



# Introduction to Testing

- Mughni Shareef, Test Manager

# What is Testing ?

*“Execution of a software component or system component to evaluate one or more properties of interest.”*

Software testing also helps to identify errors, gaps or missing requirements in contrary to the actual requirements

# Why Testing ?

- April 2017 - Bitcoin Unlimited nodes crashed due to memory leaks. It was a shocking day for Bitcoin operators and investors when almost 600 Bitcoin Unlimited (BU) nodes plummeted drastically. It came crashing from 720 to 180.
- In 2015 fighter plane F-35 fell victim to a software bug, making it unable to detect targets correctly.
- Dec 2014 – Glitch in Flight Data System used by ATC in London Airports (Heathrow, Gatwick etc.) has caused delay/cancellation of hundreds of flights for multiple days, and almost brought the air traffic to standstill.

# Why Testing ?

- **To ensure that :**
  - Software is designed & developed per the User needs
  - Application works as expected by its End-users, and doesn't throw surprises OR prevent them from doing what they intend to do
  - Application can serve all the Users even when all of them use it together ( i.e. handle the volume of load)
  - Software/ Application is actually 'usable'
  - It can only be used authorized users and not by intruders.

# Myths about Testing job!

- Not a Challenging job
- Low Skilled
- Low Paid
- Career growth prospects are not great

# Myths about Testing job!

- **Not challenging! - I don't believe it..**
  - Tester is professional investigator
  - May have to work with complex business logics, algorithms, huge amounts of data
  - Need to wear different 'Hats'
  - May involve Programming, Frameworks, Knowledge on OS/Web Internals, Architectures
  - Need to work with complex tools if they have to do performance Or security testing
  - Have much broader scope than other counterpart designations

# Testing, QA, QC??

- Quality Assurance: A set of activities designed to ensure that the development and/or maintenance process is adequate to ensure a system will meet its objectives.
- Quality Control: A set of activities designed to evaluate a developed work product.
- Testing: The process of executing a system with the intent of finding defects. (Note that the "process of executing a system" includes test planning prior to the execution of the test cases.)

# Testing Vs QA

- QA – Covers many more activities such as –
  - Defining scope
  - Test Planning
  - Release planning
  - Decision making



# Roles & Responsibilities

- To read all the documents and understand what needs to be tested.
- Based on the information procured in the above step decide how it is to be tested.
- In the test planning and preparation phases of the testing, testers should review and contribute to test plans, as well as analyzing, reviewing and assessing requirements and design specifications.
- Develop test cases and prioritize testing activities.
- Execute all the test case and report defects, define severity and priority for each defect.
- Carry out regression testing every time when changes are made to the code to fix defects.

- They may be involved in or even be the primary people identifying test conditions and creating test designs, test cases, test procedure specifications and test data, and may automate or help to automate the tests.
- They often set up the test environments or assist system administration and network management staff in doing so.
- Inform the test lead about what all resources will be required for software testing.

- As test execution begins, the number of testers often increases, starting with the work required to implement tests in the test environment.
- Testers execute and log the tests, evaluate the results and document problems found.
- They monitor the testing and the test environment, often using tools for this task, and often gather performance metrics.
- Throughout the **software testing life cycle**, they review each other's work, including test specifications, **defect reports** and test results.

# Testing Different Applications

- Web based Applications testing
- Desktop based applications testing
- Mobile Based applications Testing

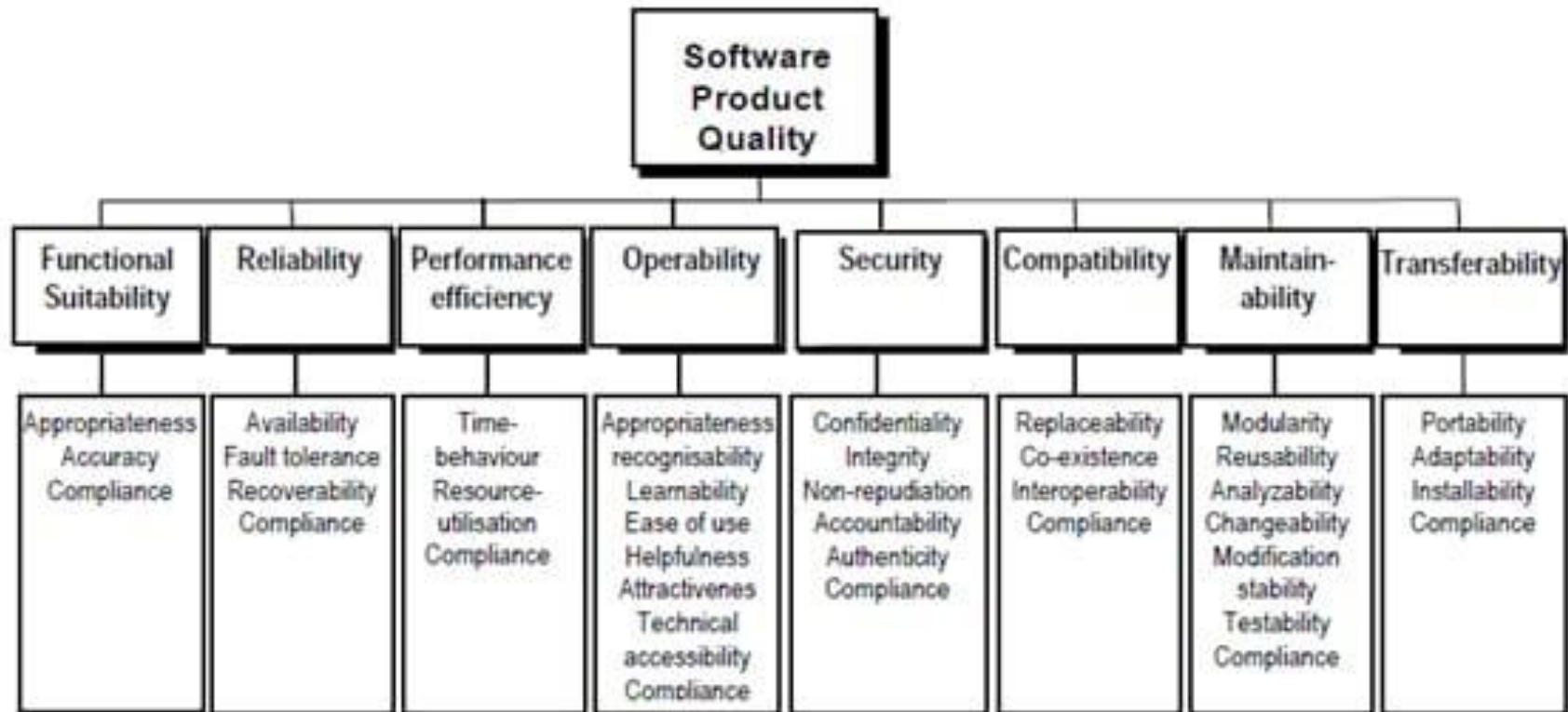
# Test Environments

Typical environments for sprint/release cycle:

- **D** - Development
- **T** - Test (the test environment where the automated regression suit runs after each commit/on-demand/periodically. Major chunk of the exploratory/story/functional and non-functional testing is done on this environment)
- **A** - Acceptance (Product Owner does the acceptance testing after deploy to this env in between or after a successful sprint.)
- **P** - Production (Finally a release is deployed to prod as per release cycle. Smoke tests are run after deploy and accessibility checks are performed periodically)

# Quality

- *“In the context of software engineering, software quality measures how well software is designed (quality of design), and how well the software conforms to that design (quality of conformance). It is often described as the ‘fitness for purpose’ of a piece of software.”*



# Cost of Quality

It's the sum of the following costs –

Prevention costs – This includes cost of training developers on writing secure and easily maintainable code

Detection costs – This includes cost of creating test cases, setting up testing environments, revisiting testing requirements.

Internal failure costs – This includes costs incurred in fixing defects just before delivery

External failure costs – This includes product support costs incurred by delivering poor quality software



# How much Testing is enough?

- Testing Principle - Exhaustive testing is impossible
- We do with the risks for the customers, the stakeholders, the project and the software
- This return on investment includes preventing failures after release that are costly.
- By prioritizing risks early it will help to determine how much testing is considered to be enough. Once you have considered the risk, you should find the goal of testing. Once you have obtained a sufficiently high level of confidence in different levels of test such as Unit testing, Integration testing, System testing, Acceptance testing and Regression testing you are done testing.

# Manual & Automation

- Manual – Done by Testers physically
- Automation – Done using an Automation tool
- Different tools include Selenium, Ranorex, UFT etc.,

# Manual Vs Automation

- Manual testing is testing of the software where tests are executed manually by a QA Analyst.
- In Automated Software Testing, testers write code/test scripts to automate test execution.
- Manual Testing helps you to get fast and accurate visual feedback.
- Automated testing helps you to find more bugs compare to a human tester.

# Manual Vs Automation

- Manual testing is a less reliable testing method because it's conducted by a human. Therefore, it is always prone to mistakes & errors.
- The tools to run automation testing can be expensive, which may increase the cost of the testing project.
- Manual testing is time-consuming and takes up human resources.
- Automated testing is significantly faster than a manual approach.

# Latest trends in Testing

- **Shift from QA to Quality Engineering**
- **IOT**
- **Digital Transformation with Agile**
- **Devops**
- **Time for Big Data Testing**
- **Bigger Market share for Mobile Users & Test Automation**
- **API and Micro Services Test Automation**
- **Increasing Adoption of Open Source Tools**
- **Performance Engineering is replacing Performance Testing**

**“The best news is that Software Testing Budgets will continue to grow”**

# References

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Q & A