



NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA-769008
MID-SEMESTER EXAMINATION, 2022

SESSION: 2021 – 2022 (Spring)
B. Tech. 8th / M. Tech. 2nd Semester

Subject code: CS6404 **Subject Name:** Software Testing
No. of pages: 10 **Full Marks:** 60 (Sub-40+Quiz-20)

Dept. Code: CS
Duration: 2hrs

Figures at the right hand margin indicate marks.
All parts of a question should be answered at one place.

Answer all questions.
Subjective Questions

Q. No.	Particulars	Marks
1. (a)	Design a black-box test suite for a function named find-rectangle-intersection that accepts four floating point numbers representing two pairs of co-ordinates (x1, y1), (x2, y2), (x3, y3), (x4, y4). The first two points (x1, y1) and (x2, y2) represent the lower left and upper right points of the first rectangle. The second two points (x3, y3) and (x4, y4) represent the lower left and upper right points of the second rectangle. It is assumed that the length and width of the rectangle are parallel to either the x-axis or y-axis. The program computes the points of intersection of the two rectangles and prints their points of intersection.	2*10=20
(b)	Design test cases for the following withdraw cash function of a bank ATM using decision table-based testing: To withdraw cash, first a valid customer identification is required. For this, the customer is prompted to insert his ATM card in the card checking machine. If his card is found to be invalid, the card is ejected out along with an appropriate apology message displayed. If the card is verified to be a valid card, the customer is prompted to type his password. If the password is invalid, an error message is shown and the customer is prompted to enter his password again. If the customer enters incorrect password consecutively for three times, then his card is seized and he is asked to contact the bank manager. On the other hand, if the customer enters his password correctly, then he is considered to have validly identified himself and is prompted to enter the amount he needs to withdraw. If he enters an amount that is not a multiple of Rs. 100, he is prompted to enter the amount again. After he enters an amount that is a multiple of Rs. 100, the cash is dispensed if sufficient amount is available in his account, his balance is updated, and his card is ejected; otherwise his card is ejected out without any cash being dispensed along with a message display regarding insufficient fund position in his account.	
2. (a)	Write a function for finding the even numbers in between 1-100. . i. Construct the CFG of the above function. ii. Determine its cyclometric complexity. iii. Identify the linearly independent paths in the CFG. iv. Design a test suite for the above function that satisfies path coverage.	2*10=20

(b)	<p>Consider the following program:</p> <pre> #include<stdio.h> main() { int p, q, r, s; clrscr; printf("Enter the two variables p, q"); scanf("%d %d", &p, &q); printf ("Enter the options 1:Addition, 2:substraction, 3:multiplication, 4:division"); scanf("%d", &r); switch(r) { case 1:s = p+q; printf("Addition of two numbers = %d", s); break; case 2:s = p-q; printf("Subtraction of two numbers = %d", s); break; case 3:s = p*q; printf("Multiplication of two numbers = %d", s); break; case 4:s = p/q; printf("Division of two numbers = %d", s); break; } } </pre> <p>Perform static data flow analysis for the above program by finding out the define-use-kill patterns for the variables <i>p</i> and <i>s</i> in the source code.</p>	
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24Feb22 ST Quiz

FM - 20

* This form will record your name, please fill your name.

1. How many test cases have to be created for 100% condition coverage of the following statement?

(condition1 && condition2 && condition 3)

(1 Point)

☐ 3

☐ 6

☐ 8

☐ 9

2. How many linearly independent paths are there during path testing of the following code?

```
int computeGCD(x,y)
int x,y;
{
    while (x != y){
        if (x>y) then
            x=x-y;
        else y=y-x;
    }
    return x;
}
```

(1 Point)

☐ 2

☐ 3

☐ 4

☐ 5

3. How many test cases can be designed with worst-case testing, if there are 4 variables in a module?

(1 Point)

☐ 17

☐ 25

☐ 625

☐ 2401

4. Each row of a state table corresponds to ____ and each column corresponds to ____?
(1 Point)

- ☐ a. State, Input
- ☐ b. State, Input Condition
- ☐ c. Input Condition, State
- ☐ d. Input, Output

5. Unit testing of a software module does NOT test which one of the following?
(1 Point)

- ☐ a. Whether the module works well with other modules.
- ☐ b. Whether the functions in the module are working as per design.
- ☐ c. Whether all arithmetic statements in the module are working properly.
- ☐ d. Whether all logical statements in the module are working properly

6. Which one of the following is a measure of the testing difficulty of a program?
(1 Point)

- ☐ a. Number of statements in the program
- ☐ b. Number of decision statements in the program
- ☐ c. Complexity of the arithmetic expressions used in the program
- ☐ d. Time complexity of the program

7. At least how many test cases are required in MC/DC testing for a predicate having 4 conditions?

(1 Point)

- ☐ a. 5
- ☐ b. 4
- ☐ c. 8
- ☐ d. 16

8. Which one of the following does not come under Glass-box testing?

(1 Point)

- ☐ a. Basic condition coverage
- ☐ b. Cause-effect graph based testing
- ☐ c. MC/DC testing
- ☐ d. Decision coverage

9. Boundary value analysis and equivalence class partitioning methods do not consider _____.

(1 Point)

- ☐ a. input
- ☐ b. output
- ☐ c. combinations of input conditions
- ☐ d. none of these

10. Suppose there are 10 nodes and 12 edges in a CFG. Find out the Cyclomatic complexity of the program corresponding to that CFG.

(1 Point)

☐ 2

☐ 3

☐ 4

☐ 0

11. Which of the following attributes of a program can be inferred from the cyclomatic complexity of a program?

(1 Point)

☐ a. Computational complexity

☐ b. Lines of code (LoC)

☐ c. Executable code size

☐ d. Understandability

12. If there are 4 rules over 3 binary conditions, then at least how many test cases are to be designed?

(1 Point)

☐ 1

☐ 3

☐ 4

☐ 8

13. If two code segments have cyclomatic complexity of 10 and 20 respectively, what will be the cyclomatic complexity of the juxtaposition of the two code segments?

(1 Point)

- ☐ a. 30
- ☐ b. 31
- ☐ c. 29
- ☐ d. 200

14. For the following program statement, which one of the following test suites would achieve basic condition coverage?

(if $a > 10 \parallel b < 50$) $p++$

(1 Point)

- ☐ a. $(a=20, b=10), (a=0, b=15)$
- ☐ b. $(a=20, b=10), (a=0, b=15), (a=5, b=45)$
- ☐ c. $(a=50, b=20), (a=0, b=35)$
- ☐ d. $(a=50, b=20), (a=1, b=85)$

15. Among the following data-flow anomalies, which one is a potential bug?

(1 Point)

- ☐ a. $\sim d$
- ☐ b. $U \sim$
- ☐ c. $K \sim$
- ☐ d. $\sim u$

16. In data flow anomalies, dd is a _____
(1 Point)

- ☐ a. serious bug
- ☐ b. normal case
- ☐ c. harmless bug
- ☐ d. none of the above

17. In a program, 200 errors were introduced, 180 of these errors were found during testing and 100 other errors were also found. Find the approximate number of errors remaining in the program.
(1 Point)

- ☐ 4
- ☐ 8
- ☐ 11
- ☐ 16

18. In a call graph, there are total 22 nodes out of which 12 are sink nodes, there are also 24 edges in the call graph, what will be the integration testing effort required for the program representing the given call graph using neighbourhood integration testing?
(1 Point)

- ☐ a. 34
- ☐ b. 24
- ☐ c. 10
- ☐ d. 48

19. In a design tree of a software there are total 20 nodes out of which 8 are leaf nodes, also there are 24 edges in the design tree, how many test drivers are required for the super-ordinate modules to test the lower-level modules?

(1 Point)

- ☐ a. 19
- ☐ b. 20
- ☐ c. 12
- ☐ d. 24

20. There are 3 fault detection techniques used in a testing environment to test a program. There are 20000 bugs present in the program. Each fault detection technique detects only 80 percentage bugs. How many bugs would still remain in the given program even after applying the above 3 fault detection techniques.

(1 Point)

- ☐ a. 10240
- ☐ b. 5120
- ☐ c. 160
- ☐ d. 32

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