

NONFUNCTIONAL TESTING

PBA SOFTWAREUDVIKLING /
BSC SOFTWARE DEVELOPMENT

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TODAY'S TOPICS

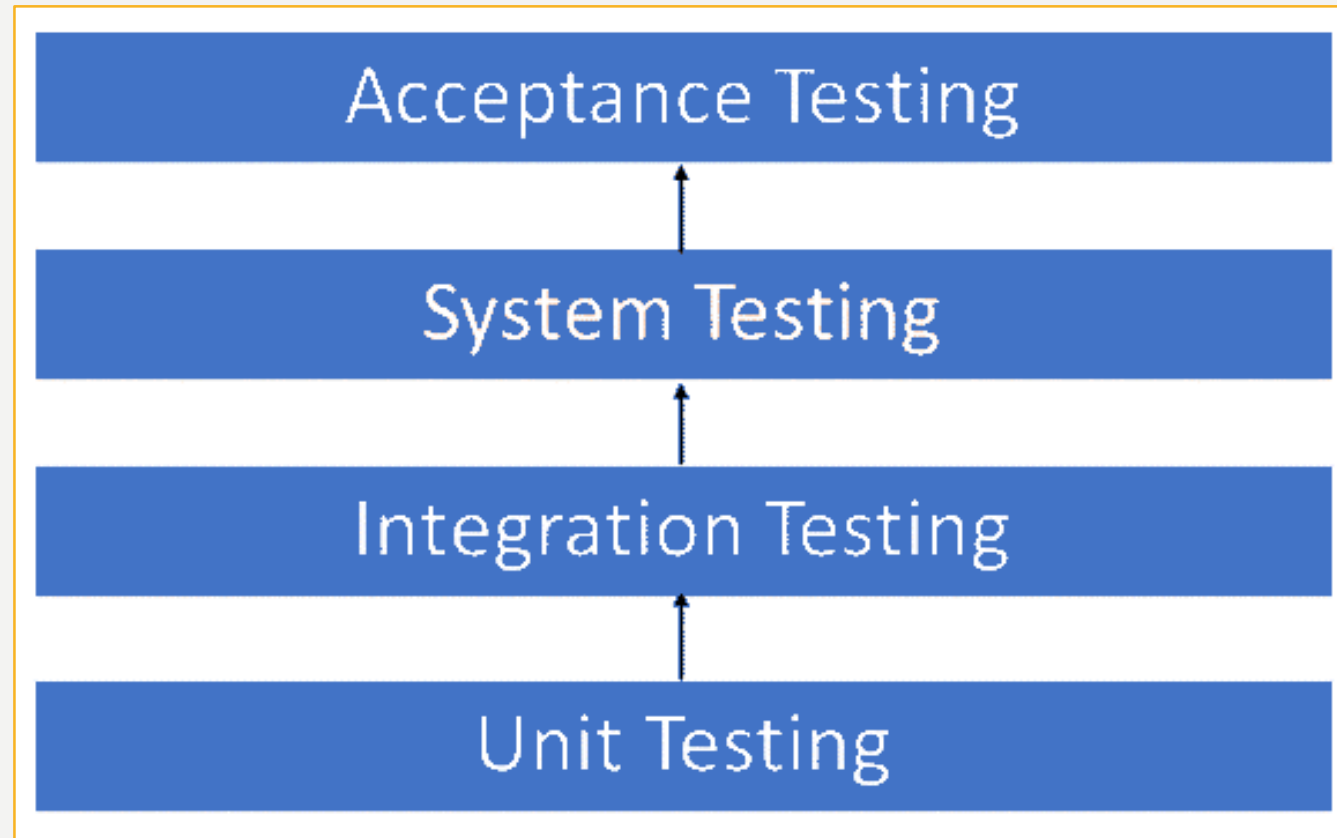
- **Overview**
 - Learning objectives
 - Introduction
 - Nonfunctional testing
 - JMeter
 - BlazeMeter
 - Examples
 - Exercises
 - Assignment
 - Guest lecturer: Jesper Terkelsen (TradeShift)

LEARNING OBJECTIVES

- Know the difference between functional and nonfunctional testing
- Know the different types of nonfunctional tests and the basic implications involved in nonfunctional testing
- Set up and execute test plans in JMeter
- Import and execute test plans in BlazeMeter

NONFUNCTIONAL TESTING

Performed after integration testing and before system testing



Nonfunctional testing

NONFUNCTIONAL TESTING

Functional / Nonfunctional

Functional requirements describe what the software system should do

Nonfunctional requirements describe how the software system should work

Nonfunctional testing is a type of testing to check nonfunctional aspects of a software application

Example...

Functional requirement: Software system must send emails when orders are placed

Nonfunctional requirement: Software system must send emails within 1 minute after orders are placed

NONFUNCTIONAL TESTING

Objectives of nonfunctional testing...

- Produce measurements and metrics for further research and development
- Enhance knowledge about the product behavior and the technologies in use
- Optimize the way the product is installed, set up, executing, managed and monitored
- Increase quality attributes of the product

Quality attributes of a software system include nonfunctional testing parameters such as security, availability, efficiency, integrity, reliability, survivability, usability, flexibility, scalability, reusability, interoperability and portability

NONFUNCTIONAL TESTING

Quality attributes / Nonfunctional testing parameters

Security	Availability	Efficiency	Integrity
Reliability	Survivability	Usability	Flexibility
Scalability	Reusability	Interoperability	Portability

NONFUNCTIONAL TESTING

There are many different types of functional tests, targeted at testing each of different nonfunctional testing parameters

Not all testing types apply to all projects but depend on the nature and scope of the project

Nonfunctional testing types

- Security testing / Maintenance testing / Regression testing
- Reliability testing / Availability testing / Stability testing
- Survivability testing / Recovery testing / Disaster recovery testing
- Performance testing / Stress testing / Efficiency testing / Load testing / Endurance testing
- Volume testing / Scalability testing
- Usability testing / Interoperability testing / Portability testing / Compatibility testing

NONFUNCTIONAL TESTING

Security testing

Focused on weaknesses, threats, vulnerabilities, loopholes...

Reliability testing

Focused on failure-free operation for a specified period of time...

Survivability testing

Focused on recovering from failures and reestablishing integrity...

Stability testing

Focused on ability to function without failures under different stress loads...

Usability testing

Focused on end users usage of the system...

Scalability testing

Focused on ability of the system to scale according to needs...

NONFUNCTIONAL TESTING

Nonfunctional testing ranges widely from sessions recording end users using the system in a test lab to actual disaster exercises of recovery plans for restoring the system back to operation...

Extensive reports and summaries should be generated for the nonfunctional tests including different types of failures, response times, statistics and similar

Actions can be taken based on nonfunctional testing reports and summaries to improve the system and meet the nonfunctional requirements

Improvement depends upon the characteristics of the system and the problems occurred

Exact numbers are unlikely to be known at the start of the requirement process

NONFUNCTIONAL TESTING

Tools...

Load / Performance

JMeter / BlazeMeter

Loadrunner / Neoload / WebLoad / Loadster / WAPT / LoadImpact

Usability

CrazyEgg / UserZoom / UserTesting / Loop11 / UsabilityHub / Usabilla

Security

SonarQube / SQLNinja / Wapiti / W3af

NONFUNCTIONAL TESTING

JMeter...

Open source software / 100% pure Java application

Designed to load test functional behavior and measure performance

Originally designed for testing Web Applications but has since expanded to other test functions

CLI mode to load test from any Java compatible OS (Linux, Windows, Mac OSX)

Ability to load and performance test many different application / server / protocol types:

- FTP / TCP
- HTTP / HTTPS
- SOAP / REST Web services
- Database via JDBC
- SMTP(S) / POP3(S) / IMAP(S)
- Native commands or shell scripts

JMeter can simulate browser behavior by sending requests to web or application servers and also parse the responses

JMeter does not execute the Javascript found in HTML pages, nor does it render the HTML pages as a browser does

NONFUNCTIONAL TESTING

BlazeMeter...

Functional load testing platform in the cloud

On your local machine, you can scale up to approximately 100 virtual users, but you can go up to 80000 virtual users and 5000 concurrent users with the BlazeMeter pro pricing plan

JMeter script can easily be imported to BlazeMeter and thereby test plans can be executed on a larger scale than locally

Supports Selenium, Taurus, Mocha, Gatling, JUnit, NUnit, Postman and many other types of executors



EXERCISES

- **JMETER**
 - TestPlan
 - ThreadGroups
 - Samplers / Assertions / Listeners / Config Elements
- **BLAZEMETER**
 - Import JMeter



GUEST LECTURER

- **JESPER TERKELSEN**
 - Tradeshift.com
 - Nonfunctional testing
 - CI / CD / DevOps / Release pipeline

RESOURCES...

FUNCTIONAL TESTING

<https://www.guru99.com/non-functional-testing.html>

<https://www.guru99.com/functional-testing-vs-non-functional-testing.html>

<https://www.guru99.com/what-is-security-testing.html>

<https://www.guru99.com/reliability-testing.html>

<https://www.guru99.com/recovery-testing.html>

<https://www.guru99.com/stability-testing.html>

<https://www.guru99.com/usability-testing-tutorial.html>

<https://www.guru99.com/scalability-testing.html>

<https://www.guru99.com/interoperability-testing.html>

<https://www.softwaretestinghelp.com/what-is-non-functional-testing/>

JMETER

<https://jmeter.apache.org/>

https://jmeter.apache.org/download_jmeter.cgi

<https://jmeter-plugins.org/>

<http://www.guru99.com/jmeter-tutorials.html>

<https://www.tutorialspoint.com/jmeter/>

<https://dzone.com/articles/getting-started-with-jmeter-a-basic-tutorial>

BLAZEMETER

<https://www.blazemeter.com/>