SRI AKILANDESWARI WOMEN'S COLLEGE, WANDIWASH

DESIGN MODEL

Class: UG COMPUTER SCIENCE

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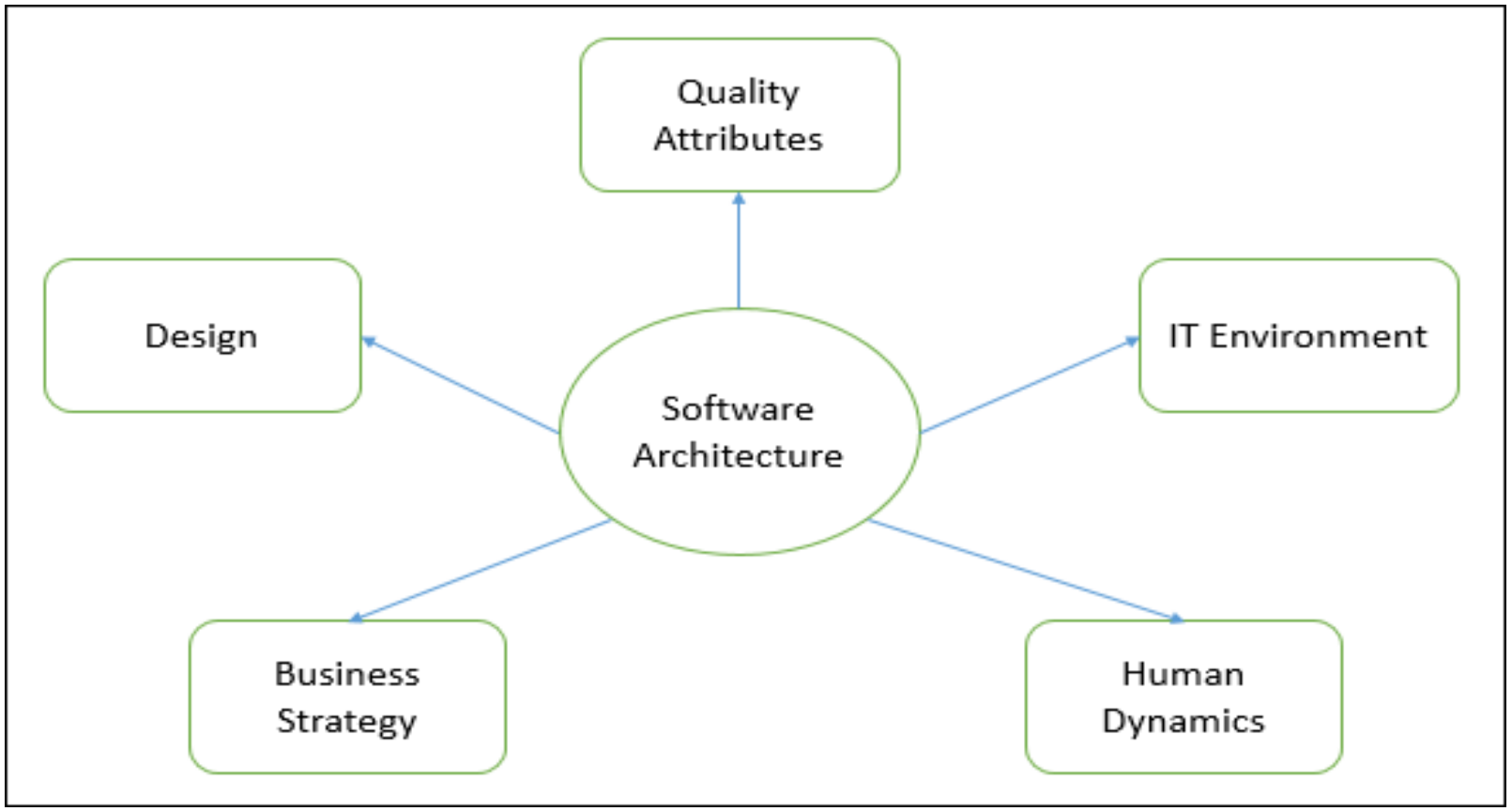
- The architecture of a system describes its major components, their relationships (structures), and how they interact with each other. Software architecture and design includes several contributory factors such as Business strategy, quality attributes, human dynamics, design, and IT environment.


Quality Attributes
Design
IT Environment
Software Architecture
Business Strategy
Human Dynamics

Software Architecture and Design

Two distinct phases

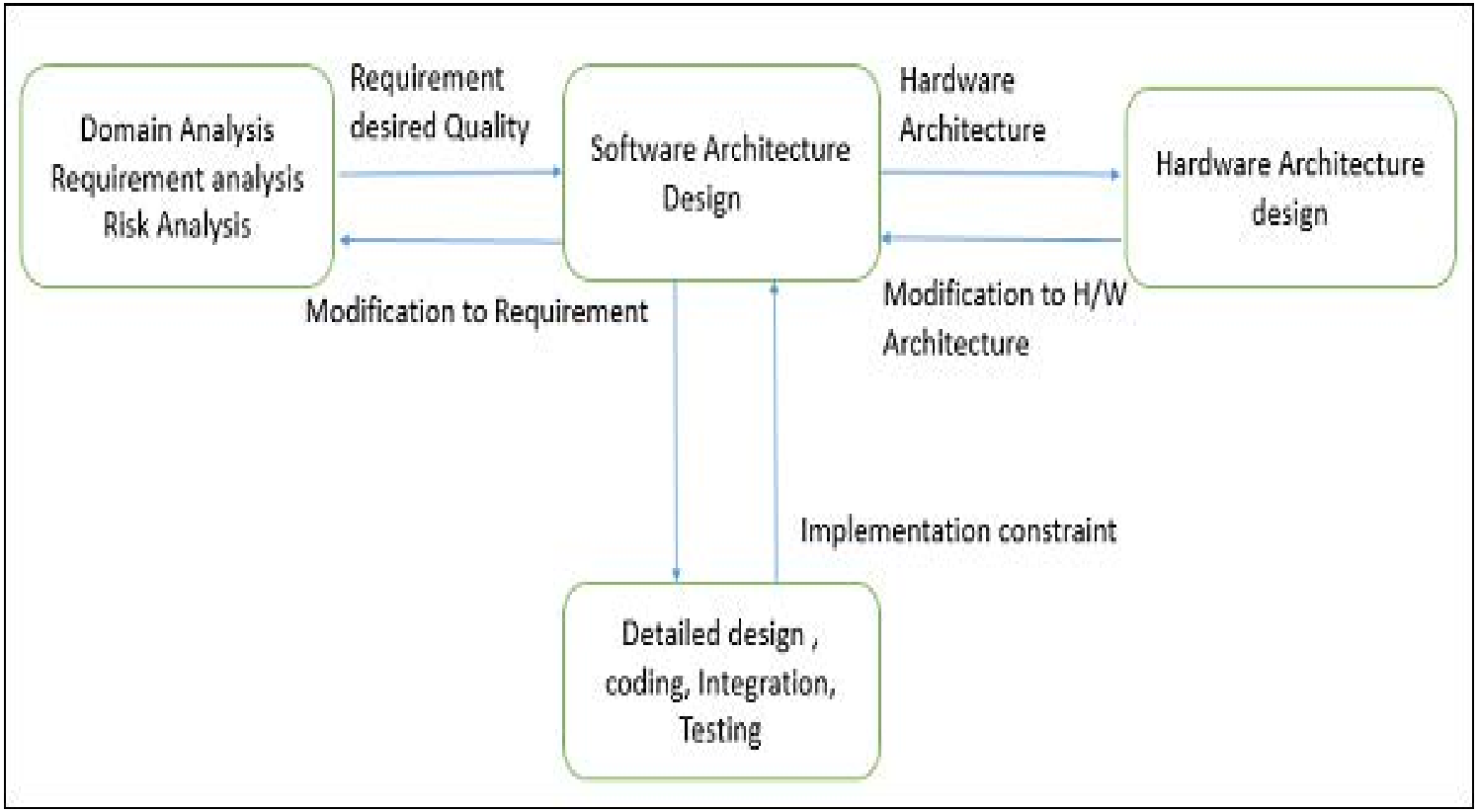
- Software Architecture
- Software Design

Software Architecture

- Architecture serves as a **blueprint for a system**. It provides an abstraction to manage the system complexity and establish a communication and coordination mechanism among components.

Software Design

- Software design provides a **design plan** that describes the elements of a system, how they fit, and work together to fulfill the requirement of the system


Domain Analysis
Requirement analysis
Risk Analysis
Requirement
desired Quality
Modification to Requirement
Software Architecture
Design
Hardware
Architecture
Modification to H/W
Architecture
Hardware Architecture
design
Implementation constraint
Detailed design ,
coding, Integration,
Testing

- **Goals of Architecture**
  - ✓Limitations
- **Role of Software Architect**
  - ✓Design Expertise
  - ✓Domain Expertise
  - ✓Technology Expertise
  - ✓Methodological Expertise
  - ✓Hidden Role of Software Architect
  - ✓Deliverables of the Architect

Quality Attributes

- **Static Quality Attributes**
- **Dynamic Quality Attributes**
  - ✓ Source
  - ✓ Stimulus
  - ✓ Environment
  - ✓ Artifact
  - ✓ Response
  - ✓ Response measure

Static Quality Attributes

- Reflect the structure of a system and organization, directly related to architecture, design, and source code.
- They are invisible to end-user, but affect the development and maintenance cost,
- e.g.: modularity, testability, maintainability, etc.

Dynamic Quality Attributes

- Reflect the behavior of the system during its execution.
- They are directly related to system's architecture, design, source code, configuration, deployment parameters, environment, and platform.

Software Quality

- Attributes can be broadly classified into 5 types:
  - Design
  - Runtime
  - System
  - User
  - Non-runtime qualities.

Reliability

- Reliability is the ability of software applications to behave as expected and function under the maximum possible load.
  - **Availability**
  - **Recoverability**
  - **Fault Tolerance**

Maintainability

- Maintainability refers to how easily software developers can add new features and update existing features with new technologies.
- The application architecture plays a critical role in maintainability.
- The well-architected software makes maintenance easier and more cost-effective.

Usability

- The Usability attributes refer to the end user's ease of use.
- Usability is tied to application performance, application UX design, and accessibility.
- To understand usability better let's consider an e-commerce page – user has purchased an item and wants to return the item.
- Good usability makes the return option available on the orders page.

Portability

- The portability quality attribute refers to how easily the system can be ported or migrated to other environments containing different hardware or operating system specifications.
- The portability problem is majorly faced in mobile native applications.

Correctness

- Correctness refers to the ability to behave or function as per software requirement specifications.
- This may include navigations, calculations, form submissions, etc.

Efficiency

- Efficiency can be defined as the time taken by the system to complete a specific task.
- In layman's terms, it can be the performance of the application.
- Performance is the most critical software quality attribute as it can make the user system to a hung state.

Security

- Security attribute focuses on the ability to safeguard applications, data, and information from unauthorized entities.
- This is very crucial as the data leaks may incur huge losses in terms of organization's brand name and reputation.
- Furthermore, the organization may face a lawsuit.

Testability

- Testability is how easily QA members can test the software and log a defect and how easy it is to automate the software applications.
- Your application design should focus on making the testing easier and faster.

THANK YOU