

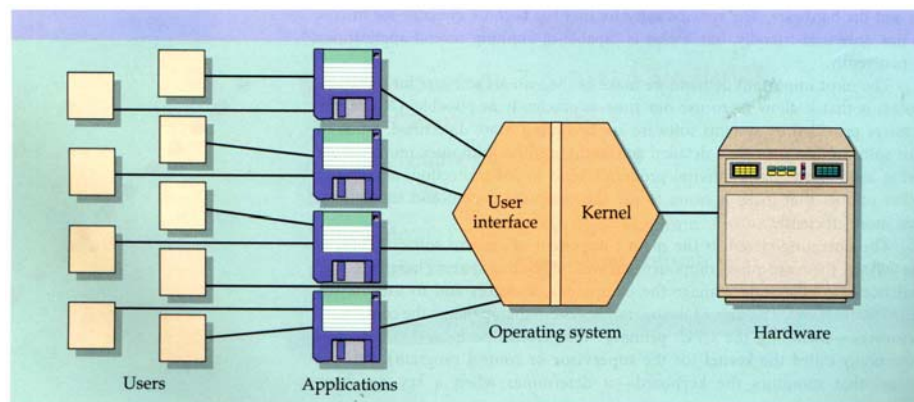
Chapter (5)

Systems Software

Systems Software includes operating system and acts as interface (between users & H/W) and utilities.

5-1 Operating Systems

The operating system is the main component of systems S/W. It has two basic functions: to efficiently manage the computer's resources, and execute the user's instructions. The part of the operating system that manages the computer's resources - including the CPU, main memory, and peripherals- is commonly called the **kernel** (or **supervisor** or *control program*). It is the kernel that monitors the keyboard -it determines when a key has been depressed and what action to take. The kernel also performs basic functions such as switching between tasks. The operating system controls the transfer of data from secondary storage to main memory and back again. The **user interface**, or *operating environment*, is the part of the operating system that permits to communicate with the H/W, for example, to save a file. See flg. fig.



Operating system for micros is less sophisticated and has fewer capabilities than similar operating system for larger systems. For example, the operating system for a mainframe may manage many terminals at different sites and allocate resources to multiple users. On the other hand, operating system for a standalone PC is usually intended for single user.

Most operating systems for mainframes were written in assembly language. More recently developed operating systems are written in **C** (they are *portable*).

The newest operating systems are often written in **C++** (object-oriented version of C, that is capable of providing graphical user interfaces).

Systems S/W is written by **systems programmers**-*software developers* with knowledge of computer architecture. Some of the operating systems, such as DOS and the Macintosh operating system, are designed to be used with specific micros. Others, such as IBM and IBM-compatible mainframe operating system, can be implemented only on large computers.

Still others, such as UNIX, are applicable to all computer types, so it is available for many different "platforms," that is, computers developed by different manufacturers or computers of different sizes. This means that UNIX is a candidate for a general-purpose, standardized operating system or as the main operating system in a networked environment.

SELF-TEST

1. The _____ software controls the overall operations of a computer and enables it to run as efficiently as possible.
2. The main component of systems software is the _____ system.
3. (T or F) Systems software often includes utilities such as antiviral programs.
4. Operating systems are written by _____ programmers.
5. _____ is the part of the operating systems that enables users to communicate with the hardware.

Solutions:

1. *Systems*
2. *Operating*
3. *T*
4. *Systems*
5. *User interface*

5-1-1 Microcomputer Operating Systems and Graphical User Interfaces

5-1-1-1 DOS (Disk Operating System) & Windows

▪ DOS

Microsoft corp. introduced **DOS** in 1981 (as 1.0 version) when the first IBM PC was unveiled.

DOS has been updated many times. Beginning with 4.0 version (1988) menus for selecting commands were used, and DOS became user-friendly.

With 5.0 version (1990) DOS was installed on hard disk without having to reformat it, and it was the first version available separately through retail PC stores. Other advantages (of 5.0 V. & more recent versions): Mouse, Pull-down menus, online help,...

▪ DOS with Windows

A number of improved user interfaces have been created to make DOS easier to use. These improvements include S/W features that are more graphic than text oriented. Graphical User Interfaces (GUI) use **icons** to represent various objects. The most popular user interface that works in conjunction with DOS is **Microsoft Windows**. With this interface, each application is opened in a window and several windows can

be opened at once, allowing user to switch from one application to another, and enabling him to perform some *multitasking* operations.

The early versions (including 3.11 V.) were not full operating systems. They provided an operating environment or Graphical User Interface. That is, they operate under the control of DOS and provide a kind of bridge between the user and DOS - a responsive and user-friendly bridge. So, DOS must be loaded in first when the computer is turned on.

▪ **Windows 95 as Full Operating System**

Windows 95 is a **full operating system**. It takes full advantage of the 32-bit architecture in newer PCs. This means that the computer will perform faster in a windows environment. With its redesigned interface, Windows 95 also offers true multitasking. It provides “plug & play” support designed to make installing and upgrading peripherals easier - devices need only be plugged in and they will be configured with appropriate drivers automatically: Windows 95 Configuration Manager coordinates all H/W device drivers and resources in the PC. Multimedia systems benefit greatly from this “plug & play” capability.

DOS 95 has not the limitation related to the number of characters in a filename, which was limited to eight.

▪ **Windows 98**

It looks like Windows 95 and has much the same screen look. Added features include:

- Internet/intranet browsing capabilities: Microsoft's browser is included with Windows. In fact, Windows itself has been made to look more like a browser.
- Support for state-of-the-art hardware: This includes support for Digital Video Disk (DVD) and latest multimedia components.
- Wizards: Windows lets users accomplish various tasks by using “wizards” step-by-step software tools that make tasks more user-friendly.

- Other features: Support for huge disk drives, improved interfaces with other S/W, improved networking features, Improved backup, built-in TV viewer, and increased security.

▪ **Windows Me (Millennium)**

It has a similar look & feel as Windows 95 & 98. The major features added in this version include: Multimedia Support, Reliability features, and network support.

▪ **Windows NT**

Windows NT (New Technology) is mostly for corporate, network environments. Windows NT looks exactly like Windows 98 and runs most of the same S/W that run under Windows 98; but Windows NT is far more robust and heavy-duty. It comes in 2 versions:

- NT Workstation, designed for individual users on a network.
- NT server, a network operating system.

Because Windows NT lacks support for older Windows and MS-DOS S/W & H/W, is more complex to learn, and requires more memory and processor power than older versions of Windows, it is seldom used on nonnetworked PCs.

▪ **Windows 2000**

It maintains NT stability and security features. It incorporates Windows 98's ease of setup and H/W awareness.

As with Windows NT, there are 2 versions:

- Windows 2000 for network servers
- Windows 2000 Professional (for individual users).

Main advantages:

- Improved management tools: one computer can serve many people, *personalization* of the start menu (programs you use most frequently are visible and others are hidden), ...
- Greatly improved built-in security mechanisms.
- Improved user interface.
- Other improvements over Windows NT: support for Windows 98 file structure, plug & play features, and much support for laptops.

▪ **Windows XP (XP stands for experience - released in 2002)**

It brings Microsoft's consumer and corporate operating systems into single product.

Windows XP versions fall into 2 categories:

- Network server, where There are 3 versions based on the network complexity.
- Desktop computer, where There are 2 versions:
 - **Windows XP professional:** It is aimed toward business users connected to corporate networks and includes features for file encryption, remote desktop access, and dual processor support.
 - **Windows XP Home edition-** its main features include: Improved user interface, Improved multimedia support, More extensive personalization, Multiple user support.

▪ **Windows Vista**

It is the last generation of windows. The improvements and added features to this generation make it easier to use, safer, and more reliable. Windows Vista versions are:

- Windows Vista Home Basic.
- Windows Vista Home Premium.
- Windows Vista Business.
- Windows Vista Ultimate.

▪ **Windows 7**

Windows 7 advantages:

- It has better ways to find and manage files.
- It helps you speed through everyday tasks.
- It's designed for more reliable performance.
- It can simplify just about everything you do with your PC
- With 64-bit support, you can take full advantage of the latest powerful PCs.

Windows 7 versions:

- Home Premium Upgrade.
- Professional Upgrade.
- Ultimate Upgrade

▪ **Windows CE**

Windows CE (CE-Consumer Electronics) is a Windows-based modular operating system designed for the embedded systems (i.e. computing devices that are integrated into other products such industrial controllers, robots and office equipment).

Windows CE is a subset of Windows designed to work with less memory on smaller screens and without much, if any, file storage.

5-1-1-2 Other Operating Systems

▪ **MAC OS**

It is Apple's Macintosh OS. It was introduced along with the Macintosh computer in 1984. It had the first commercially GUI : user-friendly.

▪ **Unix**

It is a multi-user time-sharing operating system. It was developed in 1971. It has command-line user interface. It is not tied to any family of processors. It runs on just about any computer: from micros to mainframes. Any company does not control it. There are many Unix versions and some S/w compatibility problems. It is the primary operating system in use on Internet services today.

▪ Linux

In 1991 student at University of Helsinki in Finland created the kernel of an Unix-like operating system named *Linux*. He made the source code free of charge to the public under a concept known as *open-source* S/W.

Linux code may be loaded for free from the Internet. Installing it is a complex task suitable only for the most advanced users. Several companies have packaged the Linux code with an installing program, documentation, customer support, and a number of utilities and application packages for less than 50 \$.

Linux has several advantages over Windows:

- Linux is extremely stable – it rarely ever crashes.
- Linux users form a close-knit community. You can get a quick accurate answer, via Internet, if you pose a question.
- Reinstallation of Linux is a much simpler task than reinstalling Windows.

The biggest disadvantage of Linux is the relative scarcity of applications. As Linux gains acceptance, this disparity may disappear.