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In the testing phase of the Software Development Life Cycle (SDLC), the software or system is put through several tests to find flaws, confirm its functioning, and make sure it complies with the requirements. The developers are more concerned about investigation and discovery of any issue. To have a successful test state, the developers will execute test cases, predicted, and compare actual finding of the tests and the behavior of the program in various scenarios.

The testing stage is vital to a successful SDLC due to many reasons which include but not limited to bug identification and defect prevention, verification of system requirements and behavior, and risk mitigation. Testing helps in bug identification and defect prevention in the software development process, revealing faults and problems, and enabling prompt rectification. The overall quality of the program increases because of finding and correcting problems during testing. This in term lowers the probability that issues may arise in the production environment. In validation of requirements and system behavior, testing ensures that the software meets the specified requirements and behaves as intended. It helps in confirming that the software works properly and completely as well as performs the necessary tasks, meeting stakeholders’ and users’ expectations. The behavior of the program is assessed under a variety of variables and scenarios, including varied inputs, boundary cases, and stress situations. This verification procedure aids in locating possible problems, such as flawed computations, performance hiccups, or security flaws. In risk mitigation, testing helps by identifying problems that might result in system failures, security breaches, or financial losses. Testing helps to reduce the risks associated with software development. It offers a chance to proactively manage these risks, lessening the likelihood that significant issues would arise following deployment. Therefore, the testing stage is extremely important to have a proper working program that at minimum will meet the expectations of the shareholders and provide the company with the confidence to deploy it to their users.

Although the testing stage typically follows the development stage in the SDLC, there are occasion in which exception applied where testing occurs earlier or later in the life cycle:

* Agile Development: such as Scrum or Kanban, emphasize iterative and incremental development. Testing is frequently incorporated throughout the whole development process in Agile, and testing efforts happened in each iteration or sprint, allowing for immediate feedback and early fault identification.
* Shift-Left Testing: this concept of testing moves the testing activities to earlier stages of the SDLC to identify defects and ensure quality at an early stage, reducing the cost and effort required for later-stage bug fixes.
* Continuous Integration and Continuous Deployment (CI/CD): In CI/CD pipelines, testing is automated and integrated into the development workflow. Automated tests are executed on each code commit, and if the tests pass successfully, the software is deployed. This approach allows for frequent testing and rapid feedback, reducing the time between development and testing stages.
* Exploratory testing: This type of testing involves testers actively exploring the program to understand its behavior and conduct on-the-spot tests. It may take place at any point in the SDLC and is frequently combined with other testing techniques. Exploratory testing helps find problems that scripted testing scenarios might have overlooked.
* Maintenance and Updates: When making updates or performing maintenance on an existing software system, the testing stage may occur after the development stage. The updates need to be tested to ensure they do not introduce new issues and that they do not adversely affect the existing functionality.

In conclusion, the SDLC testing phase is extremely important for guaranteeing software quality, verifying requirements, and reducing risks. Testing usually happens after the development stage, although there are few outliers where it happens earlier or later depending on the development method and project needs.

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