- The operating system provides a series of application programming interface (API) calls which applications programmers and other operations use to accomplish detailed hardware manipulations and other operations. API provides system calls by which a user program instructs the operating system to do the work.

Application base is the combination of the hardware and the operating system environment in which applications are developed

−operating system environment

- Embedded systems are characterized by a small set of specialized resources that provide functionality to devices (phones). In embedded environments, efficient resource management is the key to building a successful operating system
- Real-time systems require tasks to be performed within a particular time frame. Real-time operating system must enable processes to respond immediately to critical events. Soft real-time systems ensure that real-time tasks execute with higher priority. Hard real-time system guarantee that all of their tasks complete on time
- Virtual machine (VM) is a software abstraction of a computer that often executes as a user application on the top of the native operating system. VM tend to be less efficient than real machines because they access the hardware indirectly or simulate hardware that is not actually connected to the computer. This increases the number of software instructions required to perform each hardware action
- Portability is the ability for software to run on multiple platforms

Definition of Operating System (OS) ch.1

OS is a set of programs that controls effectively the computer resources and makes them conveniently available to users i.e easy to use. Os is rather complicated software and hence designed usually by professional

software companies and sold with computer system as part of it. During computer operation, some basic OS programs (Called Os Core or Kernel) are resident in main memory while others are stored on hard disk and loaded into memory when needed.

O/ S goals

1- The primary goal of an o/s is to make o/s convenient to use

2- A secondary goal is to use the computer H/W in an efficient manner.

3- Provide a connection between the user and computer resources.

Computer System Components

An o/s is an important part of almost every computer system . A computer system can be divided roughly into four components.

1- The hardware (CPU, Memory , I/O devices) .

2- Operating system(O/S).

3- Application programs(Assemply , Database compiler text , Editor)

4- Users

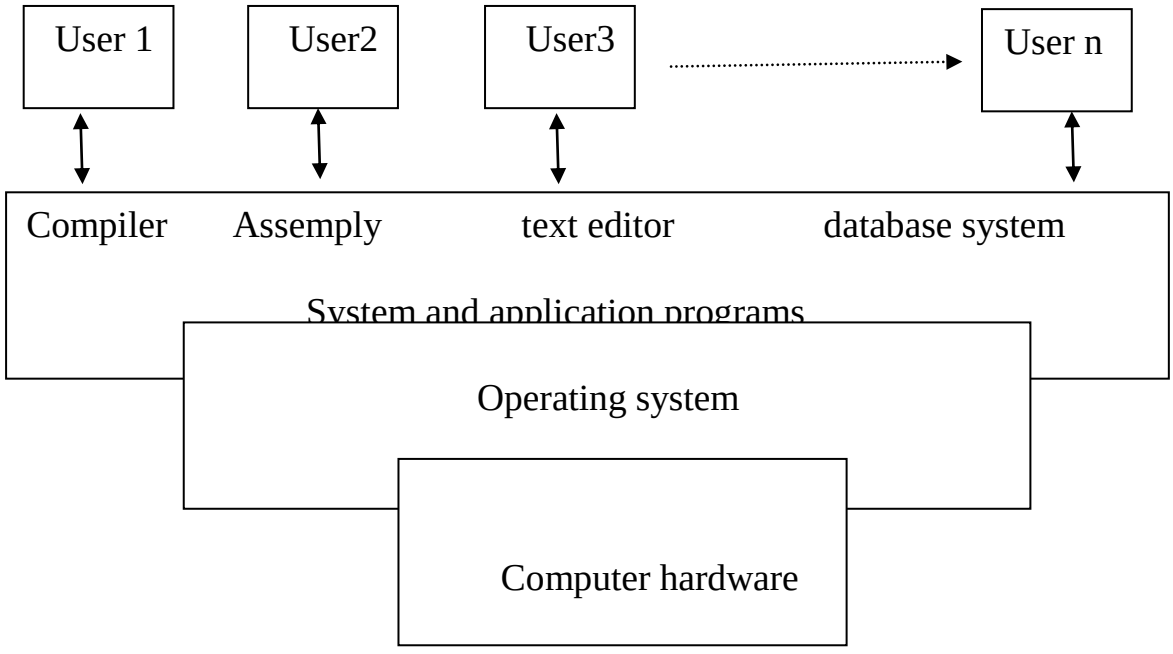

Fig 1 Abstracted view of the components of computer system

Functions of OS

The functions can be summarized as follows (will be explained later in more details):

1- Management of computer resources (processors, memory, disks, I/O devices, programs, etc.).
2-Scheduling resources among users (time sharing).
3-Protection of programs being executed in memory from one another.
4-Providing a proper user interface e.g Graphics User Interface (GUI).
5-File management.
6-Network communication.
7-Many others.

O/S Categories

The main categories of modern o/s may be classified into Meny groups , which are distinguished by the nature of inter action that take place between the computer and the users .

1- Batch system

In this type of o/s, users submit jobs on regular schedule (e.g, daily, weekly, monthly) to a central place where the user of such system did not interact directly with o/s. to speed up processing, jobs with similar needs were batched together and were run through the computer as a group. thus, the programs would have the programs with the operator, the major task of this type was to transfer control automatically from one job to the next. the o/s always resident in memory as in fig2

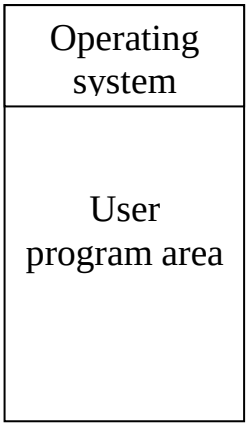

Fig 2: Memory layout for simple batch system

The output from each job would be sent back to the appropriate programmer.

- Advantage of batch system is very simple
- Disadvantages

-There is no direct interaction between the user and the job while the job is executing

- The delay between the job submission and the job completion (called turn around time) may result from amount of computing time needed.