UML Design Modeling

Taylor Walston

The University of Arizona Global Campus

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Joseph Rangitsch

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Software testing is critical in the software development lifecycle, ensuring the final product is reliable, functional, and meets user expectations. Among the various levels of testing, component testing, integration testing, system testing, and acceptance testing are key in identifying and rectifying defects at different stages of development.

Component or module testing involves testing individual software components in isolation. This level of testing is performed to verify that each component functions correctly and meets its specified requirements. Developers typically conduct it and focus on the smallest units of the software, such as functions or classes. By isolating each component, testers can identify and fix defects early in the development process, which helps maintain the software's overall quality (Hamilton,2024).

Integration testing follows component testing and involves combining individual components to test their interactions. The primary goal is to identify issues that arise when components are integrated, such as data flow problems, interface mismatches, and communication errors. Integration testing can be performed using various approaches, including top-down, bottom-up, and big bang. Each approach has advantages and is chosen based on the project's complexity and requirements. This level of testing ensures that the integrated components work together as expected and helps detect defects that might not be apparent during component testing (Hamilton,2024).

System testing is the next level at which the entire software system is tested. This level of testing is conducted to validate the complete and fully integrated software product against the specified requirements. System testing includes various tests, such as functional, performance, and security, to ensure the system meets all functional and non-functional requirements. It is a form of black-box testing, meaning the testers do not need to know the system's internal workings. The primary objective is to identify any discrepancies between the actual and expected behavior of the system (Testsigma, n.d.).

Acceptance testing is the final level of testing before the software is released to the end users. This level of testing is performed to ensure that the software meets the business requirements and is ready for deployment. The end users or stakeholders typically conduct acceptance testing, which includes user acceptance testing (UAT) and operational acceptance testing (OAT). The main goal is to ensure the software is usable, reliable, and meets the users' needs. This testing level helps identify any issues that might have been overlooked during the previous testing phases and ensures that the software is ready for production (Testsigma, n.d.).

In conclusion, each level of testing—component, integration, system, and acceptance—plays a crucial role in the software development lifecycle. These testing levels help deliver a high-quality software product that meets user expectations and business requirements by systematically identifying and addressing defects at each stage. Effective testing not only improves the reliability and functionality of the software but also enhances user satisfaction and reduces the risk of post-deployment issues.

A diagram of a course selection

AI-generated content may be incorrect.*Figure 1: Classroom DataFlow*A diagram of a class

AI-generated content may be incorrect.

Figure 2 Logical Database Layout

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