Software Engineering - Lecture 1 Notes

Introduction to Software & Software Engineering

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1. Definition of Software

- Software: Executable code + libraries + documentation.

- Program vs Software Product:

  * Program: Executes a specific task.

  * Software Product: Complete package developed for users with support & docs.

2. Types of Software

- System Software: OS, drivers, utilities.

- Application Software: User-centric programs.

- Embedded Software: Controls devices.

- Engineering/Scientific Software: Specialized tools.

- Web & Mobile Apps, Enterprise Software, etc.

3. Characteristics (Attributes) of Good Software

- Operational: Functionality, Reliability, Efficiency, Usability, Security

- Transitional: Portability, Reusability, Interoperability, Adaptability

- Maintainability: Modularity, Flexibility, Scalability

4. Software Attributes

- Functional correctness

- Usability & Maintainability

- Efficiency & Performance
- Portability & Reusability
- Reliability & Security
- Scalability & Adaptability

5. Software Engineering - Definition & Purpose

- Definition (Rajib Mall): Engineering discipline for developing software using scientific principles for efficient, reliable products.
- IEEE Definition: Application of systematic, disciplined, quantifiable approach to development, operation, and maintenance of software.

Purpose: To manage complexity, quality, cost, schedules, and changes.

6. Software Engineering Costs

- Software cost often exceeds hardware cost.
- Factors:
  * Complexity & size (effort grows exponentially).
  * Maintenance & rework due to poor quality.
  * Adaptations for changing environments.

Proper engineering practices help control time, cost, and quality.