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Quality and quality assurance. Testing types and levels.

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Senior QA, QA Leader
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Content

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- What is quality?
- Quality Control (QC) and Quality Assurance (QA)
- Testing types – classification
- Testing types – detailed [Functional; Non-functional; Change-related]
- Testing levels

What is quality?

Software quality

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Software functional quality reflects how well it complies with a given design, based on requirements or specifications. That attribute can also be described as the fitness for purpose of a piece of software or how it compares to competitors in the marketplace as a worthwhile product. It is the degree to which the correct software was produced.

QC & QA

Testing, QC, QA

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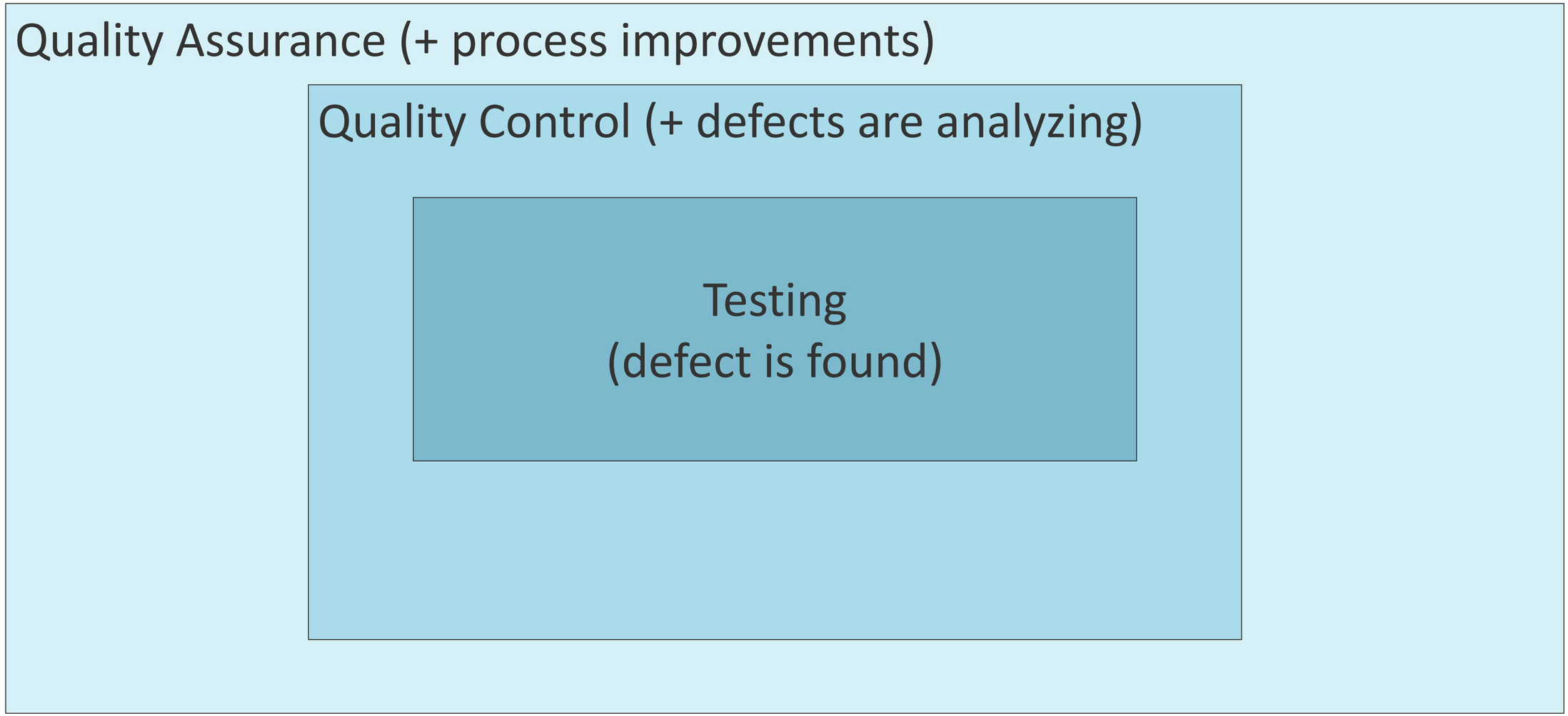

Quality Control vs Quality Assurance

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QA

- It is a procedure that focuses on providing assurance that quality requested will be achieved
- QA aims to prevent the defect
- It does not involve mandatory executing the program
- It’s a Preventive technique
- QA ensures that everything is executed in the right way, and that is why it falls under verification activity
- It requires the involvement of the whole team

QC

- It is a procedure that focuses on fulfilling the quality requested.
- QC aims to identify and fix defects
- It always involves executing a program
- It’s a Corrective technique
- QC ensures that whatever we have done is as per the requirement, and that is why it falls under validation activity
- It requires the involvement of the Testing team

БУЗ ВО "Воронежская городская клиническая поликлиника №4"

Уважаемые пациенты!

В соответствии с приказом департамента здравоохранения Воронежской области от 09.07.2021 № 1412, в целях реализации мер по профилактике и снижению рисков распространения новой коронавирусной инфекции COVID-19 **с 09.07.2021 года до особого распоряжения в учреждении приостановлен плановый консультативный прием и плановые диагностические обследования.**

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Об учреждении

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Режим работы

Контакты

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Перечень жизненно необходимых лекарственных препаратов

Нормативные документы

Полезные статьи

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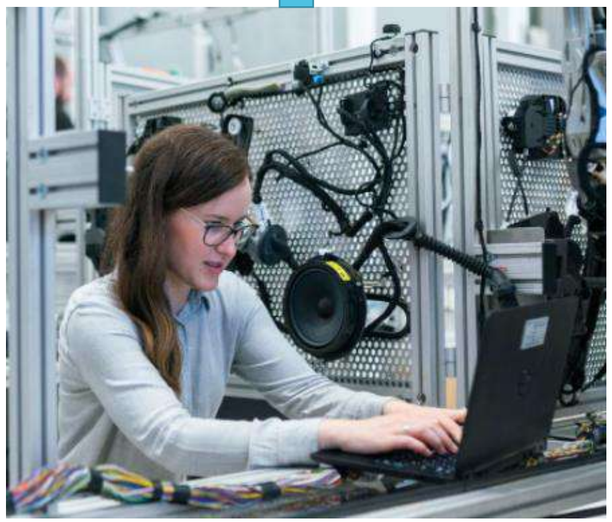
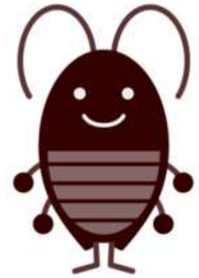
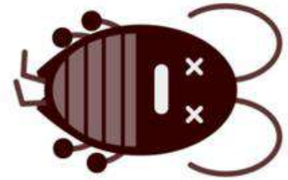
<PROGRAM>


Requirements




TOP QUALITY
QUALITY





Testing types classification

Testing types - classification

Testing types – by structure

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Structured

- Test cases based
- Check list based
- Exploratory

Unstructured

- Ad-hoc/Monkey testing
- Exploratory
- Error guessing (Experience based)

Testing types – by positivity

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- Positive – checks correct scenarios, e.g. password length is more than required minimum value
- Negative – checks invalid scenarios, e.g. password length is less than required minimum value

Testing types
– by the execution method

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- Manual
- Automated
- Semi-automated

Testing types – by approach

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- **Black box**
- Gray box
- White Box

Testing types – by object

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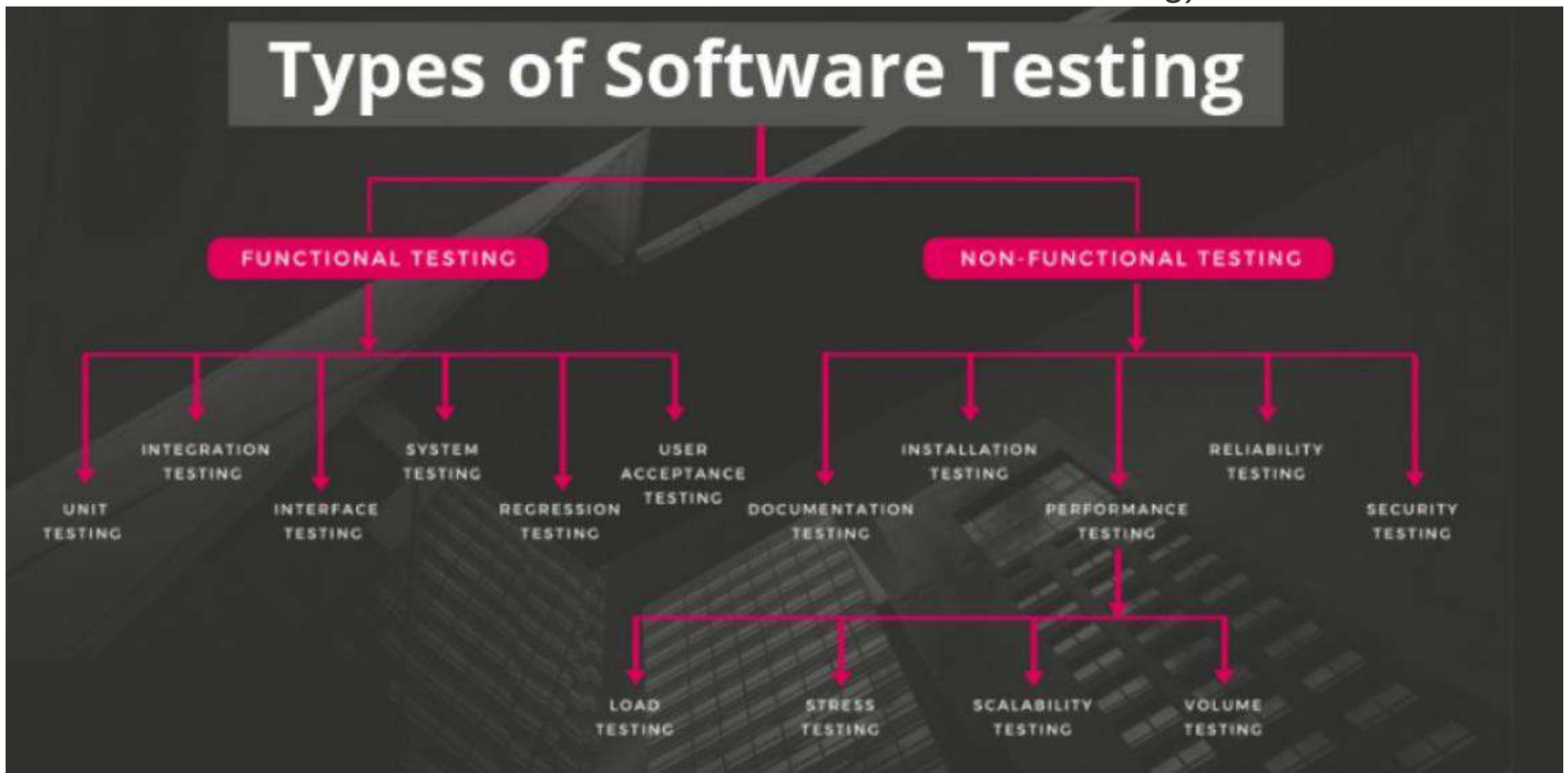
- Functions and features (functional testing)
- Characteristic (non-functional testing)
- Structure of architecture (structural testing)
- Changes and system state after (change-related testing)



Testing types - detailed

Functional testing types

Functional testing

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Testing of the functional aspects of a software application. When you’re performing functional tests, you have to test each and every functionality

What system does

- Based on **functions and features** (test basis);
- Functional testing considers the **external behavior** of software (black-box);

Applicable for all test levels

- Suitability (пригодность к использованию)
- Accuracy (аккуратность, точность)
- Interoperability (способность к взаимодействию)
- Security (безопасность)
- Functionality Compliance (соответствие стандартам и правилам)

Non-functional testing types

Non-functional testing

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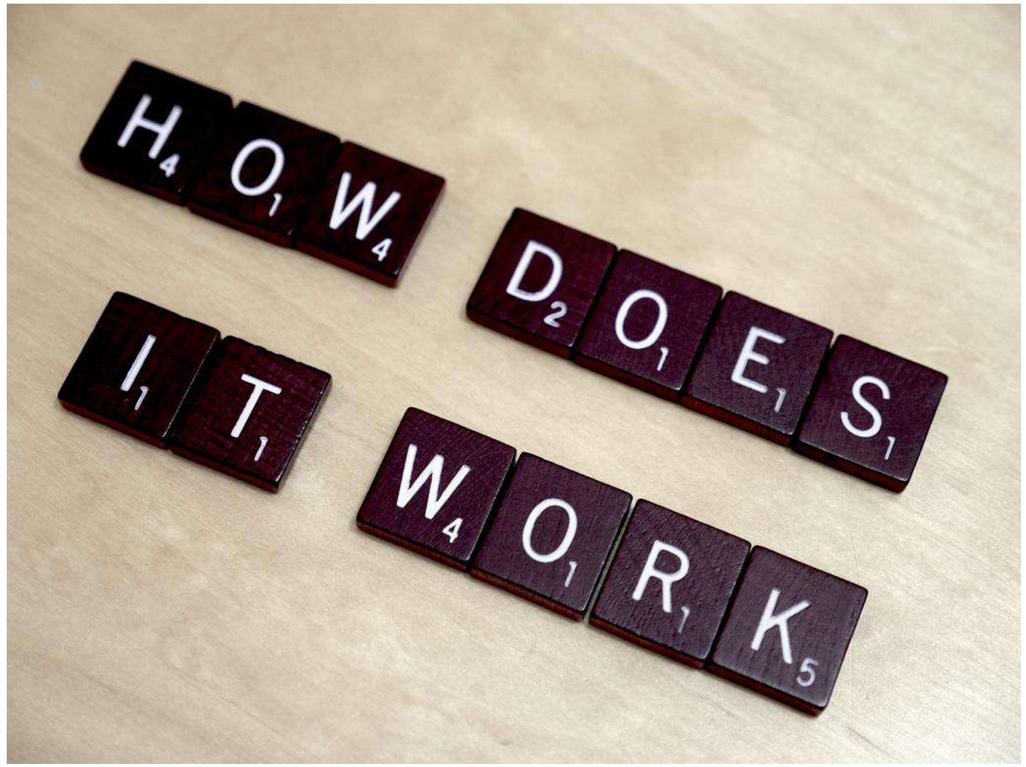
How the system works

- Reliability/Stability testing (Стабильность)
- Usability testing (Удобство использования)
- Load/Efficiency testing (Нагрузка)
- Maintainability testing (Поддержка)
- Portability testing (Портативность)
- Security testing (Безопасность)

Applicable to all test levels



Maintainability testing – assess efforts needed to make specified modifications

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- Analyzability (Анализируемость)
- Changeability (Изменяемость)
- Stability (Стабильность)
- Testability (Тестируемость)

Reliability Testing – checking capability to maintain its level of performance under stated conditions for a stated period of time

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- Maturity (зрелость, обратна к частоте отказов)
- Fault tolerance
- Recoverability

Performance testing – Used to determine a system's behavior under both normal and peak load conditions

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Weak points:

- Application server
- DB server
- Network
- Client-side processing
- Load balancing between multiple servers

Popular types:

- Load (Endurance, Scalability) Testing
- Volume Testing
- Stress Testing
- Spike Testing (kind of Stress)

Metrics:

- Load time
- Response time
- Connections/requests per second/total
- Bytes per second (total/per user)
- Memory/disk space/CPU usage
- Amount of latency/lag
- Concurrent users

Portability Testing – Assess the ease with which a software component can be moved from one environment to another

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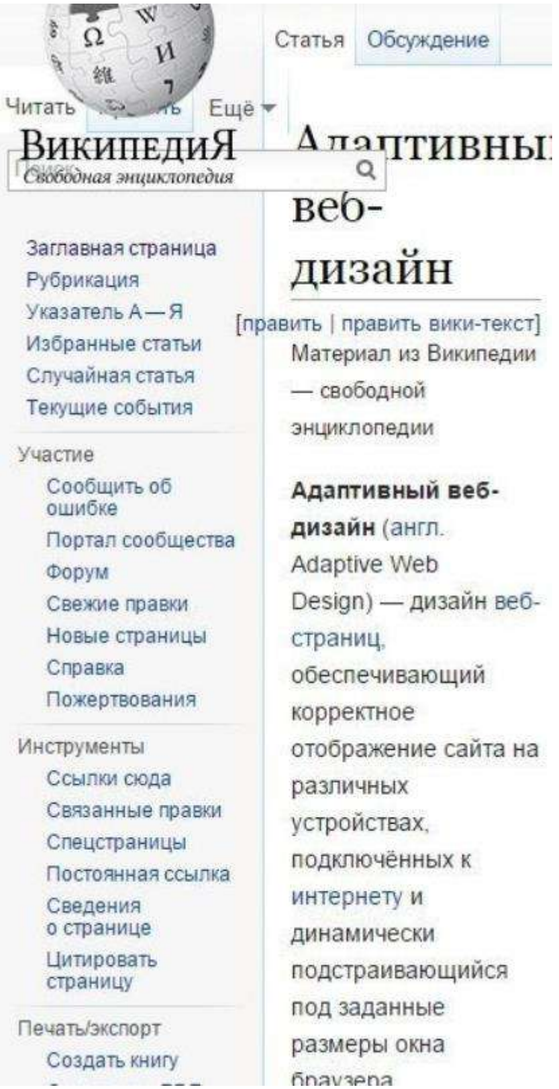
- Adaptability
- Installability
- Coexistence
- Replaceability



Usability Testing – Performed in order to make the system more user-friendly

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Main questions

- Where am I?
- What should I do?
- Why should I do that?

Types:

- Understandability
- Learnability
- Operability
- Attractiveness

Security testing

- uncovers vulnerabilities, threats, risks in a software application and prevents malicious attacks

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- **Vulnerability Scanning** – system scanning by automated software against known vulnerability signatures
- **Security Scanning** – involves identifying network and system weaknesses, and later provides solutions for reducing these risks
- **Penetration testing** – simulates an attack from a malicious hacker; involves analysis of a particular system to check for potential vulnerabilities to an external hacking attempt
- **Risk Assessment** – involves analysis of security risks observed in the organization; this testing recommends controls and measures to reduce the risk
- **Security Auditing** – internal inspection for security flaws

Change-related testing

Change Related testing

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- Smoke Testing
  - Smoke Testing is performed to ascertain that the critical functionalities of the program is working fine
  - Smoke testing exercises the entire system from end to end

- Sanity Testing
  - Sanity Testing checks the new functionality or/and bugs have been fixed
  - Sanity testing exercises only the specific component of the system

- Regression Testing
  - Testing of a previously tested program after modification to ensure that defects have not been introduced or uncovered in unchanged areas as a result of the changes made

Testing levels

Testing levels

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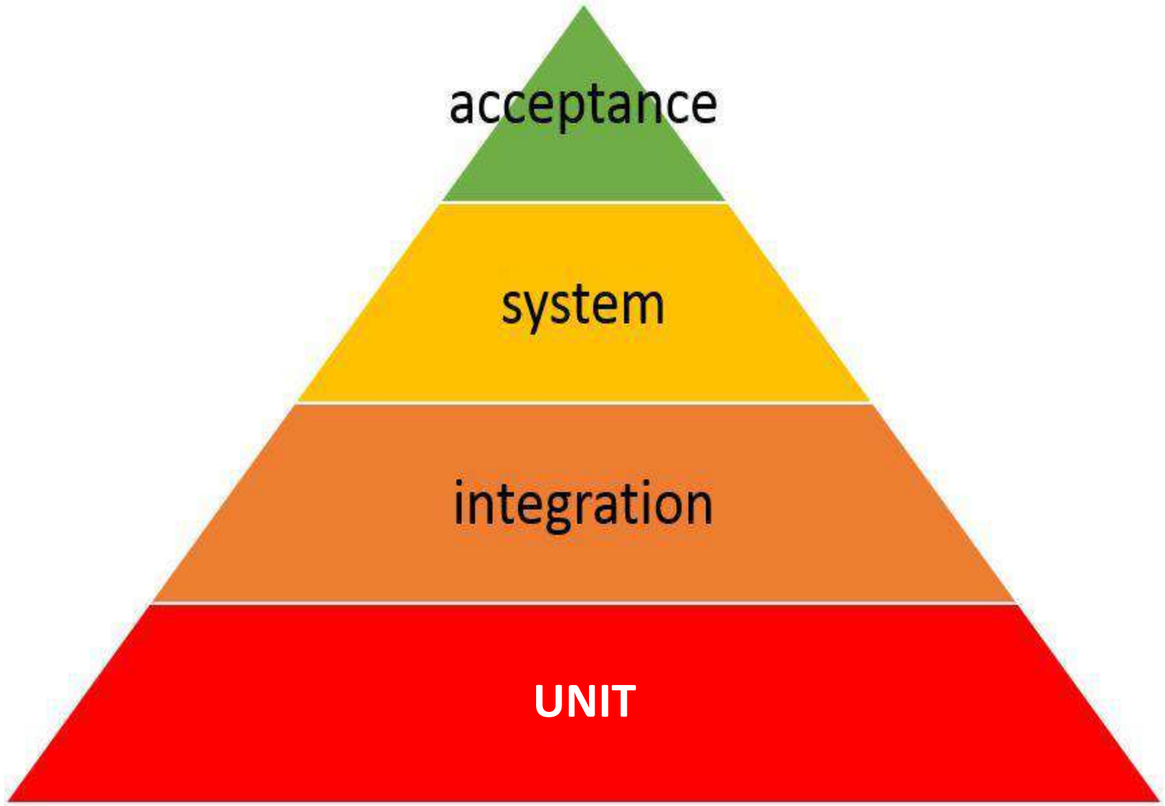
- Component/Unit Testing
- Integration Testing
- System Testing
- Acceptance Testing



Testing levels – Component/Unit

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- Unit is a smallest testable portion of system or application which can be compiled, liked, loaded, and executed. This kind of testing helps to test each module separately
- Test Basis:
  - Specification of a Component
  - Data Model
  - Code
- Includes functional, non-functional (e.g. memory leaks), structural testing (decision coverage)
- Might be performed by developers (by automated unit tests)
- There is a limit to the number of scenarios and test data that can be used to verify a source code

Testing levels - Integration

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- testing of combined parts of an application to determine if they function correctly
- Testing concentrates on integration between system modules itself
- Integration testing can be done in two ways: Bottom-up and Top-down integration testing
  - Bottom-up integration begins with unit testing, followed by tests of progressively higher-level combinations of units called modules
  - Top-down checks the highest-level modules first and progressively, lower-level modules are tested in details after
- Both non-functional and functional characteristics can be tested.

Testing levels - System

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- Tests behavior of a whole system
- This type of testing is performed by a specialized testing team
- System testing is the first step in the Software Development Life Cycle
- The application is tested thoroughly to verify that it meets the functional and technical specifications
- System testing tests, verifies and validates both the business requirements as well as the application architecture

Testing level - Acceptance

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- Main goal is to evaluate whether the system complies with the end-user requirements and if it is ready for deployment
- Acceptance testing is basically done by the user or customer
- Prod-like environment must be used

  - User Acceptance Testing (UAT)
  - Operational Acceptance Testing (backup/restore, user management, recovery, migration, etc.)
  - Contract and Regulation acceptance testing
  - Alpha and Beta testing

Questions


I'll be back