**Software Design Process (13 Marks)**

The **software design process** is a crucial phase of the **Software Development Life Cycle (SDLC)**. It involves converting software requirements into a **blueprint** for building the system. This blueprint outlines how the software will be structured, how its components interact, and how it meets functional and non-functional requirements.

The process typically includes the following stages:

**1. Requirement Analysis Review (1 mark)**

Before starting design, the team carefully reviews the **Software Requirements Specification (SRS)** to understand what the system must do. This ensures that the design addresses all functional and non-functional needs.

**2. System Design / Architectural Design (3 marks)**

* This is **high-level design** or "designing the architecture".
* It defines the overall system structure: **major components**, **modules**, **data flow**, and **how components interact**.
* **Architectural styles** like **layered**, **MVC**, or **microservices** are chosen based on system needs.
* **Outcome:** A **System Architecture Diagram** and selection of technologies (e.g., databases, frameworks).

**3. Detailed Design / Module Design (3 marks)**

* Focuses on **individual modules/components**.
* Each module’s internal logic, data structures, and algorithms are defined.
* Interface specifications are written to describe how modules interact.
* **Tools used:** Pseudocode, flowcharts, class diagrams, and UML.

**4. Data Design (1 mark)**

* Designing how data will be **stored, accessed, and manipulated**.
* Includes **database schema**, data types, and structures (arrays, lists, trees, etc.).
* Ensures **data integrity**, **normalisation**, and **efficient access**.

**5. Interface Design (1 mark)**

* Defines **user interfaces (UI)** and **application programming interfaces (APIs)**.
* Ensures that interfaces are **user-friendly**, accessible, and consistent.
* Focuses on **layout**, **navigation**, and **user interactions**.

**6. Design Validation and Review (2 marks)**

* The design is **evaluated and reviewed** to ensure it meets requirements and is feasible.
* Techniques like **walkthroughs**, **inspections**, and **prototyping** are used.
* Helps detect design flaws **early**, reducing costly changes later.

**7. Documentation (1 mark)**

* All design decisions, diagrams, interface definitions, and data models are documented.
* Essential for **future maintenance**, **development**, and **testing**.