Introduction

- A software or a program consists of a set of instructions required to solve a specific problem.
  - A program to sort a set of numbers.
  - A program to find the roots of a quadratic equation.
  - A program to find the inverse of a matrix.
  - The C compiler that translates a C program to machine language.
  - The editor program that helps us in creating a document.
  - The operating system that helps us in using the computer system.

Types of Programs

- Broadly we can classify programs/software into two types:
  a) Application Software
     - Which helps the user to solve a particular user-level problem.
     - May need system software for execution.
  b) System Software
     - A collection of programs that helps the users to create, analyze and run their programs.

(a) Application Software

- Application software helps users solve particular problems.
- In most cases, application software resides on the computer's hard disk or removable storage media (DVD, USB drive, etc.).
- Typical examples:
  - Financial accounting package
  - Mathematical packages like MATLAB or MATHEMATICA
  - An app to book a cab
  - An app to monitor the health of a person

(b) System Software

- System software is a collection of programs, which helps users run other programs.
- Typical operations carried out by system software:
  - Handling user requests
  - Managing application programs and storing them as files
  - File management in secondary storage devices
  - Running standard applications such as word processor, internet browser, etc.
  - Managing I/O units
  - Program translation from source form to object form
  - Linking and running user programs

- Some very commonly used system software:
  - Operating system (WINDOWS, LINUX, MAC/OS, ANDROID, etc.)
    - Instance of a program that never terminates.
    - The program continues running until either the machine is switched off or the user manually shuts down the machine.
  - Compilers and assemblers
  - Linkers and loaders
  - Editors and debuggers

- The OS is a collection of routines that is used to control sharing of various computer resources as they execute application programs.
  - Typical resources: Processor, Memory, Files, I/O devices, etc.
- These tasks include:
  - Assigning memory and disk space to program and data files.
  - Moving data between I/O devices, memory and disk units.
  - Handling I/O operations, with parallel operations where possible.
  - Handling multiple user programs that are running at the same time.