



FINAL ASSIGNMENT

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DEPT : BS SOFTWARE ENGINEERING

COURSE NAME: SOFTWARE VERIFICATION &
VALIDATION

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Q1. MCQS (10)

1. When should company stop the testing of a particular software?

- a. After system testing done
- b. It depends on the risks for the system being tested
- c. After smoke testing done
- d. None of the above

Ans:- b. It depends on the risks for the system being tested

2. White-Box Testing is also known as _____ .

- a. Structural testing
- b. Code-Based Testing
- c. Clear box testing
- d. All of the above

Ans:- d. All of the above

3. _____ refers to a different set of tasks ensures that the software that has been built is traceable to Customer Requirements.

- a. Verification
- b. Requirement engineering
- c. Validation
- d. None of the above

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Ans:- c. Validation

4. _____ verifies that all elements mesh properly and overall system functions/performance is achieved.

- a. Integration testing
- b. Validation testing
- c. Unit testing
- d. System Testing

Ans:- d. System Testing

5. What do you verify in White Box Testing?

- Published on 03 Aug 15

- a. Testing of each statement, object and function on an individual basis.
- b. Expected output.
- c. The flow of specific inputs through the code.
- d. All of the above.

Ans:- d. All of the above.

6. _____ refers to the set of tasks that ensures the software correctly implements a specific function.

- a. Verification
- b. Validation
- c. Modularity

d. None of the above.

Ans:- a. Verification

7. Who performs the Acceptance Testing?

a. Software Developer

b. End users

c. Testing team

d. Systems engineers

Ans:- b. End users

8. Which of the following is not a part of Performance Testing?

a. Measuring Transaction Rate.

b. Measuring Response Time.

c. Measuring the LOC.

d. None of the above.

Ans:- c. Measuring the LOC.

9. Which of the following can be found using Static Testing Techniques?

- Published on 29 Jul 15

a. Defect

b. Failure

c. Both A & B

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Ans:- a. Defect

10. Testing of individual components by the developers are comes under which type of testing?

- Published on 29 Jul 15

- a. Integration testing
- b. Validation testing
- c. Unit testing
- d. None of the above.

Ans:- c. Unit testing

Q2. Explain Black Box testing and White Box testing in detail.

Ans:- BLACK BOX TESTING:- BLACK BOX TESTING, also known as Behavioral Testing, is a software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester. These tests can be functional or non-functional, though usually functional.

This method is named so because the software program, in the eyes of the tester, is like a black box; inside which one cannot see. This method attempts to find errors in the following categories:

Incorrect or missing functions

Interface errors

Errors in data structures or external database access

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Behavior or performance errors

Initialization and termination errors

Example

A tester, without knowledge of the internal structures of a website, tests the web pages by using a browser; providing inputs (clicks, keystrokes) and verifying the outputs against the expected outcome.

Advantages

Tests are done from a user's point of view and will help in exposing discrepancies in the specifications.

Tester need not know programming languages or how the software has been implemented.

Tests can be conducted by a body independent from the developers, allowing for an objective perspective and the avoidance of developer-bias.

Test cases can be designed as soon as the specifications are complete.

Disadvantages

Only a small number of possible inputs can be tested and many program paths will be left untested.

Without clear specifications, which is the situation in many projects, test cases will be difficult to design.

Tests can be redundant if the software designer/developer has already run a test case.

Ever wondered why a soothsayer closes the eyes when foretelling events? So is almost the case in Black Box Testing.

WHITE BOX TESTING:- WHITE BOX TESTING (also known as Clear Box Testing, Open Box Testing, Glass Box Testing, Transparent Box Testing, Code-Based Testing or Structural Testing) is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. Programming know-how and the implementation knowledge is essential. White box testing is testing beyond the user interface and into the nitty-gritty of a system.

This method is named so because the software program, in the eyes of the tester, is like a white/transparent box; inside which one clearly sees.

Example

A tester, usually a developer as well, studies the implementation code of a certain field on a webpage, determines all legal (valid and invalid) AND illegal inputs and verifies the outputs against the expected outcomes, which is also determined by studying the implementation code.

Advantages

Testing can be commenced at an earlier stage. One need not wait for the GUI to be available.

Testing is more thorough, with the possibility of covering most paths.

Disadvantages

Since tests can be very complex, highly skilled resources are required, with a thorough knowledge of programming and implementation.

Test script maintenance can be a burden if the implementation changes too frequently.

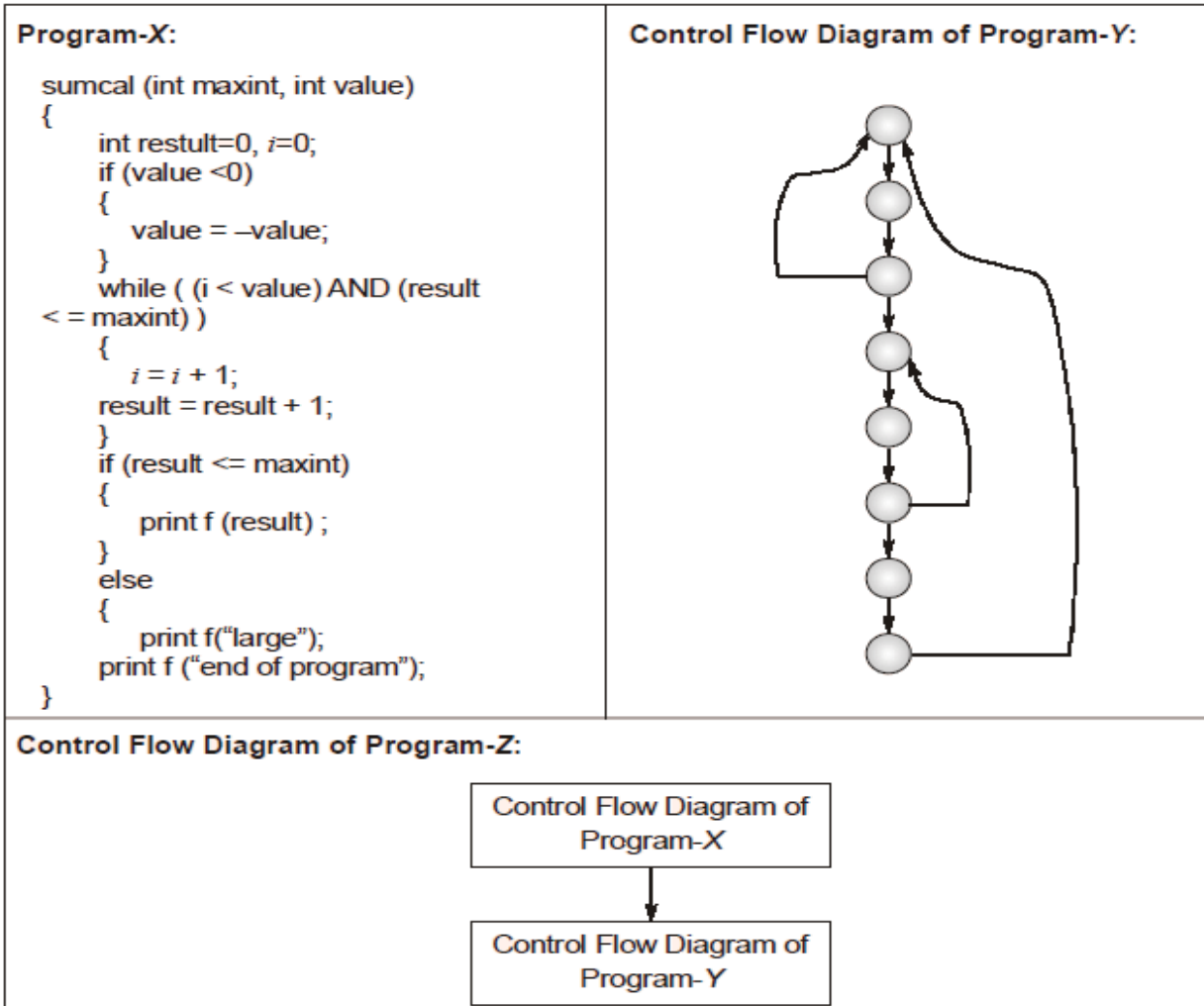
Since this method of testing is closely tied to the application being tested, tools to cater to every kind of implementation/platform may not be readily available.

Q.3:- . Find the cyclomatic Complexity and draw the Graph of this code.

```
Program-X:
sumcal(int maxint, int value)
{
    int result=0, i=0;
    if (value <0)
    {
        value = -value;
    }
    while((i<value) AND (result
<= maxint))
    {
        i=i+1;
        result = result + 1;
    }
    if(result <= maxint)
    {
        printf(result);
    }
    else
    {
        printf("large");
    }
    printf("end of program");
}
```


Cyclomatic Complexity will be equal to four (4).

Graph



The values of McCabe's Cyclomatic complexity of Program-X, Program-Y and Program-Z respectively are

- (A) 4, 4, 7
- (B) 3, 4, 7
- (C) 4, 4, 8
- (D) 4, 3, 8

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Answer= (D) 4, 3, 8

Explanation:- The cyclomatic complexity of a structured program[a] is defined with reference to the control flow graph of the program, a directed graph containing the basic blocks of the program, with an edge between two basic blocks if control may pass from the first to thesecond. The complexity M is then defined as.

$$M = E - N + 2P,$$

Where

E = the number of edges of the graph.

N = the number of nodes of the graph.

P = the number of connected components.

For first program X, E = 11, N = 9, P = 1, So $M = 11 - 9 + 2 * 1 = 4$

For second program Y, E = 10, N = 8, p = 1, So $M = 10 - 8 + 2 * 1 = 4$

For Third program X, E = 22, N = 17, p = 1, So $M = 22 - 17 + 2 * 1 = 7$

Q4. What is Z specification and why its is used for, also give some example this code written in Z specification.

Ans:- The Z notation /'zed/ is a formal specification language used for describing and modelling computing systems. It is targeted at the clear specification of computer programs and computer-based systems in general.

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Z is based on the standard mathematical notation used in axiomatic set theory, lambda calculus, and first-order predicate logic. All expressions in Z notation are typed, thereby avoiding some of the paradoxes of naive set theory. Z contains a standardized catalogue of commonly used mathematical functions and predicates, defined using Z itself.

Z is a model oriented formal specification language based on Zermelo-Fränkel axiomatic set theory and first order predicate logic. It is a mathematical specification language, with the help of which natural language requirements can be converted into mathematical form.

Although Z notation (just like the APL language, long before it) uses many non-ASCII symbols, the specification includes suggestions for rendering the Z notation symbols in ASCII and in LaTeX. There are also Unicode encodings for all standard Z symbols

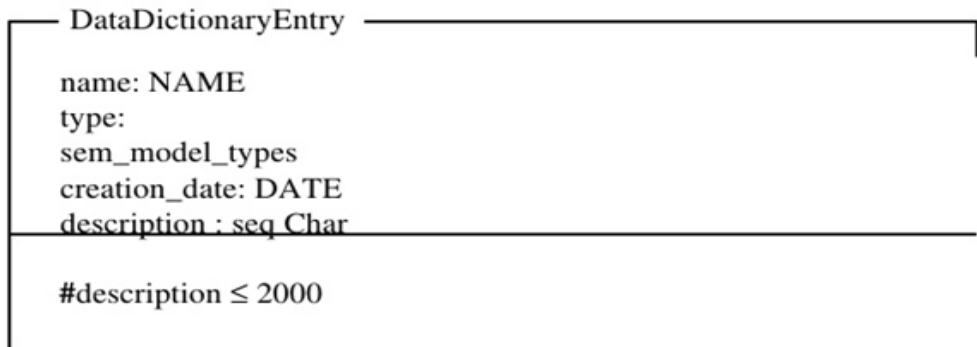
Example : Banking System

WithdrawMoney
Δ BankAccount dollarAmount? : \mathbb{N} centAmount? : \mathbb{N}
$\text{dollarAmount?} \leq \text{dollars}$ $\text{dollarAmount?} = \text{dollars} \Rightarrow \text{centAmount?} \leq \text{cents}$ $\text{centAmount?} > \text{cents}$ $\Rightarrow (\text{dollars}' = \text{dollars} - \text{dollarAmount?} - 1$ $\quad \wedge \text{cents}' = \text{cents} - \text{centAmount?} + 100)$ $\text{centAmount?} \leq \text{cents}$ $\Rightarrow (\text{dollars}' = \text{dollars} - \text{dollarAmount?}$ $\quad \wedge \text{cents}' = \text{cents} - \text{centAmount?})$

Example: Data dictionary entry

[NAME, DATE]

sem_model_types = { relation, entity, attribute }



Ans:- **(01)Delete entry**

Delete_ok

Datadictionary

Name?:NAME

name? é dom ddict

ddict' {name ?} ddict

Storage tank

(02)

Container

Indicator

Reading = contents

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Capacity = 5000

Danger level = 50