

## Software

- Software is a **program or set of programs containing instructions** which provide desired **functionality**.
- Software is a set of instructions, data or programs used to operate computers and execute specific tasks. It is the opposite of hardware, which describes the physical aspects of a computer. Software is a generic term used to refer to applications, scripts and programs that run on a device. It can be thought of as the variable part of a computer, while hardware is the invariable part.

## Software engineering

- Software engineering is an engineering discipline which is concerned with all aspects of software production.
- Software engineering is defined as a process of analyzing user requirements and then designing, building, and testing software application which will satisfy those requirements.

## Difference between software engineering and computer science

### Software engineering:

Software Engineering refers to the study of software which tell us about how Software is formed and about the processes involved in the formation of Software .It is basically known as Software Engineering because it applies the principles of Engineering in order to create a software. Thus it called by Software Engineering and people who study and apply software engineering for building a product are known as Software Engineers.

### Computer engineering:

Computer Engineering on the other hand refers to the study of both software and hardware and it tell us about the theoretical and practical implementation of mathematical formulations and technologies and make people ready to become Software Engineers. It provide us knowledge about various field like networking, processors and data base etc. It is the base of Software Engineering.

## Classification of Software

**On the basis of application normally two types:**

1. **System Software –**  
System Software **is necessary to manage the computer resources and support the execution of application** programs. Software like **operating systems, compilers,**

**editors** and **drivers** etc., come under this category. A computer cannot function without the presence of these.

2. **Applications Software –**

Application software, or app for short, is software that performs specific tasks for an end-user. For example, Microsoft Word or Excel are application software, as are common web browsers such as Firefox or Google Chrome.

### **Some others Software:**

**Embedded Software –**

This type of software is **embedded into** the **hardware** normally in the Read Only Memory (**ROM**) as a part of a large system and is used to support certain functionality under the control conditions. Examples are software used in instrumentation and control applications, **washing machines, satellites, microwaves** etc.

**Business Software –**

This category of software is used to support the business applications and is the most widely used category of software. Examples are software for **inventory** management, **accounts, banking, hospitals, schools**, stock markets, etc.

**Entertainment Software –**

Education and entertainment software provides a powerful tool for educational agencies, especially those that deal with educating young children. There is a wide range of entertainment software such as **computer games**, educational games, translation software, **mapping software**, etc.

**Artificial Intelligence Software –**

Software like expert systems, decision support systems, pattern recognition software, artificial neural networks, etc. come under this category. They involve complex problems which are not affected by complex computations using nonnumerical algorithms.

**Scientific Software –**

Scientific and engineering software satisfies the needs of a scientific or engineering user to perform enterprise specific tasks. Such software is written for specific applications using principles, techniques and formulae specific to that field. Examples are software like **MATLAB, AUTOCAD, PSPICE, ORCAD**, etc.

**Utilities Software –**

The programs coming under this category **perform specific tasks and are different from other software in terms of size, cost and complexity**. Examples are **anti-virus software, voice recognition software, compression programs**, etc.

## **Software process**

A software process is the set of activities and associated results that produce a software product. There are four fundamental process activities (covered later in the book) that are common to all software processes. These are:

1. **Software specification:** where customers and engineers define the software to be produced and the constraints on its operation.
2. **Software development:** where the software is designed and programmed.
3. **Software validation:** where the software is checked to ensure that it is what the customer requires.
4. **Software evolution:** where the software is modified to adapt it to changing customer and market requirements.

## **Characteristics of good software:**

- **Correctness:** The software which we are making should meet all the specifications stated by the customer.
- **Usability/Learnability:** The amount of efforts or time required to learn how to use the software should be less. Hence, this makes the software user-friendly even for ITilliterate people.
- **Integrity:** Just like medicines have side-effects, in the same way a software may have a side-effects. For instance, it may affect the working of another application. But a quality software should not have side effects.
- **Reliability:** The software product should not have any defects. Not only this, it should not fail while execution.
- **Efficiency:** This characteristic relates to the way software uses the available resources. Hence, the software should make effective use of the storage space and execute command as per desired timing requirements.
- **Security:** With the increase in security threats nowadays, this factor is gaining importance. The software should not have ill effects on data / hardware.
- **Safety:** The software should not be hazardous to the environment/life.