BUG & SOFTWARES

BUG INTRODUCTION

- “A software bug is a problem causing a program to crash or produce invalid output.”
- “A software bug is defined as an error, flaw, failure, or fault in a computer program or system that causes it to produce an incorrect or unexpected result, or to behave in unintended ways.”
- “A Software DEFECT / BUG is a condition in a software product which does not meet a software requirement or end-user expectation.

MOST INFAMOUS SOFTWARE BUGS

- **The “Moth-er” of all Bugs**
  - Grace Murray Hopper [1947] logged the first computer bug in her log book. She wrote the time and the sentence: ***“First actual case of bug being found”***.
  - Today it is a flaw or failure in a computer program that causes it to produce an unexpected result or crash.
- **The Y2K Bug**
  - The bug of century
- **The Dharan Missile**
  - In February 1991 (First Gulf War), an Iraqi missile hit the US base of Dhahran in Saudi Arabia, killing 28 American soldiers.
  - During investigation, it was found that the base’s antiballistic system failed to launch because of a computer bug.

- **¿Feet or meters? The Mars Climate Orbiter nav bug**
  - The **Mars Climate Orbiter** was launched in 1998 to study climate on Mars, although it never managed to fulfill its mission.
  - Probe found teams who controlled the mission from Earth used parameters in imperial units meanwhile the software calculations were using the metric system.
- **Too many digits for Ariane 5**
  - On June 4th, 1996 and only 30 seconds after the launch, the Ariane 5 rocket began to disintegrate slowly until its final explosion.
  - Simulations with a similar flight system and the same conditions revealed that in the rocket's software (which came from Ariane 4), a 64-bit variable with decimals was transformed into a 16-bit variable without decimals.

SOFTWARE TESTING

- Software testing is a process of executing a program with the aim of finding the error.
- To make our software perform well it should be error free.
- If testing is done successfully it will remove all the errors from the software

SOFTWARE TESTING PRINCIPLES

- Testing shows presence of defects
- Exhaustive testing is not possible
- Early testing
- Defect clustering (Pareto Principle to software testing state that 80% of software defect comes from 20% of modules)
- Pesticide paradox
- Testing is context dependent
- Absence of errors fallacy

SOFTWARE TESTING POLICY


Test Policy
Organizational Level Document
Test Strategy
Program Level Document
Test Plan
Project Level Document
Test Procedures & Test Cases
Test Reports
Bug & Issue Reports

TEST CASE

Sl. No.	Test case	Input	Expected output	Actual output	Remarks
1	Test Case for adding Valid Contact	Valid Phone Number and Name	Add Contact	Add Contact	PASS
2	Test case for adding Invalid Contact	Invalid Phone Number and Name	Invalid Contact Detected	Invalid Contact Detected	PASS
3	Test case for creating Group	Group Name	Group Created	Group Created	PASS
4	Test case for creating Channel	Channel Name	Channel Created	Channel Created	PASS

TEST REPORT

Name:	XYZ Systems
Project ID:	W10978
Application ID/Name:	XYZ Accounting
From Report Date:	11-Apr-15
Report Date:	17-Apr-15
Complete By (Milestone):	08-May-15

SUMMARY	
Total Test Cases	3
Executed	2
Pass	1
Fail	1
Not executed	1

Manager:	Ram Ray
QA manager:	Shyam Das

FUNCTIONAL TESTING

Test Case ID	Description	Pass/Fail/Not Executed	Test Date	Responsible Developer	Responsible Tester	Comment	Additional Comment (other than QA team)
01	Valid Login	Pass	13-Apr-2015	Developer 1	Tester 1	Login successful	
02	Login Error on invalid Login	Fail	13-Apr-2015	Developer 1	Tester 2	Incorrect error message on failure	
03	Forget Password	Not Executed	13-Apr-2015	Developer 3	Tester 2	NA	

SOFTWARE TEST POLICY

- A Test Policy is a high level document at the top of the hierarchy of the Test Documentation structure.
- Purpose is to provide a direction which the testing department should adhere to and follow.
- It should apply to both new projects and maintenance work.
- Setting an appropriate test policy by senior managers, provides a robust framework within which testing practitioners can then operate.
- This will help to ensure the maximization of the strategic value inherent in every project.

Contents of Test Policy

- Definition of Testing
  - Clarity regarding why they are testing
  - Testing techniques to be adopted at module and project level

- Description of Test Process
  - Insights of test process will become visible
  - Address questions like, which phases and subtasks will the test process include.

- Test Evaluation
  - How are we going to evaluate the results of testing.
  - What measures will we use to ensure test effectiveness in the project?

- Quality Level to be achieved
  - Which quality criteria are going to be tested.
  - Which quality level is the system required to achieve prior to its release.

- Approach to Test Process Improvement
  - How often and when are we going to assess the usefulness of the current processes in place.
  - What elements need improving and techniques that shall be used to improve the processes.

ADVANTAGES OF TESTING POLICY

1) Visible commitment to the test effort at an organizational level.

2) Definition of key processes that must be followed.

3) Definition of quality levels that must be achieved throughout testing.

4) Provides a mechanism for encouraging standardization across different projects

TEST STRATEGY

- Prepared at the program level comprising of test strategy, management principles, processes and approaches for the tests to be performed for a software in detail.
- Usually written by the test manager and the project manager in the top level.
- Prepared in large scale projects and does not need much updating.
- In small scale projects, test strategies and test approach may be included in the test plan, and also the test strategy document may not be written separately.
- Test approach and test activities included in this must be compliance test policies of the organization.

CONTENTS OF TEST STRATEGY

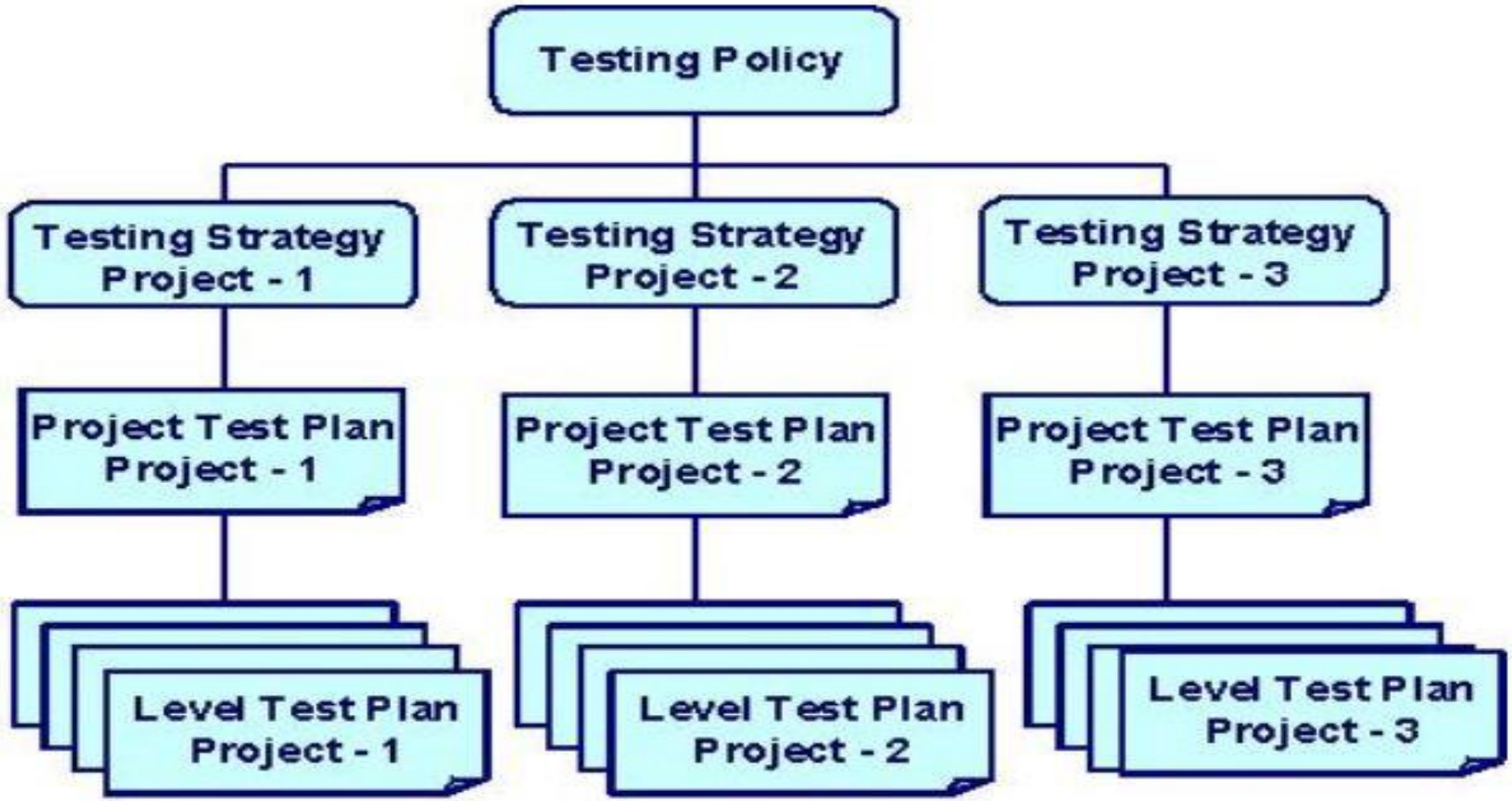
- Objective / scope of testing
- In-scope / out of scope items for testing
- Test levels (Unit, System, Integration, System Integration)
- Test types (Functional / Non-Functional)
- Entry / Exit / Stop / Resumption Criteria for testing (for different levels / phases)
- Risks to be addressed
- Test environment

- Test case design methodology
- Test methodology (Top-down / bottom-up / risk based)
- Test control and reporting
- Test automation approach
- Test tools to be used
- Defect management approach
- Defect classification
- Retesting & regression approach

TEST PLAN

- Test plan is a document prepared at the project level.
- It defines work products to be tested, how they will be tested (test cases) and test type distribution among testers.
- Test plan is usually prepared by the test manager or test leader in the test organization and shared with the entire team in the project. It is a living document throughout the project and should be kept under revision control as it’s updated.
- The information in the test plan document must be consistent with the organization’s test policy and test strategy.

- The test plan may describe the followings:
  - All test strategies specific to the project
  - Test estimations & test schedule
  - Test organization / roles / responsibilities
  - Test deliverables
  - Test reporting principles
- IEEE Std 829 (IEEE Standard for Software Test Documentation) “Test Plan Template”


Testing Policy
Testing Strategy Project - 1
Testing Strategy Project - 2
Testing Strategy Project - 3
Project Test Plan Project - 1
Project Test Plan Project - 2
Project Test Plan Project - 3
Level Test Plan Project - 1
Level Test Plan Project - 2
Level Test Plan Project - 3
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What is functional testing	What is nonfunctional testing
When inputs are valid, app login functions	After login, the dashboard loads within 3 seconds
When email notifications are on, and user receives a new message, an email notification is sent	The email notification is sent within 5 minutes
When a JPG file under 1MB is uploaded, the uploader accepts the file	When eight files or less (each under 1MB) are uploaded at the same time, the queues all
When the settings menu item is clicked, the settings page loads	The settings page has a matching appearance to the rest of the GUI