Software Engineering - Chapter 1 Summary

Definitions

- Software: Computer programs and their documentation.

- Software Engineering: An engineering discipline concerned with all aspects of software production, from system specification to maintenance.

General Issues Affecting Most Software

1. Heterogeneity: Systems must operate across diverse devices/platforms.

2. Business and Social Change: Software must adapt quickly to changing needs.

3. Security and Trust: Essential as software integrates with all aspects of life.

Types of Software

- Generic: Sold to any customer (e.g., MS Office, Photoshop).

- Customized: Built specifically for a client and tailored to their needs.

Application Types

1. Stand-Alone Applications

2. Interactive Transaction-Based Applications

3. Systems of Systems

4. Data Collection Systems

5. Entertainment Systems

6. Batch Processing Systems

7. Embedded Control Systems

8. Modeling and Simulation Systems

Software Process Activities

1. Specification: Define software and constraints.

2. Development: Design and implement the software.

3. Validation: Ensure software meets customer requirements.

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4. Evolution: Update software to meet new market and user needs.

Web-Based Systems

- The web is now a major platform for running applications.

- Web systems are complex, distributed, and easier to update incrementally.

Attributes of Good Software

1. Maintainability

2. Dependability and Security

3. Efficiency

4. Acceptability

Software Costs

- Software often costs more than hardware.

- Maintenance usually exceeds initial development cost in long-term systems.

Software Process Models

1. Waterfall (Plan-Driven)

2. Incremental (Plan-Driven or Agile)

3. Reuse-Oriented (Plan-Driven or Agile)

Software Process Types

1. Agile: Incremental planning, suitable for small-medium projects.

2. Plan-Driven: Sequential phases, suitable for large projects.

3. Scrum: A framework under Agile methodology.

Prototype

- A prototype is an initial version of the software used to understand requirements or demonstrate concepts.