



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**COURSE NAME : 19CS511 SOFTWARE TESTING**

III YEAR / V SEMESTER

Unit 1- INTRODUCTION

Topic 4: Software Testing Principles





## Testing axioms - **Problem**



- Testing cannot show the absence of bugs
- Program testing can be used to show the presence of bugs, but never to show their absence!



# Testing Principle



A principle can be defined as:

- A general or fundamental, law, doctrine, or assumption;
- A rule or code of conduct;
- The laws or facts of nature underlying the working of an artificial device.



## Principle 1/11

**Testing is the process of exercising a software component using a selected set of test cases, with the intent of (i) revealing defects, and (ii) evaluating quality**

- Execution-based activity to detect defects.
- Separation of testing from debugging since the intent of the latter is to locate defects and repair the software.



### Principle 2/11

**When the test objective is to detect defects, then a good test case is one that has a high probability of revealing a yet undetected defect(s).**

- The goal for the test is to prove/disprove the hypothesis, that is, determine if the specific defect is present/ absent.
- Based on the hypothesis, test inputs are selected, correct outputs are determined, and the test is run.
- Results are analyzed to prove/disprove the hypothesis



## Software Testing Principles-Cont..



### Principle 3/11

#### **Test results should be inspected meticulously**

- Testers need to carefully inspect and interpret test results.
- Several erroneous and costly scenarios may occur if care is not taken



## Software Testing Principles-Cont..



### Principle 4/11

**A test case must contain the expected output or result**

Expected outputs allow the tester to determine

whether a defect has been revealed, and

Pass/ fail status for the test.





## Software Testing Principles-Cont..



### Principle 5/11

**Test cases should be developed for both valid and invalid input conditions.**

- A tester must not assume that the software under test will always be provided with valid inputs.
- Software users often make typographical errors even when complete/correct information is available.
- Invalid inputs also help developers and testers evaluate the robustness of the software, that is, its ability to recover when unexpected events occur





## Software Testing Principles-Cont..



### □ Principle 6/11

**The probability of the existence of additional defects in a software component is proportional to the number of defects already detected in that component**

□ The higher the number of defects already detected in a component, the more likely it is to have additional defects when it undergoes further testing.



## Software Testing Principles-Cont..



### □ Principle 7/11

**Testing should be carried out by a group that is independent of the Development group**

- It is difficult for a developer to admit or conceive that software he/she has created and developed can be faulty.
- Testers must realize that (i) developers have a great deal of pride in their work, and (ii) on a practical level it may be difficult for them to conceptualize where defects could be found.
- Independence of the testing group does not call for an adversarial relationship between developers and testers



## Software Testing Principles-Cont..



### Principle 8/11

**Tests must be repeatable and reusable.**

- It is also useful for tests that need to be repeated after defect repair.
- The repetition and reuse of tests is also necessary during regression test (the retesting of software that has been modified) in the case of a new release of the software



## Software Testing Principles-Cont..



### Principle 9/11

#### Testing should be planned.

- Test plans should be developed for each level of testing, and objectives for each level should be described in the associated plan.
- Careful test planning avoids wasteful throwaway tests and unproductive and unplanned test-patch-retest cycles that often lead to poor-quality software and the inability to deliver software on time and within budget.



## Software Testing Principles-Cont..

### Principle 10/11

**Testing activities should be integrated into the software life cycle.**

- It is no longer feasible to postpone testing activities until after the code has been written.
- Organizations can use process models like the V-model or any others that support the integration of test activities into the software life cycle.



# Software Testing Principles-Cont..



## Principle 11/11

**Testing is a creative and challenging task.**

- Creative
- Face difficulties



# Activity





# Disadvantages



- It also becomes inconvenient and burdensome as to decide who would automate and who would train.
- It has limited to some organizations as many organizations not prefer test automation.
- Testing would also require additionally trained and skilled people.
- Testing only removes the mechanical execution of testing process, but creation of test cases still required testing professionals



# Advantages



- It is quick and simple.
- It helps to train the test engineers to increase their knowledge by producing a repository of different tests.
- It helps in testing which is not possible without automation such as reliability testing, stress testing, load and performance testing.
- It includes all other activities like selecting the right product build, generating the right test data and analyzing the results.



# Assessment 1



1. List out the Advantages of Software testing Principles

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_

2. Identify the Disadvantages of Software testing Principles

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_
- d) \_\_\_\_\_





## **TEXT BOOKS:**

1. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, —Modern Information Retrieval: The Concepts and Technology behind Search, Second Edition, ACM Press Books, 2011.
2. Ricci, F, Rokach, L. Shapira, B.Kantor, —Recommender Systems Handbook, First Edition, 2011.

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1. C. Manning, P. Raghavan, and H. Schütze, —Introduction to Information Retrieval, Cambridge University Press, 2008.
2. Stefan Buettcher, Charles L. A. Clarke and Gordon V. Cormack, —Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.

# **THANK YOU**