CUI Abbottabad

Department of Computer Science

SOFTWARE TESTING

Lecture 15

Test case Design Effectiveness

CONTENT…

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- Test Case Design Yield
- Test Case Escaped

TEST CASE DESIGN EFFECTIVENESS

The objectives of the test case design effectiveness metric is to:

(i) measure the "defect revealing ability" of the test suite and

(ii) use the metric to improve the test design process.

TEST CASE DESIGN YIELD

A metric commonly used in the industry to measure test case design effectiveness is the testcase design yield (TCDY), defined as:

$$\text{TCDY} = \frac{\text{NPT}}{\text{NPT} + \text{number of TCE}} \times 100\%$$

- *TCDY= Test Case Design Yield*
- *NPT= Number of Planned Test Cases*
- *TCE= Test Case Escaped*
- TCDY is also used to measure the effectiveness of a particular testing phase.

TEST CASE ESCAPED (TCE)

- The test engineers may find the need to design new test cases during the testing, called test case escapes, as testing continues.
- The number of test case escapes is monitored as it rises.
- A significant increase in the number of test case escapes implies the deficiencies in the test design process, and this may adversely affect the project schedule.

TEST CASE ESCAPED

- **The effectiveness metric called test case escaped is defined as**

$$\text{TCE} = \frac{\text{number of defects found by test cases}}{\text{total number of defects}} \times 100\%$$

- The total number of defects in the above equation is the sum of the defects found by the test cases and the defects found by chance can be called “side effects.”
  - D1=5
  - D2=10
  - Total defects= 20
  - TCE1=?
  - TCE2=?

TEST CASE ESCAPED

A baseline TCE value (<75 for this case) is used (in industry) to evaluate test case effectiveness and make test process improvements.

Incomplete test design and incomplete functional specifications were found to be the main causes of test escapes.

TEST CASE ESCAPED

- Test case escapes occur because of deficiencies in the test design process.
- They are identified when test engineers find defects or when they encounter conditions that are not described in the plan.
- This happens by accident or when a new test scenario occurs to test engineers while executing the planned test cases.
- As test engineers learn more about the product, they develop innovative ways to test the product and find new defects.
- These test cases had escaped from the test case design effort, which is also known as side effects.

TEST EXECUTIONS

- Test cases are simultaneously executed in multiple test environments by using the concept of test prioritization, test case selection, augmentation etc.
- Prioritization of test execution changes between test cycles.
- Some basic ideas in test prioritization are as follows:

(i) test cases that exercise basic functionalities have higher priority than the rest in the first test cycle;

(ii) test cases that have failed in one test cycle have a higher priority in the following test cycle; and

(iii) test cases in certain test groups have higher priority than the others.

SUMMARY

- During the unit, integration, and system testing phases, faults are revealed by executing the planned test cases.
- In addition to these faults, new faults are also found during a testing phase for which no test cases had been designed.
- For these new faults, new test cases are added to the test suite. Those new test cases are called test case escaped (TCE).
- Test escapes occur because of deficiencies in test design. The need for more testing occurs as test engineers get new ideas while executing the planned test cases.

REFERENCES

Book:

Software testing and quality assurance