Software is a set of instructions, rules or programs used to operate a computer system and instruct the system to carry out specific tasks. In other words, software is a generic term, which refers to any programs running on desktop PСs, laptops, smartphones or other computer devices. Software can be classified into two main categories: system software and application software.

System Software is general-purpose software, which is used to operate computer hardware. It acts as an interface between application programs and computer hardware. System software is designed to manage the system resources and provide a platform for application software to run. Some common system software examples include:

* Operating Systems (a set of programs that manage computer hardware and software resources);
* Firmware (a permanent software or set of instructions stored in ROM (read-only memory) of the computer system);
* Device Drivers (a type of software that controls specific hardware of the computer system).
* System software is usually written in low-level languages, like assembly languages, so that it could interact with the hardware at the maximum possible speed and provide an effective platform for the application programs.

Application software is designed to help the user perform a specific task, thus it is known as specific-purpose software. Unlike system software, which runs in the background, application software typically runs in the front-end making it more accessible to the user. Application software is usually written in high-level languages, like Java or C++.

A user can choose which application to install, but an application software package does not communicate directly with the hardware. That is where an Operating System comes in. It acts as an intermediary between application programs and computer hardware.

An operating system has a few main functions:

* managing the computer's hardware resources, such as the central processing unit, memory, and others;
* establishing a user interface;
* providing environment for application programs to run.

Operating systems can be classified according to different criteria.

**Desktop and mobile operating systems**

The desktop operating systems are designed to manage a personal computer. The most popular desktop operating systems are Microsoft Windows and Mac OS, while open-source operating systems such as Linux for example are also widely used.

The purpose of a mobile OS is to provide environment for application software to run on mobile devices. A mobile OS is similar to desktop OS but it is simpler in comparison, requires less RAM to operate and takes up less time to boot. Most popular mobile operating systems are Android and Apple’s iOS.

**Single-tasking and multi-tasking operating systems**

A single-tasking system can only run one program at a time. Nothing else will be done while the computer is doing this task. MS-DOS is an example of a single- tasking operating system. On the contrary, a multi-tasking operating system allows more than one program to be executed by the CPU simultaneously by switching between the tasks. Multi-tasking Operating Systems are also known as time-sharing systems since the available processor time is divided between multiple processes. These processes are repeatedly interrupted in time intervals by the task scheduling subsystem of the operating system. Most of the present-day operating systems, like

Microsoft Windows, Linux, and Mac OS are multi-tasking operating systems.

**Single-user and multi-user operating systems**

In a single-user operating system, only one user can have access to the computer system at a time. These types of operating systems are common for home computers.

Single-user operating systems can be classified into 2 types: single-user single-tasking

operating systems and single-user multi-tasking operating systems. A single-user single-tasking OS, as its name suggests, allows a single user to do only one task at a time. MS-DOS can serve as an example of a single-user single-tasking OS. In a single-user multi-tasking OS, a single user can perform multiple tasks simultaneously. This is the types of OS that most users can find on their desktop and laptop computers today. For instance, Microsoft Windows and Mac OS allow a single user to have multiple programs running simultaneously.

A multi-user OS, on the other hand, provides resources and services to multiple users concurrently. The operating system needs to make sure that the computing resources are well-shared among different users based on their requirements and that the problems with one user will not affect the other users. Unix is a good example of a multi-user OS.

**CLI operating systems and GUI operating systems**

Some operating systems have the CLI (Command Line Interface); it means that the user runs a program by typing a command. When the command is typed and the Enter key is pressed, the command is processed and the output is displayed on the screen. The user needs only a keyboard to work with a CLI since it does not allow the use of any pointing devices. Unix is a command-driven operating system mostly used on large multi-user multi-tasking mainframe computers.

Other operating systems have the GUI (Graphical User Interface) that allows the user to use a mouse to click on icons on the screen or choose commands from a list of choices known as a menu. The distinct feature of a GUI is the use of WIMP environment: windows, icons, menus and pointer.