Quality Engineering

Enabling quality everywhere

Testing Types

Globant

Today's Agenda

- Software Development Life Cycle (SDLC) and Software Testing Life Cycle (STLC)
- Test Levels
  - Unit/Component Testing
  - Integration Testing
  - System Testing
  - User Acceptance Testing
- Test Types
  - Functional
  - Non-Functional
  - White box / Structural
  - Changes related
- Test Types and Test Levels

SDLC and STLC

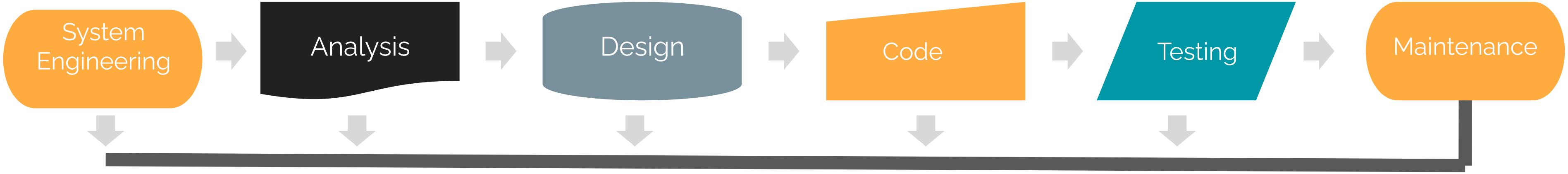
SDLC and STLC

I need to be familiar with SDLC?
Yes, so appropriate test activities can take place:

- **For every dev activity, there's a test activity.**
- Testers participate in discussions to define and refine requirements and design.
- No matter what SDLC is chosen, test activities should start early.

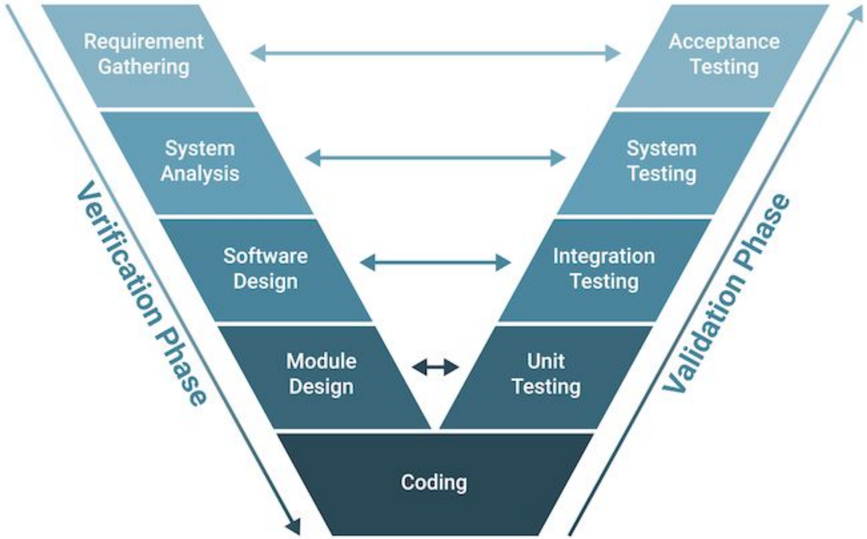
SDLC and STLC

- SDLC categories: Sequential and iterative / incremental
  - Sequential -> Waterfall model



SDLC and STLC

- SDLC categories: Sequential and iterative / incremental
    - ○ Sequential -> V Model



SDLC and STLC

- SDLC categories: Sequential and iterative / incremental
  - Incremental (in pieces)
    - RUP: Each iteration lasts 2 -3 months
    - Scrum: Each iteration lasts days or few weeks
    - Kanban: Without a fixed-length

Testing Levels

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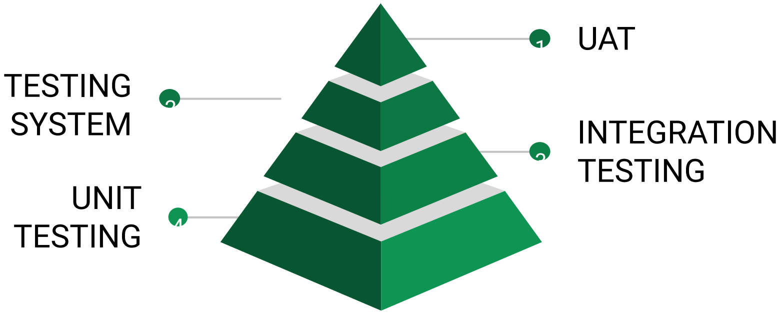
Testing Levels

- Test levels are groups of test activities that are organized and managed together.

- Test levels are related to other activities within the software development lifecycle.



Globant

Testing Levels

1 Unit Testing

Done by Developers

2 Integration Testing

Done by Testers

3 System Testing

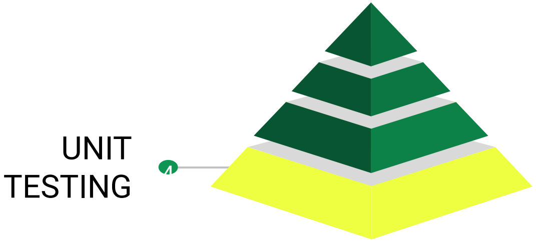
Done by Testers

4 Acceptance Testing

Done by End Users

Testing Levels : Unit Test

- The tests executed **against** static code.
- Developer (**Coder**) is **involved**.
- **Defects** detected and fixed ASAP, **without formalities**
- Coverage measured in **% of code covered.**
- A **failing unit test** can go **undiscovered** by QC.

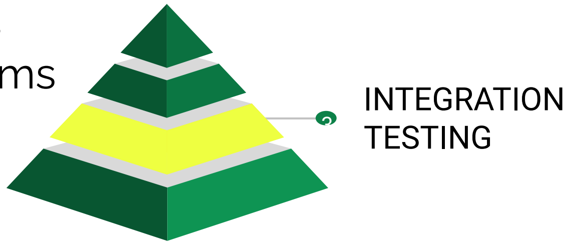


Testing Levels: Integration Test

- Identifies problems that may arise when the **different units** are **combined**.

- When the **integration** between the different components is **greater**, it becomes **harder to identify** the interface causing the error.

- Examples of typical defects
    - Inconsistent message structures between systems
    - Unhandled communication failures between systems



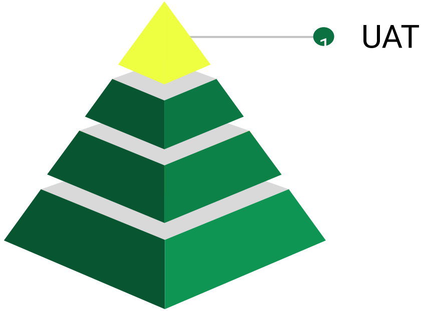
Testing Levels : System Test

- Executed by a team of **testing specialists** based on:
  - Requirements / Use Cases or User Stories
  - Risks / Business processes
- Is the **final test** to verify the system **meets the specifications.**
- The **goal** is to **find the most defects**.
- Must include **function** and **non-functional requirements**.
- Must be executed in a **controlled environment**.

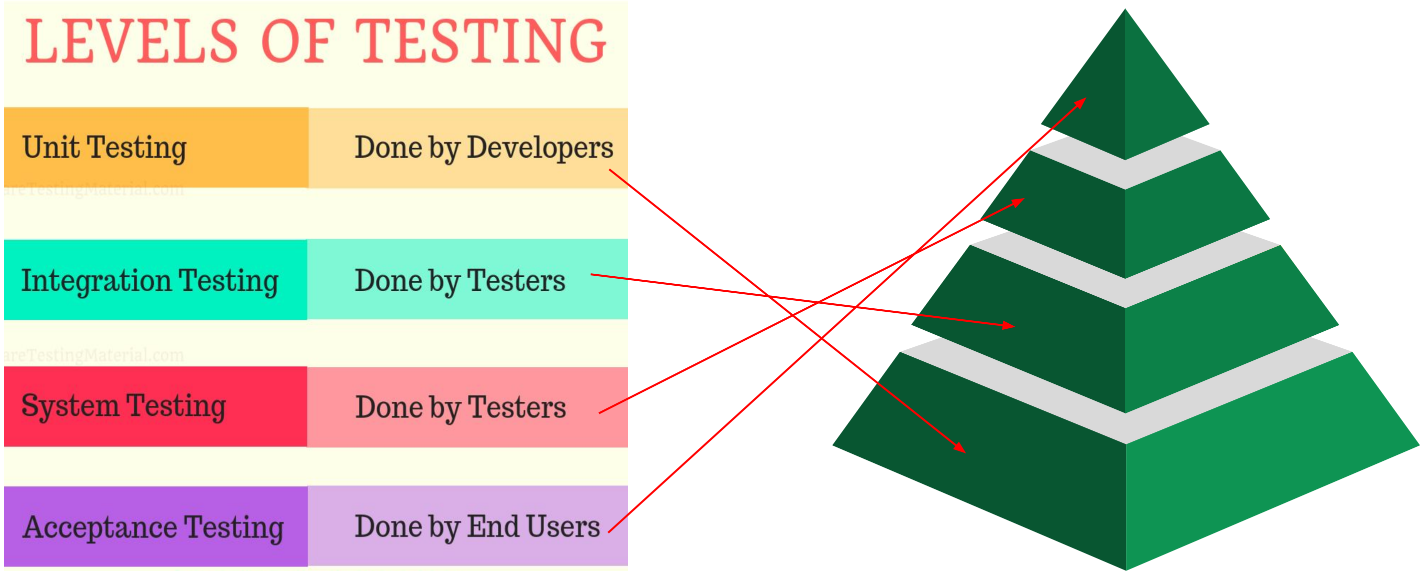
SYSTEM TESTING

Testing Levels: Acceptance Test

- Focuses mainly in **validating the system** meets the **operational expectations**.
- It's executed by the **client himself** or by **system users**.
- **QCs** often have to provide **support** to the users in this phase.
- The **goal:** to **gain confidence** on the system.
- There are **two types** of Acceptance Tests executed:
  - **Alpha Test:**
    - In a controlled development environment
  - **Beta Test:**
    - In the client's environment, under real world conditions.



Testing Levels: Roles



LEVELS OF TESTING

Unit Testing	Done by Developers
Integration Testing	Done by Testers
System Testing	Done by Testers
Acceptance Testing	Done by End Users

Testing Types

Testing Types

Functional Testing 1

What the system does?

Non-Functional Testing 2

How the system works?

3 Structural Testing

Assessment of coverage of a type of structure

4 Change-base Testing

Testing related to changes

Testing Types

Functional Testing

- **What the system does?**
- What the user or customers want on the system?
- **Behaviour** of software.
- **Black-box** techniques may be used

Testing Types

Some Functional Testing types

1. **Smoke testing**
2. **Sanity Testing**
3. **Exploratory testing**
4. **Regression**
5. **User Acceptance Testing (UAT)**

Testing Types

Non-Functional Testing

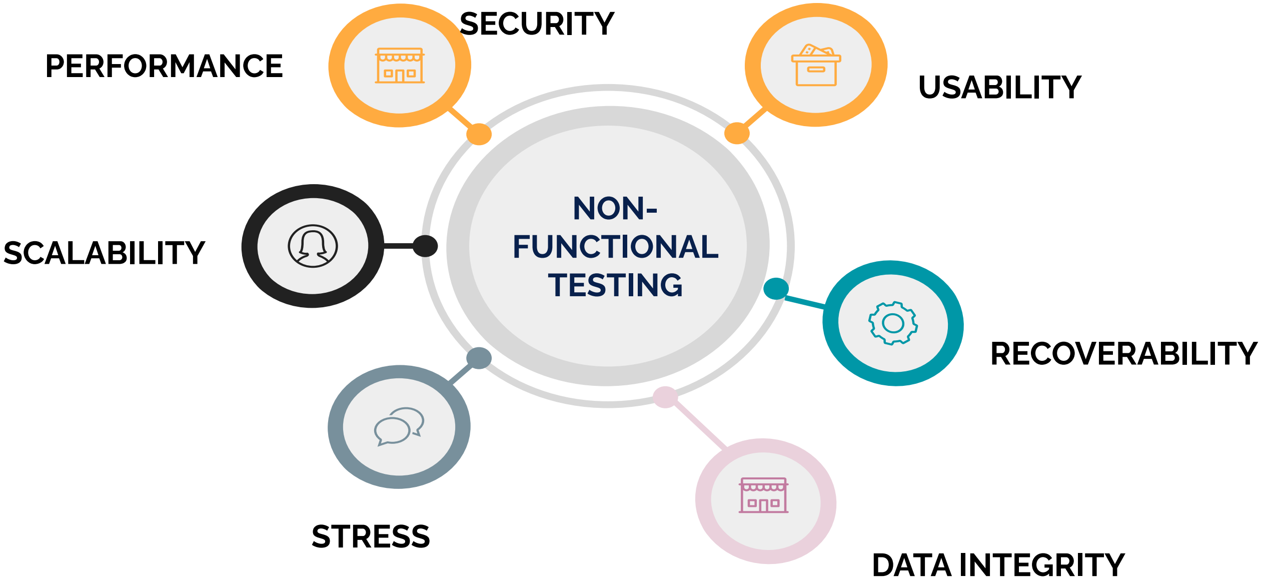
What are the non-functional aspects?

- **How** does the application **perform** under normal circumstances?
- **How** does the application **behave** when too many users login concurrently?
- Can the application **handle** stress?
- How **secure** is the application?
- Can the application **recover** from any disaster?
- Can the application behave in the same way in a different env or OS?
- Are the guides provided with the application easy to understand?

Testing Types

Non-Functional Testing

- Tests system attributes not related to the functionality.
- Is the testing of **"how well"** the system behaves.



Testing Types

Change-related Testing

- When changes are made to correct or changing functionality.
- Testing should be done to:
  - Confirm that the changes corrected the defects **(confirmation testing -retest)**
  - The change have not caused any unforeseen adverse consequences **(regression testing)**
- Confirmation and regression testing are done in all test levels, especially in Agile.

Testing Types

Change-related Testing

Regression suites are run many times -> strong candidate for **automation**. Automation should start early

Manual Testing	Automation Testing
A simplest low-level type, during each a QA runs all test manually, without using any helpful software	A QA uses a special program/tool for running test, already existing or written specially for the project.
A time-consuming process	Time-saving, particularly because a QA can re-run the same test numerous times

Testing Types

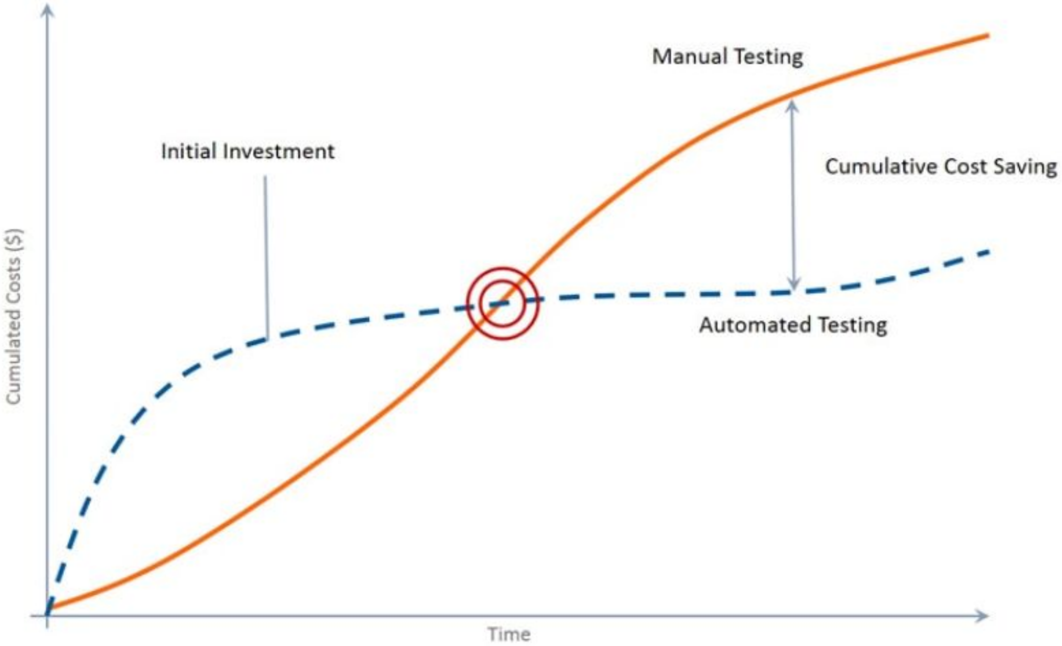
Change-related Testing

Manual Testing	Automation Testing
Can be repetitive and boring	Helps to avoid repetitive task as a QA "delegates" them to a computer
Is suitable for almost any software product	Is suitable only for stable systems and used mainly for regression. Some types of testing (research, ad-hoc, etc.) cannot be automated
Helps to define whether automation testing is possible and necessary	100% automation is not possible

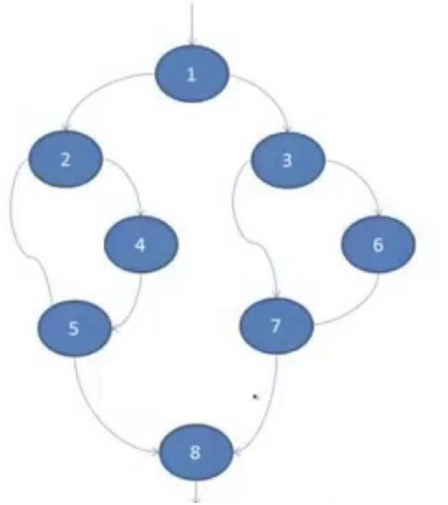
Testing Types

Change-related Testing

So, when should we start automating our tests?



Testing Types



Structural White-box Testing

- Based on the system's internal implementation
- Include code, architecture, workflows.
- *For Functional testing, this could be how many features or functions of the total have been tested so far.*
- Look at the code to see how many lines of code have been exercised by tests.

Testing Types

White-box VS Black box Testing

- Black Box Testing is a software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester

Black Box Testing	White Box Testing
No access to program code	Has access to program code
Requires external perspective	Requires knowledge of program code
Set of techniques applicable to all other phases of testing	Typically applies only to unit testing, where code is involved

Testing Types and Testing Levels

- The non-functional testing

Unit Testing:	Number of CPU cycles requires to perform the number of visits trend a Mercado Libre page gets monthly/yearly.
Integration Testing:	Notification microservice and re-execute it periodically to check new feeds.
System Testing:	Number of concurrent users that can make a video call.
Acceptance Testing:	Accessibility of the Post processing interface for people with disabilities.

Testing Types and Testing Levels

- Starting with functional testing

Unit Testing:	How a component should check the maximum size of a people connect at the same time in the page. .
Integration Testing:	How the Mercado libre system uses external payment authorizers to check Credit card.
System Testing:	How a person can submit a Mercado Libre post
Acceptance Testing:	How a person accepts/reject payments.

Testing Types and Testing Levels

- Then change-related testing

Unit Testing:	Automated regression unit tests.
Integration Testing:	System robustness if the notification microservice fails to respond.
System Testing:	Re-execute all tests for a given workflow if a new version of Facebook homepage changes.
Acceptance Testing:	Re-execute all failed test cases after a fix found in UAT.

Testing Types and Testing Levels

Activity

Let's go with an exercise!

Send Google-Form

Thank You!