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| **Objectives:**   * **To sensitize the reader regarding the importance of testing** * **To develop a strong case for testing early and process testing** * **To clarify in terms of definitions** * **To show how testing has evolved** |

**1.1 Software Testing: Definitions**

Software testing is a process of evaluating a system by manual or automatic means and verify that it satisfies specified requirements or identify differenced between expected and actual results.

Software Testing is a process in which a software project or product is developed to fulfill the needs of a customer and deliver them with specified cost and time period.

**1.1.1 Ways of Doing Software Testing**

Software Testing can be done in two ways:

* Manual Testing
* Automation Testing

**a) Manual Testing**

Tester interacts with the software to find out whether it contains any error or not

Interacts

Tester

Software

**Fig 1.1 Manual Testing**

**b) Automation Testing**

Tester interacts with the tool (a man made software application) which inturn perform the testing operation.

Testing

Instructs

Software

Tool

Tester

**Fig 1.2 Automation Testing**

Software testing is a well-definable process or set of processes aiming at checking various functional, behavioral and performance parameters of a software product / program/ application. Software testing is one of the tools used to ascertain the quality of software.

Software testing is the process used to help identify the [correctness](http://en.wikipedia.org/wiki/Correctness), completeness, [security](http://en.wikipedia.org/wiki/Computer_security_audit), and [quality](http://en.wikipedia.org/wiki/Software_quality) of developed [computer software](http://en.wikipedia.org/wiki/Computer_software). Testing is a process of technical investigation, performed on behalf of stakeholders, that is intended to reveal quality-related information about the product with respect to the context in which it is intended to operate. This includes, but is not limited to, the process of executing a program or application with the intent of finding errors.

**1.2 Motivations for Software Testing: Why?**

Software Testing is important as it may cause mission failure, impact on operational performance and reliability if not done properly. Effective software testing helps to deliver quality software products that satisfy user’s requirements, needs and expectations. It done poorly, defects are found during operation, it results in high maintenance cost and user dissatisfaction.

There can also be various reasons, for which software can have bugs, faults and/or failures, e.g.,

* Miscommunication
* Lack of clear communication
* Software complexity – especially predominant in case of multi-tiered applications, client-server and distributed applications, data communications, enormous relational databases,
* Programming errors
* Changing requirements (documented or undocumented)
* Time pressures
* Poorly documented code - tough to maintain and modify code that is badly written or poorly documented, and
* Software development tools-visual tools, class libraries, compilers, scripting tools, etc., often introduce their own bugs or are poorly documented, resulting in added bugs.

**1.3 Purpose and Benefit of Testing**

The mail objective of testing is to help clearly describe system behavior and to find defects in requirements, design, documentation, and code as early as possible. The test process should be such that it should reduce the number of defects in the software product that will be delivered to the customer. All tests should be traceable to customer requirements.

**1.3.1 Objective of Software Tester**

* The goal of software tester is to find bugs.
* The goal of software tester is to find bugs and find them as early as possible.
* The goal of software tester is to find bugs and find them as early as possible and make sure they get fixed.

**1.3.2 Best Testing Practices to be followed in Software Testing**

* Testing and evaluation responsibility is given to every member, so as to generate team responsibility among all.
* Develop Master Test Plan so that resources and responsibilities are understood and assigned as early in the project as possible.
* Systematic evaluation and preliminary test design are established as a part of all system engineering and specification work.
* Testing is used to verify that all project deliverables and components are complete, and to demonstrate and track true project progress.
* A risk prioritized list of test requirements and objectives (such as requirements-based, design-based, etc) are developed and maintained.
* Conduct reviews as early and as often as possible to provide developer feedback and get problems found and fixed as they occur.
* Design and develop major testware components and procedures with the same discipline and acre, reserved for software components.

**1.4 Career in Testing**

Possible career options in testing include:

* General:
  + [Software Quality Assurance](http://www.tech-centric.net/Software-Quality-Assurance-jobs): engineers, auditors, consultants
  + Quality Assurance Networking Test Engineer
  + [Software Quality Assurance Director](http://www.tech-centric.net/Software-Quality-Assurance-Director-jobs)
  + [Software Quality Assurance Analyst](http://www.tech-centric.net/Software-Quality-Assurance-Analyst-jobs)
  + [Sr. Quality Engineer](http://www.tech-centric.net/Sr-Quality-Engineer-jobs)
* Application specific:
  + Web Applications Quality Assurance Manager
  + Web application testers
* Vertical specific:
  + Financial applications/ services tester
  + CRM systems tester
  + Clinical applications tester
* Solutions/ company-product specific:
  + SAP tester
  + Oracle Financials tester
* Hardware/ platform specific:
  + Network tester
  + Network security analysts
  + UNIX testers
  + LINUX testers

**1.5 Summary**

* Software testing is a well-definable process or set of processes aiming at checking various functional, behavioral and performance parameters of a software product / program/ application.
* Testing can be done by manually and automatically.
* Setting up a testing team also varies in terms of the testing requirements, quality requirements i.e. validation/ verification requirements, expertise available etc.
* The goal of software tester is to find bugs and find them as early as possible and make sure they get fixed.

**Review Questions**

1. What is software testing?
2. What is the need for software testing?
3. What are the Benefits of Software Testing?
4. What are the indirect benefits of software testing?