

# **Module 1: Concepts of Information Technology (IT)**

## **Section 3: Software**

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### 1.3.1 Types of Software

#### 1.3.1.1 Distinguish between operating systems software and applications software.

**Understand the reasons for software versions.**

Software is divided into two broad categories: **systems software** and **application software**.

**Systems software** is the term used to describe programs that enable the computer to function, improve its performance and access the functionality of the hardware. Systems software's sole function is the control of the operation of the computer. You can think of systems software as providing the foundation for applications software.

Systems software is further subdivided into **operating systems** and **utilities**. The operating system is the program that actually makes the computer operate. Utilities are programs which either improve the functioning of the operating system or supply missing or additional functionality.

**Applications software** is the term used for programs that enable the user to achieve specific objectives such as create a document, use a database, produce a spreadsheet or design a building.

**Versions:** Software developers continually strive to improve the performance of their products and add new features. Especially in a world of competing products, each developer needs to make their product perform better, have fewer problems and have more features. The new releases of software products are called versions. The versions use a numbering system such as Mandrake Linux 9.2 or OpenOffice.org 1.1. A change in the first number represents a major new version while a change in the second number represents a less significant change.

### 1.3.2 Operating System Software

#### 1.3.2.1 Describe the main functions of an operating system and name some common operating systems.

As mentioned above, it is the operating system that actually makes the computer function. The following is a list of some of the functions of the operating system:

- Boot-up the computer.
- Control the hard drives: This includes such features as formatting and defragmenting disks as well as saving files to and retrieving files from disk.
- Control input devices such as keyboards, mice and scanners.
- Control output devices such as the video display and printer.
- Control the external ports: Ports are the external connections that enable peripheral devices to be connected to a computer. Common types of ports are serial, parallel, usb and firewire. Of these the USB ports are the most important.
- Provide the functionality for computers to be linked in a network.
- Provide the foundation for application software to be launched.
- Enable application software to access and use the hardware.

The following list names some operating systems. They are grouped according to similarity.

- Unix; Linux; Free BSD
  - Windows 95; Windows 98; Windows Me
- Windows NT4 Workstation / Server; Windows 2000 Workstation / Server; Windows XP; Windows 2003 Server.

### 1.3.3 Applications Software

#### 1.3.3.1 List some common software applications such as: word processing, spreadsheet, database, Web browsing, desktop publishing, accounting, together with their uses.

The following table lists some types of application software, brand names and function.

Application	Brand names	Function
<b>Word processor</b>	OpenOffice.org Writer StarWriter, KWord Microsoft Word Lotus Ami Pro Corel WordPerfect	Create, store, format and edit documents, letters and articles. Word processors are used where the emphasis is on manipulation of text.
<b>Spreadsheet</b>	OpenOffice.org Calc StarCalc, KSpread Microsoft Excel Quattro Pro Lotus 123	Create financial statements, balance sheets, perform statistical and numerical analysis of data, make forecasts based on numeric data. Spreadsheets are used where the emphasis is on arithmetic.
<b>Presentation</b>	OpenOffice.org Impress StarImpress KPresenter Microsoft PowerPoint	Create slide shows, lectures, seminars and other types of presentation.
<b>Database</b>	Sybase, MySQL Microsoft Access	Store and convert data into information. Databases are particularly useful in working with large quantities of data.
<b>Email client</b>	Evolution, KMail Microsoft Outlook	Send, receive, store and organise electronic mail.
<b>Web browser</b>	Mozilla, Netscape Microsoft Internet Explorer	Surf the Internet and view web sites.
<b>Desktop publishing DTP</b>	Microsoft Publisher Page Maker	DTP is similar to word processing except that there is more emphasis on page layout and the integration of diagrams.
<b>Accounting</b>	GnuCash Pastel Accounting	Store accounting information and produce reports, statements and invoices.
<b>Web development</b>	Dreamweaver Microsoft FrontPage	Create web sites that can be read by a browser.
<b>Graphics and imaging</b>	The GIMP Adobe Photoshop	Create and manipulate graphics images and store images in a variety of formats.

### 1.3.4 Graphical User Interface

#### 1.3.4.1 Understand the term Graphical User Interface (GUI).

A **graphical user interface** or **GUI** is designed to simplify the work of the user whether they are using the operating system or an application package. The interface consists of a screen with a number of icons or menus. Functions are executed by pointing and clicking with the mouse.

Some of the advantages of using a GUI are:

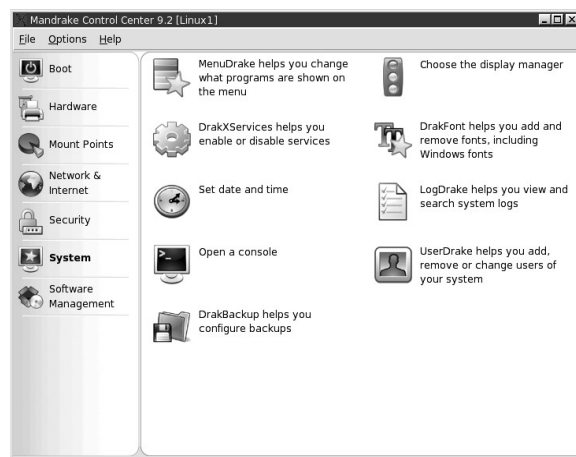
- Less work for the user. To execute a function all you have to do is point and click on an icon instead of typing out an instruction.
- Quicker to learn.
- Easy access to the basic functionality of the operating system or application package.
- Hides the underlying complexity from the user.
- Simplifies and integrates multitasking. Multitasking refers to using several applications at the same time. Opening a new application or document involves a couple of mouse clicks. Likewise switching between tasks also involves only a couple of mouse clicks.

There are some disadvantages to using a GUI based operating system.

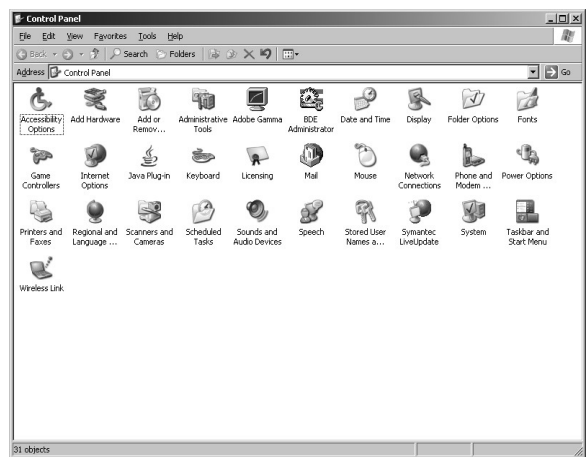
- Not all the functionality is available. The icon represents the most commonly used form of a function. A text based system gives you access to all the options associated with a function. Power users tend to switch between the GUI and the system prompt as needed.
- Being graphics based, a GUI runs more slowly than a text based system. However, with the power and speed of modern computers this is not the problem it once was.

The following screens illustrate a GUI in Linux and Windows.

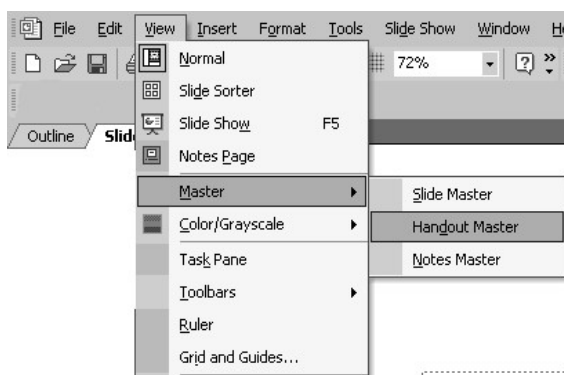
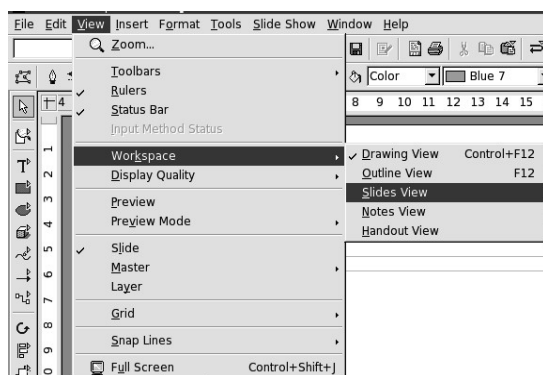
#### Linux:



#### Windows:



The following two screens illustrate the use of menus:



In each case, clicking on an icon will either execute a function or display another set of icons containing the function.

## 1.3.5 Systems Development

### 1.3.5.1 Understand how computer-based systems are developed. Know about the process of analysis, design, programming and testing often used in developing computer-based systems.

#### Program development life cycle

The development of computer programs is a highly developed and structure process involving a number of distinct stages as shown in the table below. The stages of development are known as the **program development life cycle**.

Stage	Description
<b>Analysis</b>	The problem or task is analysed and clarified. This involves analysis of the way the task is currently being done and consultation with end users. The project is set out in broad outline. The work of this stage is performed by systems analysts.
<b>Design</b>	The project is broken down into smaller sections. These too may be further broken down until there are units. The method of programming each unit is then specified in great detail. The most suitable programming language for each unit is then chosen. The complete specification is the final design. The work of this stage is also performed by systems analysts.
<b>Programming</b>	The design is handed over to programmers who code the design into programming languages such as C or Java. The work of this stage is carried out by computer programmers.
<b>Testing</b>	Since programs are long and complex, they may contain errors called bugs. These may be syntactical errors, in which the programmer made a mistake in the structure of the command, or logical errors. In these the program appears to work, but works incorrectly. The process of testing is designed to find and eliminate bugs. This stage involves end users to try out the program, programmers to fix syntactical mistakes and systems analysts to fix errors in the logic of the program.

The following are often also included as part of the development cycle.

<b>Implementation</b>	Once the systems analysts are satisfied that the system is operating correctly, it is installed and implemented. Usually this is done using a <b>pilot group</b> . In this implementation, the system is implemented on a limited scale to start with. If any further bugs are found, these can be eliminated before full scale implementation.
<b>Further development</b>	Once the system has been in use for a while, further problems, limitations or performance problems may become apparent. The system will then be modified and new versions released with the changes.