Software Architecture - Exam Questions and Answers

1. What is the difference between architectural design and module design?

Architectural Design focuses on the high-level structure of the system, identifying major components (modules) and their interactions. It answers 'How does it all fit together?'

Module Design deals with the internal design of individual components, focusing on computational aspects. It answers 'How does it work?'

2. Why is architectural design an important early stage in the software development process?

It bridges system specification and implementation, helps identify major components and their communications, allows early stakeholder discussion, system analysis, and promotes large-scale reuse.

3. State three advantages of having an explicit software architecture.

1. Improved stakeholder communication
2. System analysis for non-functional requirements
3. Promotes large-scale reuse across systems

4. Mention any four architectural design decisions.

1. Is there a generic application architecture to use?
2. What architectural style is appropriate?
3. How will the system be decomposed into modules?
4. What control strategy should be used?

5. Define the term cohesion and explain its importance.

Cohesion is a measure of how well the parts of a component work together. High cohesion means a component does a single, well-defined task, making it easier to maintain and adapt.

6. What are architectural styles, and why are they useful in software design?

Architectural styles are patterns of system organization that define component interactions and promote good practices like low coupling and high cohesion. They simplify system design by using proven templates.

7. Explain the Model-View-Controller (MVC) architectural pattern.

MVC separates a system into three components: Model (manages data), View (displays data), Controller (handles user input). It's used when there are multiple views of data.

Advantage: Independent UI and logic changes.

Disadvantage: Added complexity for simple apps.

8. Describe the 4 + 1 View Model of software architecture.

Includes: Logical View (abstractions), Process View (runtime behavior), Development View (code organization), Physical View (hardware mapping), plus Use Cases tying them together.

9. What are the main characteristics of a layered architecture?

System organized into layers, each providing services to the one above. Supports incremental development and layer replacement. Disadvantage: Clean separation and performance issues.

10. Differentiate between Transaction Processing Systems and Language Processing Systems.

Transaction Processing: Handles user database requests (e.g., ATM).

Language Processing: Translates or interprets formal language input (e.g., compilers).