Introduction to Software Engineering

- ## Nature of Software

The software is an instruction or computer program that when executed provides desired features, function, and performance. A data structure that enables the program to adequately manipulate information and documents that describe the operation and use of the program.

Characteristics of software:

There is some characteristic of software which is given below:

1. **Reliability:** The ability of the software to consistently perform its intended tasks without unexpected failures or errors.
2. **Usability:** How easily and effectively users can interact with and navigate through the software.
3. **Efficiency:** The optimal utilization of system resources to perform tasks on time.
4. **Maintainability:** How easily and cost-effectively software can be modified, updated, or extended.
5. **Portability:** The ability of software to run on different platforms or environments without requiring significant modifications.

Changing Nature of Software:

Nowadays, seven broad categories of computer software present continuing challenges for software engineers. Which is given below:

1. **System Software:** System software is a collection of programs that are written to service other programs. Some system software processes complex but determinate information structures. Other system application processes largely indeterminate data. Sometimes when, the system software area is characterized by the heavy interaction with computer

hardware that requires scheduling, resource sharing, and sophisticated process management.

2. **Application Software:** Application software is defined as programs that solve a specific business need. Application in this area processes business or technical data in a way that facilitates business operation or management technical decision-making. In addition to conventional data processing applications, application software is used to control business functions in real-time.

3. **Engineering and Scientific Software:** This software is used to facilitate the engineering function and task. However, modern applications within the engineering and scientific area are moving away from conventional numerical algorithms. Computer-aided design, system simulation, and other interactive applications have begun to take a real-time and even system software characteristic.

4. **Embedded Software:** Embedded software resides within the system or product and is used to implement and control features and functions for the end-user and for the system itself. Embedded software can perform limited and esoteric functions or provide significant function and control capability.

5. **Product-line Software:** Designed to provide a specific capability for use by many customers, product-line software can focus on the limited and esoteric marketplace or address the mass consumer market.

6. **Web Application:** It is a client-server computer program that the client runs on the web browser. In their simplest form, Web apps can be little more than a set of linked hypertext files that present information using text and limited graphics. However, as e-commerce and B2B applications grow in importance. Web apps are evolving into a sophisticated computing environment that not only provides a standalone feature, computing function, and content to the end user.

7. **Artificial Intelligence Software:** Artificial intelligence software makes use of a nonnumerical algorithm to solve a complex problem that is not amenable to computation or straightforward analysis. Applications within this area include robotics, expert systems, pattern recognition, artificial neural networks, theorem proving, and game playing.