/wipo_ip_bis_ge_03_7-main1.pdf (Last visited: 25-11-2008).

[5] Cultural Policy prepared by Ministry of Culture, Government of Pakistan. For full text please visit: http://www.culture.gov.pk (Last visited: 25-11-2008).

[6] Generally understood as meaning, besides the computer program itself, also the detailed program description determining the set of instructions constituting the corresponding program and all kinds of supporting material created to aid the understanding or application of a computer program, such as user instructions. (See GCNR, p. 55) Computer Software is a term used solely to refer to computer programs. This thesis will use both terms interchangeably.

[7] Ladas Guide on Legal Protection of Computer Software, http://www.ladas.com/Patents/Computer/SoftwareAndCopyright/Softwa01.html (Last visited: 25-11-2008).

[8] Thomas G. Field, Jr. *"What is Intellectual Property."* An article from U.S. Department of State publication, Focus on Intellectual Property Rights. For full text of the article, please visit: http://www.america.gov/st/econ-english/2008/April/20080429213326eaifas0.2220423.html (Last visited: 25-11-2008).

Unlike protection of inventions, copyright law protects only the "form of expression" of ideas, not the ideas themselves. The creativity protected by copyright law is creativity in the choice and arrangement of words, musical notes, colours and shapes. So copyright law protects the owner of property rights against those who copy or otherwise take and use the form in which the original work was expressed by the author.

For the purposes of copyright protection, the term "literary and artistic work" is understood to include every original work of authorship, irrespective of its literary or artistic merit. The ideas in the work do not need to be original, but the form of expression must be an original creation of the author.[9] The Berne Convention for the Protection of Literary and Artistic Works states: "The expression 'literary and artistic works' shall include every production in the literary, scientific and artistic domain, whatever may be mode or form of its expression".[10]

1.2.1 Works Protected by Copyright

Copyright protects "original works of authorship" that are fixed in "a tangible form of expression." The fixed form does not have to be directly perceptible so long as it can be communicated with the aid of a machine or other device.

The Berne Convention provides a list of works protected under the umbrella of 'literary, scientific and artistic' domain. The list, however, is not intended to be exhaustive. Copyright laws also protect other modes or forms of expression of works in the literary, scientific and artistic domain, which are not included in the list.

Computer programs are a good example of a type of work which is not included in the list in the Berne Convention, but which is undoubtedly included in the notion of a production in the literary, scientific and artistic domain within the meaning of Article 2. Indeed, computer programs are protected under the copyright laws of a number of countries, as well as under the WIPO Copyright Treaty (1996). A computer program is a

[9] Understanding Copyright and Related Rights, a WIPO Publication on Intellectual Property Rights. For more information, visit: http://www.wipo.int/freepublications/en/intproperty/909/wipo_pub_909.html. (Last visited: 26-11-2008).

[10] See Article 2 of the Berne Convention for the Protection of Literary and Artistic Works, 1886.

set of instructions, which controls the operations of a computer in order to enable it to perform a specific task, such as the storage and retrieval of information. The program is produced by one or more human authors, but in its final "mode or form of expression," it can be understood directly only by a machine (the computer), not by humans.[11]

Following are the works protected by the copyright law:

- **Literary Works** – (for example, emails and newspaper articles)
- **Dramatic Works** – (for example, plays)
- **Musical Works** – (for example, songs, musical scores and soundtracks)
- **Artistic Works** – (for example, paintings, photographs and images)
- **Films** – (for example, videos and cinematic performances)
- **Sound Recordings** – (for example, oral history tapes and recorded lectures)
- **Broadcasts** – (for example, TV and radio)
- **Typographic Works** – (for example, the arrangement of websites and translations)
- **Computer Program / Software**
- **Some Databases**

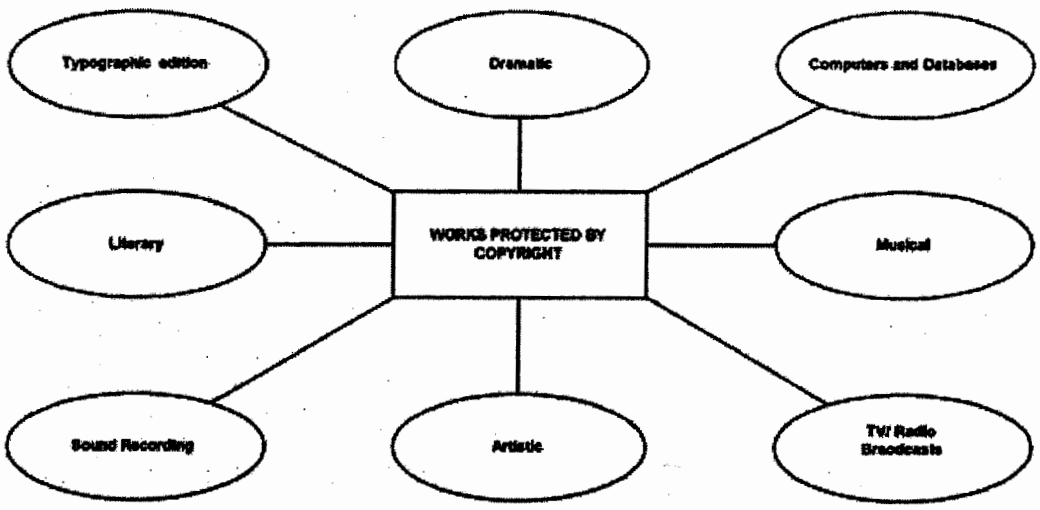

Figure 1 – *Works protected by copyright*

[11] Ibid, supra note 8.

1.2.2 Originality

It is important to note that all works protected by copyright must be original[12]. Whilst there is no definition of *Originality*, to be considered original, a work has to be more than a mechanical reproduction of a previous work. This definition can sometimes be difficult to determine, i.e. particularly in cases of works that are comprised of other works in copyright – such as collages and montages. Therefore, some countries in Europe, such as the UK have also relied upon works that demonstrate some kind of skill or judgment, rather than creativity alone[13], as a means to determine how far any new works are afforded their own copyright protection. Despite a recent case in the US[14], most countries will also follow the principle that significant skill and judgment have been employed in order for photographs of art works to be afforded their own copyright protection.[15]

1.2.3 Duration of Copyright

The essential idea behind a copyright is that artists and creators should be able to enjoy the fruits of their labour for a specific time period, after which the material becomes available for public use. Society benefits because this incentive to create will yield a rich and varied cultural menu for its citizens.[16] Indeed, one can say that copyright protection is a necessary ingredient for ensuring cultural wealth in our societies.

But if copyright protection is important for reaching cultural objectives, then it is equally true that the theft of these copyrighted goods – that is, the pirating of cultural works – is a threat to the creative sectors in our societies. Many international institutions, such as the World Bank, the World Intellectual Property Organization (WIPO), and even the United

[12] Apart from sound recordings, as long as the recording is not a copy or duplicate of an existing sound recording.

[13] Although this may gradually change since the Term Directive (Directive 93/98/EEC) states that "photographs which are original in the sense that they are the author's own intellectual creation shall be protected in accordance with Article 1".

[14] Bridgeman Art Library Ltd v Corel Corp. [2000] 5 Ent LR 104. For a thorough commentary on the case and its implications on US and UK law as well the concept of originality, please see: http://www.law.cornell.edu/copyright/cases/36_FSupp2d_191.htm (Last visited: 26-11-2008).

[15] Naomi Korn, "Guide to Intellectual Property Rights and Other Legal Issues". For online version of the publication, visit: http://www.minervaeurope.org/publications/guideipr1_0.pdf (Last visited: 26-11-2008).

[16] E. Anthony Wayne, "Why Protecting Intellectual Property Rights Matter". For full text, visit: http://www.greatwallip.com/cn/articles/why-protecting-ip-rights-matters.asp (Last visited: 26-11-2008).

Nations Educational, Scientific, and Cultural Organization (UNESCO), recognize this link[17].

Copyright does not continue indefinitely. The law provides for a period of time during which the rights of the copyright owner exist. The period or duration of copyright begins from the moment when the work has been created, or, under some national laws, when it has been expressed in a tangible form. It continues, in general, until some time after the death of the author. The purpose of this provision in the law is to enable the author's successors to benefit economically from exploitation of the work after the author's death.

In countries party to the Berne Convention[18], and in many other countries, the duration of copyright provided for by national law is as a general rule the life of the author plus not less than 50 years after his death. The Berne Convention also establishes periods of protection for works such as anonymous, posthumous and cinematographic works, where it is not possible to base duration on the life of an individual author. There is a trend in a number of countries toward lengthening the duration of copyright. The European Union, the United States of America and several others have extended the term of copyright to 70 years after the death of the author.

However, the Berne Convention permits copyright to be conditioned, as it is in the Pakistan, upon a work having been created in fixed form. Also, many countries have national copyright centers to administer their copyright systems. In Pakistan, for example, this system is administered by the Copyright Office.[19]

[17] In fact, if you visit UNESCO's web site (http://www.unesco.org), you will find an entire section devoted to the issue and a list of programs and publications that explain the benefits of copyright to educational, scientific, and cultural policies and provide help in finding ways to fight piracy.

[18] Pakistan became party to the Berne Convention for the Protection of Literary and Artistic Works (1886) on July 5, 1948. At that time, latest Act of the Convention was the Rome Act (June 2, 1928). This State deposited its instrument of ratification of (or of accession to) the Stockholm Act (July 14, 1967) in its entirety; however, Articles 1 to 21 (substantive clauses) of the said Act have not entered into force.

[19] The Copyright Office established in 1963 is situated at Karachi with a branch office at Lahore established in 1986 under Ministry of Education and became part of IPO-Pakistan since April 2005.

1.2.4 The Bundle of Rights Called "Copyright"

There are two types of rights under copyright. Economic rights allow the rights owner to derive financial reward from the use of his works by others. Moral rights allow the author to make certain actions to preserve the personal link between himself and the work.[20]

1.2.4.1 Economic rights

Most copyright laws state that the author or rights owner has the right to authorize or prevent certain acts in relation to a work. The rights owner of a work can **prohibit or authorize:**

- its reproduction in various forms, such as printed publications or sound recordings;
- the distribution of copies;
- the rental of copies;[21]
- the importation of copies;
- its public performance;
- its broadcasting or other communication to the public;
- its translation into other languages; and
- its adaptation, such as a novel into a screenplay.

1.2.4.2 Moral rights

In relation to IPR, moral rights can be defined as the set of privileges granted to authors in order to allow them the right to have the quality and authorship of their work respected. Moral rights cannot be assigned[22], however it is possible for the author of a work to waive their moral rights. An infringement of an author's moral rights can be taken to court and where appropriate, damages can be awarded to the author.

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[20] Ibid, supra note 9.

[21] The WIPO Copyright Treaty (1996) recognizes the "right to authorize rental of copies" of certain category of works, such as musical works in sound recordings, audiovisual works, and 'computer programs'. This became necessary in order to prevent abuse of the copyright owner's right of reproduction when technological advances made it easy for rental shop customers to copy such works.

[22] Although in some EU countries, Moral rights can be transferred posthumously to the author's heirs.

The Berne Convention requires Member countries to grant to authors:[23]

- the right to claim authorship of the work, (sometimes called the right of paternity); and
- the right to object to any distortion or modification of the work, or other derogatory action in relation to the work, which would be prejudicial to the author's honor or reputation, (sometimes called the right of integrity).

The Convention requires them to be independent of the author's economic rights, and to remain with the author even after he has transferred his economic rights.[24] It is worth noting that moral rights are only accorded to individual authors. Thus even when, for example, a film producer or a publisher owns the economic rights in a work, it is only the individual creator who has moral interests at stake.

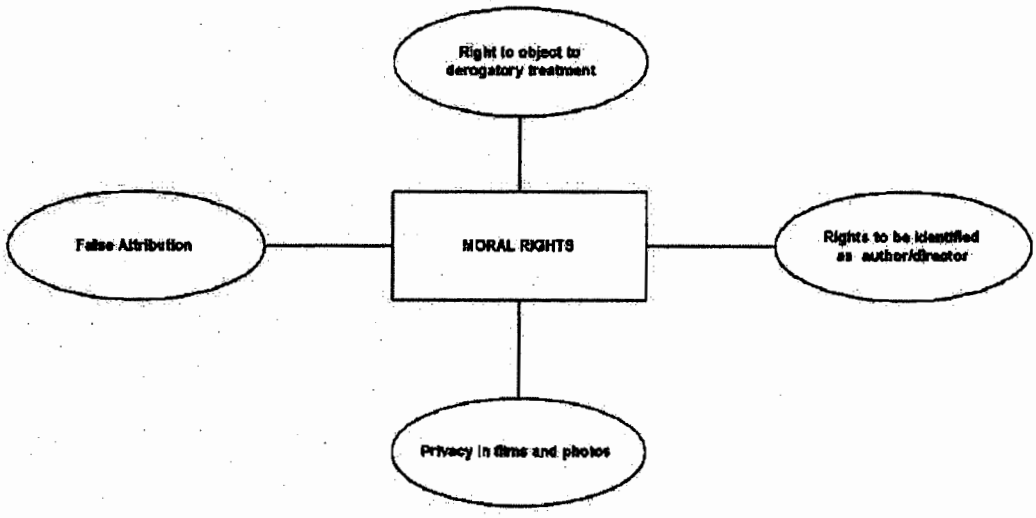

Figure 2 – *Author's moral rights under copyright law*

1.2.5 Exceptions to the Exclusive Rights

Copies of works can be reproduced without the need to seek the rights holder's permission for a number of specified purposes only, and these are generally referred to as 'Fair Dealing or Permitted Acts'. In this context, fair dealing means that the copying must

[23] See Article 6 *bis* of Berne Convention for the Protection of Literary and Artistic Works, 1886.
[24] Ibid.

not be prejudicial to the interests of the rights holders. These exceptions will vary from country to country[25], however the main ones, are as follows:

1.2.5.1 Non-Commercial Research and Private Study

Copying for research or private study must be non-commercial only. In this case, the emphasis is upon the nature/purpose of the copying itself, rather the nature of the organization carrying out the copying. As long as is practical, copies must include an acknowledgement. It is also worth noting that this exception does not include the copying of films or making of sound recordings.

For example, a museum curator in Pakistan needs to copy a few pages from a book for the purposes of research into online text that will accompany images of works hanging in the permanent collection. As long as this purpose is non-commercial, then the curator can legitimately make the copies that they need without the requirement to request permission.

However, if the museum curator needs to copy a few pages from a book for the purposes of research into an exhibition catalogue which will be sold in the shop, this type of copying will be viewed as commercial and the curator will need to seek the appropriate permission from the relevant rights holders[26].

1.2.5.2 Criticism and Review

A lawful copy of a work can be made under this exception for the purposes of criticizing or reviewing a work or the work of another. In this case, the work must be sufficiently acknowledged as well as lawfully been made available to the public, i.e. the copying of unpublished works will benefit from this exception.[27]

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[25] The implementation of the Exceptions listed in the Copyright Directive, (officially the Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the Harmonization of Certain Aspects of Copyright and Related Rights in the Information Society, have not been mandatory. So their inclusion in national legislation is likely to vary from state to state.

[26] For more relevant examples, please refer to: http://www.cla.co.uk/licensing/BLCLA-FAQ.doc (Last visited: 26-11-2008).

[27] Ibid, supra note 14.

For example, for the purposes of reviewing the work of a contemporary Italian artist which will appear in a weekly newspaper supplement, the whole work or an extract may be reproduced as long as it is acknowledged.

1.2.5.3 Making Temporary Copies

Temporary electronic copies of works (apart from databases or computer programs) held in a cache will not infringe copyright. This is upon the condition that:

- The copies are transient or incidental to an integral and essential part of a technological process.
- The sole purpose of the copies is enabling the transmission of the copies in a network between third parties by an intermediary.
- There is no economic benefit to the creation of these temporary copies.

1.2.5.4 Copies for Visually Impaired Users

Recent changes to national legislation of United Kingdom[28] have secured particular rights for visually impaired persons (VIPs) by permitting the creation of "accessible" copies of copyright material without requiring permission from the rights holders. These are dependent upon the satisfaction of the following criteria:

- Single accessible copies may be used by a VIP for their own use.
- They own or have lawful access to a master copy (this includes having a library copy).
- An accessible copy is not available commercially.

In some countries such as the UK, there are also specific provisions which allow libraries and archives to create copies of works in order to fulfill their duties, library privileges as well as provisions for educational establishments.[29]

[28] In the UK, the provisions in the EU Directive have been implemented as the Copyright (Visually Impaired Persons) Act 2002. More information about this can be found at: http://www.cla.org.uk/directive/vip.html (Last visited: 30-11-2008).
[29] For more information about these Exceptions please see: http://www.museumscopyright.org.uk/copyreg.htm (Last visited: 30-11-2008).

1.3 COMPUTER PROGRAMS / SOFTWARE

Until the personal computer revolution began in the 1980s, software was written mainly for business, government, and the military, which employed large mainframe computers as hardware. With the introduction of personal computers, which have rapidly increased in power and performance, software has emerged as an important commercial product that can be marketed to individuals and small business as well as big business and the government.[30]

World Intellectual Property Organization (WIPO)[31] has defined the computer program as being:

> "... a set of instructions expressed in words, codes, schemes or in any other form, which is capable, when incorporated in a machine-readable medium, of causing a 'computer' (an electronic or similar device having information-processing capabilities) to indicate, perform or achieve a particular function, task or result."[32]

A set of instructions that cause a computer to perform one or more tasks. The set of instructions is often called a program or, if the set is particularly large and complex, a system. Computers cannot do any useful work without instructions from software; thus a combination of software and hardware (the computer) is necessary to do any computerized work.[33] A program must tell the computer each of a set of minuscule tasks

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[30] Sci-Tech Encyclopedia may be visited for more reading on the Computer Programs / Software: http://www.answers.com/topic/computer-software?cat=biz-fin (Last visited: 30-11-2008).

[31] The World Intellectual Property Organization (WIPO) is an international organization dedicated to helping to ensure that the rights of creators and owners of intellectual property are protected worldwide and that inventors and authors are, thus, recognized and rewarded for their ingenuity. This international protection acts as a spur to human creativity, pushing forward the boundaries of science and technology and enriching the world of literature and the arts. By providing a stable environment for the marketing of intellectual property products, it also oils the wheels of international trade. The number of member States belonging to WIPO now stands at 184 (1st of January, 2009), almost 90 per cent of the world's countries – a reflection of the increasing importance and relevance attached to the work of the Organization. WIPO carries out many tasks related to the protection of intellectual property rights, such as administering international treaties, assisting governments, organizations and the private sector, monitoring developments in the field and harmonizing and simplifying relevant rules and practices. In all that it does, the key words are communication and international cooperation.

[32] Section 1(i) WIPO Model Provisions on the Protection of Computer Software, Geneva 1978.

[33] Ibid, supra note 27.

to perform, in a framework of logic, such that the computer knows exactly what to do and when to do it.

Practical computer systems divide software systems into three major classes: system software, programming software and application software, although the distinction is arbitrary, and often blurred.

1.3.1 Systems Software

System software is necessary to support the running of an application program. It includes operating systems, device drivers, diagnostic tools, servers, windowing systems, utilities and more. Operating systems are needed to link the machine-dependent needs of a program with the capabilities of the machine on which it runs. Compilers translate programs from high-level languages into machine languages. The purpose of systems software is to insulate the applications programmer as much as possible from the details of the particular computer complex being used, especially memory and other hardware features, and such accessory devices as communications, printers, readers, displays, keyboards, etc.[34]

1.3.2 Programming Software

Programming software usually provides tools to assist a programmer in writing computer programs and software using different programming languages in a more convenient way. The tools include text editors, compilers, interpreters, linkers, debuggers, and so on. An integrated development environment (IDE) merges those tools into a software bundle, and a programmer may not need to type multiple commands for compiling, interpreter, debugging, tracing, and etc., because the IDE usually has an advanced *graphical user interface,* or GUI.[35]

[34] Definition provided by an online encyclopedia: http://www.answers.com/topic/computer-software?cat=technology (Last visited: 03-12 2008).
[35] Ibid.

1.3.3 Application Software

Application software allows end users to accomplish one or more specific (non-computer related) tasks. Typical applications include industrial automation, business software, educational software, scientific and engineering software, medical software, communication software, databases, and computer games.[36] Businesses are probably the biggest users of application software, but almost every field of human activity now uses some form of application software. It is used to automate all sorts of functions.

1.4 MAIN ELEMENTS OF A COMPUTER PROGRAM

Computer program / software development is a complicated process. There are many steps involved in software programming. It includes both literary and non-literary elements. Some elements are protected under copyright law, some are un-protected while few are un-decided.[37]

Following are the elements of a computer program:

- Preparatory Design Material
- Source Code
- Object Code
- Algorithm
- Programming Languages
- User Interface or Screen Displays
- Manuals and Guides stored Digitally

[36] Ibid.
[37] For detail of these elements, see chapter 2.

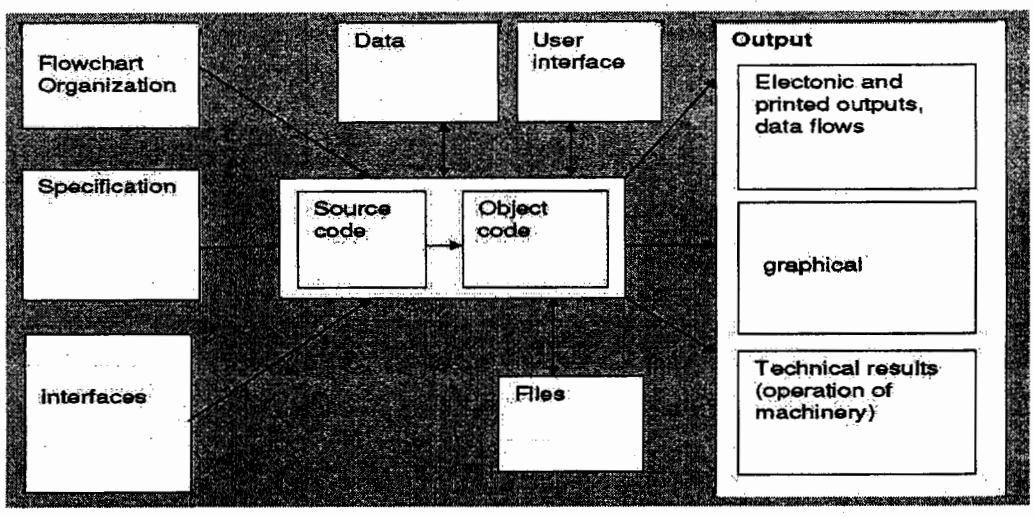

Figure 3 – *Different elements and steps of a computer program / software*

1.4.1 Preparatory Design Material

Preparatory design material comprises of the material collected for software designing, it includes the following:

- Design Schemes
- Flowcharts
- Specifications
- Outside Interface / User Requirements

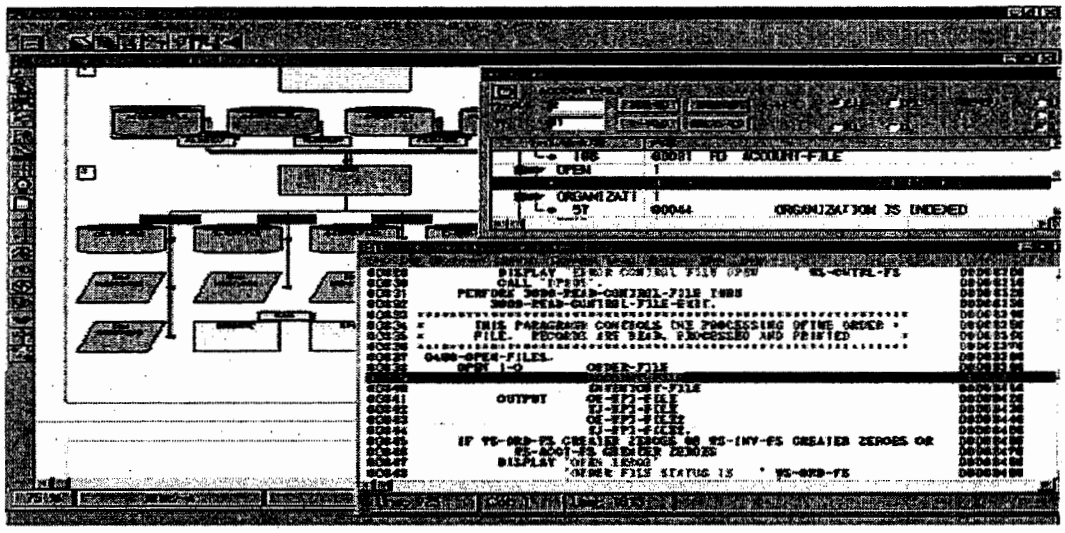

Figure 4 – *Preparatory Design Material*

1.4.2 Source Code

Source code (commonly just source) is any collection of statements or declarations written in some human-readable computer programming language. Source code allows the programmer to communicate with the computer using a reserved number of instructions.[38]

The source code which constitutes a program is usually held in one or more text files, sometimes stored in databases as stored procedures and may also appear as code snippets printed in books or other media. A large collection of source code files may be organized into a directory tree, in which case it may also be known as a source tree.

A computer program's source code is the collection of files needed to convert from human-readable form to some kind of computer-executable form.[39] The source code may be converted into an executable file by a compiler, or executed on the fly from the human readable form with the aid of an interpreter.

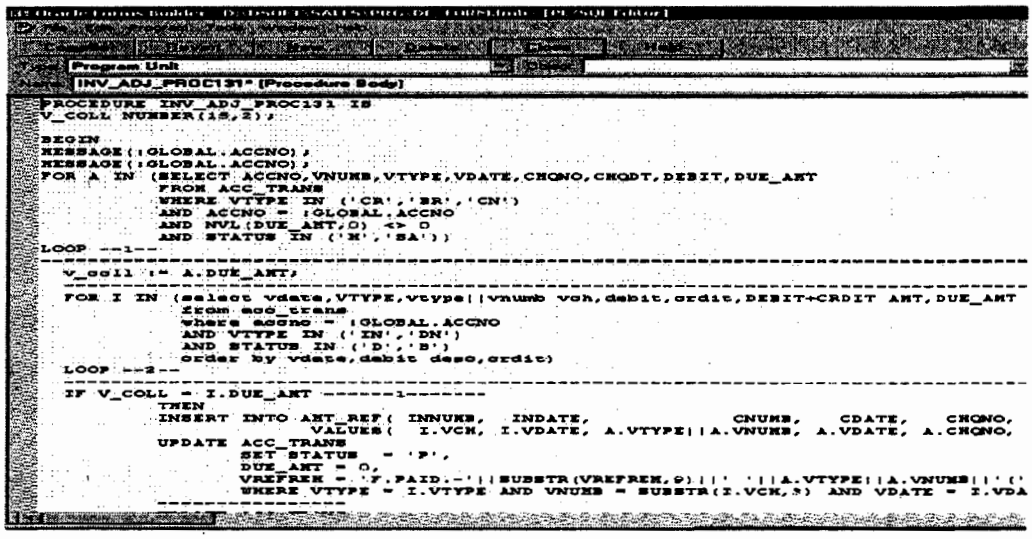

Figure 5 – *Source Code*

[38] Definition provided by an online encyclopedia: http://en.wikipedia.org/wiki/Source_code (Last visited: 07-12 2008).
[39] Ibid.

1.4.3 Object Code

Object code, or an object file, is the representation of code that a compiler or assembler generates by processing a source code file. Object files contain compact code, often called "binaries". A linker is typically used to generate an executable or library by linking object files together. The only essential element in an object file is machine code (code directly executed by a computer's CPU).[40] Object files for embedded systems might contain nothing but machine code; however, object files often also contain data for use by the code at runtime, relocation information, stack unwinding information, comments, program symbols (names of variables and functions) for linking and/or debugging purposes, and other debugging information.

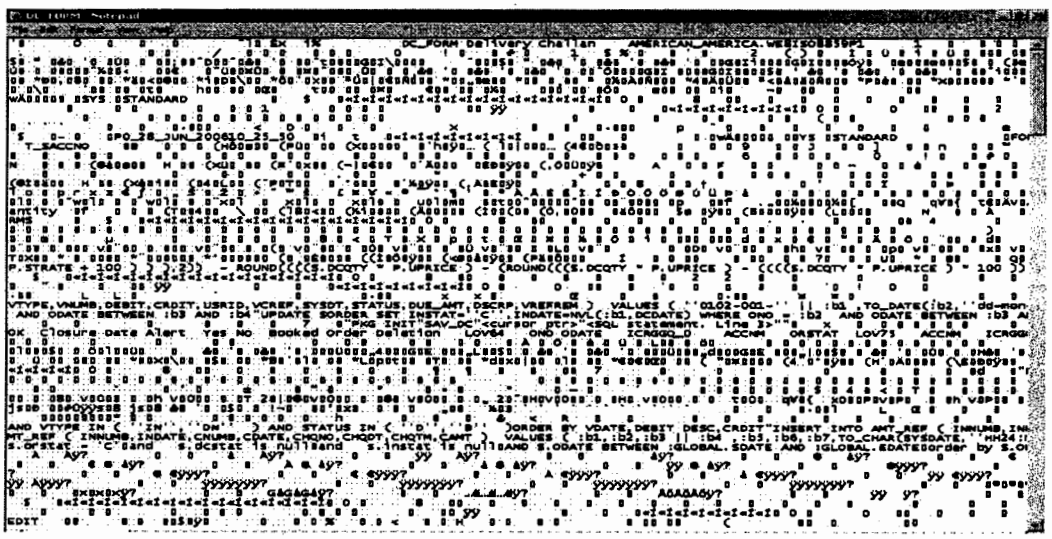

Figure 6 – *Object Code*

1.4.4 User Interface or Screen Displays

To work with a system, users have to be able to control the system and assess the state of the system. For example, when driving an automobile, the driver uses the steering wheel to control the direction of the vehicle, and the accelerator pedal, brake pedal and gear-stick to control the speed of the vehicle. The driver perceives the position of the vehicle

[40] Ibid.

by looking through the windscreen and exact speed of the vehicle by reading the speedometer. The *user interface of the automobile* is on the whole composed of the instruments the driver can use to accomplish the tasks of driving and maintaining the automobile.[41]

The user interface (also known as Human Computer Interface or Man-Machine Interface (MMI)) is the aggregate of means by which people - the users - interact with the system - a particular machine, device, computer program or other complex tool.[42] The user interface provides means of:

- **Input**, allowing the users to manipulate a system
- **Output**, allowing the system to indicate the effects of the users' manipulation.

In human-computer interaction, the user interface (of a computer program) refers to the graphical, textual and auditory information the program presents to the user, and the control sequences (such as keystrokes with the computer keyboard, movements of the computer mouse, and selections with the touch-screen) the user employs to control the program.

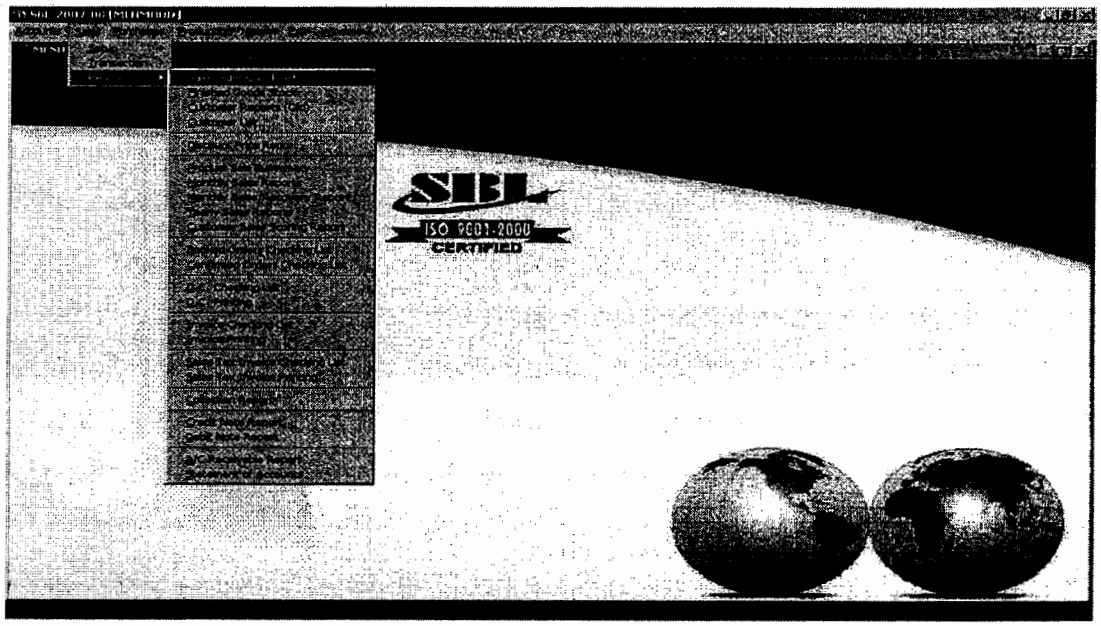

Figure 7 – *Structure and Sequence of the Program*

[41] User Interface or Screen Displays, more information can be found at: http://student.uum.edu.my/ssnet/s85984/TermPaper/Project%20Paper.htm (Last visited: 18-12 2008).

[42] For detail, visit electronic database: http://www.techchuck.com/topic/user-interface (Last visited: 18-12 2008).

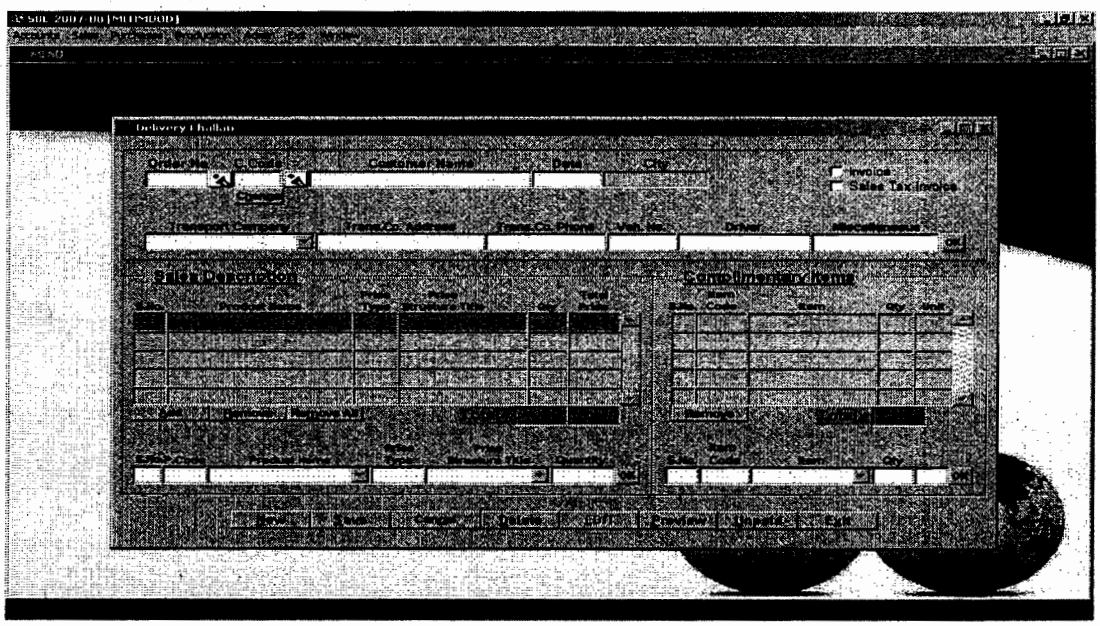

Figure 8 – *Computer Screen Display*

1.4.5 Programming Languages

"A programming language is a machine-readable artificial language designed to express computations that can be performed by a machine, particularly a computer. Programming languages can be used to create programs that specify the behavior of a machine, to express algorithms precisely, or as a mode of human communication."[43]

Many programming languages have some form of written specification of their syntax and semantics, since computers require precisely defined instructions. Some are defined by a specification document (for example, an ISO Standard), while others have a dominant implementation (such as Perl).[44] Thousands of different programming languages have been created, mainly in the computer field[45], where many more are being created every year.

Programming languages differ from most other forms of human expression in that they require a greater degree of precision and completeness. When using a natural language to

[43] http://www.dhanushinfotech.net/technology_insights.html (Last visited: 18-12 2008).
[44] Ibid.
[45] As of May 2007 The Encyclopedia of Computer Languages by Murdoch University, Australia lists 8512 computer languages.

communicate with other people, human authors and speakers can be ambiguous and make small errors, and still expect their intent to be understood. However, figuratively speaking, computers "do exactly what they are told to do", and cannot "understand" what code the programmer intended to write.[46] The combination of the language definition, a program, and the program's inputs must fully specify the external behavior that occurs when the program is executed, within the domain of control of that program.[47]

Example: Below is a simple grammar, based on Lisp[48]:

```
expression ::= atom | list
atom   ::= number | symbol
number  ::= [+-]?['0'-'9']+
symbol  ::= ['A'-'Z''a'-'z'].*
list  ::= '(' expression* ')'
```

This grammar specifies the following:[49]

- an *expression* is either an *atom* or a *list*;
- an *atom* is either a *number* or a *symbol*;
- a *number* is an unbroken sequence of one or more decimal digits, optionally preceded by a plus or minus sign;
- a *symbol* is a letter followed by zero or more of any characters (excluding white-space); and
- a *list* is a matched pair of parentheses, with zero or more *expressions* inside it.

1.4.6 Algorithm

An algorithm is a sequence of finite instructions, often used for calculation and data processing.[50] They are essential to the way computers process information. Many

[46] http://methainternet.wordpress.com/page/2/ (Last visited: 20-12 2008).
[47] Abelson, Sussman, and Sussman, "Structure and Interpretation of Computer Programs". Full text of the book is available at: http://mitpress.mit.edu/sicp/full-text/book/book-Z-H-10.html (Last visited: 20-12 2008).
[48] Lisp is programming language which is mostly used in 'Artificial Intelligence' programming.
[49] Ibid, supra note 43.
[50] http://www.absoluteastronomy.com/topics/Programming_language (Last visited: 20-12 2008).

computer programs contain algorithms that specify the specific instructions a computer should perform (in a specific order) to carry out a specified task, such as calculating employees' paychecks or printing students' report cards.

Example: One of the simplest algorithms is to find the largest number in an (unsorted) list of numbers. The solution necessarily requires looking at every number in the list, but only once at each.[51] The following is the more formal coding of the algorithm in pseudo code or pidgin code:

```
Algorithm LargestNumber
  Input: A non-empty list of numbers L.
  Output: The largest number in the list L.

  largest ← L0
  for each item in the list L≥1, do
    if the item > largest, then
      largest ← the item
  return largest
```

- "←" is a loose shorthand for "changes to". For instance, "*largest* ← *item*" means that the value of *largest* changes to the value of *item*.
- "**return**" terminates the algorithm and outputs the value that follows.

1.4.7 Manuals and Guides stored Digitally

In computer software, manuals and guides are the information that describes the product to its users. It consists of the product technical manuals and online information (including online versions of the technical manuals and help facility descriptions).[52] User Guides explain in layman's terms how to use a software application and helps to understand it.

[51] For a more complex example of an algorithm, see Euclid's algorithm for the greatest common divisor, one of the earliest algorithms known.
[52] http://www.irun.com/glossary/D_G_PopUp/documentation_D_Def.asp (Last visited: 20-12 2008).

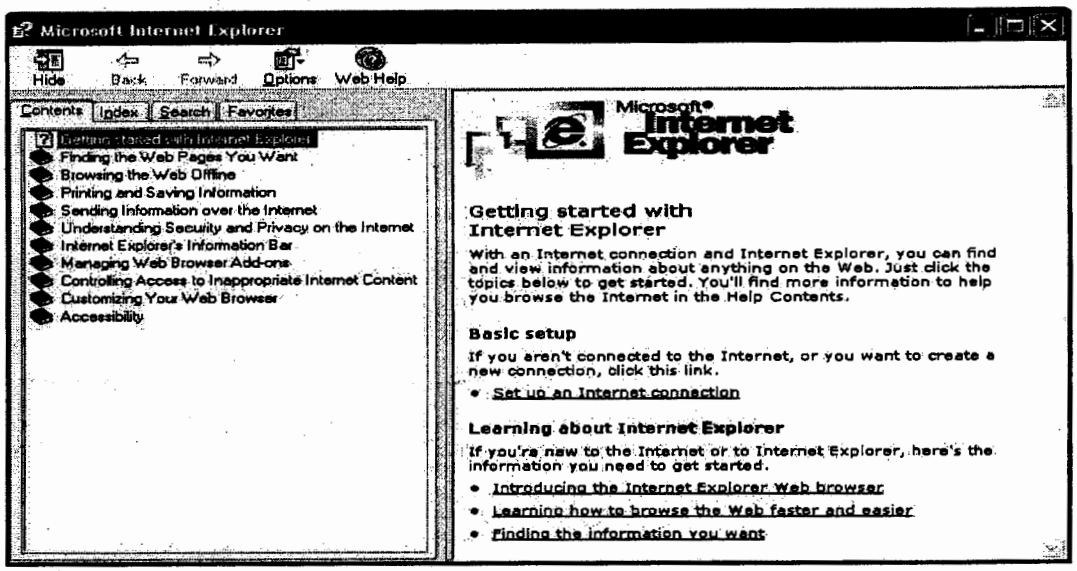

Figure 9 – *A guide stored digitally in the Internet Explorer (Computer Program)*

1.5 COMPUTER GENERATED WORKS

Computer generated work refers to the production of distinct works by computers. A work is computer-generated if it is generated in circumstances where there is no human author of the work.[53] Humans can program computers to create, and the resulting computer programs can clearly be original and copyrightable; but what about the output of the computer program? The traditional answer has been that a computer cannot be a copyright "author" because computers are not human. Yet, computers are getting better all the time at creating new works. The copyrightability of computer-created works is nonetheless likely to cause factual disputes over which portions of such works are of human origin and hence copyrightable.[54]

For instance, computer-generated music is music composed by, or with the extensive aid of, a computer. Although any music which uses computers in its composition or realization is computer-generated to some extent, the use of computers is now so widespread (in the editing of pop songs, for instance) that the phrase computer-generated

[53] Section 178 of the Copyright, Designs and Patents Act 1988 (the English Act).

[54] "Sketching the Future of Copyright in a Networked World". Final Report prepared for the U.S. Copyright Office by Professor I. Trotter Hardy, School of Law, College of William and Mary. For full text, please visit: http://www.copyright.gov/reports/thardy.pdf (Last visited: 22-12 2008).

music is generally used to mean a kind of music which could not have been created *without* the use of computers.

1.6 DATABASES

A database is a structured collection of records or data that is stored in a computer system. The structure is achieved by organizing the data according to a database model. The model in most common use today is the relational model. Other models such as the hierarchical model and the network model use a more explicit representation of relationships.

The Database Directive provides the definition as 'a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means'.[55]

Databases are used in many applications, spanning virtually the entire range of computer software. Databases are the preferred method of storage for large multi-user applications, where coordination between many users is needed. Even individual users find them convenient, and many electronic mail programs and personal organizers are based on standard database technology. Software database drivers are available for most database platforms so that application software can use a common Application Programming Interface to retrieve the information stored in a database. Two commonly used database application programming interfaces (APIs) are Java Database Connectivity (JDBC) and Open Database Connectivity (ODBC).[56]

1.7 ELEMENTS OF A DATABASE

A database comprises of many elements. A brief coverage of basic elements found in database is as under:

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[55] Definition provided in Article 1(2) of the Directive on the Legal Protection of Databases 96/9/EC, Official Journal L 077, 27/03/1996 p. 0020 - 0028 (the Database Directive).

[56] "Data Communication" by Oladayo Yusuff and Remi Omowaiye, Ladoke Akintola University of Technology, Ogbomoso. For full text, please visit the link: http://www.lautech.edu.ng/Academics/pre-degree/material/MODULE%205.pdf (Last visited: 26-12 2008).

- The Database Schema
- Tables
- Entity
- Attribute
- Keys
- Data Types
- Relationships

1.7.1 The Database Schema

A *schema* is quite simply a group of related objects in a database. Within a schema, objects that are related have relationships to one another, as discussed earlier. There is one owner of a schema, who has access to manipulate the structure of any object in the schema. A schema does not represent a person, although the schema is associated with a user account that resides in the database.

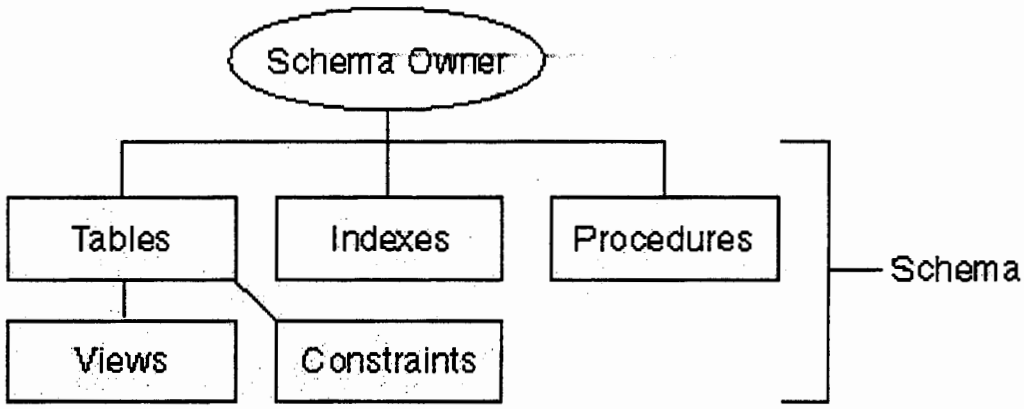

Figure 10 - *Collection of objects that comprise a database schema*

1.7.2 Tables

A *table* is the primary unit of physical storage for data in a database. When a user accesses the database, a table is usually referenced for the desired data. Multiple tables

might comprise a database, therefore a relationship might exist between tables. Because tables store data, a table requires physical storage on the host computer for the database.[57]

Tables are used to store the data that the user needs to access. Tables might also have constraints attached to them, which control the data allowed to be entered into the table. An entity from the business model is eventually converted into a database table.

Figure 2 illustrates tables in a schema. Each table in the figure is related to at least one other table. Some tables are related to multiple tables.

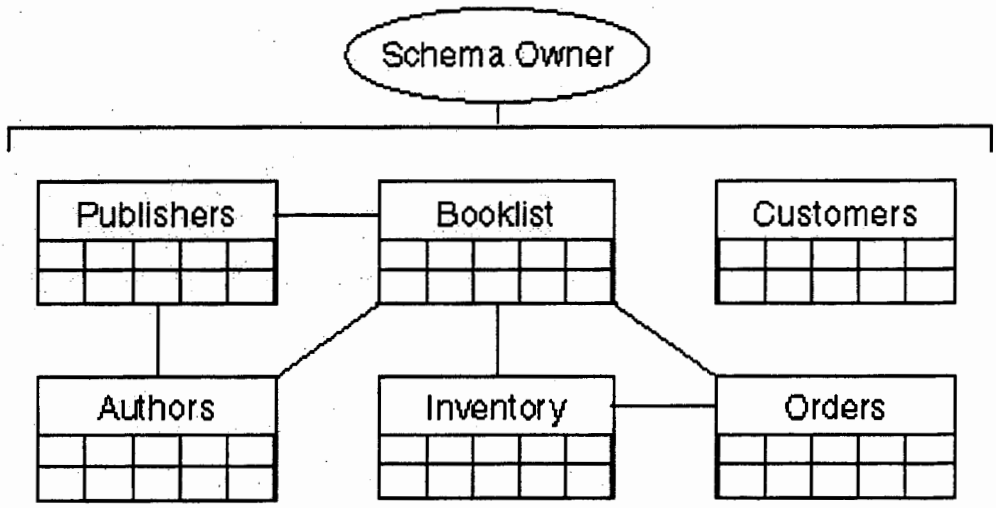

Figure 11 - *Database tables and their relationships*

1.7.3 Entity

"An entity may be defined as a thing which is recognized as being capable of an independent existence and which can be uniquely identified. An entity is an abstraction from the complexities of some domain".[58] When we speak of an entity we normally speak of some aspect of the real world which can be distinguished from other aspects of

[57] "The Elements of a Database" by Ryan Stephens and Ronald Plew. For text of the article, visit: http://www.developer.com/db/article.php/10920_719041_1 (Last visited: 26-12 2008).
[58] Definition by an online encyclopaedia; http://en.wikipedia.org/wiki/ER_diagram (Last visited: 30-12 2008).

the real world.[59] An entity may be a physical object such as a house or a car, an event such as a house sale or a car service, or a concept such as a customer transaction or order.

1.7.4 Attribute

An attribute is a named value or relationship that exists for some or all instances of some entity and is directly associated with that instance.[60]

Examples include the href attribute of an HTML anchor element, the columns of a database table considered as attributes of each row, and the members, properties and methods of an object in OOP. This contrasts with the contents of some kind of container (e.g. an array), which are typically not named. The contents of an associative array, though they might be considered to be named by their key values, are not normally thought of as attributes.

1.7.5 Keys

The integrity of the information stored in a database is controlled by keys. "A *key* is a column value in a table that is used to either uniquely identify a row of data in a table, or establish a relationship with another table. A key is normally correlated with one column in table, although it might be associated with multiple columns".[61]

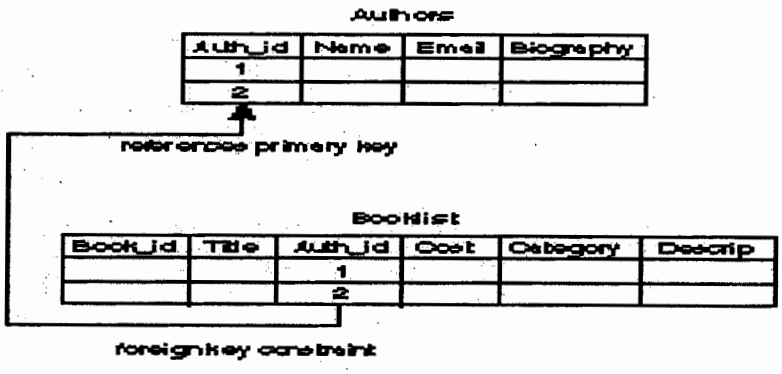

Figure 12 - *Referential integrity or parent/child relationships*

[59] "Database Systems" by Paul Beynon Davies, Houndmills, Basingstoke, UK: Palgrave (2004).
[60] Ibid, supra note 56.
[61] Ibid, supra note 54.

1.7.6 Data Types

A *data* type determines the type of data that can be stored in a database column. Although many data types are available, three of the most commonly used data types are:

- Alphanumeric
- Numeric
- Date and time

1.7.7 Relationship

- "Most databases are divided into many tables, most of which are related to one another. In most modern databases, such as the relational database, relationships are established through the use of primary and foreign keys. The purpose of separating data into tables and establishing table relationships is to reduce data redundancy. The process of reducing data redundancy in a relational database is called normalization."[62]

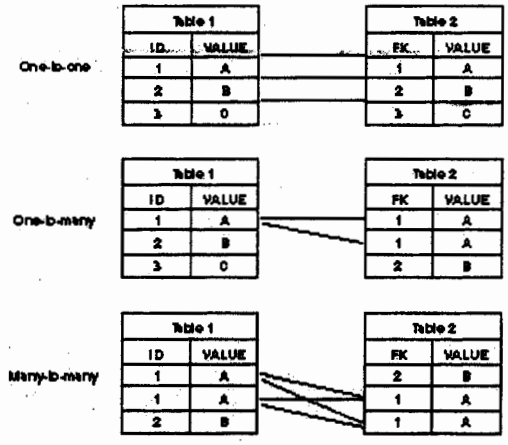

Figure 13 - *Available table relationships in the relational model*

[62] Ryan K. Stephens and Ronald R. Plew, Database Design (ISBN: 0-672-31758-3), a book by Sams Publishing.

CHAPTER II

COPYRIGHT PROTECTION OF COMPUTER PROGRAMS AND DATABASES IN PAKISTAN

2.1 PROTECTION OF COMPUTER PROGRAMS/SOFTWARE UNDER THE COPYRIGHT ORDINANCE, 1962

The copyright law in Pakistan is grounded in Copyright Ordinance, 1962 which is directly based on English Copyright Act of 1911. Many changes and amendments have been introduced in original Copyright Ordinance with the passage of time through Copyright (Amendment) Act, 1992 and Copyright (Amendment) Ordinance, 2000.

Pakistan being the signatory of the Berne Convention, Universal Copyright Convention and the TRIPS Agreement is required to comply with the copyright provisions of these instruments in its territory. National Treatment to the foreign authors is required under these instruments. It means that the work of the foreign author published outside the jurisdiction of Pakistan, in any other member states of these conventions, will enjoy the same protection as if it has been published in Pakistan. So the copyright work protected in other member states will enjoy the protection of Copyright Ordinance here in Pakistan.

2.1.1 Protected Work

The copyright protection of the Ordinance covers the original literary works including the computer programs according to the requirement of TRIPS Agreement.[63] The computer programs were added in the Ordinance as "literary work" by an amendment in 2000. It also includes dramatic, musical and artistic works such as drawing, maps, photographs, architectural work and the records.

2.1.2 Duration of Protection

Different categories of copyright work, as mentioned above, are granted different duration of protection under section 13-23 of the Ordinance depending upon the nature of work. For instance the copyright protection of published literary, dramatic, musical and artistic work is the life of the author plus 50 years after his death. While in case of

[63] Section 2 (p) of the Ordinance says that "literary work" includes works on humanity, religion, social and physical sciences, tables "compilations and computer programs, that is to say programs recorded on any disc, tape, perforated media or other information storage device, which, if fed into or located in a computer or computer-based equipment is capable of reproducing any information." (Amended in 2000).

cinematographic work, records and photographs copyright protection is granted for 50 years starting from the year in which the work was published.

2.1.3 Licensing

Assignment of the copyright protected work is permissible by the owner of the work. The assignment may be partial or whole. It may be absolute or conditional and may also be for the entire term of protection granted by the ordinance or for a limited time period agreed upon between the licensor and licensee. Further the license may be exclusive or non exclusive, with the effect that non exclusive licensee does not have any right to sue for the infringement of the copyright protected work except if he becomes a co-plaintiff with the original owner. Moreover compulsory license may also be granted by the Copyright Board.[64]

2.1.4 Registration

To register the copyright work is not obligatory or mandatory for the author of the work. However, it is recommended to get the copyright work registered as the registered work enjoys certain privileges over unregistered work. On the basis of the registered work a suit can be filed for its infringement and thereupon the certificate of registration can be produced as evidence that the work is copyright protected and all the rights are reserved for the owner of the right. Section 42(2) of the Ordinance provides for the registration of copyright work with the Registrar of Copyright Office.

2.1.4.1 Register of Copyrights

Section 38 of the Copyright Ordinance, 1962 states that the Registrar shall keep at the Copyright Office a register in prescribed form[65] to be called the Register of Copyrights in which shall be entered the names or titles of works and the names and addresses of authors, publishers and owners of copyright and such other particulars specified in FormI.

[64] Section 45 of the Copyright Ordinance, 1962 states that the Central Government shall constitute a Board to be called the "Copyright Board" consisting of the Chairman, Members (3 to 5) and the Registrar (*ex-officio*). Powers and Procedure of the Board is given in Section 46 of the Ordinance.

[65] The Register of Copyrights shall be kept in four parts i.e. (i) Literary, Dramatic and Musical Works; (ii) Artistic Works; (iii) Cinematographic Works; and (iv) Records. For reference, see Rule 3 of the Copyright Rules, 1967.

The Register of Copyright shall at all reasonable times be open to inspection, and any person shall be entitled to take copies of or make extracts from, any such register on payment of such fee and subject to such conditions prescribed in the Second Schedule of Copyright Rules, 1967.

The Register of Copyrights shall be prima facie evidence of the particulars entered therein and documents purporting to be copies of any entry therein or extracts therefrom certified by the Registrar and sealed with the seal of the Copyright Office shall be admissible in evidence in all courts without further proof of production of the original.[66]

Registration of copyright is available under four parts, as under:

i) Literary, Dramatic and Musical Works;
ii) Artistic Works
iii) Cinematographic Works
iv) Record Works

2.1.4.2 Application for Registration

Application for registration may be filed in Copyright Office, Karachi directly or through IPO Regional Office, Lahore which has been established to facilitate the applicants. Initial examination facility is available in Regional Office, Lahore then the application is forwarded to Copyright Office, Karachi because the registration certificate is only issued by the Copyright Office, Karachi.

Every Application for registration of copyright shall be made in triplicate in Form II and every application for registration of changes in the particulars of copyright entered in the Register shall be made in triplicate in Form III.

The person applying for registration shall simultaneously send a copy of the application to every other person interested in the copyright of the work.

[66] See Section 42 of the Copyright Ordinance, 1962.

Any person applying to register an artistic work shall publish an advertisement of the said artistic work in any national Urdu or English language daily newspaper in circulation where the applicant resides or carries on business.

If no objection to such registration is received by the Registrar within thirty days of the receipt of the application by him, he shall, if satisfied about the correctness of the particulars given in the application, enter such particulars in the Register.

If the Registrar receives any objections for such registration within thirty days of the receipt of the application by him or if he is not satisfied about the correctness of the particulars given in the application, he may, after holding such inquiry as he deems fit, enter such particulars of the work in the Register as he considers proper.

The Registrar shall, as soon as may be, send wherever practicable, a copy of the entries made in the Register to the parties concerned.

2.1.4.2 Correction of Entries in the Register of Copyrights

The Registrar may, on his own motion or on application of any interested person, amend or alter the Register for the purposes specified in section 41[67] after giving, wherever practicable, to the person affected by such amendment or alteration, an opportunity of being heard against such amendment or alteration and communicate to such person the amendment or alteration so made.[68]

2.1.4.3 Certificate of Registration

A certificate of registration of copyright in a work shall be prima facie evidence that copyright subsists in the work and that the person shown in the certificate as the owner of the copyright is the owner of such copyright.[69]

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[67] Purposes specified in section 41 are; (a) correcting any error in any name, address or particular, or (b) correcting any other error which may have arisen therein by accidental slip or omission. Further, the Copyright Board, on application of the Registrar or of any person aggrieved, may order the rectification of the Register of Copyrights by; (a) the making of any entry wrongly omitted to be made in the Register, or (b) the expunging of any entry wrongly made in or, remaining on, the Register, or (c) the correction of any error or defect in the Register.

[68] See Rule 5 of the Copyright Rules, 1967.

[69] See Section 42 of the Copyright Ordinance, 1962.

apply. In some countries the copyright protection is also granted to "sweat of the brow"[73] databases, which are not creative but are based on a certain level of effort or investment. In the view of the European Community and its member States, sweat of the brow databases should also enjoy, under certain conditions, protection as intellectual property with the same logic that calls for using the potential of intellectual property rights for job creation, growth, prosperity and for the dissemination of information and know-how in other areas. Intellectual property protection is a mechanism for the distribution of quality content on appropriate terms. As such, it has demonstrated its benefits for music, literature, films, software, or industrial products of many kinds in the traditional environment during the last century as well as today. It appears to be essential that electronic databases also benefit from this mechanism. Electronic commerce would be a contradiction in terms without a level playing field for intellectual property protection for those databases which are crucial for its operation.[74]

While defining the meaning of Copyright in section 3 (3), the Ordinance states that entitlement to copyright in compilation of data or other material shall not extend to data or other material itself and shall be without prejudice to any copyright subsisting in the data or other material, that is to say the copyright shall subsist to the extent of compilation only.

2.4 OUTCOME OF PROTECTION UNDER THE ORDINANCE

Under the Copyright Ordinance, 1962 there are some elements of computer program which are protected, some are unprotected while some are yet undecided. These are discussed in detail below:

[73] In a traditional English idiom, the *sweat of one's brow* refers to the effort expended in labor, and the value created thereby. The intellectual property law doctrine referred to in English as "sweat of the brow", which relates chiefly to copyright law, takes its name from this idiom. According to this doctrine, an author gains rights through simple diligence during the creation of a work, such as a database, or a directory. Substantial creativity or "originality" is not required. The creator of a copyrighted work, even if it is completely unoriginal, is entitled to have his effort and expense protected, and no one else may use such a work without permission, but must instead recreate the work by independent research or effort. The classic example is a telephone directory. In a "sweat of the brow" jurisdiction, such a directory may not be copied, but instead a competitor must independently collect the information to issue a competing directory. The same rule generally applies to databases and lists of facts.

[74] Ibid.

2.4.1 Protected Elements of a Computer Program

Protected elements include;

- Source Code
- Object Code
- Structure, Sequence and Organization of the Source Code
- Computer Screen Displays

2.4.2 Unprotected Elements

Elements which are declared unprotected are;

- Main Function or Functions of the Program
- Algorithm

2.4.3 Undecided Elements

There are some elements which are undecided yet. These are:

- User Interface (Not decided in Pakistan)
- Technical Interface

2.5 EFFECTS OF PROTECTION AND EXCEPTIONS UNDER THE COPYRIGHT ORDINANCE, 1962

Copyright Ordinance safeguards the interest of the copyright holder by efficiently protecting his copyright protected work and by providing an effective enforcement mechanism.

2.5.1 The rights afforded to the proprietor of the copyright

Copyright grants a bundle of exclusive rights to author of copyright (to the owner of software, in context of this debate) including the right to prevent others from;

- Copying or reproducing the computer programs/software.
- Publishing, issuing or selling software copies, CDs to public or commercial entities.

- Renting, hiring or lending the CDs or software to the public.
- Adopting the software/ computer programs.

Anyone interfering with these exclusive rights of the copyright holder is said to have committed the infringement of the copyright and will be punished under section 66 of the said ordinance.

2.5.2 Fair Dealing and its Abuses

The basic purpose of intellectual property protection is to provide the motivation and incentives to the producers for their creations and inventions, by granting the exclusive right over that product for a definite period of time (depending upon the forms of IP right involved).

The purpose of copyright protection, being a form of IP rights, is to provide the author the economic reward for his efforts on one hand and the "promotion, advancement and dissemination of culture and knowledge, on the other hand. It converges the interests of the authors and the public interest by providing the possible remuneration to the author, which motivates him to produce and distribute his work to public. Thus serving the public interest in the advancement and dissemination of science and arts .on proprietary basis, copyright enables the one to get its creation protected and on regulatory basis these creations when presented to public in expressed form constitute a part of streams of information and knowledge whose unrestricted access to public is critical for the intellectual advancement.

Copyright is also considered "the right of the author to control the reproduction of his intellectual property". However the right of the authors to control the commercial exploitations of his /her protected work is lost by its first publication under the doctrine of exhaustion of IP rights. The copyright holder, however, maintains the right over the reproduction of his product and may exclude the unauthorized copying of his work. It not only provides the economic reward but also affords the compensation to the author, for the financial risk borne by the author in process of publishing his work.

The exercise of intellectual property right is problematic as often said, because it interferes with the principle of free movement of goods, services, knowledge and information. It creates a problem of public and private interests and therefore such information and knowledge must not be copyright protected so that the public must have easy and free access to it, the argument continues. The copyright was considered as "strict monopoly" in the beginning.

Some countries, like UK and USA, tried to resolve the contention by sorting out a balance between the author's exclusive right of copying his work and the public interest. Moreover the exercise of right was further qualified by providing a time limit on term of protection of copyright work. Some other countries like UK and Pakistan restrict the copyright protection by providing a "fair use" or "fair dealing" policy. The same limitation is termed as "fair use doctrine" in United States. Under this doctrine the right is granted to public to copy the author's work for criticism, educational purposes or parody without getting the permission from the owner. This fair use policy may be defined as "the privileges in other than the owner of copyright, to the use of copyrighted materials in a reasonable manner without the owner's consent, notwithstanding the monopoly granted to owner."

These limitations over copyright work however are not at all at the discretion of the states. Article 9 of Berne convention and Article 13 of TRIPS Agreement require and obliges the member states to allow the limitations on copying copyright work provided such copying does not conflict with a normal exploitation of work and does not unreasonably prejudice the legitimate interest of IP holder.

So far as the copyright Ordinance of Pakistan is concerned, the term "fair dealing" is not defined anywhere. However, the term may be interpreted from;[75]

- Purpose of dealing.
- Character of dealing.
- Amount of dealing.

[75] Presentation by Mr. Aurangzeb Mahmood on "Copyright Protection of Computer Programs and Databases" in a seminar titled *Intellectual Property Law – Recent Developments in Pakistan* held at International Islamic University, Islamabad on December 10, 2007.

- Alternatives to the dealing.
- Nature of the copyright work.
- Effect of the dealing on the work.

Copyrighted work under "fair dealing" doctrine does not constitute the infringement of that work. However the distinction between fair dealing and infringement is not clear and defined. No specific limitation of words, lines or pages has been suggested beyond which the copying will become the infringement. Acknowledgements of the source of copyright work also not substitute the required permission of the owner, copying for commercial use or systematically copying any protected document to avoid the subscription or purchase are also not considered as "fair dealings".

What constitute the infringement and what is allowed under fair dealing cannot be determined by examining any particular factor. All the relevant factors must be analyzed collectively in order to reach a decision for infringement or fair dealing.[76] In pursuance of above-mentioned details it can be concluded that it is difficult to determine whether a particular act falls within the fair use policy or it constitute the act of infringement.

2.6 STRATEGIES TO PROTECT COPYRIGHT WORK

The copyright can be protected by certain technical and non-technical methods. Moreover, a copyright statement may also be provided.

2.6.1 Copyright Statement

Copyright statement demonstrates that the work in hand is copyright protected. It also provides and establishes the year from which "© work" is registered. When copyright statement is produced with the work then infringer may not take the plea of lack of knowledge on his part. Following is one of the forms of copyright statement;

© [Name of copyright owner] 20xx

[76] See the US Library of Congress' Copyright Office web pages, (Last visited: 16-01 2009). <http://www.copyright.gov/fls/fl102.html> and <http://memory.loc.gov/ammem/ndlpedu/start/cpyrt/>

2.6.2 Technical Methods for Protecting Copyright Work

2.6.2.1 Encryption

It is one of the technical methods to protect copyrighted work. It is an algorithmic scheme in which the plain text is encode into a non-readable text or cipher text. The purchaser or user is provided with a "key" or "code" to decrypt the document. By using code the document is re-converted into plain and readable text.

2.6.2.2 Password

A password is directed to the person who then will be able to have access to copyright protected work with the help of that password. It is a secret word that is used for authenticating the identity of the person trying to get the access.

2.6.2.3 Trojan Horses

Trojan horse or Trojan is specie of computer threat, which comes into sight for performing desirable actions but in reality performs malicious functions allowing the unauthorized access to host machine. So they get the ability to save their files on the user's computer or even get the ability to control the computer or watch the user's screen.[77] "Waterfalls.scr" is a simple example of Trojan horses. The author of the program introduced it as a free waterfall screen saver, it unloads the hidden scripts or commands without knowledge and consent of the owner, if accepted and downloaded. Moreover, it conceals or drops the malicious payload on the computer.

2.6.3 Non-Technical Methods

Non-technical methods for the protection of copyright include End User License Agreements (EULA) for example Click-wrap and Shrink-wrap license agreements between user and the copyright owner.

[77] Anis Ben Aissa. "Quantifying security threats and their impact", Proceedings of the 5th Annual Workshop on Cyber Security and Information Intelligence Research Cyber Security and Information Intelligence Challenges and Strategies - CSIIRW 09 CSIIRW 09, 2009.

2.6.3.1 Shrink-wrap and Click-wrap Agreements

Shrink-wrap License Agreement is basically a single paper agreement containing terms and conditions for the use of that software. That agreement is wrapped in a cellophane or transparent plastic coating along with the software box[78] containing the software installation diskettes or the manual of the owner. Generally, it refers to a transparent plastic wrapping that seals the software box. The buyer can easily read provisions without opening the sealing. He will be deemed to have agreed with terms of the agreement if he opens packaging without reading the agreement or start using the software if it was not shrink-wrapped.

The purchaser is required to accept license agreement before using software if he does not agree with the terms then he can return the product without opening it and have right to full refund from the seller of that software.[79]

The historical development of these agreements is not known. Who and when used it for the first time.[80] The use of these agreements became common in early 1980s.[81] However these agreements now play a vital role in software transactions and they helped in shifting the primarily customized packaging into a mass-market mode of delivery.[82]

Click wrap license agreements are similar to those shrink-wrap license agreements except that they have been adopted for recently developed online forums of electronic commerce/transactions.[83] Click-wrap agreements are also termed as "web wrap", "click through" or "click proceed" agreements.[84]

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[78] Page M. Kaufman, The Enforceability of State 'Shrink-wrap' License Statutes in Light of Vault Corp. v. Quaid Software Ltd., 74 Cornell L. Rev. at 222 (1988).
[79] Apik Minassian, the Death of Copyright: Enforceability of Shrink-wrap Licensing Agreements, 45 UCLA. L. Rev. at 569 (1997).
[80] Mark A. Lemley, Intellectual property and Shrink-wrap Licenses, 68 S. Cal. L. Rev. at 1241, (1995).
[81] David Einhorn, the Enforceability of Tear-Me-Open Software License Agreement, 67 J. PAT & TRADEMARK OFFSOC'Y at 509 (1985).
[82] Christopher L. Pitet, the Problem with "Money Now, Terms Later": Pro-CD, Inc v. Zeidbenberg and the Enforceability of "Shrink-wrap" Software Licenses, 31 Loy. L. A. L. Rev. at 325.
[83] Jerry C. Liu et al., Electronic commerce: Using click-wrap agreements, 15 NO.12 CLW 10 (1998).
[84] J.T. Westermeier, Web Agreements, 505 PLI/Pat 321 (1998).

Unlike the shrink-wrap license agreement, the licensor in click-wrap agreement doesn't any signed agreement from the user of the instead he gets the assent of the customer via computer.[85] For instance when you want to have access to a free email such as hotmail or yahoo or want to download a free "real player" software you will get a paper stating the terms and conditions of using the hotmail or yahoo account and similarly you will be asked whether you agree to the terms and conditions for downloading the real player. If the user agrees with prescribed terms then he has to click "I AGREE" and subsequently will be bound by the terms and conditions of the contracts.

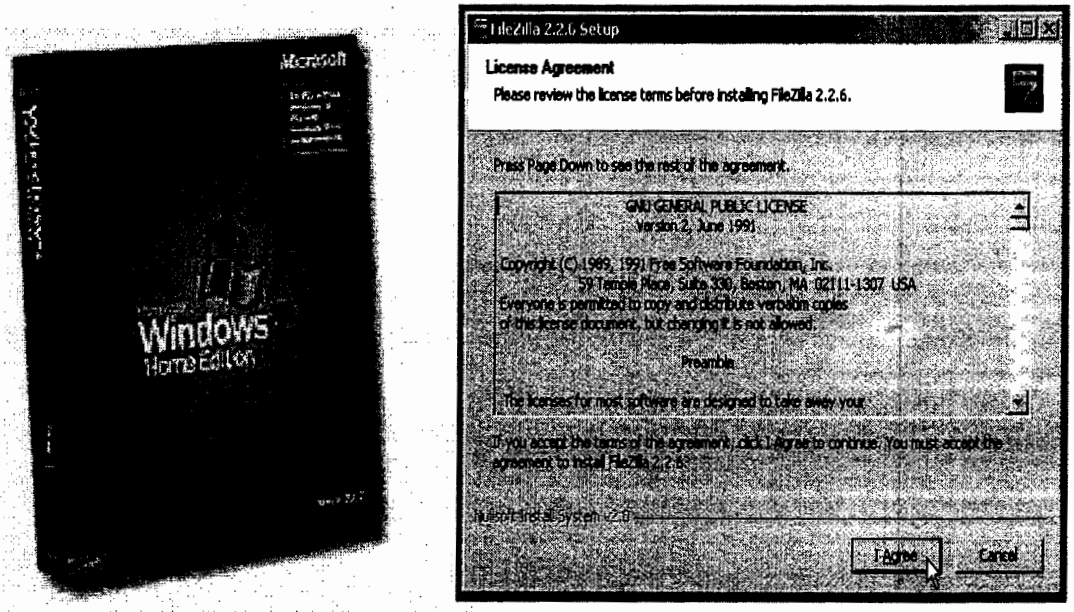

Figure 14 – *Shrink-wrap and Click-wrap License Agreements.*

2.6.4 Enforceability of End-User License Agreement

Although End-User License agreements existed since 1980s: but they remained unenforceable till 1996. It was through a legal conflict "Pro CD, Inc v. Zeidenberg" that

[85] Zachary M. Harrison, Just Click Here: Article 2B's Failure to Guarantee Adequate Manifestation of Assent in Click-wrap Contracts, 8 Fordham Intellectual Property Media & Entertainment, L. J. at 907 (1998).

the court held that these agreements will have the force of law. Pro CD, Inc v. Zeidenberg[86] was a leading case, which overturned the precedents of unenforceability of these agreements.

Brief facts of the case are as follows: the plaintiff, Pro CD, prepared software containing the information of more than 30,000 telephone directories. The database cost more than $ 10 million and updating the information was very expensive. It issued two different license versions of the information: the customer's version and the commercial version which was highly priced.

Defendant, Mathew Zedinberg, purchased a customer version in which there was a notification about the license agreement governing the purchase and use of the software. The license was both in decoded form on the CD-ROMS which appear on user's screen every time the software runs, and was also printed in manual.[87]

The defendant started uploading the information on his website without paying any attention on the license agreement which restricted such use. As a result the same information were available on defendants website and the customers moved to the defendant as the price maintain by him was low that that of the Pro CD

Pro CD brought an action for the breach of the agreement and failed in his action at district court which held that these agreements are unenforceable and even if they are considered to be enforceable then the copyright law of the states pre-empted the enforcement of such agreements under the state law.[88]

On Appeal the 7th circuit reversed the decision of the lower court holding that the shrink-wrap license agreements should be treated as "ordinary contracts accompanying the sale of the product, and therefore are governed by the common law of contracts and the Uniform Commercial Code" and "the shrink-wrap license agreements are enforceable

[86] *ProCD, Inc. Vs. Zeidenberg*, 86 F.3d 1447 (7th Cir. 1996).
[87] Ibid.
[88] Ibid.

unless there terms and conditions are objectionable on the grounds applicable to the contracts in general".[89]

The court gave a pivotal importance to the fact that the agreement was persistently disregarded by the defendant who prohibit such use and provides for refund in case the purchaser doesn't agree with the terms of purchase and use of software. For the second issue the court held that such agreements are not pre-empted by the federal copyright law as the protection of un-copyrightable databases didn't create a right which is equivalent to any of the exclusive rights within the scope of copyright.

2.6.5 Typical License Terms

For the purpose of preventing the unauthorized use of the copyright protected work the software developers relay on the provisions of license agreements. In order to maintain the control over the flow of his product the software developers use to license their product instead of selling it out. By licensing the software the purchaser will retain the title of the software, can put the limitations on customer's use, and prohibit the reverse engineering elimination of disputes, limitation of liability, warrant disclaimer and the choice of governing law forums. The usual practice of the software developers is to grant a non exclusive license as in exclusive license they lose the right of re-licensing the software to others.[90]

While drafting these agreements the software developers can't go against the law. Following are the some of typical license terms postulated by the software developers in their license agreement;

2.6.5.1 Underlines Ownership

Underlines ownership means that the user only receives the non transferable and non exclusive title to use that product. He doesn't get the legal title instead his title remain equitable i.e. he can only sue and get benefits from the software and can't sell or relicense that software.

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[89] Ibid.
[90] H. Ward Classen, Fundamentals of Software Licensing, 37 IDEA: J. L. & Tech. 1 (1996)

2.6.5.2 Number of copies that can be made

Generally the owner restricts the right of making copies of software or allows the copying only for personal use of the user, within the scope of enterprise license. The user however is allowed to make one copy of back up or archival copies, but that is only for internal use depending upon the terms of EULA. Further all the proprietary and copyright notices contained on or in the software are required to be reproduced on the copies made by the user.

2.6.5.3 Commits user to confidentiality regarding source code

Dependant upon the restriction of applicable law and the terms and conditions maintained by the agreement, the licensee can't authorize any one to have access to the source code of the software, or reverse engineering, decompiling or reverse compiling the software without the express and written authorization of the owner of the software.

2.6.5.4 Termination of license

Usually the license agreements provide for the termination of the license agreements;

1. When that software is replaced with any upgrade, revision or replacement software; or

2. If the purchaser commits the breach of agreement or re-license the product to any third party.

2.6.5.5 Liability limitation

This clause sets and provides for the maximum liabilities of the owner and user of the software relating to software licensed, whether for breach of contract, breach of warranty and torts including the negligence. The owner acknowledges his liability to others arising from death, or personal injuries resulting from our negligent acts or omissions; claims for non payment, the breach of any obligation of confidence and the customer's breach of any license term.

CHAPTER III

COPYRIGHT PROTECTION OF COMPUTER PROGRAMS & DATABASES UNDER DIFFERENT IP CONVENTIONS AND TREATIES

3.1 THE BERNE CONVENTION AND PROTECTION OF COMPUTER PROGRAMS

The need for a uniform system for the protection of literary and artistic works led to the conclusion and adoption of the Berne Convention on 9th September, 1886.[91] It is the oldest treaty for the protection of literary and artistic works. The objective of the convention is "to protect the rights of authors in their literary and artistic works in as effective and uniform manner as possible."[92]

The convention undertakes to accomplish its objective by setting forth minimum standard for the protection of these works and by working out the following three basic principles;

3.1.1 The National Treatment Principle

It is based on "non-discriminatory principle". According to this principle, the work originating in any one of the member states are to be given the same protection, by the other states, as these countries grant to the work of their own nationals.

3.1.2 The Automatic Protection Principle

According to this principle, national treatment is not dependent upon any formality i.e. the protection in other member states is granted automatically and it does not depend upon any formality, registration or deposit by the originator of the work with the other member states.

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[91] The Berne Convention, concluded in 1886, was revised at Paris in 1896 and at Berlin in 1908, completed at Berne in 1914, revised at Rome in 1928, at Brussels in 1948, at Stockholm in 1967 and at Paris in 1971, and was amended in 1979. The Convention is open to all States. Instruments of ratification or accession must be deposited with the Director General of WIPO. It is to be noted that WTO Members, even if they are not party to the Berne Convention, must comply with the substantive law provisions of the Berne Convention, except that WTO Members not party to the Berne Convention are not bound by the moral rights provisions of the Berne Convention. It should also be noted that developing and "transition" countries may, at least until 2000, delay the application of most of the obligations provided for in the TRIPS Agreement (Article 65). Naturally, States party to the Berne Convention cannot delay the application of their obligations provided for in the Berne Convention. The Berne Union has an Assembly and an Executive Committee. Every country member of the Union which has adhered to at least the administrative and final provisions of the Stockholm Act is a member of the Assembly. The members of the Executive Committee are elected from among the members of the Union, except for Switzerland, which is a member ex officio. On January 01, 2009, the Executive Committee had 40 members. Soft-copy of the Convention is available at: <http://www.wipo.int/treaties/en/ip/berne/trtdocs_wo001.html>

[92] As indicated in preamble of the Berne Convention.

3.1.3 Independence of Protection

According to this principle, the exercise and enjoyment of the copyright in other states is not dependent upon the existence of protection in the country of origin i.e. if copyright work is not registered in its country of origin, it still can be exercised in other member states.

Article 2 of the Berne convention provides a non-exhaustive list of the works to be protected under the convention. It include the original production of literary, scientific and artistic domain, derivative works (based on pre-existing work such as translation) etc. The convention provides the "minimum standards" for protection of all the works mentioned in Article 2 and also provides the period of protection of such right (usually author's life plus 50 years).

The Berne convention has been revised several times from 1886 to 1979 in order to improve the international system of protection provided by the convention.[93] Changes have been adopted in order to cope with the challenges of accelerating development of Information and Communication Technologies (ICTs). Notwithstanding so many revisions and amendments, the Berne convention did not provide any system regarding the copyright protection of computer programs and databases.

So the treatment of computer software was left to the discretion of the concerned states i.e. whether they protect the computer programs under copyright law or otherwise. Therefore, because of the silence of the Berne convention, there was not any appropriate or uniform approach as to the protection of computer software. Different jurisdictions adopted different approaches. An intensive debate was instigated on the protection of software during 1970s which continued till the first half of 1980s.[94] The debate aimed to bring a conclusive end to the prevailing controversy regarding the protection of computer

[93] See Aaron D. Charfoss, How Far Have We Come, and Where Do We Go From Here: The Status of Global Computer Software Protection under the TRIPS Agreement, 22 Nw. J. Int'l L. & Bus, at 265 (2002).

[94] WIPO, Wipot Intermediate Training Course On Practical Intellectual Property Issues In Business China, 2003, 2, available at: http://www.wipo.int/sme/en/activities/meetings/china_most_03/wipo_ip_bis_ge_03_7.pdf (Last visited: 27-01 2009).

programs i.e. whether the computer program should be granted copyright protection, or they should be protected under a *sui-generis* system.

WIPO proposed a *sui-generis* system for the software protection which, however, was disapproved and rejected by the United States.[95] Instead, the United States declared the computer programs, within its territory, as a form of literary and artistic work to be protected under copyright law.[96] European Union also favored the copyright protection of computer programs and in 1991 they promulgated "Council Directives 91/250/EEC for the Legal Protection of Computer Programs"[97] by which they declared both the source code and object code to be the literary work to be protected under copyright law.

The stance of these world leading countries on copyright protection of computer software led the other countries to adopt the same within their jurisdiction under the provisions of TRIPS Agreement.[98]

3.2 TRIPS AGREEMENT AND SOFTWARE PROTECTION

Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS),[99] that has been adopted as a result of the Uruguay Round, is the most detailed and comprehensive international document on Intellectual Property Rights (IPRs) covering almost all the types of IPRs.

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[95] WIPO, Wipot Intermediate Training Course On Practical Intellectual Property Issues In Business China, 2003, 2, available at: http://www.wipo.int/sme/en/activities/meetings/china_most_03/wipo_ip_bis_ge_03_7.pdf (Last visited: 27-01 2009).

[96] Charfoss, supra note 6, at 266.

[97] Directive 91/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs, available at: http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=Directive&an_doc=1991&nu_doc=250 (Last visited: 27-01 2009).

[98] TRIPS, Article 13. Charfoss, supra note 6, at 267.

[99] The World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is an attempt to narrow the gaps in the way these rights are protected around the world, and to bring them under common international rules. The agreement covers five broad issues: (a) how basic principles of the trading system and other international intellectual property agreements should be applied; (b) how to give adequate protection to intellectual property rights; (c) how countries should enforce those rights adequately in their own territories; (d) how to settle disputes on intellectual property between members of the WTO; and (e) special transitional arrangements during the period when the new system is being introduced.

TRIPS Agreement was negotiated under the pressure of developed countries (e.g. United States, European Union, Japan – the countries producing major IP protected goods) for universalizing the high standards for intellectual property protection.[100] This pressure played a crucial role for the conclusion of TRIPS Agreement.[101] The TRIPS incorporates many provisions and supplement the Paris, Rome, Berne and Washington Conventions. So TRIPS is an integrative document which sometimes provides "conventions plus" protection and "convention minus" at another time for IPRs.[102]

TRIPS Agreement provides a comprehensive and consistent system for the protection and enforcement of IPRs as it;[103]

- Firstly, incorporates many provisions established by pre-TRIPS conventions and treaties e.g. it recognizes and applies the principle of Most Favorite Nation and National Treatment.[104]

- Secondly, it meets the deficiencies of previous intellectual property conventions, where they are silent or provide inadequate measures e.g. it expressly declared that computer programs should be granted copyright protection whereas Berne convention was silent on the issue. Further, it required member states to regulate the related rights regarding sound recordings, computer programs, etc.[105]

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[100] Carlos M. Correa, "Intellectual Property Rights, the WTO and Developing Countries – The TRIPS Agreement and Policy Option" (London: Zed Books Ltd.) 2000, at p-1.

[101] The TRIPS Agreement, which came into effect on 1 January 1995, is to date the most comprehensive multilateral agreement on intellectual property.

[102] For instance, in case of Moral Rights provided by Berne Convention are granted "Convention Minus Protection" as quoted by Carlos M. Correa, "Intellectual Property Rights, the WTO and Developing Countries – The TRIPS Agreement and Policy Option" (London: Zed Books Ltd.) 2000.

[103] Countries are free to provide higher levels of protection, and many developed countries do. For example, higher IPR standards can be found in the North American Free Trade Agreement (NAFTA) and the bilateral Free Trade Agreements (FTAs) between countries and the United States.

[104] TRIPS, Art 2(1) and 9 (1); Samuelson, at 531; Charles R. McManis, Taking TRIPS on the Information Superhighway: International Intellectual Property Protection and Emerging Computer Technology, 41 Vill. L. Rev. 207, 217 (1996).

[105] "Berne-plus" means that the minimum standard for international copyright protection has raised beyond the Berne standard in the ways enumerated in the substantive section of the TRIPS Agreement on copyright (Section II, Articles 9-14).

- Thirdly, it requires a strong "enforcement mechanism" to be maintained by the member states by establishing a strong judicial and administrative machinery providing injunctions, remedies and penalties in case of infringement.[106]

- Finally, most important is the establishment of Dispute Settlement Understanding (DSU) or Dispute Settlement Mechanism (DSM). If any country is not complying with the "minimum standards" settled by TRIPS Agreement, the affected country can go for cross-retaliation from that country under DSU / DSM.

TRIPS Agreement resulted in significant improvement. It tried to resolve the controversy related to the legal protection of computer programs i.e. whether software should be protected under copyright or patent law.

Article 10 of TRIPS Agreement expressly declared that the computer programs are to be protected as literary work, whether in object or source code under the provisions of Berne conventions.[107]

The National Treatment, and other principle of IP conventions adopted by TRIPS, also applies to the computer software i.e. the owner of software will enjoy the same protection in all other member states which they grant to their own nationals, without any reciprocity.[108] Further, the introduction and establishment of DSM also strengthened the copyright protection of computer software.[109]

Article 11 of TRIPS Agreement grants "rental right" to the author of computer program and for cinematographic works. This is another right which has accorded for the first time by TRIPS Agreement. So the owner of copyright protected software has the right to rent-out his original work. However, in case of cinematographic work, this rental right is subject to a so called impairment test. The owner can exercise this right except when the

[106] Ibid.
[107] Ibid.
[108] Berne Convention, Art 5 (1); TRIPS, Arts 1(3), 3, 4.
[109] Pamela Samuelson, Challenges for the World Intellectual Property Organization and the Trade-Related Aspects of Intellectual property Rights Council in Regulating Intellectual Property Rights in Information Age, E.I.P.R 1999, 21(11), (1999)528, 530-531.

rental does not result in widespread copying of that work which impairs the reproduction right.[110]

Moreover, all the remedies provided in Part-III of TRIPS Agreement may also be availed by the owner of copyright protected computer programs.[111] Part-III of TRIPS Agreement contain five section, namely, the general obligations of member states for protection of IPRs, enforcement procedure and remedies, provisional measures, border measures and criminal procedure. The owner of computer program can enjoy and exercise his rights under all these provisions of Part-III e.g. he can obtain injunctions and can ban the importation of pirated products.[112]

Although the copyright protection of computer programs has been worked out by TRIPS Agreement under the pressure of major software producers e.g. United States, but still some significant aspects are not resolved, for instance the scope of copyright protection as it applies to software and the questions posed by the functional aspects of computer programs.[113] TRIPS Agreement provides the scope of copyright protection which is, however, general. Article 9 and 10 provide that copyright protection will only cover the expression and not the ideas, procedure, methods, data or material itself.[114]

The main conflict, in connection to the software is how far the copyright should protect software with the fact that copyright protection does not cover the functional aspects e.g. structure of program and its behavior, and whether these functional elements should be protected otherwise like by patents or any other form of Intellectual Property Law.

Program behavior (the actions performed by computer by the execution of object code e.g. copying, deleting, etc.) and program's structure (formation and organization of program in a way that ensures its efficient operation)[115] are the most costly to develop, therefore, are most valuable parts of software programs, as it is argued, but still are not

[110] Ibid.
[111] Art 41 to 61 of the TRIPS Agreement "Enforcement of Intellectual Property Rights".
[112] For more information with regard to enforcement mechanisms of the TRIPS see World Trade Organization, Guide to Uruguay Round Agreements, 227 (1998).
[113] Ibid.
[114] TRIPS, Arts 9(2) and 10.
[115] Karjala, supra note 7, at 53.

protected by copyright so can easily be imitated.[116] These functional aspects can easily be imitated even if the competitor could not access the source code by using reverse engineering i.e. to de-compile the software to examine it in order to understand its underlying idea and it is legal under TRIPS Agreement.[117]

So copyright only protects the expression and not the underlying idea. The developers, who want to protect their underlying ideas, will definitely move towards patents and the patent will impede the innovation. So far the idea-expression dichotomy is left to the discretion of member states as the Berne and TRIPS both are silent about the protection of these technical aspects of software.

TRIPS Agreement did not prohibit the grant of patent to computer programs. They can be protected under patents if they fulfill the criterion of patentability and the states granting patent protection does not discriminate foreign developers. Article 27 of TRIPS Agreement did not preclude the software from patent protection. It must be noted that granting software patent is not an obligation under the system developed by TRIPS Agreement,[118] however, WTO members[119] may grant software patents because no uniform definition of 'invention' is given by TRIPS. Therefore, different countries may adopt the patentability of computer programs.[120]

Despite of the shortcomings of copyright protection of computer programs, the member states, however, are obliged to grant the copyright protection. On other hand, if countries grant patents for software by using abovementioned flexibility, it will again create problem as patents impede the innovation in software industry.[121]

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[116] Manifesto, supra note 39, at 2310-2312.
[117] Lorrie Ackerman, Should Reverse Engineering of Computer Software Through Intermediate Copying Be Prohibited, available at http://lorrie.cranor.org/pubs/re (Last visited: 30-01 2009).
[118] Ibid at 153.
[119] The World Trade Organization (WTO) is the only international body dealing with the rules of trade between nations. At its heart are the WTO agreements, negotiated and signed by the bulk of the world's trading nations. These documents provide the legal ground-rules for international commerce. They are essentially contracts, binding governments to keep their trade policies within agreed limits. Although negotiated and signed by governments, the goal is to help producers of goods and services, exporters, and importers conduct their business.
[120] Ibid at 55.
[121] The issue of patentability of computer programs will be discussed in detail in forth-coming chapter.

3.3 WIPO COPYRIGHT TREATY AND PROTECTION OF COMPUTER PROGRAMS

Article 4 of WIPO Copyright Treaty (WCT) declares that computer programs, whatever may be the form of their expression, should be protected under copyright law. Further, it also clarifies that the scope of copyright protection granted to the computer program, under this treaty, will be the same as given by Berne and TRIPS Agreement i.e. it also protects the expression and not the underlying idea and functional aspects of computer program.

The treaty protects the computer programs, but did not provide any definition of computer program, rather it declares that the definition of computer program given in "WIPO Model Provision on the Protection of Computer Programs" is valid and incorporates it into WCT. This definition reads as follows;

> "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 national legislature of the member states are required to incorporate the essential elements of the computer program as elaborated in this definition.[122] However, national laws may provide even a broader definition for computer software but it is not an obligation under the treaty. For instance, the definition of computer program given in Article 1.1 of "Computer Programs Directive of the European Community"[123] includes the preliminary / preparatory design material of software in the definition of computer programs. What is preparatory design material is explained, a bit, in one of the recitals of Directive which provides that;

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[122] For example, Section 101 of the U.S. Copyright Act defines "computer program" as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result". Article 2 (xbis) of the Japanese Copyright Law contains a similar, simple and general definition, according to which a "'[computer] program' means an expression of combined instructions given to a computer so as to make it function and obtain a certain result."

[123] Council Directive of 14 May 1991 on the Legal Protection of Computer Programs.

> "the definition of computer program will also include the preparatory design work, leading to the development of that program, provided that the nature of preparatory work is such that a computer program can result from it at a later stage."

However, it is argued that the concept of preparatory design material, as it is defined in the recital of Council's Directive, does not properly fall within the concept of computer program. The preparatory material, specifically, cannot cause the computer to perform a particular task so generally it is not protected under copyright law.

Another issue with respect to computer program is concerning the images created as a result of operational activity of that computer program. The issue aroused that whether these images fall within the definition of computer program and are protected by copyright. In the absence of any uniform strategy, different approaches have been adopted by member states but the general and dominant view is that the images do not form part of the definition of computer program, as Article 4 of WCT cannot be extended to the screen images.[124] However, the screen images also enjoy the copyright protection provided they meet the general requirement of copyright protection, under certain national legislations, as the copyright protection granted to different categories of work is not necessarily required to be same.

Articles 4 of WCT simply incorporates the concept of computer programs as provided in TRIPS Agreement that computer programs, whether in source or object code, are to be protected under copyright. The Berne convention on the other hand protects the computer programs under copyright "whatever may be the mode of its expression".

[124] For example, the concept of "computer programs" under the Computer Programs Directive of the European Community does not extend to the results of the operation of the computer programs. The same may be said about the U.S. law as reflected in several court decisions. Paul Goldstein sums up the U.S. legal situation in the following way: "Video games typically consist of two separable elements, each independently copyrightable: a computer program, characteristically embodied in a semiconductor chip located in the game console, and the animated audiovisual display that the computer program projects onto a video screen when activated by the player Rights in the computer program can be infringed without infringing rights in the audiovisual display, and rights in the audiovisual display can be infringed without infringing rights in the computer program. Although the images in video game displays may appear in no fixed sequence, courts have generally held that they meet section 101's requirement of a "series of related images" and thus constitute audio-visual works. (P. Goldstein, 'Copyright – Principles, Law and Practice', Little Brown and Co. Boston, Toronto, London, 1989, Volume I, 168-169).

The question may arise that why TRIPS Agreement talk about the different kinds of computer programs i.e. source code and object code, while the Berne convention did not create any distinction and dealt generally with computer programs?

The reason, as it appears, may be to reject the unsound options which state that computer programs are protected under copyright only when they are source code and copyright protection cannot be granted to computer programs when they are in object code because of the utilitarian purposes of program under this code. This view, however, was rejected because Berne convention did not refute to grant copyright protection to any work just because it serves the utilitarian purposes. Whereas TRIPS Agreement protects the computer programs in source and object code and WCT protects the computer software "whatever may be the mode of their expression". The text of WCT seems to be mere functional firstly because it corresponds to the provisions of Berne convention (rather it incorporate the same words of Berne convention) and secondly it may happen that the classification of computer programs may become obsolete with the passage of time and some new categorize may emerge. Therefore, a general statement carrying all these aspects is appreciated.

WCT also talks about the 'rental rights' which are granted to the authors of computer programs under Article 7 of the said treaty. The Article grants the exclusive right to the copyright owner of software, to permit or prohibit the commercial rental of his original work to others but renting out of protected programs is not allowed when the program itself is not the essential object of rental.

3.4 COPYRIGHT PROTECTION OF COMPUTER PROGRAMS UNDER EU DIRECTIVES

Computer programs are to be protected as literary and artistic work, by copyright under Article 1(1) of the Council Directive 91/250-EEC. According to this legislation, the preparatory design material of these programs is also included in the definition of 'computer programs'.

The Directive, under Article 1(2), only protects the expression and not the ideas and principles which underlie any element of a computer program, including those which underlie its interfaces.

Further, the Directive recognizes and grants the 'rental rights' to the holder of copyright protected software under Article 4. However, this right is subject to the doctrine of exhaustion, which implies that the distribution right of the copyright holder of program exhaust by its first sale within EEA by the owner himself or with his consent, with the exception of controlling further rentals.

3.5 DATABASE PROTECTION

All these major Intellectual Property Treaties and Conventions provide guidelines for the protection of databases around the globe. The compilation or collection of the data is also protected under copyright law irrespective of the fact that the data to be compiled has already been protected or not under the copyright law.

3.5.1 Berne Convention and Protection of Databases

Under Article 2(5) of the Berne Convention, collections of literary or artistic works such as encyclopedias and anthologies which, by reason of the selection and arrangement of their contents, constitute intellectual creations shall be protected as such, without prejudice to the copyright in each of the works forming part of such collections.[125]

3.5.2 TRIPS and Protection of Databases

While protecting databases, TRIPS illuminates in Article 10.2 that the databases and other compilations of data or other material shall be protected as such under copyright even where the databases include data that as such are not protected under copyright. Databases are eligible for copyright protection provided that they by reason of the selection or arrangement of their contents constitute intellectual creations. The provision also confirms that databases have to be protected regardless of which form they are in, whether machine readable or other form. Furthermore, the provision clarifies that such

[125] "Intellectual Property Concepts - Authorship and Originality - II", Computer Law and Security Review: The International Journal of Technology and Practice.

protection shall not extend to the data or material itself, and that it shall be without prejudice to any copyright subsisting in the data or material itself.

3.5.3 WCT and Database Protection

WCT incorporates the same concept as given by TRIPS Agreement. Article 5 of the WCT while protecting databases under copyright law states that compilations of data or other material, in any form, which by reason of the selection or arrangement of their contents constitute intellectual creations, are protected as such.[126] This protection does not extend to the data or the material itself and is without prejudice to any copyright subsisting in the data or material contained in the compilation.

3.5.4 Council Directive 1996 and Database Protection

Article 3 of the Council Directive 96/9/EC of 11 March 1996 states that in accordance with this Directive, databases which, by reason of the selection or arrangement of their contents, constitute the author's own intellectual creation shall be protected as such by copyright. No other criteria shall be applied to determine their eligibility for that protection.

The copyright protection of databases provided for by this Directive shall not extend to their contents and shall be without prejudice to any rights subsisting in those contents themselves.[127]

Article 7 of the Directive incorporates that Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.

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[126] UNCTAD/ICTSD Capacity Building Project on *Intellectual Property Rights and Sustainable Development:* TRIPS and Development – Resource Book. Electronic version of the document is available at: http://www.iprsonline.org/unctadictsd/docs/2.1copyright.pdf (Last visited: 09-02-2009).

[127] Intergovernmental Oceanographic Commission of UNESCO. "Meeting of the *Ad hoc* Working Group on Oceanographic Data Exchange Policy" held at UNESCO Headquarters, Paris, France on 15-17 May, 2000. For full text of the session, visit: http://ioc.unesco.org/iocgov/ioc21/documents/INF-1144rev.doc (Last visited: 11-02-2009).

CHAPTER IV

COPYRIGHTABILITY VS PATENTABILITY

4.1 BRIEF HISTORY

The idea for developing a *sui generis* system for computer programs, covering all the basic elements of computer programs namely the object code, source code and documentation, emerged in 1970s when WIPO started to think about the issue of legal protection of computer programs. As a result, the WIPO Model Provisions for protection of Computer Programs were proposed for *sui generis* protection of computer programs. Those Model Provisions, however, were not followed by the national legislators and copyright protection of computer programs started to prevail.

In February 1985, WIPO and UNESCO held a meeting of Joint Group of Experts on Copyright Aspect of Computer Programs and the meeting resulted, after a thorough study[128] and vibrant debate, in the recognition of the computer programs.[129] After some years of that meeting, there were two main developments which concluded what had been worked out at WIPO forum in 1985's meeting.

- Firstly the publication of Computer Programs Directives of the European Community in July 1991, and
- Secondly the conclusion of the TRIPS Agreement in April 1994.

Both these instruments declared that computer programs should be protected as literary work under the provision of Berne Convention.

[128] "Legal Protection for Computer Programs: a Survey and Analysis of National Legislation and Case Law" by Michael S. Keplinger (document UNESCO/WIPO/GE/CCS/2).

[129] As the study presented it, at that time, there were still only five countries – in chronological order: the Philippines, the United States of America, Hungary, Australia and India – which had provided in their statutory law on copyright protection of computer programs. After the February 1985 meeting, in May, June and July, within less than two months, for example, the following four countries recognized, in their statutory law, such protection (in chronological order): Germany, May 23; Japan, June 14; France, July 3; and United Kingdom, July 16. (This is also a good example of how the "guided development" period contributed to the harmonization of copyright laws).

4.2 CHARACTERISTICS OF COPYRIGHTABILITY

Copyright, being a form of IPRs, protect the original work of expression and grant the owner of copyright an exclusive right over his creation preventing all others from commercial exploitation of that product without consent of the right-holder.[130]

Copyright protection can be granted to any work provided that work is original and is expressed in a tangible medium. Originality of the work is what that is required and it is different from novelty. A work may qualify as an original work, so far as it is not the result of copying, even if it closely resembles to any other work.

4.2.1 Copyright Protection of Computer Programs

Today, the opponents of copyright protection of computer programs are very few. A computer program is not merely a technical solution but is a creation which possesses certain technical (physical) character which affects the hardware of computer during its operation. But this cannot be taken as a ground for the exclusion of computer programs from copyright protection.

Article 10 of TRIPS Agreement (which is an interpretive provision) and article 4 of 1996 WIPO Copyright Treaty declare that protection of computer programs will be in accordance to the provisions of Berne Convention.[131]

4.3 CHARACTERISTICS OF PATENTABILITY

According to WIPO a patent, whether it is a product or process patent, introduces a new way of doing something or it offers a new solution to any existing problem.[132] The patent grants to its holder an exclusive right over his invention.

An invention is patentable if it is novel, involves an inventive step and is useful. Novelty means that the invention must not form part of the "prior art" of that particular field.[133]

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[130] World Intellectual property Organization (WIPO), Introduction to Intellectual Property, Kluwer Law International, page 154-155 (1997).

[131] Computer programs shall be protected as literary work under Article 2 of the Berne Convention, 1886.

[132] See the World Intellectual Property Organization website, available at: http://www.wipo.int/about-ip/en/about_patents.html (Last visited: 24-03 2009).

Inventive step means that the invention must be non obvious to the experts of that field and thirdly it must be of commercial use and beneficial for practical purposes.[134] Any invention fulfilling the above mentioned criterion is eligible for patent protection.

4.3.1 Patent Protection of Computer Programs

Whether patents should be granted to computer programs or not has been a controversial issue for along time. The software industry posses some unique characteristics which distinguish it from other typical industries. The nature of software industry is so different that patent can not serve its original purposes for software rather it impede the innovation.

Patents are there to provide incentives to the inventor for further innovation but it is the intrinsic characteristic of software industry so patents are not required for that purpose. Moreover, patents prevent the use of prior art while in software industry every new innovation is directly based upon the previous one and if software patents are granted it will result in patent infringement and expensive litigations over the patent infringement will discourage the independent inventor and small companies.

The people from legal community were of the view that computer programs are just like the mathematical formulas[135] or abstract ideas so they would not qualify for patent protection and same has been approach of the courts till 1980s. Thereafter, a change came in courts approach and the practice of granting software patent started and applied by different jurisdictions.[136]

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[133] Supra note 124, at page 165.

[134] Turkish Patent Institute, Note on Protection of Software, Unpublished note, at 125.

[135] Mathematical algorithms constitute just one of many judicially created exceptions to the statutory subject matter of patent law. Some others include laws of nature, abstract ideas, and business methods. The latter, business methods, was eventually struck down in State Street Bank & Trust, Co. v. Signature Financial Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998). In addition, patents must meet the requirements of non-obviousness, novelty, and usefulness.

[136] In the US these cases were: Diamond v. Diehr, 450 US 175 (1981) (holding that application of a mathematical formula embodied in a software program that performed a useful process qualified for patent protection); In re Alappat, 33 F.3d 1526 (Fed. Cir. 1994) (en banc) (holding that Diehr's "useful function" requirement could be satisfied if the software ran on a general purpose computer); In re Beauregard, 53 F.3d 1583 (Fed. Cir. 1995) (the PTO announced it would accept patent claims for software-based inventions even if not implemented in hardware, for example if it was embodied in a floppy disk); State

The debate over software patent is not yet over, as it is evident by the rejection of proposed Directives on Computer Implemented Inventions by EUs parliament. The proposed Directives were meant to harmonize the patent laws of all member states of EU to the extent of computer implemented innovations and to ensure that the inventors developing the software technologies could get patent over their invention. However, despite of the rejection of proposed Directives, inventions can be patented to some extent by European Patent Office (EPO) and by national patent offices of the member states.

The discussion over the IPRs protection of the computer programs is still indecisive at international level. The controversy is because of unique traits of the computer programs which perform the technical function by creative expression. Both copyright and patent protections have certain pros and cons for software industry. Copyright merely protect the "literal expression" and not the idea behind the software which usually form a substantial part of its commercial value. The patents, on the other hand, protect the ideas which mostly provide the technical function like controlling machinery, regulating room temperature etc, and because of this fact the inventors of software moved towards the patent protection of their inventions. In other words it can be said that copyright law protect the expression of the code of software thus protecting it against piracy whereas the patent protect the underlying functionality of that program shielding it against copying by the relevant competitors.[137]

4.4 SOFTWARE PATENTABILITY AROUND THE WORLD

4.4.1 The U.S. position

United States adopted the most liberal approach regarding the software patents. US patent law provides that whoever invent or discover any new and useful process "machine

Street, (striking down the long-standing "business method" exception and cementing recent precedent protecting software patents).

[137] See David S. Evans & Anne Layne-Farrar, *Software Patents and Open Source: The Battle over Intellectual Property Rights*, 9 VA. J.L. & TECH. 10, § B(1)(a) (2004) (as explained by an interviewed subject, "Patents are inter-industry mechanisms for creating value. Copyright is creating protection between the industry and the channel or end customers."). Also, the penalties for patent infringement are generally much harsher than for copyright infringement, and apply even if one is not aware of the patent's existence.

manufacturer or composition of matter . . . may obtain patent . . ."[138] The exception to this law was created by US Supreme Court by excluding "laws of nature, natural phenomena and abstract ideas" from patentability.[139]

Till 1981, the computer programs and software were regarded as mathematical algorithms or abstract ideas by the United States Patent and Trademark Office (USPTO). So they were falling under the exception created by the US Supreme Court and were excluded from patentability i.e. abstract ideas are not patentable. A significant shift in this attitude came in 1981 by the decision of the Supreme Court in Diamond v. Diehr.[140] In this case the Supreme Court held that patent application can not be refused merely on the ground that the invention was created by using "mathematical formula, computer program or digital computer." After this decision, the US started to grant patent to a wide rang of software implemented inventions[141] if the invention is "concrete, useful and produce tangible results".

4.4.2 The EUs position

EUs stance is somewhat different from that adopted by US. The law regarding patentability of the software programs, contained in Article 52 of European Patent Convention (EPC),[142] is somehow confusing. Paragraph 2 of Article 52 of EPC explicitly exclude the computer programs from patent protection, while paragraph 3 of the same Article demonstrates that the items listed down in paragraph 2 are the only items excluded from patent protection "as such".[143] The word "as such" denotes that like other items of paragraph 2, computer programs are open to patent protection. Currently, the EU Patent Office is granting patent to software inventions if the technical effects created by

[138] 35. U.S.C.A § 101.
[139] *Diamond v. Diehr*, 450 US 175, 185 (1981).
[140] Ibid, at page 187.
[141] The terms "computer-implemented invention", "software-enabled invention", "software-operated invention", computer program-related inventions' are also used to convey a same meaning.
[142] European Patent Convention (EPC), available at: http://www3.european-patent-office.org/dwld/epc/epc_2002_v1.pdf (Last visited: 25-03-2009)
[143] See EU Parliament Directorate-General for Research working paper, The Patentability of Computer Programs Discussion of European-level Legislation in the field of Patents for Software, p. 8 (2002) available at http://www.europarl.eu.int/meetdocs/committees/juri/20020619/SoftwarePatent.pub.pdf (Last visited: 25-03-2009)

that innovation are beyond the normal physical interaction between the computer programs and the computer.[144]

In February 2002, a "Directive of the European Parliament and of Council on the Patentability of Computer Implemented Inventions" was proposed by the European Commission for the harmonization of national laws of the member states.[145] The Directives proposed to grant patent to software innovations provided they fulfill the criterion of patentability i.e. novelty, inventive step and commercial use.[146] But the proposed Directives are still disputed not only among the member states but also between Parliament and Council.

4.4.3 Landmark Cases

As mentioned earlier that United States patent law regarded the patents at mathematical algorithms or abstract ideas hence excluding them from patent protection.[147] However with the passage of time shift came in its jurisprudence regarding the software patents which was the result of software cases, mentioned below, decided by the Supreme Court.

Diamond v. Diehr (1981)[148]

In this case the Supreme Court allowed the grant of the patent protection for a machine controlled by computer programs, although it did not fully allowed the computer programs to be patentable. The court further held that currently most of the inventions are the result of computer programs or any mathematical formulas but they cannot be patented so long as the criterion for patentability is fully met. The decision was a precedent-setting decision and became basis for many other future cases of software

[144] Ibid.
[145] See Proposal for a Directive of the European Parliament and of the Council on the Patentability of Computer-implemented Inventions (Proposed Directive On the Patentability of Computer-implemented Inventions), Official Journal C 151 E of 25.06.2002.
[146] See Proposed Directive On the Patentability of Computer-implemented Inventions, Art 4.
[147] The USPTO – General Information Concerning Patents, 2005. USPTO. 10 December 2005 http://www.uspto.gov/main/patents.htm (Last visited: 08-04 2009).
[148] For full text of the *Diamond, Commissioner of Patents and Trademarks Vs. Diehr, et al.* 450 U.S. 175 (Supreme Court 1981), please visit: <www.law.uconn.edu> (Last visited: 08-04 2009).

patent. Through this ruling "creative patent attorneys were now able to wrap software innovations into patent for tangible processes or products."[149]

State Street Bank& Trust Company v. Signature Financial Group, Inc. (1998)[150]

The decision of this case further relaxed and eased the restriction s on software patents. It was held that the patent protection can be granted to any innovation provided that produces "a useful, concrete and tangible result".[151]

John W. Rees wrote that the decision of the court in state street case caused a "boom in patent application filing" and the boom, which still exists, resulted in the grant of thousands of software patent with other 10,000 estimated patents pending.[152]

Lotus Development Corp. v. Borland International, Inc. (1996)[153]

This case established and strengthens the idea that copyright protect only the literal expression of the software programs whereas its code can be duplicated by any one. Copyright protection is useful "provided one does not copy the literal code."[154]

Initially the case laws were favoring the copyright protection of computer programs but with the passage of time patent protection substantially increased and consequently, particularly after this case, the copyright protection has weakened.

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[149] Hahn, Robert W. Intellectual Property Rights in Frontier Industries. Washington, D.C.: AEI-Brookings Joint Center for Regulatory Studies, 2005

[150] *State Street Bank & Trust Co. Vs. Signature Financial Group Inc.* 149 F.3d 1368 (Federal Circuit 1998).

[151] Arnold, Beth and David Lane. "Patent Strategies for Protecting Bio-informatic Inventions: It May be Worth Venturing Out of Group 1600." Foley Hoag, LLP. 1 February 2005. 10 December 2005 http://www.fhe.com/publications.asp?pubID=000323292105#_ftnref9 (Last visited: 08-04 2009).

[152] Syrowik, David R. and Roland J. Cole. "The Challenge of Software-Related Patents: A Primer on Software-Related Patents and the Software Patent Institute." SPI.org. 9 December 2003. 10 December 2005 http://www.spi.org/primintr.htm (Last visited: 10-04 2009).

[153] *Lotus Development Corp. Vs. Borland International, Inc.* 516 U.S. 233 (Supreme Court 1996).

[154] Lundberg, Steven W. and Stephen C. Durant, ed. Electronic and Software Patents. Washington, D.C.: The Bureau of National Affairs, Inc., 2000.

4.5 CONTROVERSY

Generally the patents are considered to be advantageous for most of the industries but this is not same when it comes to software industry. Bill Gates, the Software tycoon, wrote in a memo:

> "If people had understood how patents would be granted when most of today's ideas were invented and had taken out patents, the industry would be at a complete standstill today. ... The solution is patenting as much as we can. A future start-up with no patents of its own will be forced to pay whatever price the giants choose to impose. That price might be high. Established companies have an interest in excluding future competitors."[155]

On the other ideological extreme are the words of Linus Torvalds, an advocate of open source movement, he said:

> "The fact is technical people are better off not looking at patents. If you don't know what they cover and where they are, you won't be knowingly infringing on them. If somebody sues you, you change the algorithm or you just hire a hit-man to whack the stupid git."[156]

It is evident from the statement of these representatives of software industry that role of patent in software industry is dubious and controversial. Some countries have tried to resolve the controversy by eliminating the patents from software industry for instance EU by article 52 of European Patent Convention (EPC) precluded computer programs from patentability. The article provides that "schemes, rules and methods for performing mental acts, playing games or doing business, and *programs for computers*" are not patentable. In response to this certain lobbying groups within Europe and rest of the world are exerting full efforts to eliminate patents from software industry.

[155] Lessig 24-07-2002: Keynote to OSCON.
[156] For complete Article, please visit: <http://lwn.net/Articles/7001/> (Last visited: 13-04 2009).

Moreover the certain recent movements, even within the software industry are the result of this prevailing controversy and inappropriateness of the patents in software industry. The Open Source Software Movement is the response to this controversy. The opponent to software patents, the open source developers and many other companies, claim that the patents are the impediments to the creation of new software as the inventors are threatened by the fear of expensive litigations over the unintentional and unknown infringements of existing software patents. Software are not restricted to any physical constraint and it is the main and unique characteristics distinguishing the software industry from all other industries the patents has ever dealt with and giving it a particular economic structure.[157]

4.6 DOES SOFTWARE PATENTS KILL EFFICIENT SOFTWARE DEVELOPMENT?

The original purpose of the patent is to protect the invention from imitation and to provide the incentives and economic returns to the inventors for the cost of his/her pains suffered during the process of invention. If the patent does not serve the assigned purposes the inventors and especially the independent inventor would not be ready to incur the expenses associated with the process of developing and marketing of that invention. But when it comes to the software industry it is considered that the patent does not serve the same purposes rather it sometimes impedes innovation and proves fatal to independent inventors.

A software patent, as discussed earlier, is a controversial topic opposed vigorously in software world. Gordon Irlam and Dr. Ross Williams discuss that the absence of the physical constraints in software world enhance the complexity of it structure. This complexity has grown so much that some software programs can be understood by a single person as the software product may consist of twenty parts or it may be even with thousand parts in case of more sophisticated industry. Hence the complexity of the

[157] Irlam, Gordon and Ross Williams. "Software Patents: an Industry at Risk." 25 January 1994. 10 December 2005 <http://progfree.org/Patents/industry-at-risk.html> (Last visited: 13-04-2009).

product is enhanced because of uncountable number of parts and line of codes comprising that product.

Abstraction techniques of computer programs, is another factor contributing in its complexity. Software programs are abstracted and re-abstracted into components to be used in larger programs. Therefore, portioning of these technologies is difficult because of software's abstraction.[158] Irlam and Dr. Williams continue to argue that most industries have products that that in software industry a "product can contain thousands of inventions, any of which might be patented." So the many patents can be obtained even for a single product. This will again create problems of patent infringements.

Moreover, software industry is very dynamic. New software products are developed in very short time period as compare to any other typical industry in which the innovation take place or new generation of the product is produced in a period covering ten to twenty years.[159] This is another factor increasing the complexity of software world. As during these twenty years of patent protection many new generations of the software programs come and go. A very well known example, demonstrating this dynamic and speedy innovation process of software industry is the windows Operating System by Microsoft. Microsoft released windows 3.1 in 1992 and windows XP, the most used operating system in the world, in 2001 after 9 years. During these 9 years Microsoft went through many significant changes and innovations modifying the software.[160]

As a comparison of innovation process of software industry with some conventional industry let's have a look at Media Storage with respect of VHS & DVDs. The VHS format was released in 1976 and nothing new came in Video and Media Storage until 1996 when DVD came, almost after 30 years.

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[158] Ibid.
[159] Ibid.
[160] After releasing Windows XP in 2001, Microsoft Corporation came up with another innovative operating system named Windows Vista in just five years. Most recently, Microsoft introduced Windows 7 in 2009 which is the latest operating system at this point of time. These developments show the speedy innovation process in the Software Industry.

The cost of research and software industry is minimal so the patents don't serve its original purpose. To encourage the inventor by giving him an exclusive right for a certain period of time to get economic return. The software patents in reality destroy the small companies as the litigation over the patent infringements is both expensive and fatal to the existence of small companies and independent inventors.

Software industry develop and innovate in a sequential and complementary way, in which every new innovation gets its roots directly from the previous one and is labeled as complementary it occur through the complement efforts of many inventors. This is another reason for claimed non-patentability of software patents as patents impede the "sequential innovations mechanism" as it require the novelty (prior invention cant be taken as the bases of new innovation, prohibiting the use of prior art).by patenting the product the firm gets the ability to prevent the other competitors from using that product as the basis for new innovations and restrict them from adding their ideas in prior invention which actually leads towards the achievement of new innovation in software world. And this will adversely affect the software industry which in fact exhibits the sequential and complementary innovations.[161]

Given the reasons the patents in software industry does not serve its assigned purposes i.e. Promotion of innovation and encouraging the inventors, rather it impedes the innovations and at it worst it may be injurious for entire software industry. Software industry can continue to develop and prosper without patents.

4.7 THE OPEN SOURCE MOVEMENT

The Open Source Software Movement is the necessary response to the tension prevailing in software industry regarding patents. The Open Source Movement is opposing the software patents and refutes to get its product patented as being unsatisfied with the proprietary development models. It is aiming to develop the software products with explicit and implicit characteristic offering the access to source code, community code

[161] Bessen, James and Eric Maskin. "Sequential Innovation, Patents, and Imitation." researchinnovation.org January 2000. 10 December, 2005 http://www.researchoninnovation.org/patent.pdf (Last visited: 20-04 2009).

developments, local skills and capacity building, freedom from vendor lock-in, reduced costs, broad rights, and the ability to customize to local conditions. The Open Source Movement has released many reliable software programs with these traits and benefits.[162]

The aims of Open Source Movement are twofold, which run parallel with the sequential and complementary innovations, firstly it guarantees the right of software inventor to use their previous invention as a basis of its new product. Hence it ensures the sequential innovation process and complementary innovations and secondly it aims to encourage the collaborations on software innovations.[163]

The open source movement, which has been surprisingly successful, is associated with many famous names of software world, the people who believe that software was borne out of academic spirit and the information must be free and available to everybody.

4.8 COPYRIGHT VS PATENT: THE MOST APPOSITE SYSTEM OF PROTECTION

The software patents, as mentioned before, hamper the process of innovation in software industry. The patent granting 20 years of monopoly over the product is totally incompatible with an industry which experience a rapid and dynamic innovation process. This is because during these 20 years many new generations of that product come and go and the software invention which was non-obvious twenty years ago may become very obvious within 2 years in software world.

Software programs consist of numerous details and code lines and uncountable number of parts, as a result a single software product can qualify for number of patents as its each part constitute a different innovation. Because of this complicated structure of software programs it will be very difficult to innovate new programs which itself will be comprised of hundreds or thousands of new innovations, without violating any of the existing software patent. This in turn will discourage the innovation within the industry as

[162] Professor Robert Rines, Tri Ngo and Richard Sinn. "The Software Protection Debate." 19 December, 2005.
[163] Ibid.

it will be very expensive and time consuming for inventors to search about all the existing patents to avoid the infringement liability and to make sure that their invention is not violating any of the existing patent.

Software controversy has grown so much that many software industries are in a constant "patent arms race". Every company tries to get, as preventive measures, as many patents for their products as possible to avoid the future litigation from any other company owing so many patents so that they can counter sue the company for patent infringement if it brings any legal action of patent violation against it as the chances of software infringements are very high and each company must be infringing on a patent somewhere.

Additionally, if a big software company wants to avoid the competition from any small company or any independent inventor it can sue it for patent infringement. In fighting the expensive litigation, the small company will definitely collapse. The patents may become an anti-competitive tool in the hands of big companies.

The rapid innovation is an essential requirement for any company to survive and to be successful in software world; the patents can not serve its original purpose for software industry because of its unique structure and requirements. The cost of production is very low so patent compensation is not required to encourage the further innovations. It is evident from software history that software industry thrived in a patent less system and it will flourish and will work more efficiently without patents.

CHAPTER V

ENFORCEMENT IN PAKISTAN
(WITH SPECIAL REFERENCE TO COMPUTER PROGRAMS / SOFTWARE)

5.1 WHAT IS SOFTWARE PIRACY?

Software piracy is the commission of any prohibited act which may not fall in the purview of "fair-use policy" or form part of the terms and restrictions imposed by developer of computer program for using that product. It may include copying, downloading, reproducing any packaged software without consent of the owner. Thus if a computer program is copied or downloaded on diskettes or any other medium and subsequently it is copied or printed out on any paper, it will be an infringement.

Purchasing of software that had been copied illegally will also constitute an infringement of copyright. The intention of infringer to illegally copy the computer program is not at all required to prove the infringement and liability for infringement lies upon the person who, without consent of the owner, commit any of the prohibited acts himself or authorizes others to do so.

5.1.1 Kinds of Software Piracy

5.1.1.1 Soft-lifting

Purchasing a single licensed copy of software and loading it onto many computers, against the terms and conditions of license agreement, is called soft-lifting.

5.1.1.2 Uploading and Downloading

Making unamortized copies of any copyright protected software by the end-user connected to internet by modem or online service providers. This type of software piracy is very common now-a-days.

5.1.1.3 Software Counterfeiting

Software counterfeiting is unlawfully duplicating copyrighted software in an apparently legitimate form or design.

5.1.1.4 OEM Unbundling

Selling software, standalone, which was actually intended to be sold with another accompanying hardware is called OEM unbundling.

5.1.1.5 HDD Loading

It is copying software illegally on the Hard Disk Drive (HDD) of personal computer and usually the motive behind this activity is to provide an incentive to the end-users of that program to ultimately purchase the hardware from that particular dealer.

5.1.1.6 Renting

It is unauthorized selling software for temporary use against specified rent. Renting out software amounts to piracy and is prohibited act.

5.1.2 Effects of Piracy

Software piracy adversely affects the software industry. It slow downs the process of innovation of new software technologies as the attention of software developers is diverted towards the frustrating task of protecting the existing software programs rather than developing innovative technologies.

Financial losses due to software piracy are borne both by the developers (software industry) and retailers, as the retailers then restrict their software selection only to the programs that would not get devalue by pirated copies floating around. This whole in turn will impact the ultimate users of the software programs. The end-user will suffer when developer's attention will be focused on combating piracy instead of innovating and the retailer will restrict their selections. The user will also suffer by the viruses, spyware and adware integrated in the pirated software. Infact the only possible beneficiaries of pirated software are the pirates themselves.

A well established legitimate software market provides a better environment for foreign-direct-investments (FDIs). According to Global Piracy Study 2009, a mere 10 percent decrease in prevailing piracy rate can contribute over US $160 to national GDP and will increase the national income over US $20 million.

5.2 ENFORCEMENT OF COPYRIGHT UNDER PAKISTANI LEGAL SYSTEM

Pakistan has been under constant criticism because of insufficient IPRs protection and enforcement mechanism. It has been declared as 4th largest exporter of pirated optical disks. As per the facts and figures provided by Business Software Alliance (BSA),[164] the piracy rate of Pakistan in 2007 was 84% which increased by 2% in 2008.[165] These facts and figures, however, are just aimed for contemplation in the light of software piracy rate of other countries when taken together.

Pakistan is all set to adopt new standards of TRIPS Agreement and all the IPR legislations has been revamped for that purpose i.e. for providing an effective protection and enforcement mechanism. Combating IPRs violation in more effective way has been one of the top priorities set out by the Government of Pakistan through all the IPRs legislations.

See Section 56, 59, 65 and 74(3) of the Copyright Ordinance, 1962 dealing with the copyright infringement of computer programs. These sections provide details of the acts which may constitute infringement of computer software and provide the remedies available to the owner in case of infringement.

Section 56 of the Copyright Ordinance, 1962 provides a list of acts which constitute the infringement of software and falls in purview of piracy. It includes copying, issuing copies, renting out of software and performing the work without expressed consent or license of the copyright owner. Moreover, the importation of pirated material is also the infringement of that program.

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[164] *Business Software Alliance* <www.bsa.org> is the foremost organization dedicated to promoting a safe and legal digital world. BSA is the voice of the world's software industry and its hardware partners before governments and in the international marketplace. Its members represent one of the fastest growing industries in the world. BSA programs foster technology innovation through education and policy initiatives that promote copyright protection, cyber security, trade and ecommerce. BSA members include Adobe, Apple, Autodesk, Avid, Bentley Systems, Borland, CA, Cadence Design Systems, Cisco Systems, CNC Software/Mastercam, Corel, Dell, EMC, HP, IBM, Intel, McAfee, Microsoft, Monotype Imaging, PTC, Quark, Quest Software, SAP, Siemens PLM Software, SolidWorks, Sybase, Symantec, Synopsys, and The MathWorks.

[165] Sixth Annual BSA and IDC Global Software Piracy Study, May 2009. According to this study, Pakistan is one of the top 10 countries who had Highest Piracy Rates in 2008.

The Ordinance afforded three types of remedies for infringement of computer programs i.e. civil, criminal and administrative remedies. The copyright owner can sue for damages, can claim for prohibitory injunctions, can also claim for undue benefits gained by the infringer because of infringement and delivering up of infringed articles. The copyright owner himself or his licensee, according to Section 59, can only sue for alleged copyright infringement for abovementioned remedies. All the offences under Copyright Ordinance are cognizable and non-bailable.[166] Amended Section 65 of the Ordinance provides that every suit or other civil proceedings regarding infringement, at the discretion of the applicant, should be instituted and tried in the Court of the District Judge.

5.3 ROLE OF FIA IN SOFTWARE PROTECTION

Copyright Ordinance, 1962 came onto the schedule of Federal Investigation Agency (FIA) in April 2005.[167] Although, other forces like Police and Pakistan Customs are also there to combat IPR violations, the role of FIA is vital and most important being the premier investigative agency of the country. As regards measures taken against the software pirates, the FIA is in a transitional stage, vis-à-vis enforcement of IPRs, establishing operational unites, building investigative / prosecutive capacities, and strengthening laws.

That's why FIA lacks an effective surveillance network for getting information of copyright infringements and subsequently conducting its raid and searches. Notwithstanding FIA is trying its level best to control software piracy and conduct speedy action as soon as they receive any relevant information.

Recently, FIA has initiated crackdown to curb the threats of software piracy in country. The most recent incident is the case FIR No. 17/2009 under Section 109 and 420 of Pakistan Penal Code, Section 66(a) and 66(b) of the Copyright Ordinance, 1962 and

[166] See Section 74(3) of the Copyright Ordinance, 1962.

[167] Ever since having mandated to enforce copyright laws in Pakistan, the FIA closed half-a-dozen illegal optical disc enterprises in Karachi. Since then the FIA was able to register 63 cases [as of April 20, 2009] and seize over 1.5 million pirated optical discs. The majority of cases are subjudice in various courts of law.

Section 7, 8 and 22 of Prevention of Electronic Crimes Ordinance, 2008. It has been registered in Crime Circle, Karachi on April 23, 2009. Brief of the case is that Anti-Piracy Manager of Microsoft Corporation Pakistan, Mr. Salman S. Siddique logged a complaint against M/s Gadget (Softwise) Karachi that it is installing unlicensed Microsoft Windows, Microsoft Office and Microsoft Windows Server on PCs and selling them out to the customers in violation of the provisions of Copyright Ordinance, 1962. FIA, after preliminary inquiry, conducted a raid in the premises of M/s Gadget (Pvt.) Limited and they recovered the infringing articles including 59 pirated CDs of Microsoft Corporation, 4 Hard Disk Drives carrying pirated versions of Microsoft and 1 Motherboard that was being used for installing pirated versions on customer's computers.

The Sindh and Lahore High Courts have convicted 13 pirated software resellers and fined them Rs.180,000 for infringing IPRs of software producers and thereby breaching the copyright law.[168]

5.3.1 Enforcement Strategies

In Pakistan, IPR Enforcement Agencies have adopted a systematic system for IPR enforcement based upon a "top-down gradual approach". This top-down approach gets its roots from "special and differential treatment" principle of WTO. Under this system the developed cities of Pakistan like Karachi, Lahore and Islamabad are given priority over less developed cities for IPR enforcement.[169] This approach is anchored on two rules for proper IPR enforcement and combating piracy. Firstly, it aims to control the supply side i.e. it focuses to eliminate the supply of counterfeited and pirated software. Secondly, it controls the demand side by providing the genuine software to meet the needs of consumers. Enforcement coordination is structured at following three levels:

- Policy Board Interface — Structured at Policy Level
- Organizational Interface — Structured at Supervisory Level
- Enforcement Coordination Interface — Structured at Operational Level

[168] Anti-Counterfeit and Infringement Forum, Pakistan (ACIF) Quarterly Newsletter 'PLEDGE' for Original Products, Issue No. 6 (April-June, 2007).

[169] According to "Special and Differential Treatment" principle of WTO, the developed, developing and least developed countries are treated differently.

Enforcement coordination at operational level is institutionalized through Regional Enforcement Coordination Committees (RECC) that are constituted by all the agencies of enforcement chain in Karachi, Lahore and Islamabad. Regional Enforcement Coordination Committees are comprised of IPO-Pakistan, Law Division, Private Investigation Agencies and Pakistan Electronic Media Regulatory Authority (PEMRA). Moreover, Citizen-Police Liaison Committees, already existing in major urban areas, may also be especially invited into the enforcement loop.

5.3.2 Impediments to Enforcement

Although the task of combating piracy in Pakistan is handed over to FIA and its authority is enhanced by declaring the copyright crimes cognizable i.e. FIA is not in need of warrants from Court of law for conducting its raids, search operations but still FIA encounter with certain impediments. These impediments are because of ineffective enforcement regime, lack of infrastructure and sometimes because of the shortcomings of IP legislations itself.

The purpose of law, infact, is not to punch the criminal but to create deterrence through severely punishing the criminal and this serves as preventive measures for further crime. So far as the piracy of software programs in Pakistan is concerned, it is because the punishments provided for software infringement under Copyright Ordinance are not sufficient to create deterrence among copyright infringers. The prevailing punishment, as provided by Copyright Ordinance, for copyright infringement if fine only upto Rs.100,000 and imprisonment for a maximum term of three years. This is totally ineffective for creating deterrence to copyright infringers who are usually the wealthier parties.

The lack of infrastructure in Pakistan is another impediment to IPRs enforcement. This include the lack of proper intelligence and surveillance network for conducting raids and inability of investigators / prosecutors to investigate, collect and analyze the evidence.

More effective and proper strategies for IPRs enforcement lower the chances of piracy. FIA needs to be equipped with forensic expertise and scientific aids to face the

confronting challenges of piracy. At national level, IP based society with proper infrastructure and IP legislations offering effective punishments to deter the criminals, who are usually financially sound enough to defend themselves by high profile lawyers, is the requirement of time.

5.3.3 Case Studies

Dr. Syed Iqbal Raza Vs. Siemens AG is the leading case of software piracy in Pakistan.[170] Brief facts of the case are as under;

Dr. Syed Iqbal Raza, the plaintiff, is a physician and director of the Children's Hospital Islamabad. Defendants are Siemens A.G. Germany, Siemens Medical Solution Health Services Corporation USA and Siemens Pakistan Engineering Company Ltd.[171]

In 1997, Plaintiff set out to develop methods for evaluating and tracking the performance of medical professionals. Plaintiff's goal was to attempt to make the process for managing hospitals and hospital personnel more efficient. He did so "by collecting various types of data from 104 medical professionals through a research study referred to as 'Dr-SIR-104. He used this research data to develop Dr-SIR, a concept for a hospital management software product.

In September 2000, Plaintiff was invited by officials at the Strengthening of Health Services Academy in Pakistan (SHAIP) to present his concepts for Dr-SIR. After his presentation, SHAIP officials asked Plaintiff to provide them with written materials outlining the concepts for Dr-SIR so that the product could be evaluated. Plaintiff provided SHAIP with approximately 160 pages containing his concepts. On October 9, 2000, SHAIP's Chief Technical Officer forwarded, with Plaintiff's permission, the concept papers with a letter to the Counsellor, Head Economic and Commercial Section of the German Embassy in Islamabad. Shortly thereafter, Plaintiff briefed the Counsellor on the Dr-Sir concepts, and the Counsellor believed Defendants might be interested in entering into a "partnership with [Plaintiff] to develop a complete software product."

[170] Dr. Syed Iqbal Raza Vs. Siemens AG, a subjudice case during the study analysis being done.
[171] Siemens Medical Solution Health Services Corporation USA and Siemens Pakistan Engineering Company Ltd. are wholly owned subsidiaries of Siemens AG, a German corporation.

Plaintiff had no confidentiality or non-disclosure agreement with these organizations regarding his Dr-SIR concept. Plaintiff alleged that in January 2001, he received a letter from Siemens Pakistan Engineering Company, Ltd. Indicating that the company was not sufficiently related to Hospital Management so as to benefit from the software, but it would inform some of its clients to contact Plaintiff for details on the software. Plaintiff contended that Defendants did not return the 160 pages of written materials he provided for their review. After receiving the January 2001 letter, Plaintiff continued to develop his concepts. Plaintiff won first prize for software development at the 2002 National Software Competition sponsored by the National University in Islamabad, and Plaintiff registered Dr-SIR with, among others, the World Health Organization in September 2001 and the United States Foreign Commerce Liaison Office in February 2003.

In October 2001, unbeknownst to Plaintiff, Defendants launched their "SOARIAN" hospital management software in the United States. In April 2003, Plaintiff met with Zia Chishti, the Chief Executive Officer (CEO) of Align Technology and then CEO of TRG, a venture capital firm. Mr. Chishti informed Plaintiff that Defendants had developed and were marketing in the United States, a software product that was very similar to Dr-SIR.

Plaintiff then reviewed Siemens' public papers, press releases, patents and patent applications relating to the SOARIAN product and concluded that the product most likely incorporates a number of the proprietary concepts he had disclosed to [Defendants] in November 2000.

After discovering so, Dr. Raza filed a suit for recovery of damages for infringement of Intellectual Property Rights on September 05, 2003 in the court of Senior Civil Judge, Islamabad. In that suit he prayed for a decree with costs for recovery of rupees twenty-billion as damages.

Thereby, defendants filed several applications challenging the jurisdiction of the court and admission of the petition by Dr-SIR under Order VII Rule 11 of the Civil Procedure Code, 1908. The court gave clear decision in favour of Dr-SIR stating that Dr-SIR has

cause of action against the defendants. On June 20, 2005 the Civil Judge, Aamer Saleem Rana ordered that:

> ". . . Contents of the plaint reveals a cause of action against the defendants. The controversies which have been raised by the defendants are of factual nature and it would be pertinent to decide the same after framing of the issues and recording the evidence from both sides. Instant application is devoid of merits, same is hereby dismissed."

Despite six years have been passed, the case is still pending before the Islamabad High Court, Islamabad[172] because defendants are a multinational company who can afford the prolonged litigation. They are still filing different applications regarding technical issues like jurisdiction of the court, appointment of a commission for witnesses etc. to prolong the matter.

Dr. Iqbal Raza also filed a case against Siemens AG in the US on February 28, 2006, alleging claims based on trade secret misappropriation and unjust enrichment. But his claim was time-barred because the Complaint was not filed within the applicable 3 year statute of limitations. After hearing arguments of both the parties, Judge Joseph J. Farnan, concluded that:

> ". . . In the circumstances of this case, the Court concludes that no reasonable fact-finder could conclude that Plaintiff would have been unable to discover his claims in the exercise of reasonable diligence and file his Complaint based on those claims by July 2005. Because

[172] When Islamabad High Court, Islamabad started functioning in February 2008, the case was transferred from Lahore High Court, Rawalpindi Bench to Islamabad High Court because The Islamabad High Court has original, appellate and other jurisdiction in respect of the Islamabad Capital Territory provided that the Islamabad High Court will have original jurisdiction over the suits the amount or value of subject-matter of which is twenty-five hundred thousand rupees or more. On July 31, 2009, the Chief Justice of Pakistan, Iftikhar Muhammad Chaudhry has declared the Constitutional (Amendment) Order, 2007 and the Islamabad High Court (Establishment) Order, 2007 to be un-constitutional and of no legal effect. Therefore, the Islamabad High Court ceased to exist by that decision of full bench of Supreme Court in Constitution Petition No. 9 of 2009.

Plaintiff's Complaint was filed more than six months after that date, the Court concludes that Plaintiff's Complaint is time-barred."

5.4 FIGHTING SOFTWARE PIRACY IN A GLOBAL ENVIRONMENT

In 2007, the global piracy rate was 38% which increased by 3% in year 2008 and with this increase the annual capital losses reached to $53 billions from $48 billions.[173] Global piracy rate is growing day by day because of 'online piracy' which has become a significant and constant challenge to global digital commerce. Internet has facilitated the piracy upto its maximum. Before this "online / internet piracy" unauthorized copying of any software was not possible except through the physical exchange of floppy discs, CDs, or any other hard medium. But internet facilitates the products to move from one computer to another electronically with no hard medium transaction and less chances of detection, even sometimes without knowledge of the computer owner. The chances of internet piracy are higher in coming era as the use of internet is spreading more than ever and it is also becoming less expensive.

Moreover, copying of the software required, in past, a sound understanding of complex computer codes but now it is just at a distance of one click of mouse over peer-to-peer networks, through mail order and auction sites, over news groups or even as simple email attachments.[174]

So piracy is now supported by the vision of internet that says; "it is acceptable to appropriate the creative works of others in order to disseminate them to the world free of cost." This vision, no doubt, maximize the global piracy level, minimize the innovative output and victimize the local culture as well as the economies of developing countries.

The victims of piracy include artists whose creativity goes unrewarded, governments who lose hundreds of millions in tax revenues, national economies that are deprived of new investments, consumers whose product choices are fewer and less diverse, and the

[173] Sixth Annual BSA and IDC Global Software Piracy Study, May 2009, <http://www.bsa.org/globalstudy> The Study estimates that the rate of software piracy in the Asia-Pacific region was 61 percent during 2008 (Last visited: 20-05-2009).

[174] http://www.wipo.int/edocs/mdocs/copyright/en/wipo_ip_cm_07/wipo_ip_cm_07_www_82573.doc (Last visited: 28-05-2009).

producers of creative works who, due to rampant theft, have fewer resources to invest in the development of new digital products and services.[175]

	Piracy Rates				Losses ($M)			
	2008	2007	2006	2005	2008	2007	2006	2005
Pakistan	86%	84%	86%	86%	$159	$125	$143	$48
Asia Pacific	61%	59%	55%	54%	$15,261	$14,090	$11,718	$8,050
Worldwide	41%	38%	35%	35%	$52,998	$47,809	$39,698	$34,482

Table 1 – *Piracy Rates and Losses in Pakistan, Asia-Pacific and Worldwide*[176]

Therefore, strong measures are required to combat piracy at local, national and international level to counter these unhealthy trends. For instance, the Computer Program Deliberation and Mediation Committee of Korea has embarked upon the creation of a "fair-use environment" for software through a number of anti-piracy measures, including consultation on legitimate software management, free software to detect illegal copies, monitoring of suspicious websites, and an awareness campaign to change public attitudes toward legitimate software in Korea.[177]

The Business Software Alliance (BSA) has recommended several strategies and concrete steps for reducing and finally eliminating the piracy from global environment.[178] These recommendations include the implementation of WCT, creation of strong enforcement mechanism, resources required to apply these mechanisms and increasing public education and awareness.[179]

[175] Ibid.
[176] IDC used the following basic research architecture to measure software piracy rates: Firstly, determined how much packaged software was put into use in 2008. Secondly, determined how much packaged software was paid for / legally acquired in 2008. Lastly, subtracted one from the other to get the amount of pirated software.
[177] For more information, visit: <http://www.pdmc.or.kr/> (Last visited: 02-06-2009).
[178] Ibid, supra note 163.
[179] A detailed list of steps can be found at Sixth Annual BSA and IDC Global Software Piracy Study, May 2009 <http://www.bsa.org/globalstudy> (Last visited: 20-05-2009).

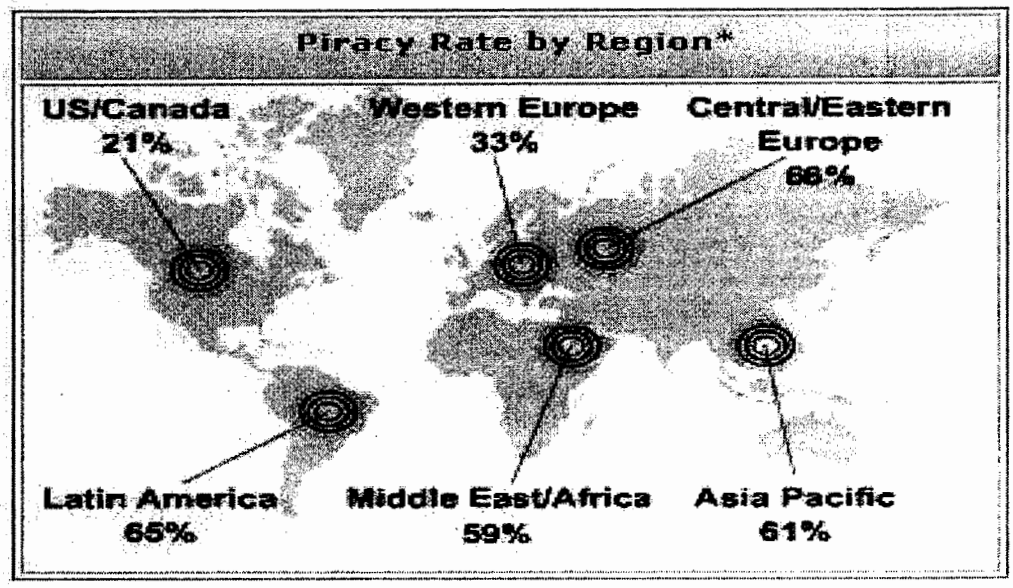

Figure 15 – *Worldwide Piracy Rates by Region*
**(BSA and IDC Global Software Piracy Study, May 2009)*

5.5 REMEDIES AVAILABLE IN CASE OF INFRINGEMENT

Copyright Ordinance of 1962 provides for three types of remedies to copyright owner in case of violation of his rights. According to Section 59, only the copyright owner or his licensee has the right to file a suit of copyright infringement. These remedies are civil, criminal and administrative, which though are distinct and independent, can be availed of simultaneously.

5.5.1 Civil Remedies

Civil remedies for the copyright infringement include damages, delivery of infringing copies and damages for conversion. The Ordinance differentiates between the intentional infringement and innocent infringement of copyright protected material. In case of innocent infringement some of the remedies, mentioned above, cannot be availed. For instance, the innocent infringer cannot be held liable for the payment of damages but may be required to give up the infringing activities or to pay the owner a sum representing the reasonable commercial value of that use, in some cases.

Moreover, the master / employer is vicariously liable for the acts of his servants / employees done in due course of work. So employer will be liable for any infringement committed by his employee even if he does not have the knowledge of that infringing activity and despite of the fact that he gave clear cut directions to his employees not to indulge in such activity which may constitute copyright violation.

The copyright owner must be vigilant enough to initiate the suit within proper time and limit specified for such cases. However, if the owner is unable to initiate legal proceedings for any sufficient cause which is accepted by the court, than the Ordinance provide for 'special remedies' i.e. the owner may apply to the court for immediate provisional orders preventing the further violation of copyright and preserving the evidences, if any, to such infringement.

5.5.2 Criminal Remedies

Criminal remedies for copyright infringements include the imprisonment for three years, fine upto Rs.100,000 or both of them,[180] seizure of infringing material and its delivery to copyright owner.

Additionally, Section 70(b) provides that if the offender who has been convicted under Section 66 repeats the commission of same offence then he will be fined upto Rs.200,000 in addition to the imprisonment which may extend to three years.

Section 71 of the Ordinance deals with the copyright infringement committed by the companies. According to this section, the person who is incharge of company or is responsible to conduct its business along with the company itself will be held liable for such infringement and punished accordingly. However, if a person proves that he has exercised due diligence for preventing for preventing the commission of offence or it was committed without his knowledge, will not be held liable. Section 74(1) empowers the police officer to seize the infringing copies and any other equipment used in this connection, for its production before Magistrate, without getting warrant from court for that purpose.

[180] See Section 66 of the Copyright Ordinance, 1962.

5.5.3 Administrative Remedies

Administrative remedies include motivating the Registrar of copyrights to stop the export and import of pirated copies in Pakistan. Any consignment intended to be imported into or exported out of Pakistan is suspected to contain pirated copies of copyright protected work, then an application can be made to Customs Officers for examination and detention under Customs Act, 1969.

CHAPTER VI

CONCLUSION & RECOMMENDATIONS

6.1 CONCLUSION

In the last few years, enormous development has taken place in the field of Information and Communication Technologies (ICTs). In parallel to these developments, protection of computer programs and databases both domestically and internationally has become important. The most common and globally acceptable intellectual protection form for these creations, contained in Article 10 of the TRIPS Agreement is the copyright protection.

The same legal principle that protects a book, song, or painting, automatically protects computer programs by forbidding copying or close paraphrasing of the source code. Copyrights are straightforward to enforce because it is easy to identify what is being protected: a particular implementation of a set of algorithms to solve a problem, rather than the algorithm itself. They have the advantage of being automatic, free, and only useful against criminals. Copyrights allow the abstract ideas behind a software program to be created by anyone, but protect an implementation of those ideas in concrete form, so developers who implement their own ideas do not have to worry that someone will put them out of business.

Copyright piracy is a trade barrier which can be lowered significantly in a relatively short period of time, in most cases, by a clear commitment from the responsible political officials and enforcement agencies to take immediate action against large-scale commercial pirates, and to impose deterrent penalties on such infringers. The enforcement mechanism in the TRIPS Agreement provide a comprehensive foundation for the development of civil, criminal and administrative procedures and remedies necessary for effective enforcement against traditional forms of copyright piracy. It is up to each government to arrange and coordinate efforts with its police, prosecutors, judges, customs officers, tax authorities, administrative agencies (such as Intellectual Property Organizations) and other authorities to ensure that its enforcement system complies with TRIPS Agreement.

In order to promote research & development, attract foreign-direct-investment, and overall improve our economic conditions, we have to protect each others' Intellectual

Property Rights. Because of the dearth of IPRs protection, the foreign investors do not invest in our country. And the government is losing revenues as the pirates do not pay taxes. This situation can be overturned by implementing effective enforcement policies.

6.2 AREAS WHERE COPYRIGHT ORDINANCE IS SILENT

- Technological measures to protect the computer program neither allowed nor prohibited so the status of these measures if taken and incorporated in the software by the industry is unclear.
- "Fair dealing" has not been made clear in the Ordinance. It is silent as to what amount of use is 'fair'. There is a need to have a balance with fair dealing.
- What if the authorized user of a computer program does some thing which one may say as "unfair dealing", how to determine?
- The infringer can do the de-compilation of the computer program or reverse engineer it – the Ordinance is silent about 'reverse engineering'.
- For the purpose of research and development falling under limitations and exceptions,[181] the reverse engineering is Fair Dealing, how to determine?
- The circumvention tools used for terminating the technological measures is neither legal nor illegal.

6.3 RECOMMENDATIONS

The Copyright legislation in Pakistan should be reviewed and the aforementioned areas should be made clear under the Ordinance. Furthermore, basic IPR concepts should be incorporated in curriculum at secondary school level because 'piracy' is immoral and unethical beside it is a crime.

The government and software companies cannot eliminate 'piracy' without active participation of the general public. The most important factor is very high prices of genuine software products which should be brought into the purchasing power of the people. When there will be minute difference between original and pirated software

[181] See Section 57 of the Copyright Ordinance, 1962.

prices, the people will definitely prefer original products because of the benefits associated with them in the shape of technical support and backup by the software company.

The recommendations regarding legislation, enforcement and adjudication of IPRs are given below:

6.3.1 Legislation

TRIPS Compliance

The flexibilities given under the TRIPS agreement may be incorporated in detail rather than vague provisions as given under the Copyright Ordinance, 1962. The technological methods to protect computer programs from piracy and infringement may be specifically allowed to strengthen the industry.

"Fair Dealing" to be defined

The "Fair Dealing" should be defined in the Ordinance and the scope of fair dealing should also be incorporated so that one may not violate IPRs of others under the umbrella of fair dealing. Provisions on limitations and exceptions need to be reviewed in the light of TRIPS agreement.

Protected & Non-protected Elements

It should be worked out which elements of the computer programs are protectable and which are not? There are some elements which are not decided yet like user interface has not been decided in Pakistan. It should also be decided and protected under the Ordinance.

Reverse Engineering

Reverse engineering and de-complication of computer programs should be allowed for the enhancement of research and development, however conditions may be applied to restrict the use of this clause to the fair dealing.

6.3.2 Enforcement

Proven Anti-Piracy Strategy

The proven "blueprint" for reducing PC software piracy is a combination of consumer education, strong intellectual property policies, effective law enforcement, and legalization assistance programs run by software companies and government agencies. The progress seen in so many nations is proof that this anti-piracy blueprint works – and that local governments, businesses, and consumers all benefit.

Intellectual Property Awareness Campaigns

Our culture is not aware to piracy that is why our country is having such a high piracy level of 86%. IP is critical to our very existence and the administrative agencies like IPO-Pakistan should spread this message in general public with the assistance of various stakeholders of private sector and government institutions.

Strong Enforcement Model

One possible way to minimize software piracy tendency in the country is to have strong enforcement model in place which provides immediate and long lasting remedies to the victims of software piracy. That includes permanent shutdown of all illegal distribution, torrent websites; heavy penalties should be imposed on the pirates. Until and unless, these rules are intact, intellectual property thieves will remain free to exploit the software developers.

Affordable Pricing Model

Apart from the law enforcement model in place and running smoothly, there is another factor that pays a much powerful role in keeping the piracy tendency steady and going; the cost of software in high demand. For instance, the cost of original software CD is Rs.5000, why would the users like to go after it when the pirated CD is available for Rs.50 in the market. As a consequence, the original software due to its expensive-and-non-affordability nature is pirated and brought into the market at lower rates. The users cannot be tuned in to buy the expensive software. Adding an affordable pricing model of the software product for the target market would leave no room for pirates.

Cost of software offered by multinationals should also be made affordable for the consumers so as to counter / minimize software piracy in the country. At present multinationals are facing cross bordering issues and they had to provide equitable prices being biased towards one country. However, they should design and implement an effective strategy for efficient controlling of every software piracy quandary.

Research & Development Spending

Improvement can be achieved by innovation. Innovation is possible by Research & Development (R&D) only. Pakistan needs innovative products for competing with the international Information and Communication Technology (ICT) giants. R&D should be promoted and rewarded at university level as companies cannot afford R&D as the resources are undersized. Therefore, awareness of IPRs in ICT should be created in the Universities.

Strong IP Portfolio

Strong IP portfolio of software companies can act as a motivating factor in improving IT industry. Pakistan IT industry is small by international standards. However, IP portfolios safeguard developer's interest in the product, improve creativity and augment exports.

Vendor Legalization Efforts

These are generally deals with major customers to supply software at volume discounts in exchange for replacing pirated software. Such programs have been paying off, and in tough economic times, we can expect such efforts to increase as suppliers work to convert as many users of pirated software to customers as possible.

Vendor Agreements with Original Equipment Manufacturer (OEM Bundling)

Agreements to preload software onto hardware systems before they are shipped are also paying off. As the number of non-branded (white box) vendors continues to fall, more of these agreements will take place.

Technical Advances / Assistance

Digital rights management, embodied in programs like Microsoft's Windows Genuine Advantage, will lower piracy by encouraging customer self-audits and by offering services not available to users of non-legal software.

Software Asset Management (SAM)

These programs, which help end users manage and deploy software as well as manage their software licenses, can save money in the organization even if money has to be spent to legalize previously unlicensed software.

Government-led Education and Enforcement

Governments can have an impact by educating consumers on the local benefits of using legal software (and the risks of using pirated software); enforcing intellectual property laws; increasing use of legitimate software in government agencies; and promoting enterprise software legalization programs for private businesses. A detailed mechanism for protection of computer programs, databases, music, audio/video and cinematographic work through the use of modern technological means may be evolved with the active coordination and participation of industry and academia.

New Distribution Agreements

New forms of software distribution such as bundling PCs with broadband access services and delivering software-as- a-service ("cloud computing") will make the use of legitimate software more common.

Public-Private Partnerships

Increased government and industry partnerships in compliance programs such as those of the BSA, and increased lobbying by local industry associations and vendors will ensure increased government attention to intellectual property rights. The growth of local software industries will create a "virtuous circle," in which local vendors have a vested interest in working to lower piracy.

Globalization

As multinational companies invest in emerging markets, and as local players in China, India, Russia, and other fast-growing economies increasingly become multinational, the inefficiencies and risks of using pirated software will encourage the use of legitimate software.

6.3.3 Adjudication

Capacity Building of Prosecutors

The investigation and prosecution of IPR cases are technical in nature and are new phenomenon in the law enforcement circles of Pakistan, which invariably require modern investigative techniques and prosecutive abilities. Therefore, the prosecutors should be trained after regular intervals in Intellectual Property Academy (IPO-Pakistan) and FIA Academy.

Establishment of Intellectual Property Courts / Tribunals

In Pakistan, there are several courts which deal with specific matters, for instance consumer courts, banking courts, labour courts, services tribunals, etc. On the same basis, special tribunals / courts specifically for the cases related to IPR infringements should be established. These courts should have judges who are experts in Intellectual Property laws.

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http://www.questia.com

http://www.wipo.int

STATUTES AND CONVENTIONS

Berne Convention, 1886

Copyright Ordinance, 1962 [as amended in 2000]

EU Directives

Paris Convention, 1983

TRIPS Agreement, 1995

WIPO Copyright Treaty, 1996

GOVERNMENT OF PAKISTAN

Intellectual Property Organisation of Pakistan
COPYRIGHT OFFICE, KARACHI

DUPLICATE
Registration No.16169-Copr

Certificate of Registration of Copyright

Certified that the Copyright in the **LITERARY WORK(COMPUTER SOFTWARE,2005)** entitled **PIA RECIPE AND INVENTORY MANAGEMENT SYSTEM.** authored by **SYED ALI HASSNAIN JAFRY, MANAGER FINANCIA SYSTEMS, M/S. PIA, KARACHI** and published by **M/S. PAKISTAN INTERNATIONAL AIRLINES CORPORATION, PIA BUILDING , KARACHI,** in the year **2005** has been registered in the Register of Copyrights in the name of **M/S. PAKISTAN INTERNATIONAL AIRLINES CORPORATION, PIA BUILDING QUAID-E-AZAM INTERNATIONAL AIRPORT, KARACHI** under Registration No.**16169**-Copr.

GIVEN UNDER MY HAND AND SEAL ON THIS **7TH** DAY OF **MAY, 2007.**

PLEASE NOTE THAT TITLE/NAME/BRAND/MARK GIVEN BY APPLICANT IN APPLICATION FORM OR APPEARING ON "WORK" IS NOT REGISTERED BUT ONLY THE EXPRESSION/STYLE/GETUP OF THE "WORK" IS REGISTERED/PROTECTED UNDER COPYRIGHT LAW

7/5/07

SHAKIL AHMED ABBASI
Registrar of Copyrights

FORM-II
APPLICATION FOR REGISTRATION OF COPYRIGHTS
[SEE RULE 4 (i)]

The Registrar of Copyrights,
Central Copyright Office,
KARACHI.

Sir,

In accordance with section 39 of the Copyright Ordinance, 1962 (XXXIV of 1962), I/We hereby apply for registration of copyright and request that entries may be made in the Register of Copyrights as in the enclosed statement of particulars sent herewith in triplicate.

I, also send herewith duly completed the statement of further particulars relating to the work.

2. In accordance with sub-rule (3) of Rule 4 of the copyright rules, 1967, I/We have sent by hand pre-paid registered post copies of this letter and of the enclosed statement(s) to the other parties concerned as shown below:-

NAME AND ADDRESS OF THE PARTIES	DATE OF DESPATCH
1	2

3. The prescribed fee has been paid, as per details below:- **By Pay-Order**

4. Communication on the subject may be addressed to:-

Muhammad Khalid Advocate
Amir Malik Advocate, Jubilee Inductance House,
1st Floor, I.I. Chundrigar Road, Karachi

List of enclosures: -

Yours faithfully

Place: Karachi,
Dated: 31-10-2005

(Muhammad Khalid)
Advocate

***STATEMENT OF PARTICULARS (TO BE SENT IN TRIPLICATE)**

**See entries 7, 11, 12 and 13 of the statement of particulars and the party referred to in entry 2(e) of the statement of further particulars.

ATTESTED

Cont'd.....P/2

NAZEER AHMED PATOLI
Deputy Registrar of Copyrights,
Government of Pakistan,
Copyright Office, IPO-Pakistan,
Karachi, Ph: 021-9230141

STATEMENT OF PARTICULARS.

(To be sent in triplicate)

1. Registration Number_____- Corp.
(to be filled in the Copyright office)

2. Name, Address and Nationality of the applicant.

M/s Pakistan International Airlines Corporation, PIA Building, Quaid-e-Azam International Airport, Karachi Pakistani.

3. Nature of the applicant's interest in the Copyright of the work. **Copyright Owner**

4. Class and description of the work and year of creation. **Literary work / Computer Software (CD) 2005.**

5. Title of the work. **"PIA RECIPE AND INVENTORY MANAGEMENT SYSTEM"**

6. Language of the work. **English / RM. Cobol under Unix.**

7. Name, address and nationality of the author and if the author is dead, the date of his death.

Syed Ali Hassnain Jaffery, Manger Financial Systems, M/s. Pakistan International Airlines Corporation, PIA Building, Quaid-e-Azam International Airport, Karachi Pakistani National.

8. Whether work is published or unpublished. **Published**

9. Year and country of first publication and name, address and nationality of the publisher.

2005 – Pakistan. M/s Pakistan International Airlines Corporation, PIA Building, Quaid-e-Azam International Airport, Karachi Pakistani.

10. Year and countries of subsequent publications, if any and names addresses and nationalities of the publishers.

Being published continuously since, 2005 by the applicants company.

ATTESTED

NAZEER AHMED PATOLI
Deputy Registrar of Copyrights
Government of Pakistan
Copyright Office, IPO-Pakistan,
Karachi, Ph: 021-9230141

Cont'd.....P/3

11. Names, Addresses and Nationalities of the owners of the various rights comprising the copyright in the work and the extent of rights, held by each, together with particulars of assignment and licenses, if any.

All rights reserved with the applicant company.

12. Names, Addresses and Nationalities of the other persons, if any authorized to assign or license the rights comprising the copyrights.

None-else.

13. If the work is an artistic work, the location of the original work, including name, address and nationality of the person in possession of the work (in the case of an architectural work the year of completion of the work should also be mentioned).

Not an artistic work.

14. Remarks, if any; NIL.

Place: Karachi,
Dated: 31-10-2005

(Muhammad Khalid)
Advocate

Cont`d.....P/4

ATTESTED

NAZEER AHMED PATOLI
Deputy Registrar of Copyrights,
Government of Pakistan,
Copyright Office, IPO-Pakistan,
Karachi, Ph: 021-9230141

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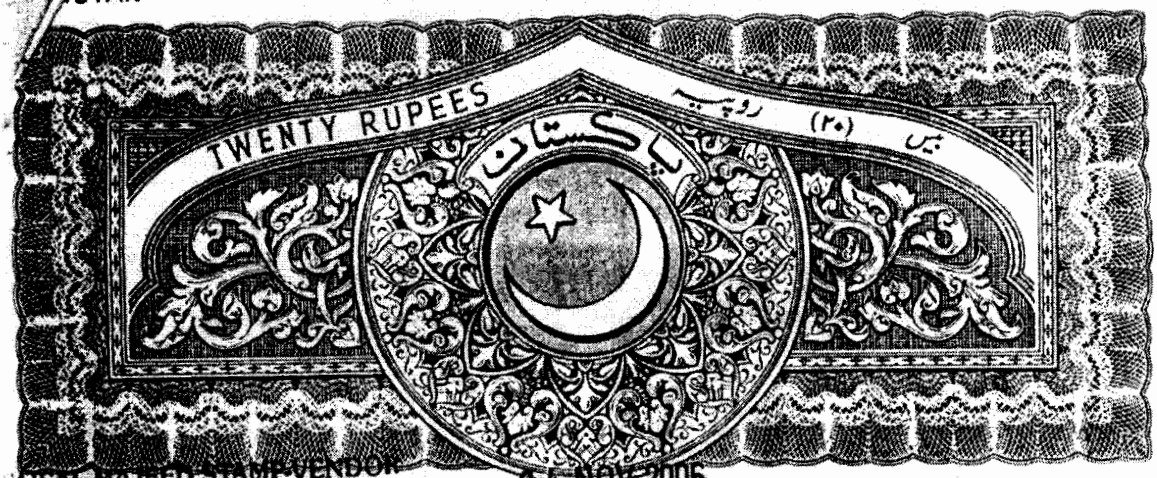

ATISAL MAJEED STAMP VENDOR
Lic. No. 105, Shop No. 8, New Ruby Centre,
M. A. Jinnah Road, Boulton Market, Karachi.
No. S8018 DATE 24 NOV 2006
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RPOSE
LUE RS. 20
AMP VENDOR'S SIGNATURE

AFFIDAVIT

I, Syed Ali Hasnain Jaffery son of S.M. Hasnain Jafri Muslim, adult, working as Manager Financial Systems, M/s. Pakistan International Airlines Corporation, PIA Building, Quaid-e-Azam International Airport, Karachi, do hereby state on oath as follows:-

1. I say that I am the employee of M/s. Pakistan Internaitonal Airlines Corporation and working as a Manager Financial Systmes.

2. I say that the Software titled "PIA RECIPE AND INVENTORY MANAGEMENT SYSTEM" is created/ designed by me for M/s. Pakistan International Airlines Corporation.

3. I say that I have surrendered all the rights in respect of above said Software to Pakistan International Airlines Corporation for its use or registration. I further say that I have no objection if the rights under the Copyright Ordernance 1962 in respect of said Software be registered in the name of the Pakistan International Airlines Corporaiton.

TAJUDDIN QURESHI Advocate Notary Public

Whatever has been stated above is true and correct to the best of my knowledge and belief.

DEPONENT

ATTESTED
PRESENTED FOR ATTESTATION
24 JAN 2007
NOTARY PUBLIC
TAJUDDIN QURESHI
ADVOCATE
KARACHI-PAKISTAN

The deponent above named is identified by me to the commissioner for taking affidavit.

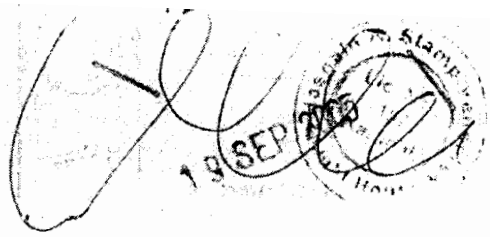
ADVOCATE

ATTESTED

Solemnly affirmed before me on oath at Karachi on this ___ day of November 2006, by the deponent above named who is identified by Mr. Amir Malik, Advocate, who is personally known to me.

NAZEER AHMED PATOLI
Deputy Registrar of Copyrights
Government of Pakistan
Copyright Office, IPO-Pakistan,
Karachi, Ph: 021-9230141

COMMISSIONER FOR TAKING AFFIDAVIT



VAKALATNAMA

BEFORE THE REGISTRAR COPY RIGHTS

CASE NO: of 2005

Pakistan International
Airlines Corporation. ..... Petitioner

I, Asmatullah Khan S/o Haji Ghulam Sarwar , attorney of the above named petitioner, do hereby appoint and authorized Mr. Amir Malik, Muhammad Khalid and Muhammad Ramzan, Advocates, to act, appear and plead for me/ us in the above case.

I also authorize the said advocate to compromise the case and/or withdraw any sum on my/our behalf.

Karachi: Dated this the 29 day of October, 2005

(ASMATULLAH KHAN)
Manager Legal Services
& Attorney P.I.A.C.

Received by me on the 29th October, 2005 from the
ACCEPTED

Advocate .....

Address for Service:

AMIR MALIK
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Karachi-74000
Tel # 2417688
Reg. No. 2673/H.C./KCY.

Muhammad Khalid
Advocate

Muhammad Ramzan
Advocate

ATTESTED

NAZEER AHMED PATOLI
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