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Julius Ndasi

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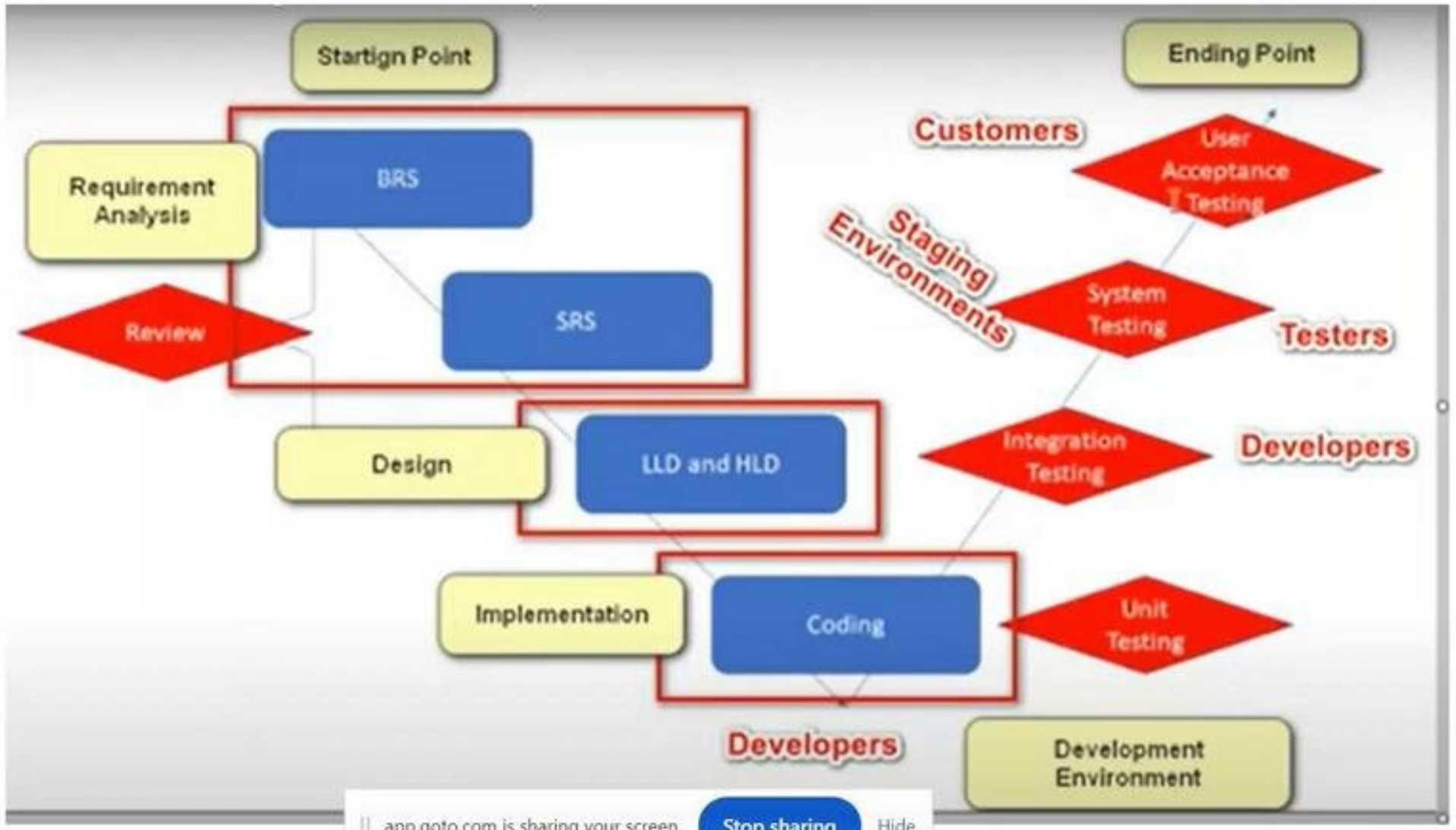
V-Model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Ending Point
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BRS
SRS
Review
Customers
User Acceptance Testing
Staging Environments
System Testing
Testers
Design
LLD and HLD
Integration Testing
Developers
Implementation
Coding
Unit Testing
Developers
Development Environment
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Verification vs. Validation

Verification	Validation
• Checks "Are we building the product right"? • Verification is the process for determining whether or not a product fulfills the requirements or specifications • Done without executing the software (All static testing techniques used) • Confirms to requirements (Producer view of quality)	• Checks "Are we building the right product"? • Validation is concerned with evaluating a product to determine if it meets the end user needs • Done by executing the software (Includes all Dynamic Testing techniques) • Fit for use (consumers view of quality)

Agile Software Development

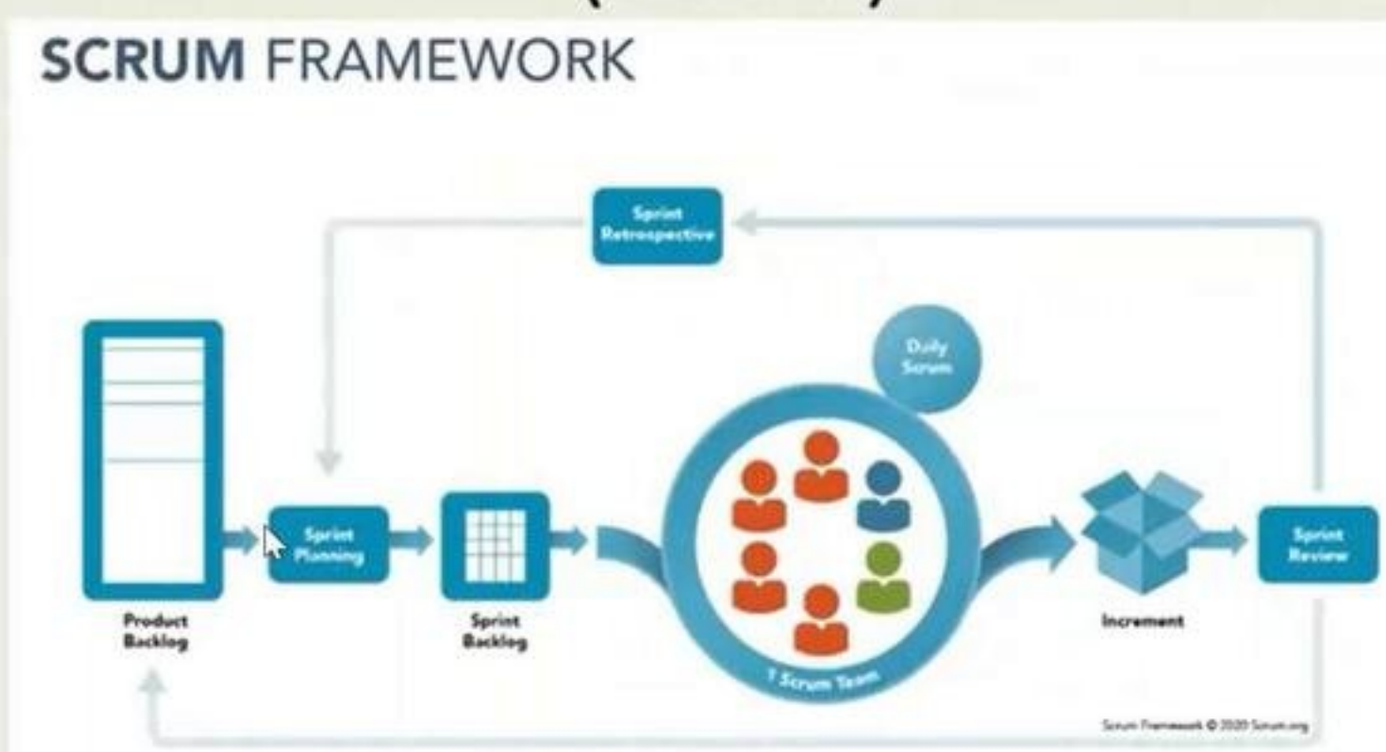
The capability of rapidly and efficiently adapting to changes is known as agility.

Agile software development is based on iterative and incremental development.

Agile methodology uses continuous stakeholder feedback to produce high quality consumable code through use cases and a series of short time-boxed iterations.

https://tech.gsa.gov/guides/user_story_example/

Agile Software Development Framework (SCRUM)



- Agile means **Quick**
- In these days, everything changing very dynamically in the market
- To accommodate such dynamic changes in the requirements, Agile Model came into the picture
- No importance to Documentation (Very less documentation is required)
- More importance to communication (So more meetings will be here)
- Requirements will be broken into small sized stories and added to the Backlog
- Prioritize the stories, estimated and added to one iteration of duration 2 weeks to 4 weeks
- In this iteration, all the Product Owners, BA, Developers, Testers and others will communicate and complete their tasks on a story by story basis in a quicker way

Fundamental Test Process

Steps in Fundamental Test Process

Fundamental test process consists of 5 steps

- Planning and Control (Analyze Requirements and Create test plan)
- Analysis and Design (WHAT and HOW to test, Come up with test scenarios, identify test data required, test env setup, create RTM)
- Implementation and Execution (Create detailed test cases and test execution)
- Evaluating exit criteria and reporting
- Test Closure Activities

Test Planning and Control

During Test planning

- Understand the goals and objectives of the customers, stakeholders, and the project
- Understand the risks which testing is intended to address.
- Set goals and objectives for testing based on goals and objectives of customers, stakeholders and project

Major tasks of Test Planning

Identify the objectives of testing based on the scope and risks of project

- Decide which components, systems or other products are in the test scope
- Decide the business, product, project and technical risks which need to be addressed
- Decide the objective of testing
  - to uncover defects,
  - to verify that the software meets requirements
  - to demonstrate if software is fit for use

Major tasks of Test Planning cont.

Determine the test approach

- How testing will be carried out?
- What test techniques will be used?
- What needs to be tested and what extent of test coverage required?
- Who is involved and when?
- Decide test deliverable's to be produced (Test cases, test data)

Implement the test policy and/or test strategy

- If the organization test policy and strategy exists then during planning ensure that testing adheres to those policy/ strategy

Major tasks of Test Planning cont.

Determine the required test resources	• Define the required resources for testing like testers, hardware and software etc.
Scheduling test analysis and design tasks, test implementation, execution and evaluation	• You need to prepare the schedule for all the tasks so that tracking can be done and progress is captured
Determining the exit criteria	• Criteria set to find out when to finish testing. The tasks that must be completed for the test level before we can exit the test phase

Test Control

After test planning we need to measure and control the progress

Test Control is the ongoing activity of comparing actual progress against the plan

Test control reports the status of test progress including any deviations from the actual plan

Test control monitors the testing throughout the project

The major tasks of test control

Measure and analyze results of reviews and testing	• Track test pass/fail percentage • Track tests remaining
Monitor and document test progress, coverage and exit criteria	• Track how many tests executed • What is the testing outcome(Number of tests passed/failed) • Risk assessment of test outcome

Test Analysis and Design

During Test Analysis and Design we build test designs and test procedures (Scripts) The major tasks of test analysis and design are:

Reviewing the test basis

- Review software requirements specification (SRS) document, design document
- Start designing black box tests using test basis
- This identifies gaps and ambiguities in specifications and prevents defects

Identifying the test conditions

- Based on the analysis of test items and specifications prepare the test conditions

Test Analysis and Design cont.

Designing the tests

- Apply test design techniques to design your tests

Evaluate testability of the requirements and system

- Make sure that all the requirements are testable

Design the test environment

- Hardware and software required to test
- Any supporting tools like test management tools etc.

Test Implementation and Execution

Take test conditions and make them into test cases

Build test environment where test execution needs to be done

Test Implementation and Execution co

Test implementation & execution have the following major tasks

Test Implementation

- Develop test cases and prioritise them
- Apply test design techniques to develop test cases
- Prioritize test cases based on the risk assessment
- Create test suites (Logical collection of tests)
- Prepare test environment

Test execution

- Execute test cases
- Record the test execution outcome with details like environment, software version
- Compare actual with expected result (Report Incident – Incident is then analysed and bug is logged if its an actual defect)
- Perform re-test after defect is fixed to ensure that defect is corrected after fix

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Evaluating Exit Criteria and Reporting

Exit Criteria evaluation is an activity where test execution is assessed against the defined objectives.

This should be done for each test level.

Exit criteria is set based on risk assessment for each level and exit criteria evaluation ensures that we have done enough testing to exit testing or test level

Major tasks in Evaluating Exit Criteria or Definition of Done (In Agile Dev)

Check test logs against the exit criteria specified in test plan	• Check the test execution percentage • Check the defect raised/fixed/outstanding
Assess if more tests are needed or if the exit criteria specified should be changed	• Based on exit criteria make assessment if more tests are required to fulfill exit criteria • Still some defects pending to be fixed • Project risks increased and so need to change exit criteria by consulting stakeholders
Writing a test summary report for stakeholders	• Preparing the test summary report and distributing with all stakeholders • Helps stakeholders make the release decisions about software

Test Closure Activities

Collect data from completed test activities to consolidate experience, major tasks in test closure activities are:

Check which planned deliverables have been delivered	• Test strategy/plans, test cases etc. • All incident reports have been resolved(Fixed/deferred)
Finalise and archive testware for later use	• Test cases/scripts • Test environment • Any other test infrastructure

Test Closure Activities cont.

Handover testware to the maintenance organisation

- After software release maintenance phase will start
- Maintenance organization can be a different organization other than one who developed software
- They will need the testware for maintenance changes or any bugs fixes in production environment

Evaluate the testing and analyze lessons learned for future releases and projects

- Helps to improve the whole SDLC and test process
- Improve test design and execution methodologies for reducing invalid defects

Test Levels

There are 4 test levels in Software Testing

- Component Testing or Unit Testing
- Integration Testing
- System Testing
- Acceptance testing

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