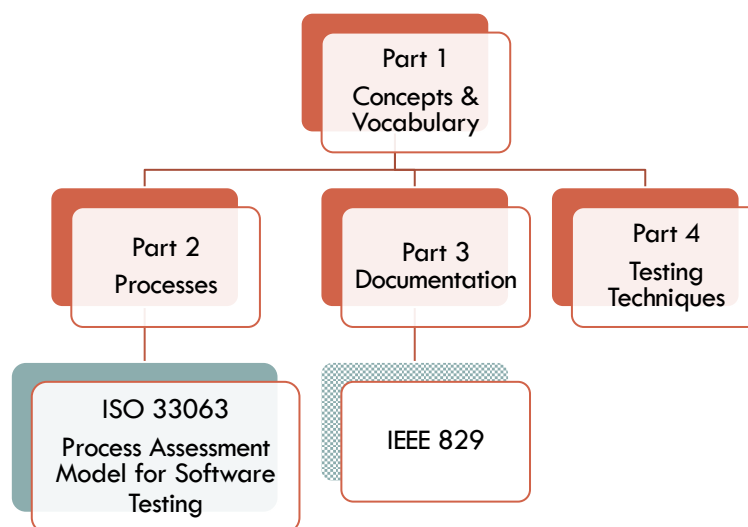


CENG 316 Software Engineering

Intro to ISO/IEC 29119 - Software Testing

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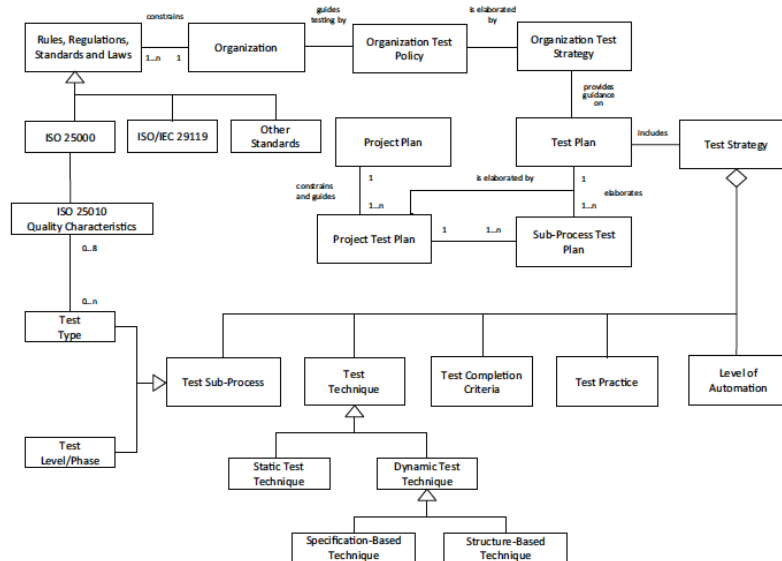
ISO/IEC 29119 - Structure



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Software Testing Context



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Goals and Usage of Testing

- Goals:

- ❑ Find defects in the test item prior to its release for use
- ❑ Provide information about the quality of the test item and any residual risk in relation to how much the test item has been tested;
- ❑ Mitigate the risks to the stakeholders of poor product quality.

- The usage:

- ❑ Improve the test item by having the defects removed;
- ❑ Improve management decisions by providing information about quality and risk as the basis for the decisions
- ❑ Improve the processes in the organization by highlighting processes

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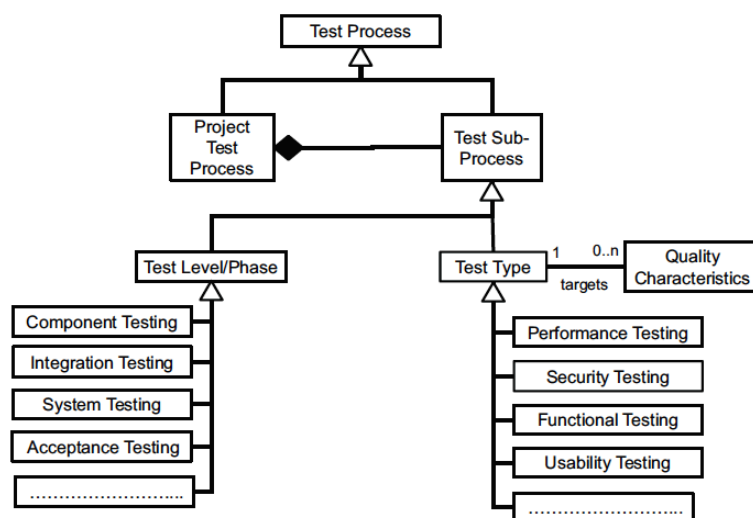
Testing Considerations

- Testing is a process. A process is a set of interrelated or interacting activities that transforms inputs into outputs.
- The organizational test process sets and maintains the test policies and test strategies that apply across the organization's projects and functions.
- Testing should be planned, monitored and controlled.
- Testing entails examining a test item.
- Testing can be carried out on a product without executing the product on a computer. This is called static testing ... reviews, walkthroughs or inspections.
- Dynamic testing consists of more than "just" running executable test items; it also includes both preparation activities and follow-up activities.
- Testing, should aim to provide both types of confirmation – validation and verification - through discovery of defects.

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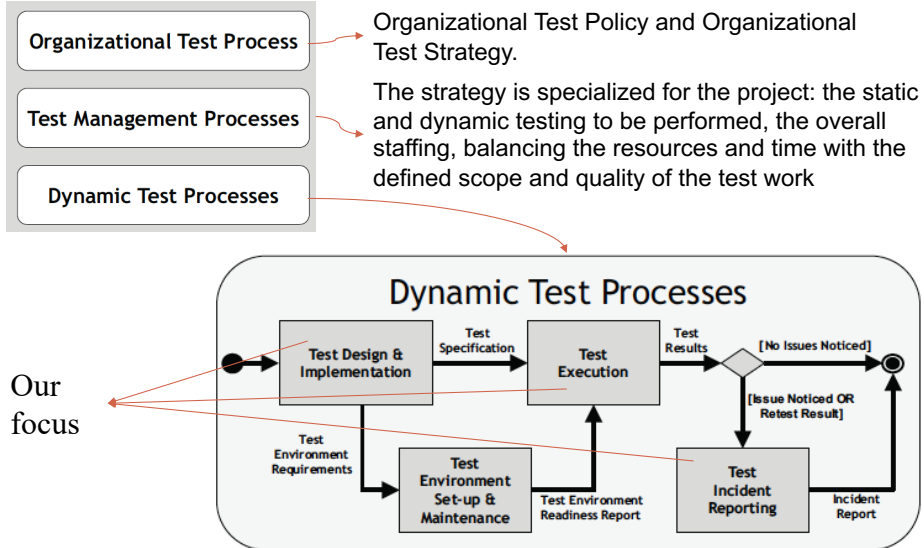
Test Levels, Types and Processes



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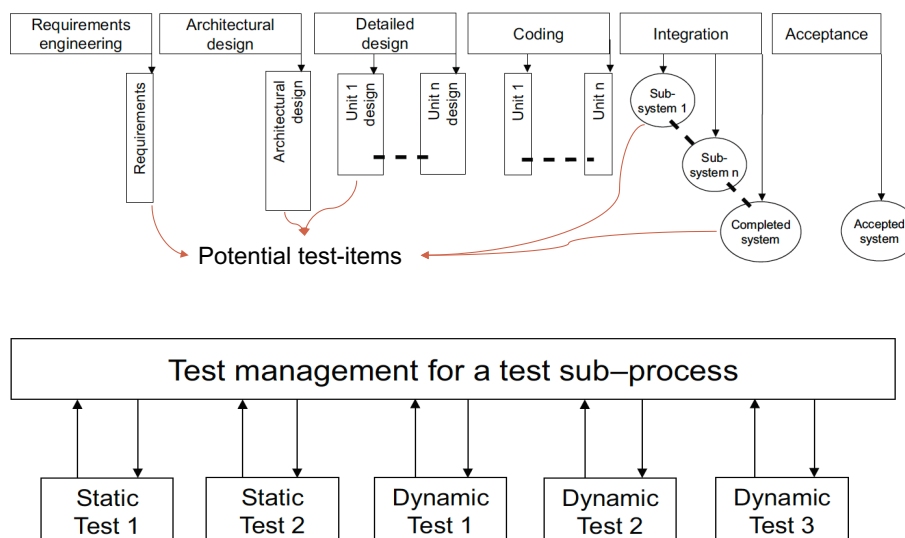
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Test Processes



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Development sub-processes



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Test objectives

- Test subprocesses depend on test objectives:
 - Provision of information to the risk management activity;
 - Provision of information about the qualities of the product;
 - Assessment of whether the product has met stakeholder expectations;
 - Assessment of whether defects have been correctly removed with no adverse side effects;
 - Assessment of correct change implementation with no adverse side effects; and
 - Assessment of fulfilment of requirements (i.e. regulatory, design, contractual, etc.).

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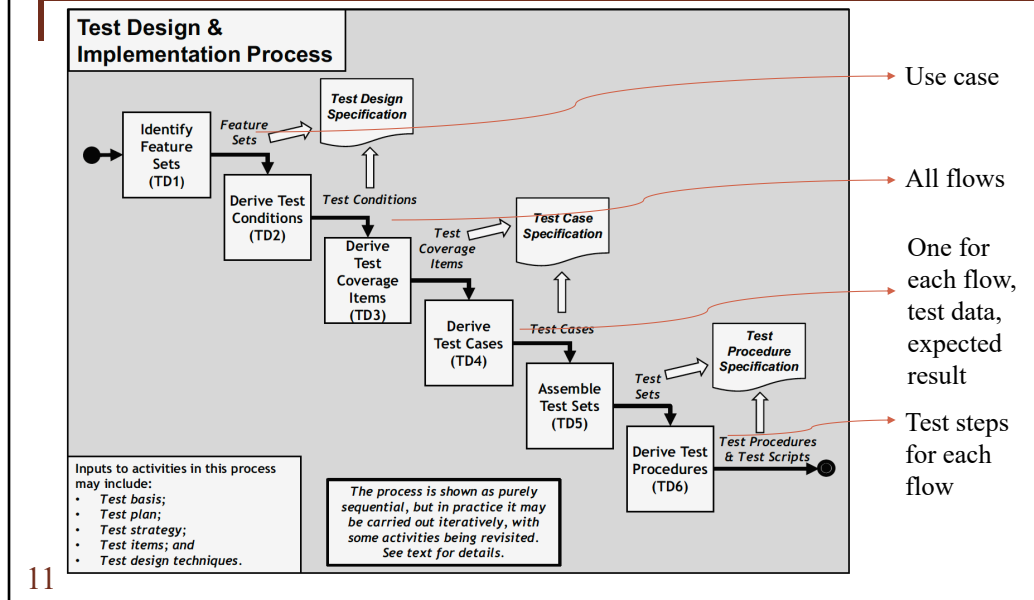
Testing Quality Characteristics

- Measuring quality characteristics based on ISO/IEC 25010 System and software quality models:
 - Functional Suitability: the degree to which the product provides functions that meet stated and implied needs when the product is used under specified conditions;
 - Performance Efficiency: the performance relative to the amount of resources used under stated conditions;
 - Compatibility: the degree to which two or more systems or components can exchange information and/or perform their required functions while sharing the same hardware or software environment;
 - Usability: the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use;
 - Reliability: the degree to which a system or component performs specified functions under specified conditions for a specified period of time;
 - Security: the degree to which information and data are protected so that unauthorized persons or systems cannot read or modify them and authorized persons or systems are not denied access to them;
 - Maintainability: the degree of effectiveness and efficiency with which the product can be modified;
 - Portability: the degree to which a system or component can be effectively and efficiently transferred from one hardware, software or other operational or usage environment to another.

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Test design & Use cases



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Test design example

Use Case ID	UC001	
Use Case	change_password	
Purpose	To allow a user to change their existing password to a new password	
Actors	User	
Description	This use case allows users to change their current password to a new password.	
Trigger	User clicks Change Password button on the Main Menu screen	
Preconditions	User must already be logged into the system	
Scenario Name	Step	Action
Basic Flow	1	User clicks Change Password button
	2	System displays Change Password screen
	3	User enters their current password correctly
	4	User enters their new password correctly
	5	User re-enters their new password correctly
	6	User clicks OK
	7	System displays message "Password changed successfully"
Alternative Flow - Existing Password Incorrect	3.1	User enters their current password incorrectly
	3.2	User enters their new password correctly
	3.3	User enters their new password correctly
	3.4	User clicks OK
	3.5	System displays an error message "Current password entered incorrectly. Please try again." and highlights all text in the Current Password field
Alternative Flow - New Password Less Than 8 Characters	4.1	User enters a new password that is less than 8 characters long
	4.2	User clicks OK
	4.3	System displays an error message "New password must be at least 8 characters long. Please try again."

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Test design example

- Step 1: Identify Feature Sets (TD1)
 - FS1: change_password function
- Step 2: Derive Test Conditions (TD2)
 - TCOND1: Main Flow (for FS1)
 - TCOND2: Alternative Flow – Existing Password Incorrect (for FS1)
 - TCOND3: Alternative Flow – New Password Less Than 8 Characters (for FS1)
- Step 3: Derive Test Coverage Items (TD3)
 - TCOVER1: Main flow(for TCOND1)
 - TCOVER2: Alternative Flow – Existing Password Incorrect (for TCOND2)
 - TCOVER3: Alternative Flow – New Password Less Than 8 Characters (for TCOND3)

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Test design ... Derive Test Cases (TD4)

Use Case Name	change_password	
Test Case Name	Main Flow	
Description	User successfully changes their password	
Actors	User	
Test Coverage Item	TCOVER1	
Use Case Steps Covered	1, 2, 3, 4, 5, 6, 7	
Preconditions	User is already logged into the system	
#	Step	Expected Result
1	User clicks Change Password button	System displays Change Password screen
2	User enters their current password correctly	Current password is masked with asterisk (*) symbols
3	User enters their new password correctly	New password is masked with asterisk (*) symbols
4	User re-enters their new password correctly	New re-entered password is masked with asterisk (*) symbols
5	User clicks OK	System displays message "Password changed successfully"

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... Derive Test Cases (TD4)

Use Case Name	change_password	
Test Case Name	Alternative Flow – Existing Password Incorrect	
Description	User attempts to change password but enters their current password incorrectly	
Actors	User	
Test Coverage Item	TCOND2	
Use Case Steps Covered	1, 2, 3.1, 3.2, 3.3, 3.4, 3.5	
Preconditions	User is already logged into the system	
#	Step	Expected Result
1	User clicks Change Password button	System displays Change Password screen
2	User enters current password incorrectly	Current password is masked with asterisk (*) symbols
3	User enters their new password correctly	New password is masked with asterisk (*) symbols
4	User enters their new password correctly	New password is masked with asterisk (*) symbols
5	User clicks OK	System displays error message “Current password entered incorrectly. Please try again.”

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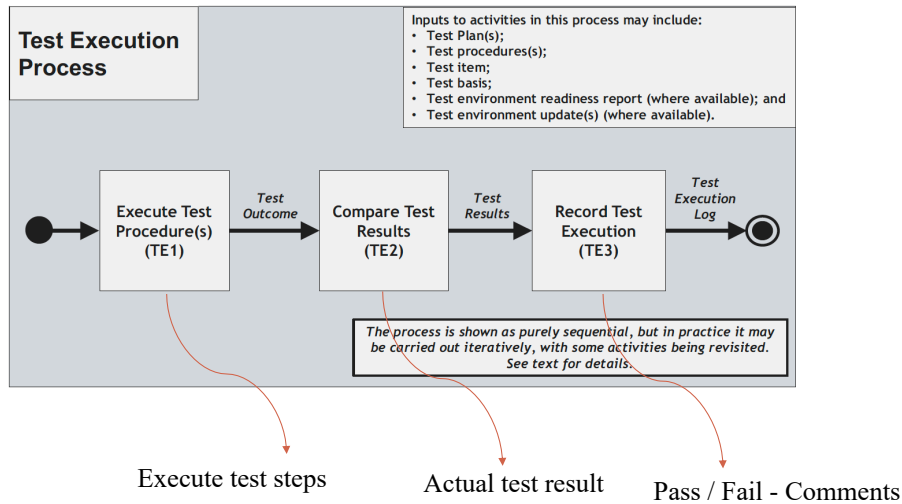
... Derive Test Cases (TD4)

Use Case Name	change_password	
Test Case Name	Alternative Flow – New Password Less Than 8 Characters	
Description	User attempts to change password but enters less than 8 characters for password	
Actors	User	
Test Coverage Item	TCOND3	
Use Case Steps Covered	1, 2, 3, 4.1, 4.2, 4.3	
Preconditions	User is already logged into the system	
#	Step	Expected Result
1	User clicks Change Password button	System displays Change Password screen
2	User enters their current password correctly	Current password is masked with asterisk (*) symbols
3	User enters a new password that is less than 8 characters long	New password is masked with asterisk (*) symbols
4	User clicks OK	System displays an error message “New password must be at least 8 characters long. Please try again.”

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Test execution - Use cases



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Our template

Project Name: GAAPP

Test Scenario ID	Login-1	Test Case ID	Login-1A
Test Case Description	Login – Positive test case	Test Priority	High
Pre-Requisite	A valid user account	Post-Requisite	NA
Designed-by	Alice	Executed-by	Humpy Dumpy
Design date	10/05/2021	Execution date	12/05/2021

Test Execution Steps:

S.No	Action	Inputs	Expected Output	Actual Output	Test Env.	Test Result	Test Comments
1	Launch application	https://www.GAAP P.com/	GAAPP home	GAAPP home	FIREFOX 85.0 (64-BIT)	Pass	Launch successful
2	Enter correct Email & Password and hit login button	Email id : test@xyz.com Password: *****	Login success	Login success	FIREFOX 85.0 (64-BIT)	Pass	Login successful

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Quiz / Workshop

- As a team design a test case for one of the use cases included in the SRS you specified.