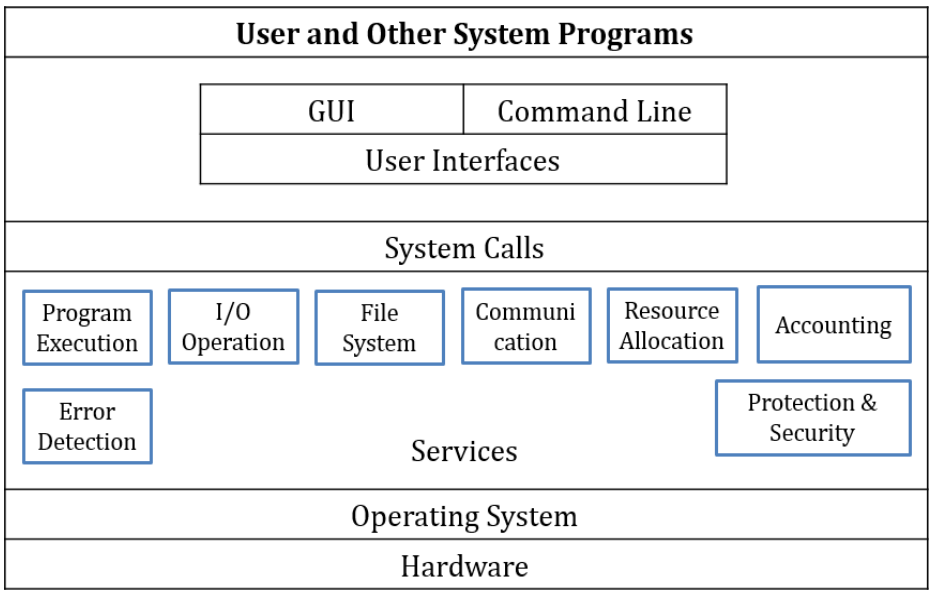
III OPERATING SYSTEM SERVICES

Furthermore, the operating system, in one form or another, provides certain services to the computer system.

- User Interface
- Program Execution
- I/O Operations
- File System Manipulation
- Communications
- Error Detection
- Resource Allocation
- Accounting
- Protection and Security



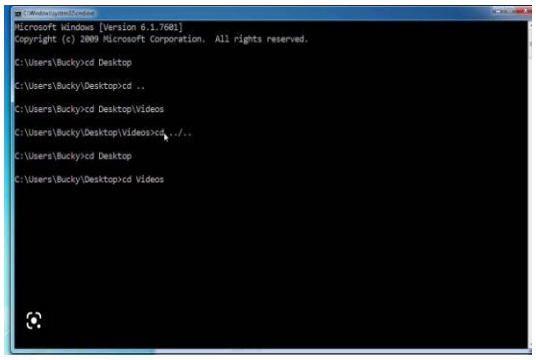
- **User Interface**

Almost all operating systems have a **user interface** (**UI**). Two types of User Interface are Command Based Interface and Graphical User Interface

Command Based Interface

Requires a user to enter the commands to perform different tasks like creating, opening, editing or deleting a file, etc. The user has to remember the names of all such programs or specific commands

which the operating system supports. The primary input device used by the user for command based interface is the keyboard. Command-based interface is often less interactive and usually allows a user to run a single program at a time. Examples of operating systems with command-based interfaces include MS-DOS and Unix.



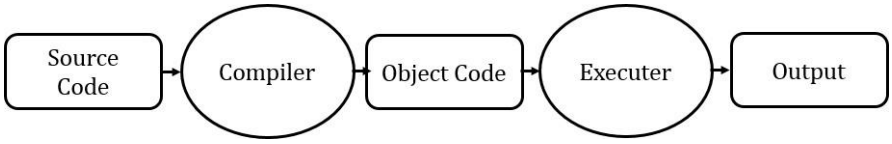
Command Based Interface **Graphical User Interface**

Graphical User Interface (GUI)

The interface is a window system with a mouse that serves as a pointing device to direct I/O, choose from menus, and make selections and a keyboard to enter text. Mobile systems such as phones and tablets provide a **touch-screen interface**, enabling users to slide their fingers across the screen or press buttons on the screen to select choices.

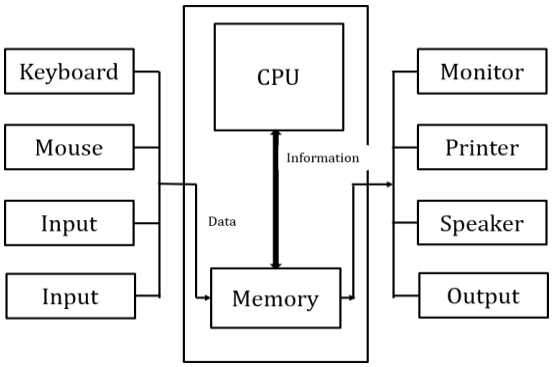
❖ **Program Execution**:

The OS is in charge of running all types of programs, whether they are user or system programs. The operating system makes use of a variety of resources to ensure that all types of functions perform smoothly.



❖ **Input/Output Operations**:

The operating system is in charge of handling various types of inputs, such as those from the keyboard, mouse, and desktop. Regarding all types of inputs and outputs, the operating system handles all interfaces in the most appropriate manner.



For instance, the nature of all types of peripheral devices, such as mice or keyboards, differs, and the operating system is responsible for transferring data between them.

❖ **File System Manipulation**:

The OS is in charge of deciding where data or files should be stored, such as on a floppy disk, hard disk, or pen drive. The operating system determines how data should be stored and handled.

❖ **Communications :**

There are many circumstances in which one process needs to exchange information with another process. Such communication may occur between processes that are executing on the same computer or between processes that are executing on different computer systems tied together by a network. Communications may be implemented via **shared memory**, in which two or more processes read and write to a shared section of memory, or **message passing**, in which packets of information in predefined formats are moved between processes by the operating system.

❖ **Error Detection:**

The operating system needs to be detecting and correcting errors constantly. Errors may occur in the CPU and memory hardware (such as a memory error or a power failure), in I/O devices (such as a parity error on disk, a connection failure on a network, or lack of paper in the printer), and in the user program (such as an arithmetic overflow or an attempt to access an illegal memory location). For each type of error, the operating system should take the appropriate action to ensure correct and consistent computing. Sometimes, it has no choice but to halt the system. At other times, it might terminate an error-causing process or return an error code to a process for the process to detect and possibly correct.

❖ **Resource Allocation:**

The operating system guarantees that all available resources are properly utilized by determining which resource should be used by whom and for how long. The operating system makes all of the choices.

❖ **Accounting:**

The operating system keeps track of all the functions that are active in the computer system at any one time. The operating system keeps track of all the facts, including the types of mistakes that happened.

❖ **Protection and Security :**

The operating system is in charge of making the most secure use of all the data and resources available on the machine. Any attempt by an external resource to obstruct data or information must be foiled by the operating system.