

## Unit 4 Introduction to Computer Software

### Structure:

- 4.1 Introduction
  - Objectives
- 4.2 Computer Software
- 4.3 Overview of operating systems
  - Windows
  - Linux
  - Unix
  - Mac OS
  - Solaris
- 4.4 Overview of application software
  - Office tools – MS Office, Star Office
  - Graphic application software – CorelDraw
  - Engineering application software
  - Environmental Science application software
  - Medical Science application software
  - Software Legal Issues
- 4.5 Overview of proprietary software
- 4.6 Overview of open source technology
- 4.7 Summary
- 4.8 Terminal Questions
- 4.9 Answers

### 4.1 Introduction

As we discussed in the previous unit, computer, memory signifies the state information of a computing system, as it is kept active in some physical structure. The term "memory" is used for the information in physical systems which are fast, as a distinction from physical systems which are slow to access (i.e. data storage). In this unit, we will study the computer software, various operating systems, application software, Overview of proprietary software, open source technology & Computer software installation. In general, computer software is created by computer programmers using a programming language. The programmer writes commands in the programming language that are related to what someone might use in everyday speech. These commands are called source code. Another

computer program called a compiler is then used on the source code, transforming the commands into a language that the computer can understand. The result is an executable computer program, which is another name for software.

**Objectives:**

After studying this unit, you should be able to:

- describe the Computer Software
- explain operating systems
- describe application software
- Discuss proprietary software

**4.2 Computer Software**

Computer Software is a general term for organized collections of computer data and instructions, often broken into two major categories: system software that provides the basic non-task-specific functions of the computer, and application software which is used by users to accomplish specific tasks. A computer program guides a computer to perform some processing function or combination of functions. For the instructions to be carried out, a computer must execute a program, that is, the computer reads the program, and then follows the steps encoded in the program in a exact order until completion. A program can be executed many different times, with each execution yielding a potentially different result depending upon the options and data that the user gives the computer.

Different kinds of computer software are designed to do a variety of tasks including word processing, number crunching, image and video editing, data storage, and home entertainment. There are three major types of computer software:

**1. System Software**

System software is used to run the computer hardware. It includes mainly the Operating system and device drivers. System software refers to the files and programs that make up your computer's operating system. System files include libraries of functions, system services, drivers for printers and other hardware, system preferences, and other configuration files. The programs that are part of the system software include assemblers, compilers, file management tools, system utilities, and debuggers.

The system software is installed on your computer when you install your operating system. You can also update the software by running programs such as "Windows Update" for Windows or "Software Update" for Mac OS X. Unlike application programs, however, system software is not meant to be run by the end user. For example, while you might use your Web browser every day, you probably don't have much use for an assembler program (unless, of course, you are a computer programmer).

Subsequently system software runs at the most basic level of your computer; it is called "low-level" software. It produces the user interface and allows the operating system to interact with the hardware. Fortunately, you don't have to worry about what the system software is doing since it just runs in the background.

## **2. Programming Software**

Programming software usually provides tools to assist a programmer in writing computer programs and software using different programming languages. Computer programmers are accountable for teaching computers how to perform tasks and solve computational problems. They develop the software that runs on computers using special software called a compiler. A compiler is a computer program that decodes text written in a computer language into another computer language.

A computer language is the language that computer understands and can interpret. There are two main types of computer languages the High level language and the Low level language or machine language. Since the computer is a machine, it understands the machine language. Unfortunately, the machine language is very difficult for human beings to understand, hence the need of a compiler. Examples of computer languages include Pascal, Basic, Java, C-Sharp, and Prolog.

## **3. Application Software**

It allows end users to accomplish one or more specific tasks. Typical applications include industrial automation, business software, educational software, medical software, databases, and computer games.

Computer software works in a unique way. First, the program has to be installed onto the computer using an installer program. The installation process copies all the necessary files needed to run the program to the

computer's storage and may have to teach the OS how to run the program by altering or configuring the OS as required. The most common method of installing Software on a personal computer is by booting from a CD-ROM that contains the installation program and installable software. Such a CD can be burned.

After installing the program, the program can then be used by "loading" it into the computer's memory. Once the software is loaded, the computer is able to execute the software. Computers operate by executing the computer program. This involves passing instructions from the application software, through the system software, to the hardware which ultimately receives the instruction as machine code. Each instruction causes the computer to carry out an operation which may include moving data, carrying out a computation, or altering the control flow of instructions. A program should be "unloaded" from memory after use to allow other programs use the memory.

#### **Self Assessment Questions**

1. \_\_\_\_\_ is technically a set of instructions written in a computer language that solves a computational task.
2. \_\_\_\_\_ is used to run the computer hardware.
3. \_\_\_\_\_ usually provides tools to assist a programmer in writing computer programs and software using different programming languages.
4. \_\_\_\_\_ allows end users to accomplish one or more specific tasks.

#### **4.3 Overview of operating systems**

An operating system is a computer program that accomplishes the hardware and software resources of a computer. At the foundation of all system software, the OS performs basic tasks such as controlling and allocating memory, prioritizing system requests, controlling input and output devices, facilitating networking, and managing files. It may also provide a graphical user interface for higher level functions.

Examples of operating system are Windows Vista, WindowsXP, Windows98, WindowsME, Windows95 etc, Linux family of operating systems such as, Ubuntu, RedHat, Mandrake, SuSE, Solaris, and UNIX.

The operating system is the most important software because it is responsible for booting the computer. Every computer must have an

operating system installed on it. The Windows family of OS's is the most popular. A survey says 9 out of every 10 computers run Windows operating system.

#### **4.3.1 Windows**

The term Windows collectively describes any or all of several generations of Microsoft operating system products. The Microsoft Windows family of operating systems originated as a graphical layer on top of the older MS-DOS environment for the IBM PC. As of 2004, Windows held a near-monopoly of around 90% of the worldwide desktop market share, although some predict this to dwindle due to the increased interest in open source operating systems.

The first Microsoft Windows, version 1.0, released in November 1985, lacked a degree of functionality and achieved little popularity. Windows 1.0 did not provide a complete operating system; rather, it extended MS-DOS. Modern versions are based on the newer Windows NT core that first took shape in OS/2 and borrowed from Open Virtual Memory System. Windows runs on 32-bit and 64-bit Intel and AMD processors, although earlier versions also ran on the DEC Alpha, MIPS, and PowerPC architectures (some work was done to port it to the SPARC architecture).

In August 1995, Microsoft released Windows 95, which made further changes to the user interface and was the first Windows version to utilize multitasking. In July 1993, Microsoft released Windows NT based on a new kernel. NT was considered to be the professional operating system. NT and the Windows non-professional line would later be fused together to create Windows XP.

The next in line was Microsoft Windows 98 released in June 1998. Substantially criticized for its slowness compared with Windows 95, many of its basic problems were later rectified with the release of Windows 98 Second Edition in 1999.

As part of its professional line, Microsoft released Windows 2000 in February 2000. The consumer version following Windows 98 was Windows Me (Windows Millennium Edition). Released in September 2000, Windows Me attempted to implement a number of new technologies for Microsoft: most notably publicized was "Universal Plug and Play." However, the OS was substantially criticized for its lack of compatibility and stability.

In October 2001, Microsoft released Windows XP, a version built on the Windows NT kernel that also retained the consumer-oriented usability of Windows 95 and its successors. This new version was widely praised in computer magazines. It shipped in two distinct editions, "Home" and "Professional", the former lacking many of the superior security and networking features of the Professional edition. Additionally, the "Media Center" edition was released in 2003, with an emphasis on support for DVD and TV functionality including program recording and a remote control.

In April 2003, Windows Server 2003 was introduced, replacing the Windows 2000 line of server products with a number of new features and a strong focus on security; this was followed in December 2005 by Windows Server 2003 R2.

Windows Vista, the successor to Windows XP, is due to be released on January 30, 2007. It was released to business consumers on November 30, 2006. Windows Vista introduces a breakthrough user experience and is designed to help you feel confident in your ability to view, find, and organize information and to control your computing experience.

The visual sophistication of Windows Vista helps streamline your computing experience by refining common window elements so you can better focus on the content on the screen rather than on how to access it. The desktop experience is more informative, intuitive, and helpful. And new tools bring better clarity to the information on your computer, so you can see what your files contain without opening them, find applications and files instantly, navigate efficiently among open windows, and use wizards and dialog boxes more confidently. Windows Server 2003's successor will be Windows Server "Longhorn", and has a planned release date in the second half of 2007.

#### **4.3.2 Linux**

Linux operating system is one of the most prominent examples of open source development and free software; its underlying source code is available for anyone to use, modify, and redistribute freely. Originally developed and used primarily by individual enthusiasts on personal computers, Linux has since gained the support of corporations such as IBM, Sun Microsystems, Hewlett-Packard, and Novell, Inc., and has risen to importance as an operating system for servers; eight of the ten most reliable internet hosting companies now run Linux on their web servers.

Linux has been more commonly ported to different computing platforms than any other operating system. It is used in devices ranging from supercomputers to mobile phones, and is gaining popularity in the personal computer market. Linux's roots in the Unix operating system mean that in addition to graphical configuration tools and control panels available for many system settings and services, plain-text configuration files are still commonly used to configure the operating system and can readily be made accessible (or not) to users, at the administrator's will.

#### **4.3.3 Unix**

UNIX is an operating system is to coordinate the various parts of the computer the processor, the on-board memory, the disk drives, keyboards, video monitors, etc. to perform useful tasks. The operating system is the master controller of the computer, the glue that holds together all the components of the system, including the administrators, programmers, and users. When you want the computer to do something for you, like start a program, copy a file, or display the contents of a directory, it is the operating system that must perform those tasks for you.

More than anything else, the operating system gives the computer its recognizable characteristics. It would be difficult to distinguish between two completely different computers, if they were running the same operating system. Conversely, two identical computers, running different operating systems, would appear completely different to the user. UNIX was created in the late 1960s, in an effort to provide a multiuser, multitasking system for use by programmers. The philosophy behind the design of UNIX was to provide simple, yet powerful utilities that could be pieced together in a flexible manner to perform a wide variety of tasks. The UNIX operating system comprises three parts: The kernel, the standard utility programs, and the system configuration files.

The kernel is the core of the UNIX operating system. The kernel is a large program that is loaded into memory when the machine is turned on, and it controls the allocation of hardware resources from that point forward. The kernel knows what hardware resources are available (like the processor(s), the on-board memory, the disk drives, network interfaces, etc.), and it has the necessary programs to talk to all the devices connected to it.

#### 4.3.4 Mac OS

Mac OS was named by the Apple company as "Mac System Software" in the beginning, a specially designed operating system only for 68K first Motorola processors with own Macintosh hardware, Mac OS takes up a special role in the world of desktop systems. The first version was "System 1" and appeared bundled with the Mac in 1984. The classic desktop is designed as a single user operating system and almost completely hides the full path to files and directories. The graphic representation is condensed to the essence. Whole interface is very easy to use and does not need the right mouse button for user interaction. Mac OS does not include a command line interface.

Starting with System 3.0, the used file system HFS was used officially, which does not differ between uppercase and lowercase letters. System 5.0 was the first release to run several programs with the integrated MultiFinder at the same time. The operating system was programmed up to system 6.0 mostly in assembler and partially in Pascal and used a 24-bit addressing mode. Cooperative Multi-tasking could optionally be enabled in System 6. System 7.0 first supported 32-bit addressing. Thus allow the operating system can use more memory and more powerful programs. Since 1994 System 7.5 supported for the first time the PowerPC architecture and is optimized with the following Mac OS versions further on this architecture. With System software 7.6 the name was changed to Mac OS in January 1997.

The optimization of the operating system to the hardware has the disadvantage that the system software cannot be installed on every Mac. Application compatibility to the Mac systems may also vary with each version. 2006 MacOS X was presented for the first time publicly on x86 hardware, Apple allows the use of Mac OS X only on specific intel-Macintosh systems. According to Steve Jobs Mac OS X have been developed since 2000 internally parallel for Intel and PowerPC processors. The version of Mac OS X 10.6.0 raised the optimization to Intel-based processors further, the new operating system is no longer available for PowerPC Macintosh or pure 32-bit Intel processors. In return the user receives a pure 64-bit operating system optimized for performance on multiple processors. Even the GPU computing power itself can be used with specific applications. The selection of software is focused on the creative



industry and enables such as the professional graphic, audio and video editing. Office applications such as MacWrite, Microsoft Office, OpenOffice and 3D games are also available. The choice of browsers is large with iCab, Microsoft Internet Explorer, Netscape, Opera and Mozilla Firefox.

#### **4.3.5 Solaris**

This is the operating system developed by Sun Microsystems. It is certified against the Single UNIX Specification as a version of UNIX. Although Solaris proper is still proprietary software, the core operating system has been made into an open source project, Open Solaris. Solaris is considered to be the SunOS operating system plus a graphical user environment, ONC+, and other components. OpenSolaris was seeded on June 14, 2005 from the then-current Solaris development code base; both binary and source versions are currently downloadable and licensed without cost.

The fundamental Solaris codebase has been under continuous development since work began in the late 1980s on what was eventually released as Solaris 2.0. The Solaris version under development by Sun is codenamed Nevada, and is derived from what is now the OpenSolaris codebase.

#### **Self Assessment Questions**

5. An operating system (OS) is a computer program that manages the hardware and software resources of a computer. (True/False)
6. UNIX is an operating system. (True/False)

#### **4.4 Overview of application software**

Application software is the computer software designed to help the user to perform a singular or multiple related specific tasks. Typical examples are word processors, spreadsheets, media players and database applications.

Application software is a subclass of computer software that employs the capabilities of a computer directly and thoroughly to a task that the user wishes to perform. This should be contrasted with system software which is involved in integrating a computer's various capabilities, but typically does not directly apply them in the performance of tasks that benefit the user. In this context the term application refers to both the application software and its implementation. A simple, if imperfect analogy in the world of hardware would be the relationship of an electric light bulb (an application) to an electric power generation plant (a system). The power plant merely

generates electricity, not itself of any real use until harnessed to an application like the electric light that performs a service that benefits the user. Typical examples of software applications are word processors, spreadsheets, and media players. Multiple applications bundled together as a package are sometimes referred to as an application suite.

Some might bundle together a word processor, a spreadsheet, and several other discrete applications. The separate applications in a suite usually have a user interface that has some commonality making it easier for the user to learn and use each application. And often they may have some capability to interact with each other in ways beneficial to the user. For example, a spreadsheet might be able to be embedded in a word processor document even though it had been created in the separate spreadsheet application. User-written software tailors systems to meet the user's specific needs. User-written software includes spreadsheet templates, word processor macros, scientific simulations, graphics and animation scripts.

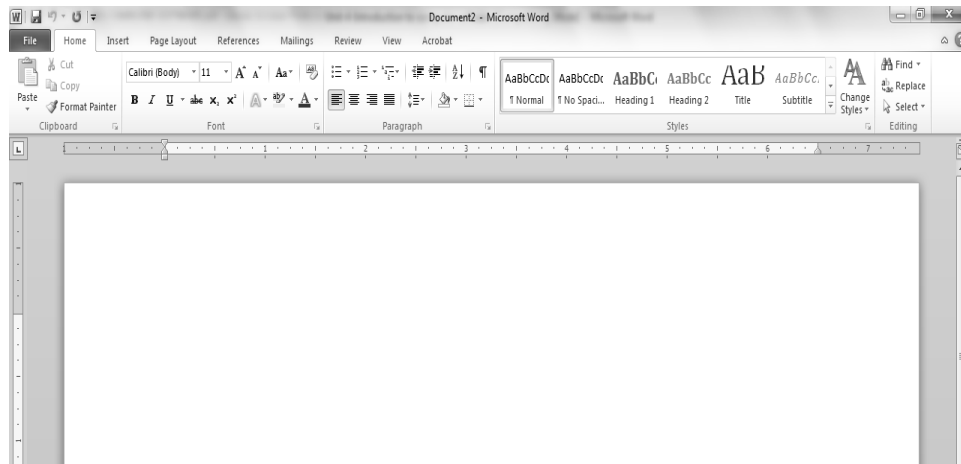
Even email filters are a kind of user software. Users create this software themselves and often overlook how important it is. In some types of embedded systems, the application software and the operating system software may be indistinguishable to the user, as in the case of software used to control a VCR, DVD player or Microwave Oven.

#### **4.4.1 Office tools – MS Office**

Microsoft Office is a software package that consists of different software applications that complete different activities. Microsoft office is both for home use and for business. Microsoft Office is by far the most widely recognized software suite in the world with about 600 million users worldwide. Microsoft Office among many others includes the following:

**Word processor:** It is a computer application used for the production (including composition, editing, formatting, and possibly printing) of any sort of printable material. A word processor may also refer to a stand-alone computer unit similar to a typewriter, but frequently including technological advancements such as a screen, advanced formatting and printing options, and the ability to save documents onto memory cards or diskettes. Word processors almost invariably allowed the user to choose between standard typing and word processing modes by way of a switch. Such word

processors should not be confused with an electric typewriter. Figure 4.1 shows the graphical user interface of the Microsoft Word 2007.



**Fig. 4.1: Microsoft Word 2007**

Word processors are descended from early text formatting tools (sometimes called text justification tools, from their only real capability). Word processing was one of the earliest applications for the personal computer in office productivity. Microsoft Word is the most widely used computer word processing system. There are also many other commercial word processing applications, such as WordPerfect. Open-source applications such as OpenOffice's Writer and KWord are rapidly gaining in popularity.

Word processing typically refers to text manipulation functions such as automatic generation of:

- Batch mailings using a form letter template and an address database (also called mail merging);
- Directories of keywords and their page numbers;
- Tables of contents with section titles and their page numbers;
- Tables of figures with caption titles and their page numbers;
- Cross-referencing with section or page numbers;
- Footnote numbering

Other word processing functions include "spell checking" (actually checks against wordlists), "grammar checking" (checks for what seem to be simple grammar errors), and a "thesaurus" function (finds words with similar or opposite meanings). In most languages grammar is very complex, so

grammar checkers tend to be unreliable and also require a large amount of memory.

**Spreadsheet:** Spreadsheet applications are computer programs that let you create and manipulate spreadsheets electronically. A spreadsheet is a table of values arranged in rows and columns. Each value can have a predefined relationship to the other values. If you change one value, therefore, you may need to change other values as well. In a spreadsheet application, each value sits in a cell. You can define what type of data is in each cell and how different cells depend on one another. The relationships between cells are called formulas, and the names of the cells are called labels.

Once you have defined the cells and the formulas for linking them together, you can enter your data. You can then modify selected values to see how all the other values change accordingly. This enables you to study various what-if scenarios.

A simple example of a useful spreadsheet application is one that calculates mortgage payments for a house. You would define five cells:

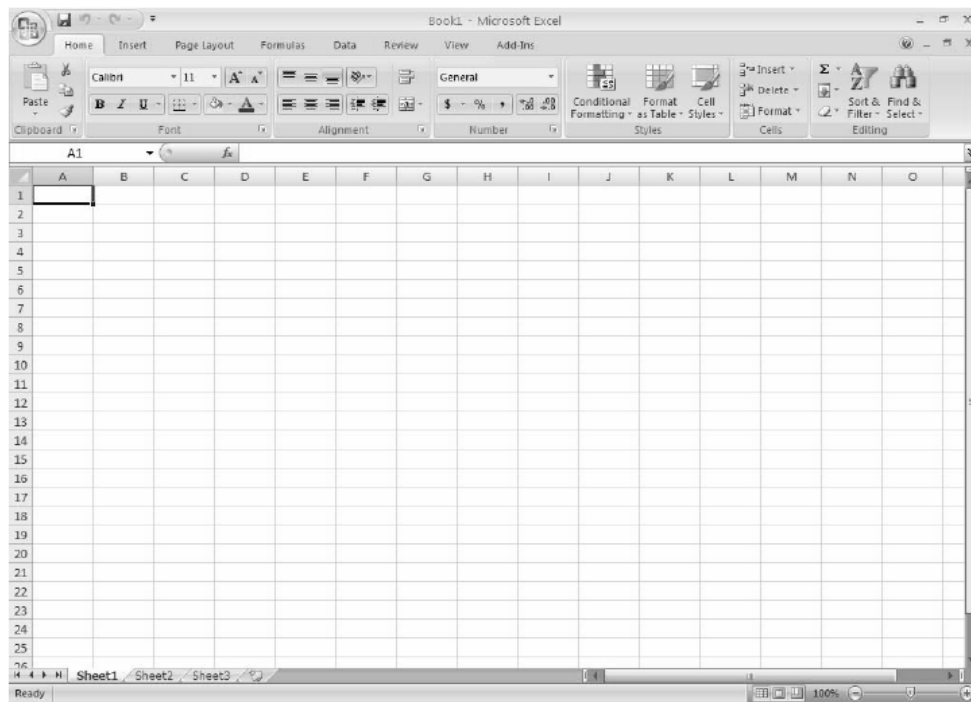
- total cost of the house
- down payment
- mortgage rate
- mortgage term
- monthly payment

Once you had defined how these cells depend on one another, you could enter numbers and play with various possibilities. For example, keeping all the other values the same, you could see how different mortgage rates would affect your monthly payments.

There are a number of spreadsheet applications on the market, Excel being among the most famous. The more powerful spreadsheet applications support graphics features that enable you to produce charts and graphs from the data.

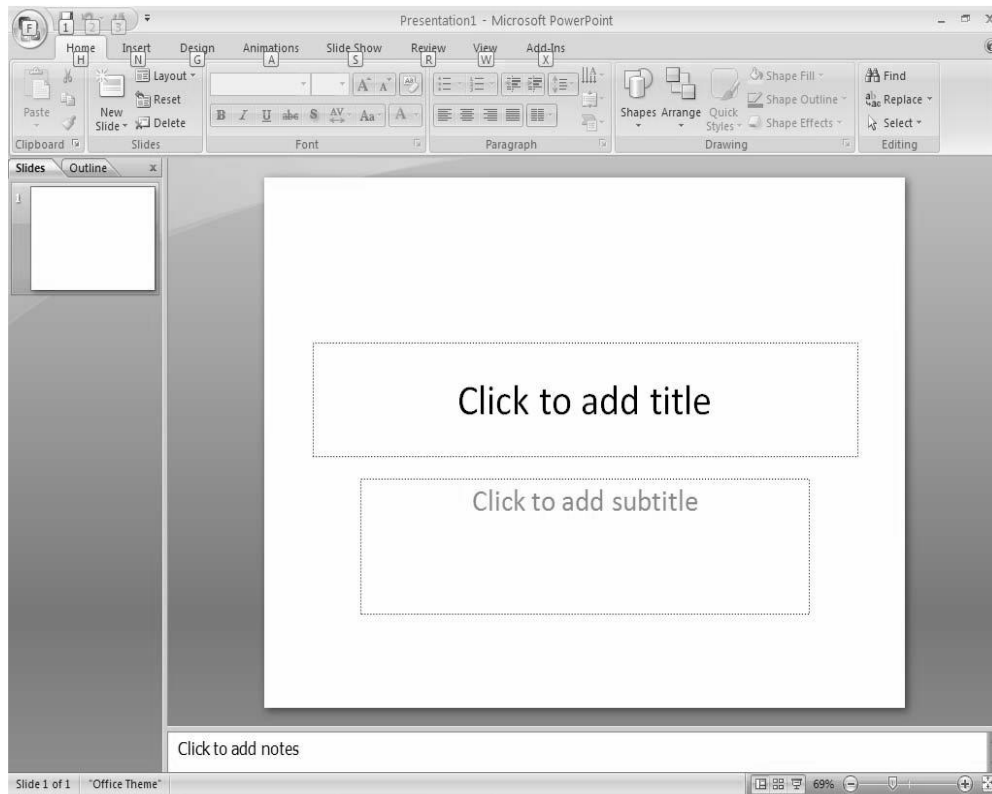
Most spreadsheet applications are multidimensional, meaning that you can link one spreadsheet to another. A three-dimensional spreadsheet, for example, is like a stack of spreadsheets all connected by formulas. A change made in one spreadsheet automatically affects other spreadsheets.

With Microsoft Excel, you can create detailed spreadsheets for viewing and collaboration. Create customized formulas for your data and analyze it with easy to construct charts. Figure 4.2 shows the graphical user interface of the Microsoft Excel 2007.



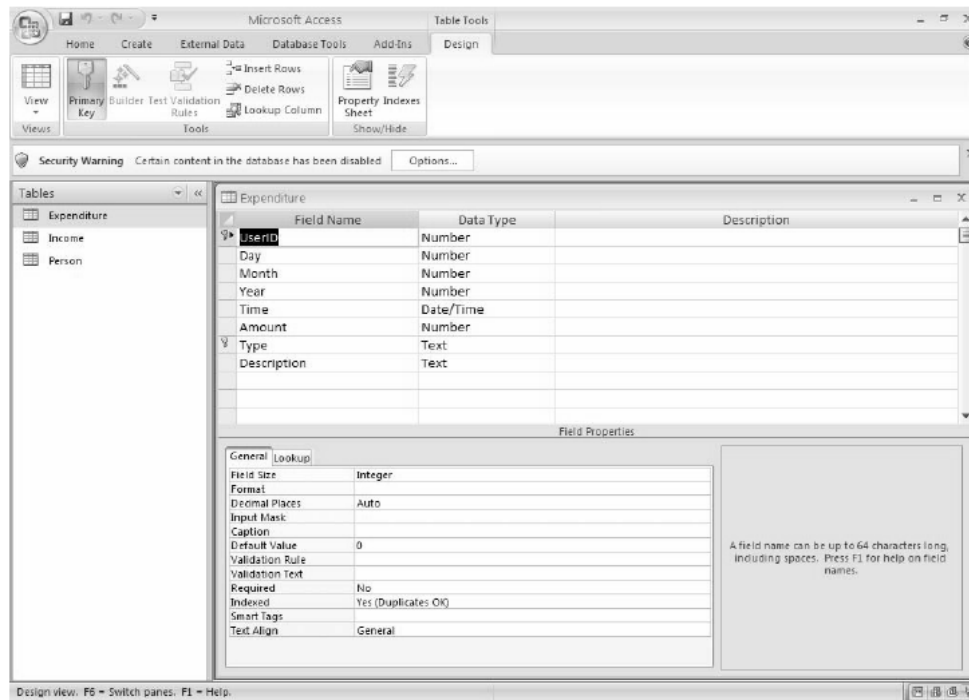
**Fig. 4.2: Interface of Microsoft Excel 2007**

**Microsoft PowerPoint:** provides a comprehensive set of tools for creating powerful presentations. Organize and format your material easily, illustrate your points with your own images or clip art, and even broadcast your presentations over the web. Figure 4.3 shows the graphical user interface of the Microsoft PowerPoint 2007.



**Fig. 4.3: Interface of Microsoft Power Point 2007**

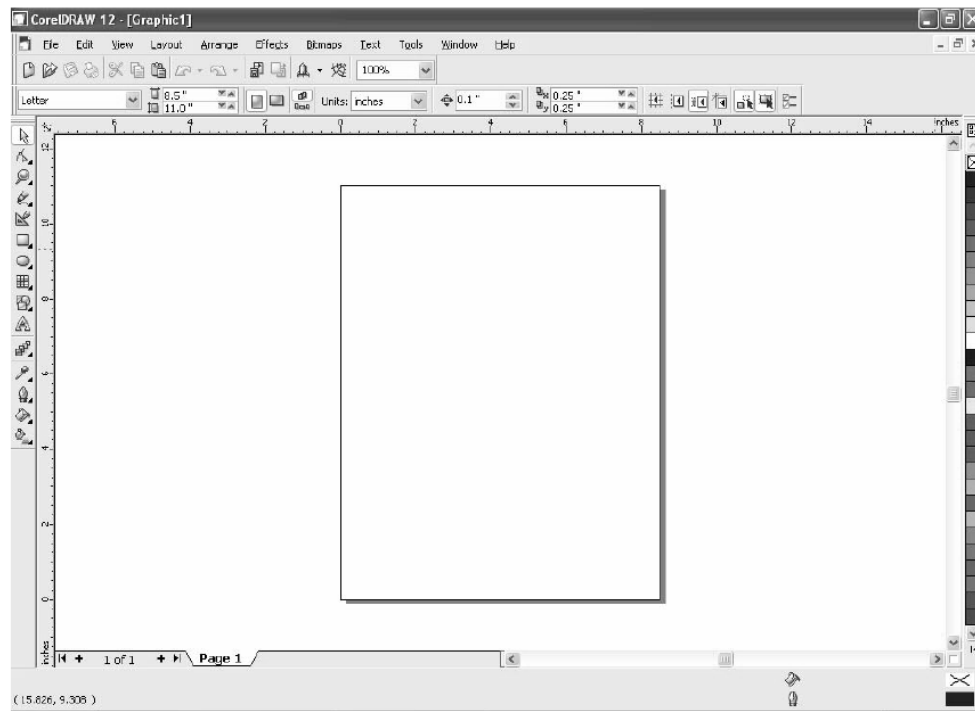
**Microsoft Access:** It provides advanced and powerful new tools for managing your databases. Share your database with co-workers over a network, find and retrieve information quickly, and take advantage of automated, pre-packaged wizards and solutions to quickly create databases. Figure 4.3 shows the graphical user interface of the Microsoft Access 2007.



**Fig. 4.4: Interface of Microsoft Access 2007**

#### **4.4.2 Graphic application software – CorelDraw**

This is a class of software used for creating and editing images. They are mainly used in manipulating images and for creating special graphic effects used in making banners, vector shapes, calendars, T-shirts etc. A general name for graphic and text creation and manipulation is Desktop Publishing.



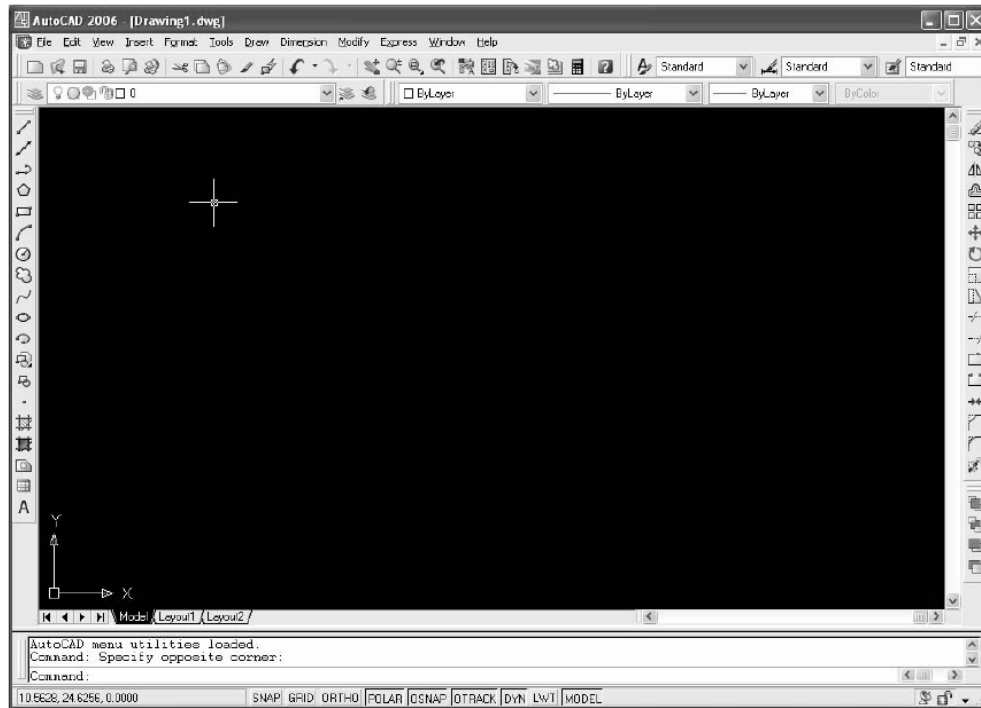
**Fig. 4.5: Corel draw interface**

#### **4.4.3 Engineering application software**

This is a class of software used by various specialists in achieving a high degree of accuracy and precision. They are used for Computer Aided Design (CAD). Popular software that fall into this category is AutoCAD and Electronic workbench. AutoCAD is a suite of CAD software products for 2 and 3-dimensional design and drafting. Modern AutoCAD includes a full set of basic solid modeling and 3D tools.

Electronic workbench is CAD software used in designing, testing, and simulating electronic circuits.





**Fig. 4.6: Screen shot of AutoCAD 2006**

#### **4.4.4 Environmental Science application software**

These are software that can be useful to the environment as a whole. In the area such as the oil industry there is software for monitoring of oil rigs. The operator does not have to go to the site to monitor the rigs.

#### **4.4.5 Medical Science application software**

Medical and Agricultural software are used in the field of medicine and agricultural science. They help to make work easier in the field in which the software is applied. For example in the medical field during surgery the software has been designed to simulate the operation to be carried out for surgeons and waits for a confirmation from the computer that he or she is eligible or ready to perform the operation on the patient. Just like we play our car race games on a play station. Likewise we also have software programs for agricultural science. The motive behind this software is to avoid risk that occur during operation in a real life scenario. Also the software can be used for educative purposes.

#### 4.4.6 Software Legal Issues

Software is viewed as intellectual property. Just like a book or music it must be respected and treated as such. This means that the permission of the creator must be required before use or distribution. The 'terms and conditions of use' are usually expressed in a license agreement (End User License Agreement, EULA) which is a legal document that is binding between the creator and the user of software. Different licensing schemes exist for using software.

Proprietary software's are developed for the purpose of making profit and are usually very expensive. Open source software that are normally free but may require a low fee for support services. Freeware are computer programs given away free of charge. Shareware are computer software that is distributed free of charge but is usually accompanied by a request for a small payment from satisfied users to cover costs and registration for documentation and program updates.

#### Self Assessment Questions

7. \_\_\_\_\_ is the computer software designed to help the user to perform a singular or multiple related specific tasks.
8. Microsoft Access gives you powerful new tools for managing your databases. (True/False)

#### 4.5 Overview of proprietary software

Proprietary software has its own limitations on using and copying it, usually enforced by a proprietor. The term's literal meaning covers software that has an owner who exercises control over what users can do with it. The adjective "proprietary" also avoids confusion with the phrase "commercial software", since free software can also be sold and used for commercial purposes. The risk involved with proprietary software is that if for any reason the proprietor ceases, or decides to cease, or limit production or support for a proprietary software product, previous licensees can be left at a disadvantage and have no recourse if problems are found with the software. The proprietor uses a temporary monopoly with copyright and sometimes software patents that can make the software more expensive. A dependency on future versions and upgrades can make the monopoly permanent without the emergence of a competing software package.

Well known examples of proprietary software include Microsoft Windows, RealPlayer, Adobe Photoshop, Mac OS, WinZip and some versions of UNIX. Some free software packages are available under proprietary terms. Examples include MySQL & Send mail.

Selected proprietary software comes with source code or provides offers to the source code. Users are free to use and even study and modify the software in these cases, but are restricted by either licenses or non-disclosure agreements from redistributing modifications or sharing the software. Shareware, like freeware, is proprietary software available at zero price, but differs in that it is free only for a trial period, after which some restriction is imposed for example, it is completely disabled.

#### **Self Assessment Questions**

9. \_\_\_\_\_ software is that has restrictions on using and copying it, usually enforced by a proprietor.
10. Some proprietary software comes with source code or provides offers to the source code. (True/False)

#### **4.6 Overview of open source technology**

It is computer software whose source code is available under a copyright license that allows the users to study, change, and improve the software, and to redistribute it in modified or unmodified form. It is the most prominent example of open source development. In 1998, a group of individuals advocated that the term free software be replaced by open-source software (OSS) as an expression which is less ambiguous and more comfortable for the corporate world. Software developers may want to publish their software with an open-source software license, so that anybody may also develop the same software or understand how it works. Open-source software generally allows anybody to make a new version of the software, port it to new operating systems and processor architectures, share it with others or market it. The aim of open source is to let the product be more understandable, modifiable, duplicable, reliable or simply accessible, while it is still marketable.

The distribution terms of open-source software must comply with the following criteria:

### **1. Free Redistribution**

The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

**Reason:** By constraining the license to require free redistribution, we eliminate the temptation to throw away many long-term gains in order to make a few short-term sales dollars. If we didn't do this, there would be lots of pressure for cooperators to defect.

### **2. Source Code**

The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately complicated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

**Reason:** We require access to un-complicated source code because you can't evolve programs without modifying them. Since our purpose is to make evolution easy, we require that modification to be made easy.

### **3. Derived Works**

The license must allow changes and derived works, and must allow them to be distributed under the same terms as the license of the original software.

**Reason:** The mere ability to read source isn't enough to support independent peer review and rapid evolutionary selection. For rapid evolution to happen, people need to be able to experiment with and redistribute modifications.

### **4. License Must Be Technology-Neutral**

No provision of the license may be predicated on any individual technology or style of interface. This provision is aimed specifically at licenses which require an explicit gesture of assent in order to establish a contract between

licensor and licensee. Provisions mandating so-called "click-wrap" may conflict with important methods of software distribution such as FTP download, CD-ROM anthologies, and web mirroring; such provisions may also hinder code re-use. Conformant licenses must allow for the possibility that (a) redistribution of the software will take place over non-Web channels that do not support click-wrapping of the download, and that (b) the covered code (or re-used portions of covered code) may run in a non-GUI environment that cannot support popup dialogues.

### **5. Integrity of the Author' Source Code**

The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

**Reason:** Promising lots of improvement is a good thing, but users have a right to know who is responsible for the software they are using. Authors and maintainers have reciprocal right to know what they're being asked to support and protect their reputations. Accordingly, an open-source license must guarantee that source be readily available, but may require that it be distributed as pristine base sources plus patches. In this way, "un-official" changes can be made available but readily distinguished from the base source.

### **6. No Discrimination against Persons or Groups**

The license must not discriminate against any person or group of persons.

**Reason:** In order to get the maximum assistance from the process, the maximum range of persons and groups should be equally eligible to contribute to open sources. Therefore we forbid any open-source license from locking anybody out of the process. Some countries, including the United States, have export restrictions for certain types of software. An OSD-conformant license may warn licensees of applicable restrictions and remind them that they are obliged to obey the law; however, it may not incorporate such restrictions itself.

### 7. Distribution of License

The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

**Rationale:** This clause is intended to forbid closing up software by indirect means such as requiring a non-disclosure agreement.

### 8. License Must Not Be Specific to a Product

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

**Rationale:** This clause forecloses yet another class of license traps.

### 9. License Must Not Restrict Other Software

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

**Rationale:** Distributors of open-source software have the right to make their own choices about their own software.

### Self Assessment Questions

11. \_\_\_\_\_ is computer software whose source code is available under a copyright license that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form.
12. Open-source software generally allows anybody to make a new version of the software, port it to new operating systems and processor architectures, share it with others or market it. (True/False)

### 4.7 Summary

- A computer program directs a computer to perform some processing function or combination of functions.
- System software is used to run the computer hardware.

- Programming software: usually provides tools to assist a programmer in writing computer programs and software using different programming languages.
- Application software: It allows end users to accomplish one or more specific (non-computer related) tasks.
- Microsoft Office is a software suite that consists of different software applications that complete different activities.
- Spreadsheet applications (sometimes referred to simply as spreadsheets) are computer programs that let you create and manipulate spreadsheets electronically.
- Freeware are computer programs given away free of charge.
- Proprietary software is that has restrictions on using and copying it, usually enforced by a proprietor

#### **4.8 Terminal Questions**

1. What is computer software?
2. Define operating system.
3. What are the uses of application software's?
4. Briefly explain proprietary software.

#### **4.9 Answers**

##### **Self Assessment Questions**

1. Computer software
2. System software
3. Programming software
4. Application software
5. True
6. True
7. Application software
8. True
9. Proprietary
10. True
11. Open-source software
12. True

**Terminal Questions**

1. Computer software (also computer program) is technically a set of instructions written in a computer language that solves a computational task. Refer section 4.2.
2. An operating system (OS) is a computer program that manages the hardware and software resources of a computer. Refer section 4.3.
3. Application software is the computer software designed to help the user to perform a singular or multiple related specific tasks. Refer section 4.4.
4. Proprietary software is that has restrictions on using and copying it, usually enforced by a proprietor. Refer section 4.5.

**Book References:**

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**E-References**

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