TURKCELL AKADEMİ

Software Quality and Testing
&
Fundamentals of Testing

Abstract;

Testing should be started as early as possible in Software Development Life Cycle.

The major role of testing is ensuring that there is no inconsistency between customer requirements and delivered product. It is important to know product itself and product's integration points as well as knowing customer's requirements.

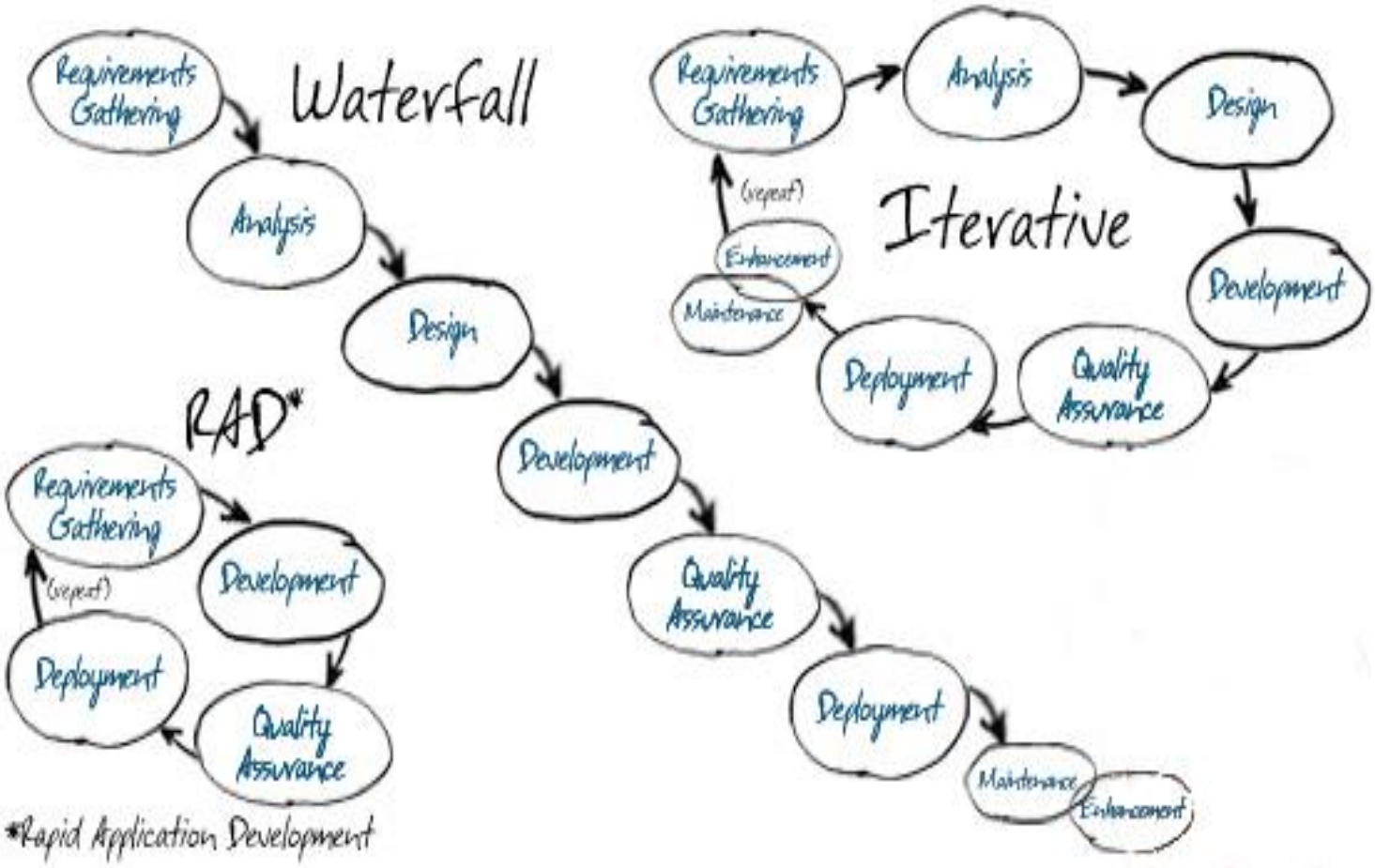
In this presentation we have explained various levels of testing and importance of test process in software development life-cycle.

TEST IN SOFTWARE DEVELOPMENT OUTLINE

- Start With Why
- SDLC Models
- V-Model
- UAT-User Acceptance Test
- Cost Of Change

What do you want to learn today?

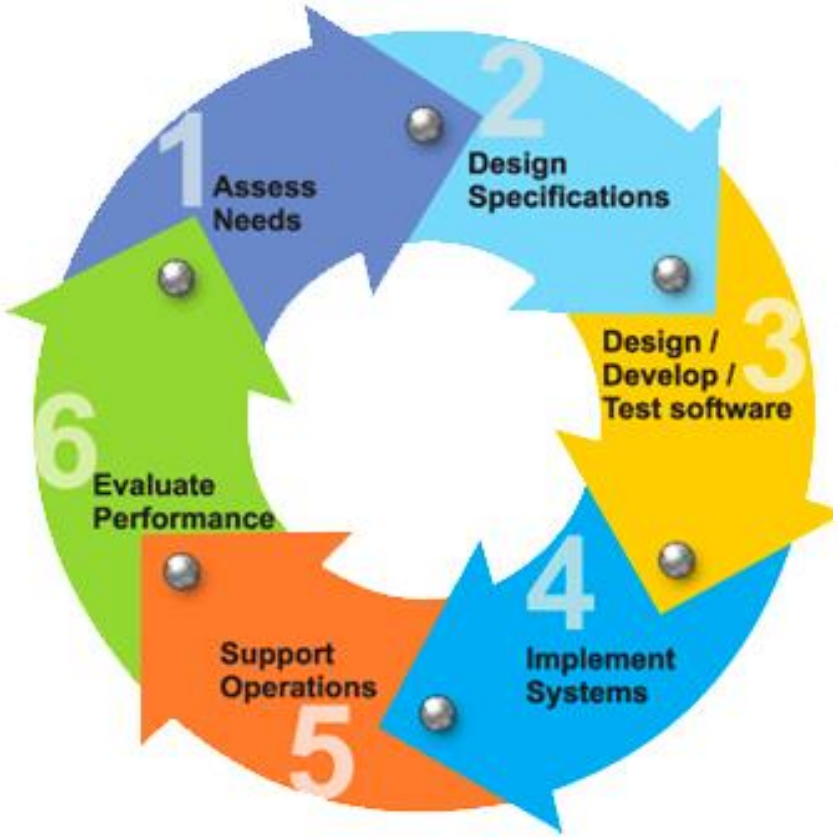
What is SDLC

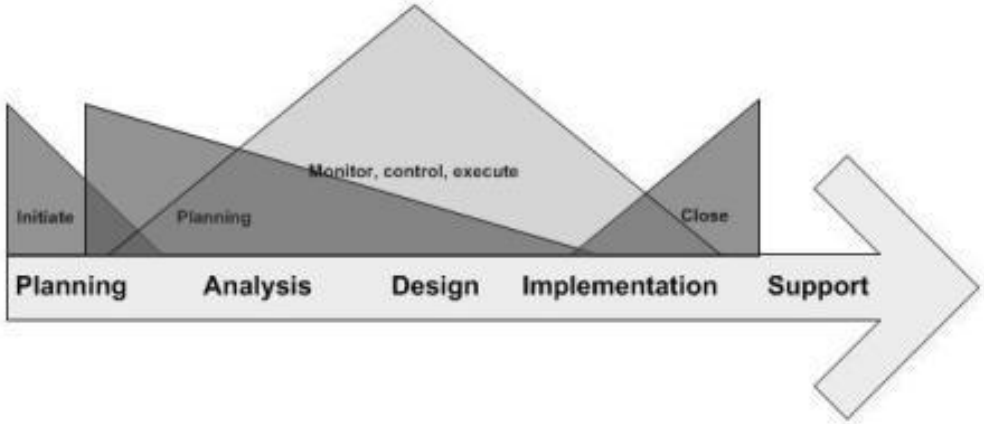

Waterfall
Requirements Gathering
Analysis
Design
Development
Quality Assurance
Deployment
Maintenance
Enhancement
Iterative
Requirements Gathering
Analysis
Design
Development
Quality Assurance
Deployment
(repeat)
Enhancement
Maintenance
RAD*
Requirements Gathering
Development
Quality Assurance
Deployment
(repeat)
*Rapid Application Development

What is SDLC


1
Assess Needs
2
Design Specifications
3
Design / Develop / Test software
4
Implement Systems
5
Support Operations
6
Evaluate Performance

How Turkcell manages SW Development Projects?





Testing in Software Development

- Testing needs to begin in parallel with the requirement analysis phase of the project and **as early as possible** in the life cycle.

- Testing activities should be carried out in **parallel with development activities**.

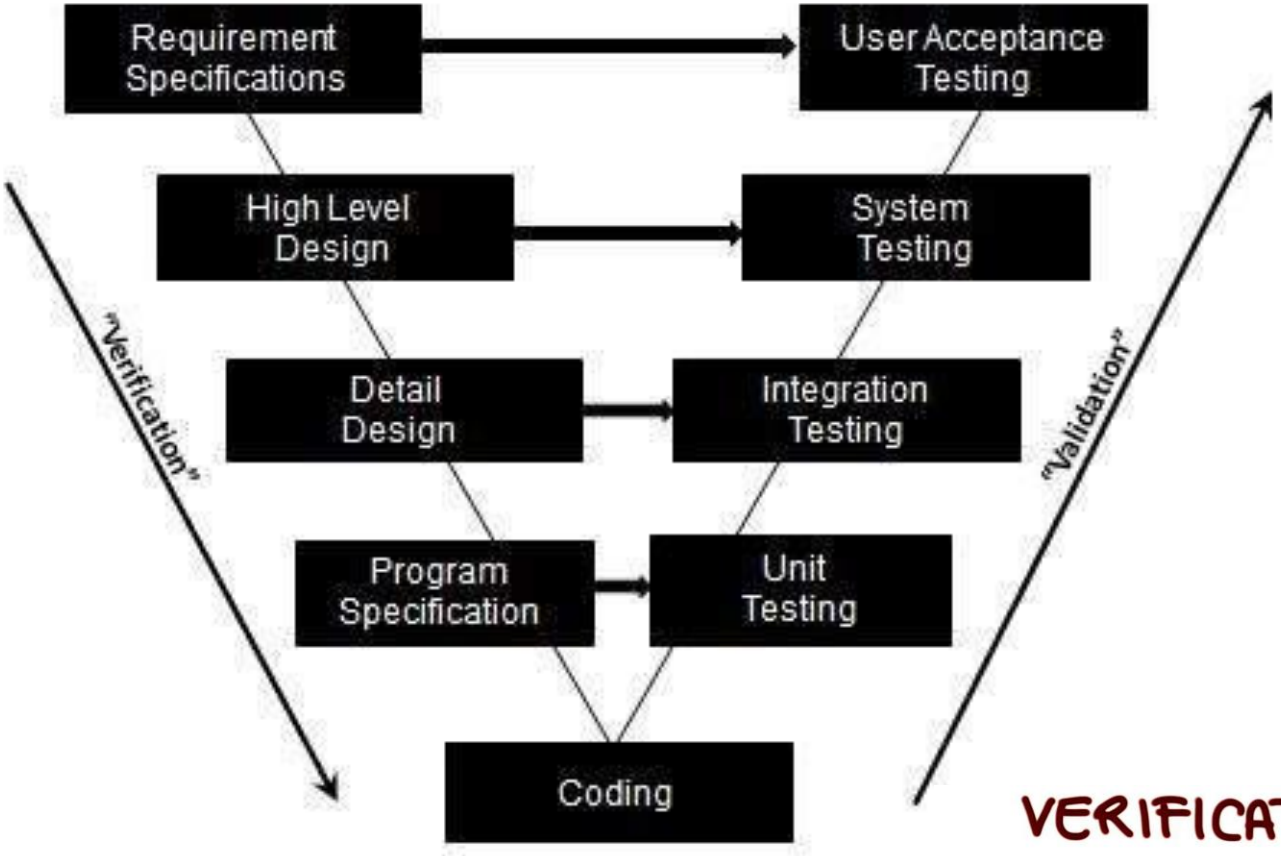
- Testing is a **continuous activity** that continued throughout the software development process.

- There is a testing process that corresponds to a each software development process.

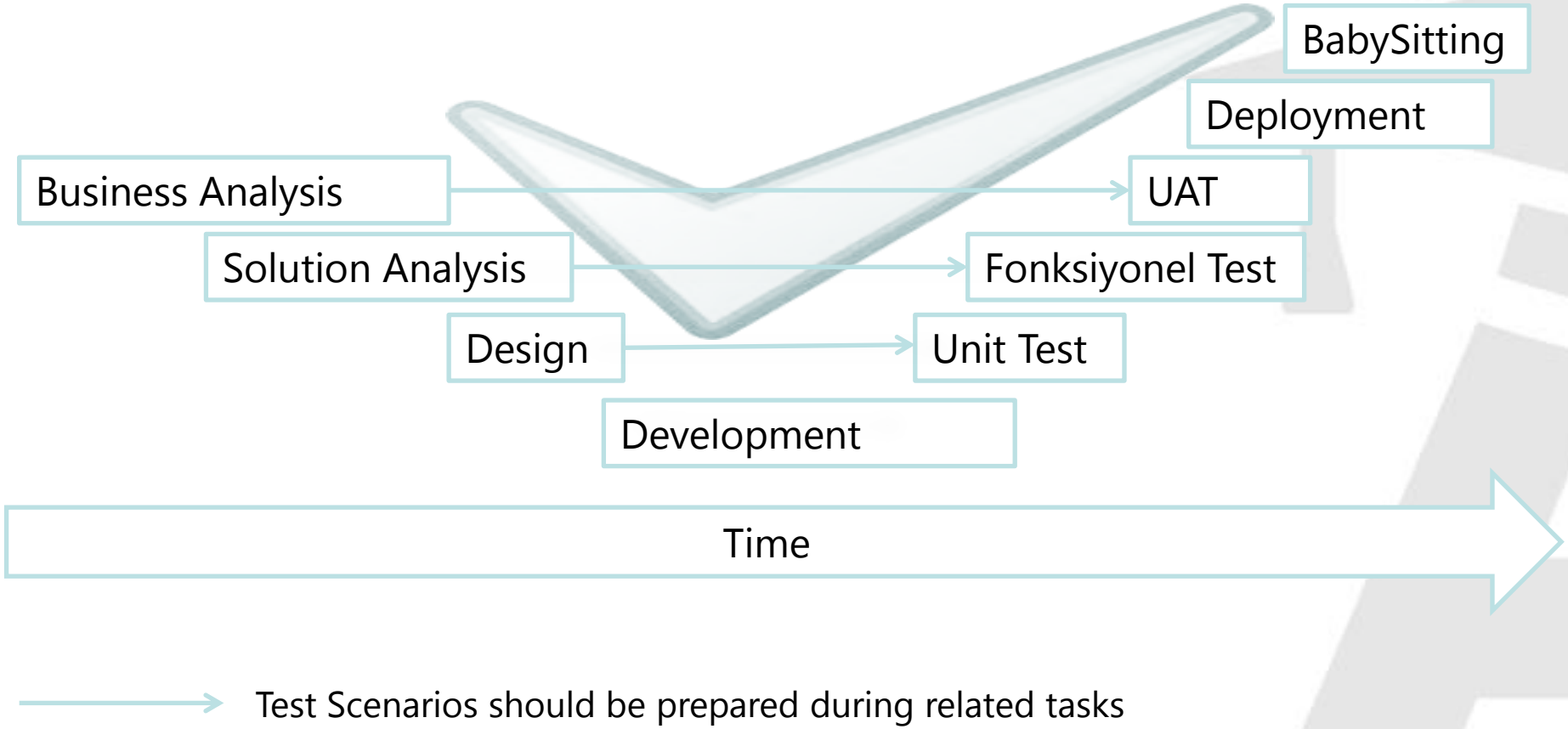
- Coding and testing should be done together for an effective testing.

- There are different models for software development.

Development Model V-Model



V-MODEL ALTERNATIVE- TURKCELL V-MODEL



Development Model Iterative Model

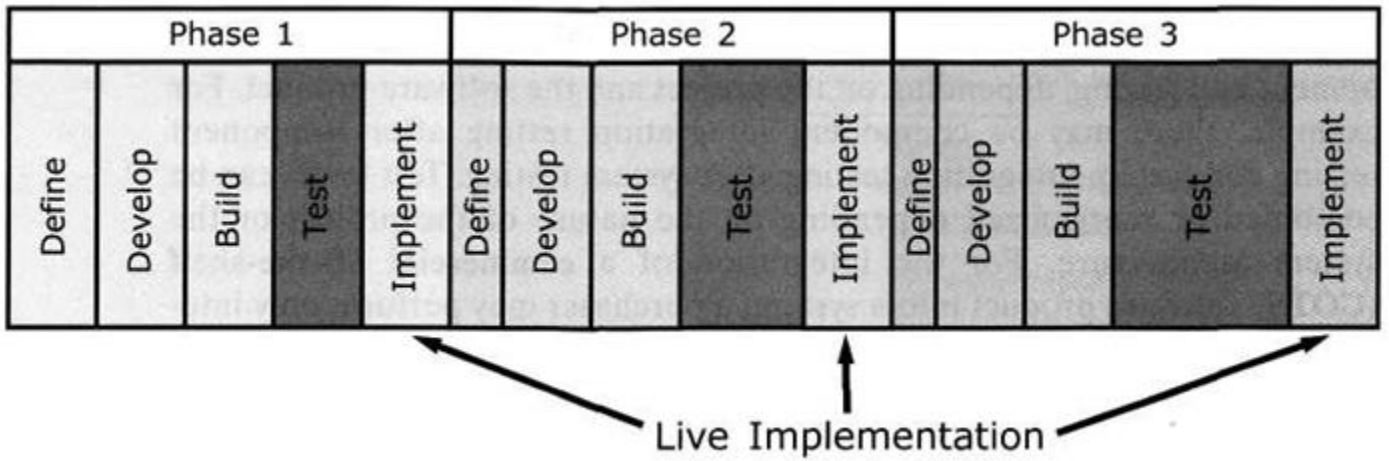


FIGURE 2.3 Iterative development model

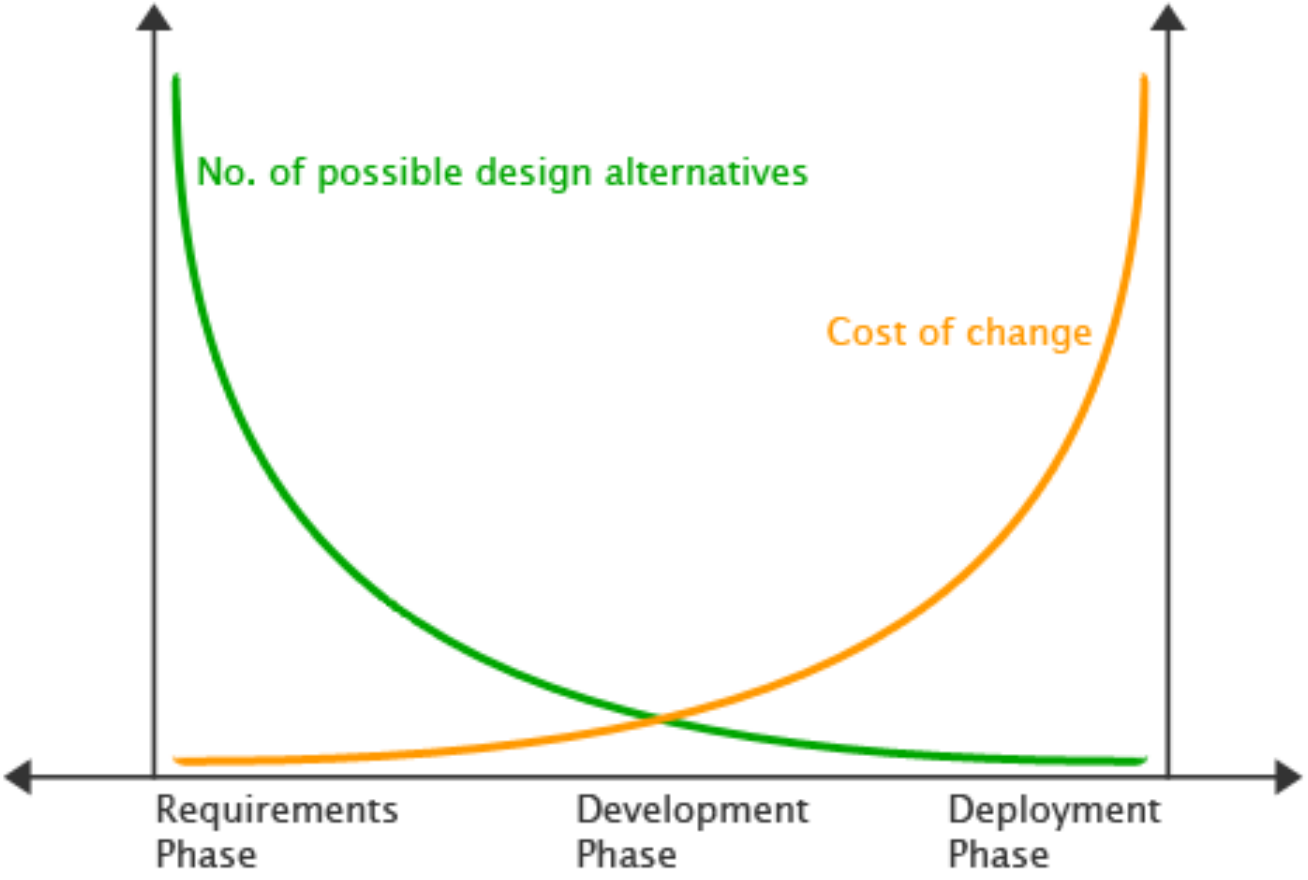
Development Model Agile Models

- Agile, Scrum, Extreme Programming

- It promotes the generation of business stories to define the functionality.

- It demands an on-site customer for continual feedback and to define and carry out functional acceptance testing.

Cost of Problem – Cost Of Change



Source: Bias & Mayhew, 1994

Get Ready

- **Below is a list of problems that can be observed during testing or operation. Which is MOST likely a failure?**

a) The product crashed when the user selected an option in a dialog box.

b) One source code file included in the build was the wrong version.

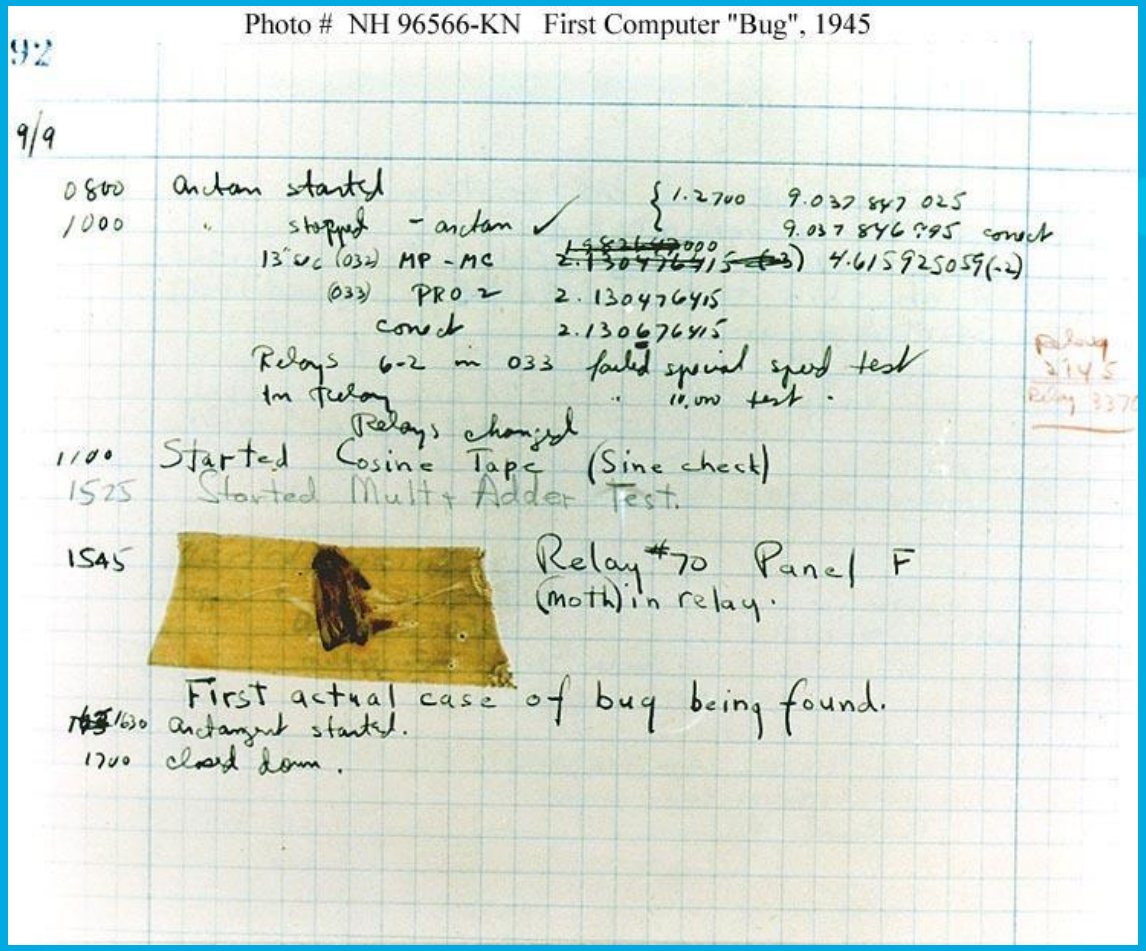
c) The computation algorithm used the wrong input variables.

d) The developer misinterpreted the requirement for the algorithm.

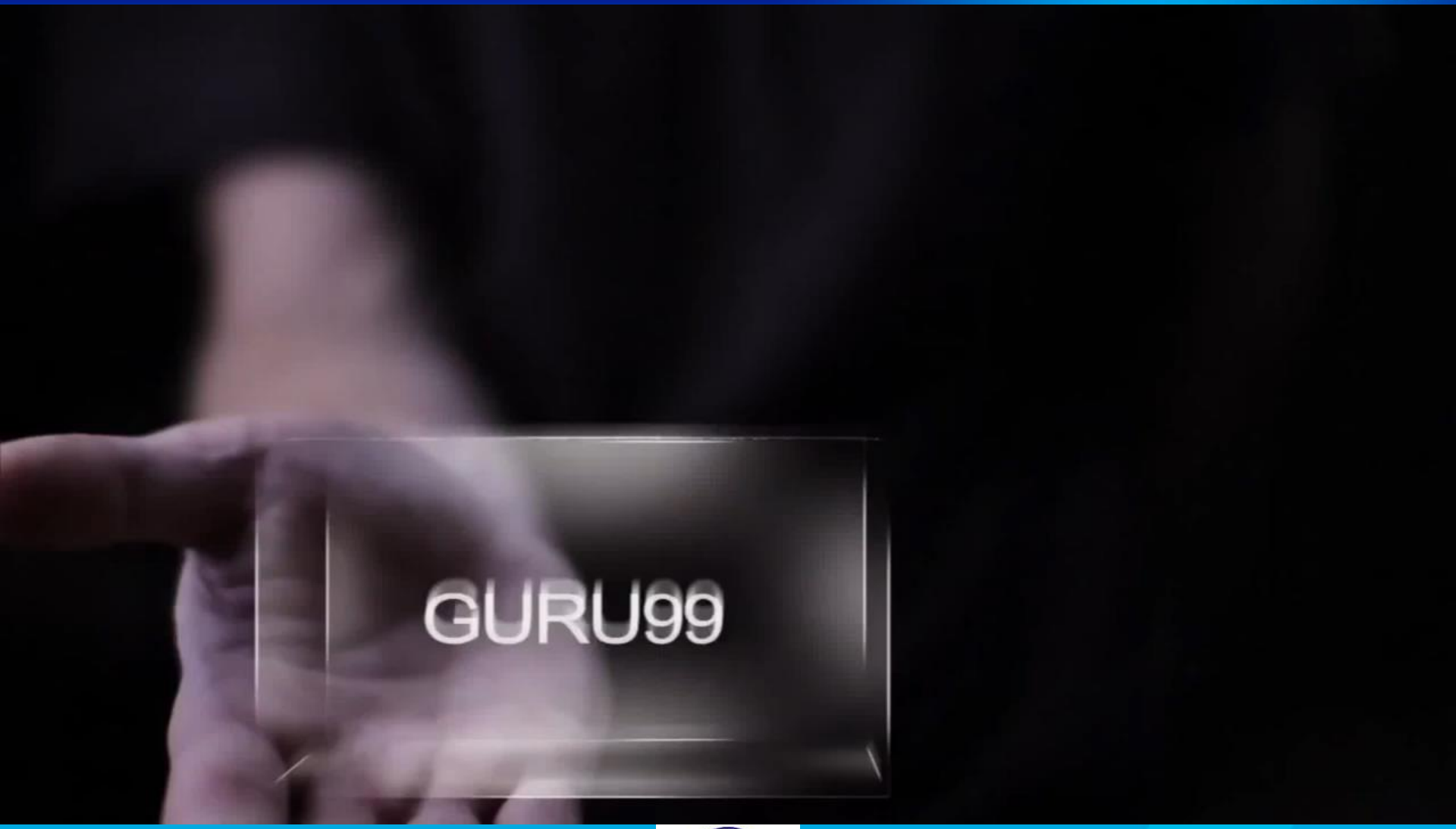
Fundamentals of Testing

- Definition of Testing,
- Why It Is Required,
- Common Testing Principles,
- Testing Process,
- Test Psychology

First Computer Bug



Definition of Testing



Get Ready

- **Which of the following statements is the MOST valid goal for a test team? [K1]**

a) Determine whether enough component testing was executed.

b) Cause as many failures as possible so that faults can be identified and corrected.

c) Prove that all faults are identified.

d) Prove that any remaining faults will not cause any failures.

Software Process Testing Types

- Development testing (component, integration, system testing…)
- Acceptance testing
- Operational testing

WHY TESTING IS REQUIRED

- Everyone
- Everywhere
- Everytime
- Everthing

WHY TESTING IS REQUIRED

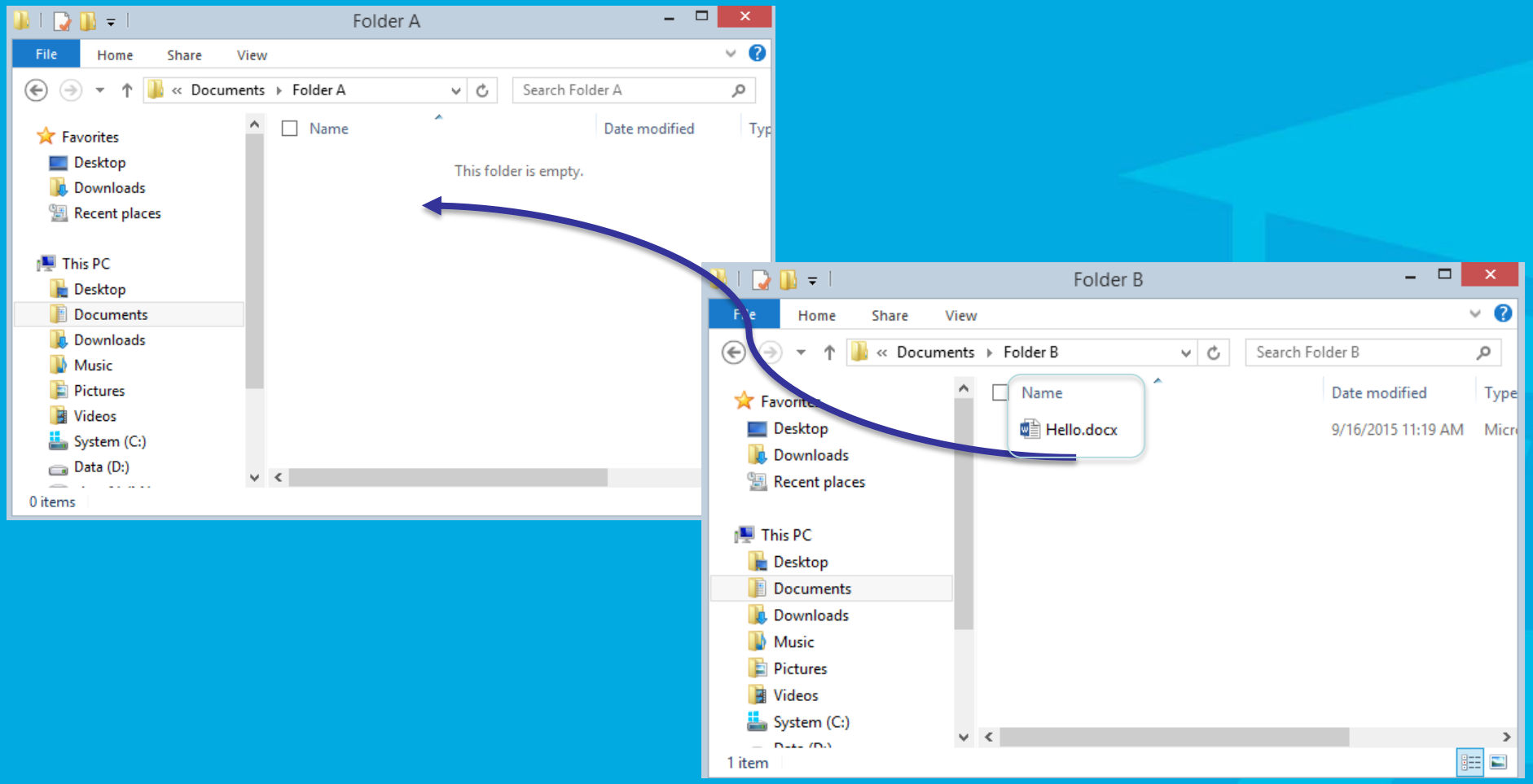
Errors may produce defects in the software code or system

- Requirement based defects
- Design based defects
- New and complicated technology
- Insufficient test process
- Infrastructure problems etc.

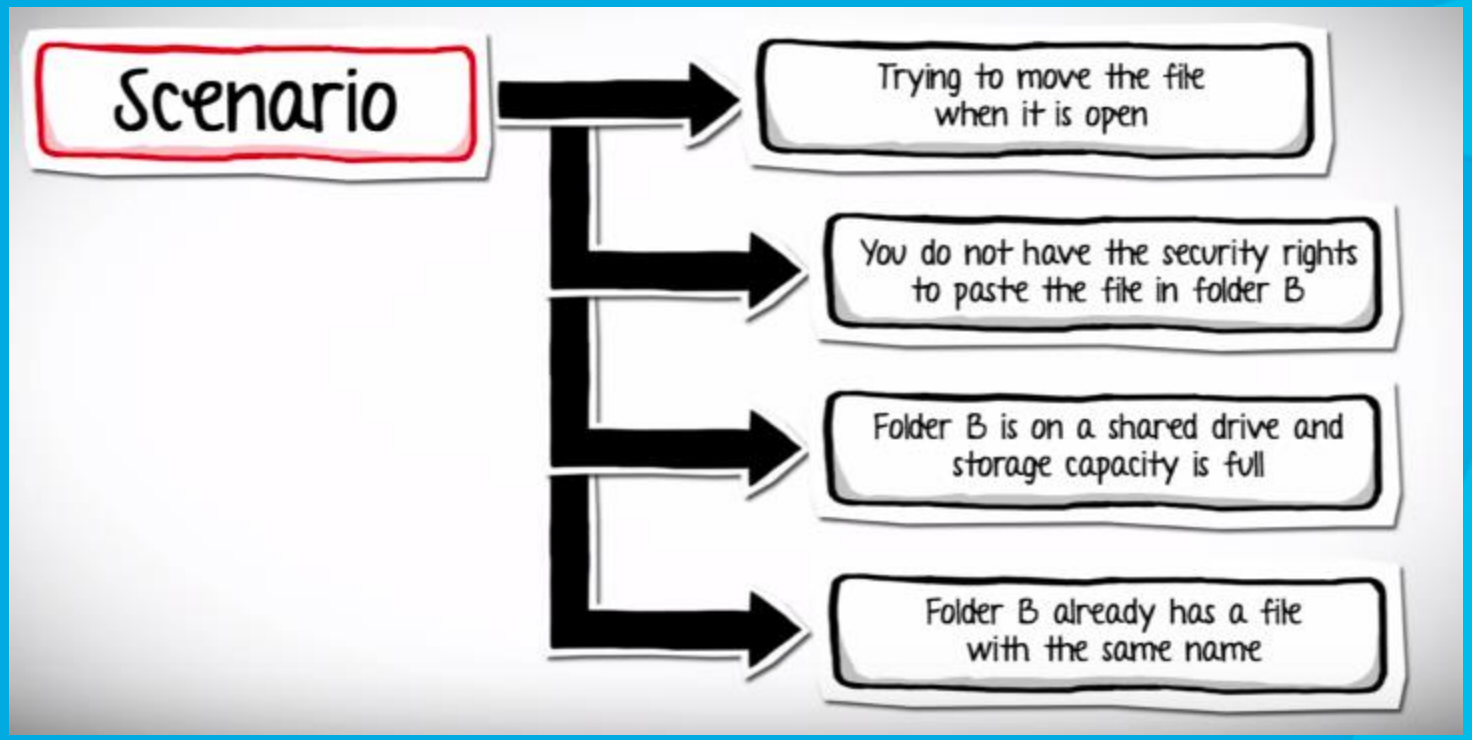
WHY TESTING IS REQUIRED

- Improved quality of product and service
- Contractual or legal requirements
- Industry-specific standards.

Exercise


Folder A
File
Home
Share
View
Documents
Folder A
Search Folder A
Favorites
Desktop
Downloads
Recent places
This PC
Desktop
Documents
Downloads
Music
Pictures
Videos
System (C:)
Data (D:)
Name
Date modified
This folder is empty.
0 items
Folder B
Documents
Folder B
Search Folder B
Hello.docx
9/16/2015 11:19 AM
1 item

Exercise


Scenario
Trying to move the file when it is open
You do not have the security rights to paste the file in folder B
Folder B is on a shared drive and storage capacity is full
Folder B already has a file with the same name

Common Testing Principles

1) Testing shows presence of defects
2) Exhaustive testing is impossible
3) Early testing
4) Defect clustering
5) Pesticide paradox
6) Testing is context depending
7) Absence – of – errors fallacy

Common Testing Principles

Testing everything is not possible.

Or suppose you have 15 input fields to test each having 5 possible values, the number of combinations to be tested would be 5^15 = 30 517 578 125!!

Field 1	Field 2	Field 3
Field 4	Field 5	Field 6
Field 7	Field 8	Field 9
Field 10	Field 11	Field 12
Field 13	Field 14	Field 15

Common Testing Principles

Common Testing Principles

Priority

1. Urgent
2. Mandatory
3. Major
4. Low
5. Optional

Likelihood- Realization

1. Probable
2. Possible
3. Improbable

Get Ready

- **Which of the following statements BEST describes one of the seven key principles of software testing?**

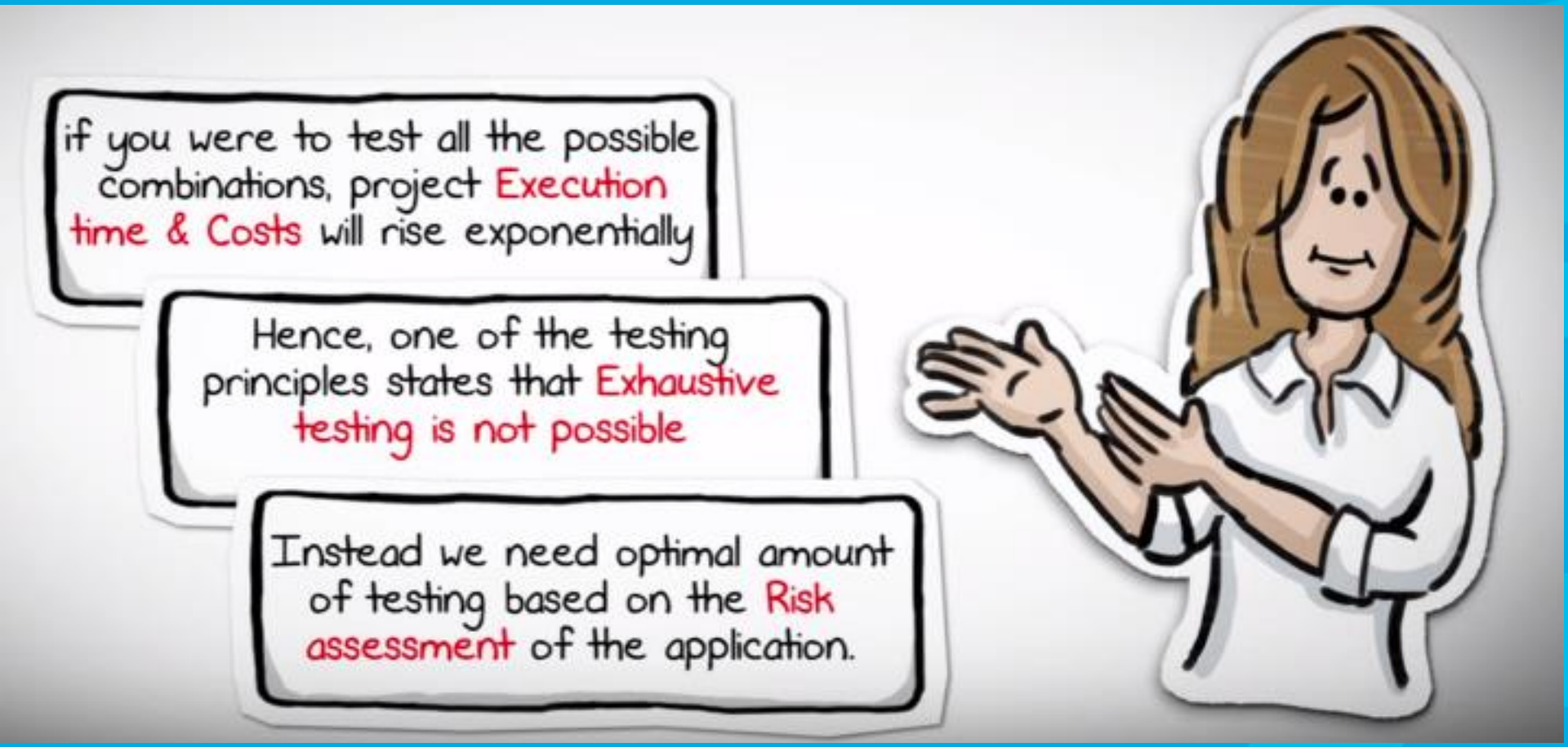
a) Automated tests are better than manual tests for avoiding the Exhaustive Testing.

b) Exhaustive testing is, with sufficient effort and tool support, feasible for all software.

c) It is normally impossible to test all input / output combinations for a software system.

d) The purpose of testing is to demonstrate the absence of defects.

Risk Assessment



Exercise

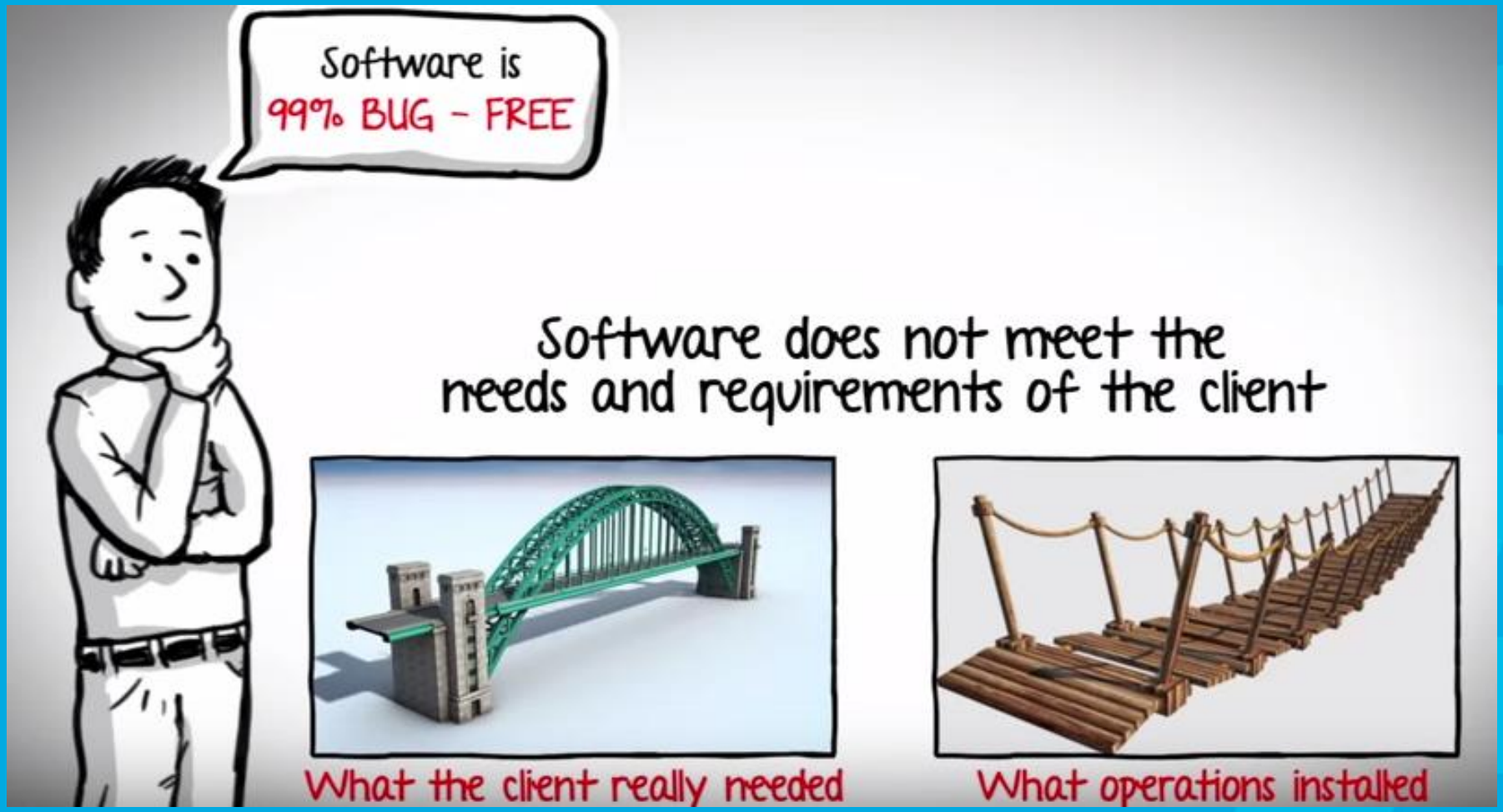
Which operation is most likely to cause your operating system to fail?

Opening Word document

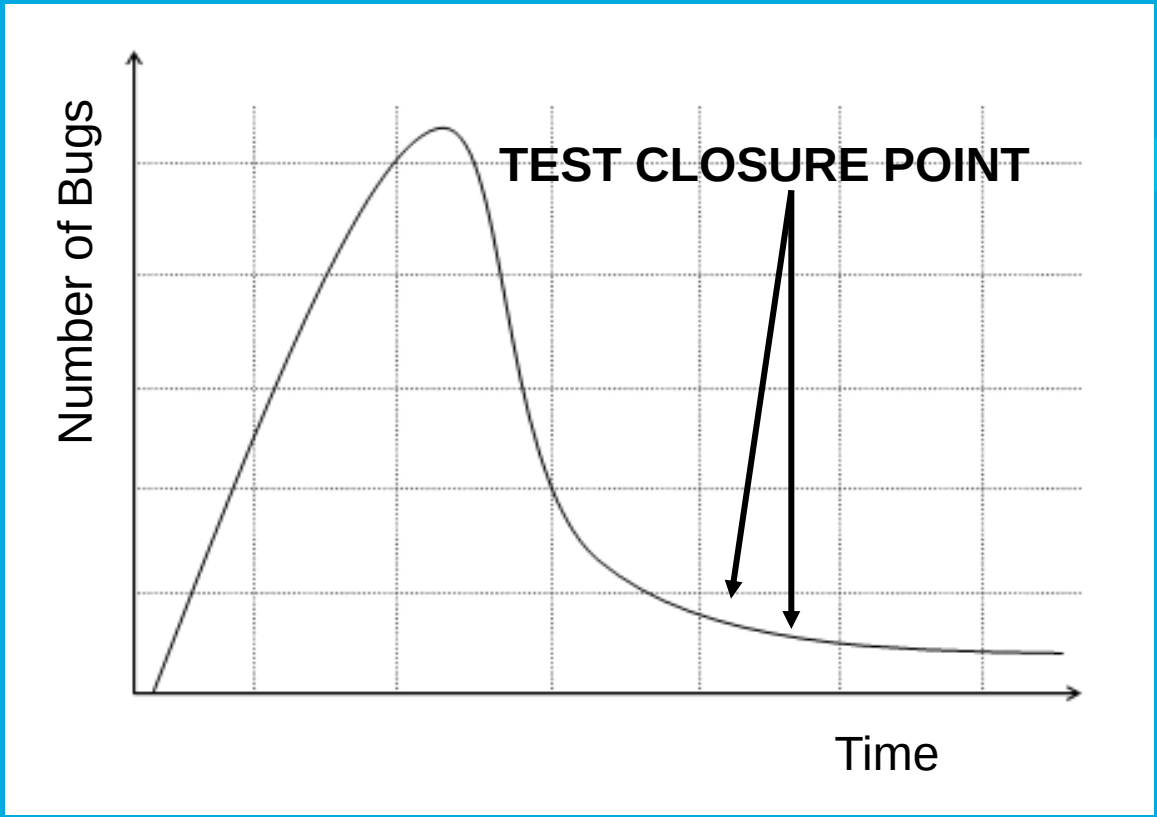
Opening Internet Explorer

Opening 10 heavy graphics applications all at the same time

REQUIREMENTS OF THE PROJECTS



FINALIZATION OF TESTING

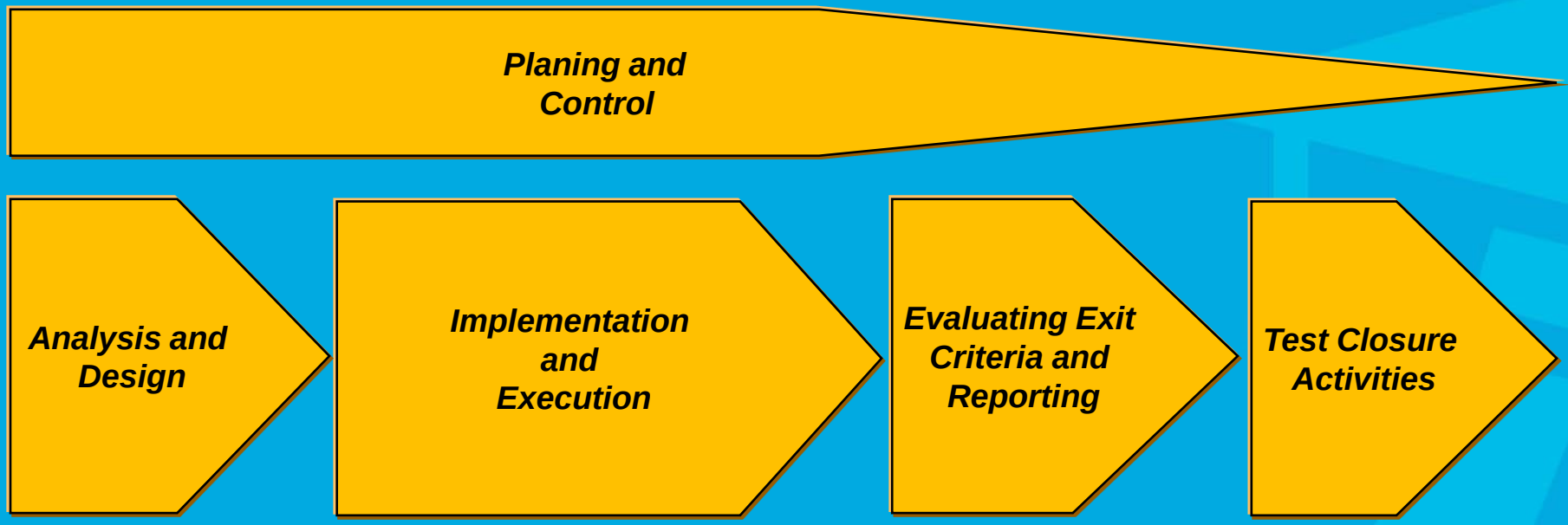


TESTING PROCESS

A process in the software development life cycle.

- Test planning
- Test case preparation
- Testing
- Evaluate the results
- Examining completion (or exit) criteria
- Reporting

TESTING PROCESS



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Planning and Control

Test Planning:

- Scope and risks
- Objectives
- Test approach
- Test resources
- Scheduling
- Exit criteria

Test Control:

- Measure and analyze the results of reviews and testing
- Monitor and document progress, test coverage and exit criteria
- Provide information on testing
- Initiate corrective actions
- Make decisions

Test Analysis and Design

Objectives are transformed test conditions and test designs.

- Review the test basis
- Identify test conditions
- Design the tests
- Evaluate testability
- Design the test environment

Implementation and Execution

Implementation:

- Test cases and test data
- Create test suites
- Implement and verify the environment

Execution:

- Execute the test suites and individual test cases
- Log the outcome of test execution
- Record
- Compare actual results with expected results.
- Report incidents.
- Repeat test activities for
- each discrepancy.

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Evaluating Exit Criteria and Reporting

Test execution is assessed against the defined objectives.

- Check test logs
- Assess
- Report

Get Ready

- **Which of these tasks would you expect to perform during Test Analysis and Design?**

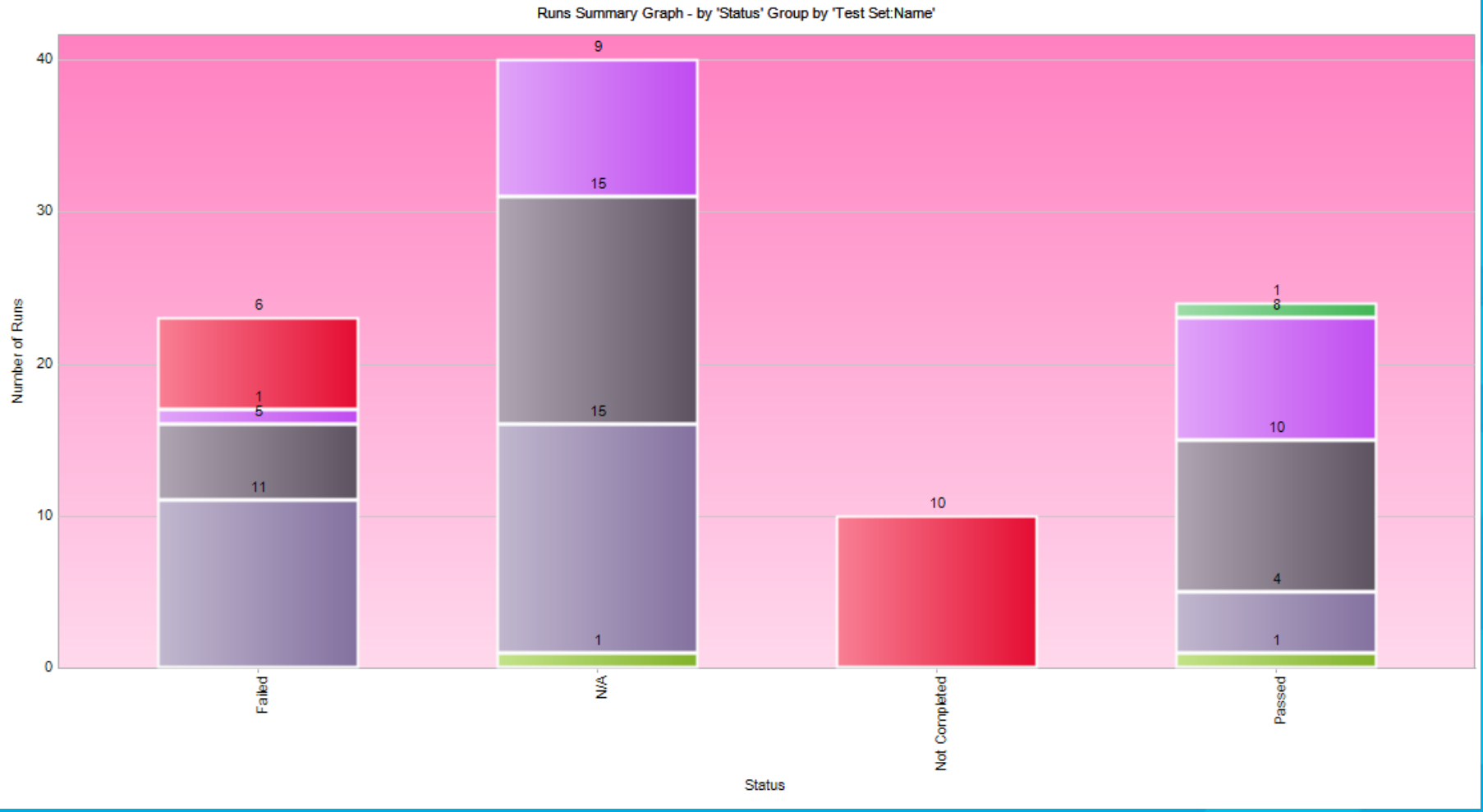
a) Setting or defining test objectives.

b) Reviewing the test basis.

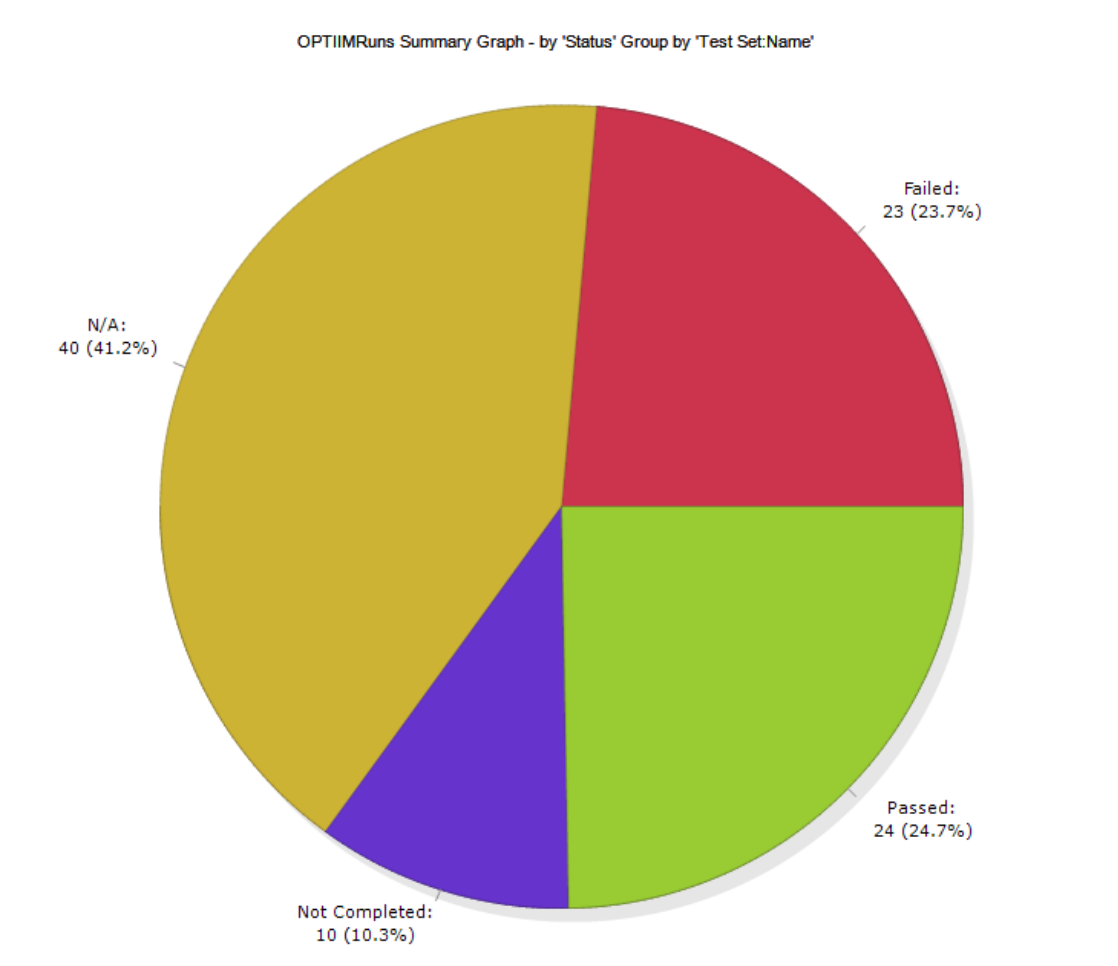
c) Creating test suites from test procedures.

d) Analyzing lessons learned for process improvement.

Report Example



Report Example



Test Closure Activities

- Last Checks
- Finalize and archive testware
- Hand over testware
- Lessons learned

THE PSYCHOLOGY OF TESTING

THE PSYCHOLOGY OF TESTING

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İSTANBUL TEKNİK ÜNİVERSİTESİ 1773

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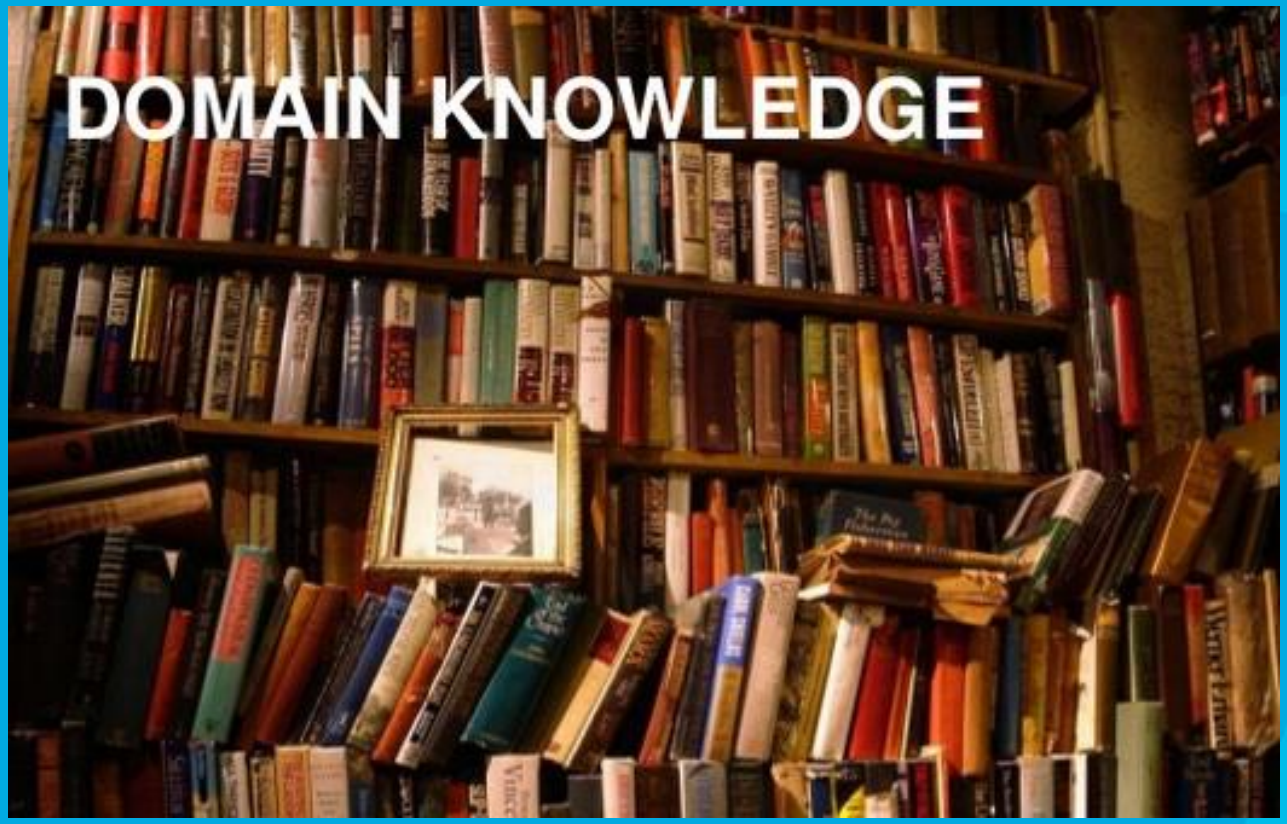

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Technical knowledge rules as king


THANK YOU