

**Questions:****1. What challenges does software engineering face in terms of construction compared to traditional engineering fields?**

*Answer:* Software engineering faces challenges in estimating project costs, dividing projects into manageable pieces, ensuring compatibility, facilitating communication among team members, measuring progress, and managing a wide range of details. Unlike traditional engineering fields, software lacks the ability to construct systems from generic prefabricated components, leading to historical reliance on building complex software systems from scratch.

**2. What is the significance of the software requirements specification in the development process, and why does it often lead to challenges?**

*Answer:* The software requirements specification serves as a written agreement among stakeholders, guiding the software's development and resolving disputes. However, poor communication and changing requirements are major causes of cost overruns and late deliveries. Unlike building construction, where major changes to a floor plan are rare once construction begins, software engineering frequently experiences shifts in desired capabilities, causing instability. Effective communication with stakeholders is essential to address evolving needs during the software development life cycle.

**3. How does the software design phase differ from requirements analysis, and what does it entail?**

*Answer:* While requirements analysis identifies the problem to be solved, the design phase creates a plan for constructing the proposed system. Requirements analysis focuses on what the software system is to do, while design determines how it will accomplish those tasks. In the design stage, the internal structure of the software system is established, resulting in a detailed description that can be converted into programs. The analogy to constructing an office building involves developing detailed structural plans that guide the actual construction, with various notational systems and modeling methodologies employed in the design.

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4. **What characterizes the implementation phase of the software development life cycle, and what distinction exists between a software analyst and a programmer in this phase?**

**Answer:** The implementation phase involves writing programs, creating data files, and developing databases. In this stage, a distinction exists between a software analyst, involved in the entire development process with emphasis on requirements analysis and design, and a programmer, primarily responsible for implementation. However, the terminology may be blurred, with some titled analysts functioning as programmers and vice versa. The implementation phase highlights the translation of the design into executable programs, showcasing the hands-on development aspect of the software engineering process.

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