31 March 2022

B.Sc. Engg. SWE 6th Semester

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

SEMESTER FINAL EXAMINATION SUMMER SEMESTER, 2020-2021
DURATION: 3 Hours FULL MARKS: 150

SWE 4603: Software Testing and Quality Assurance

Programmable calculators are not allowed. Do not write anything on the question paper.

Answer all **6 (six)** questions. Marks of each question and corresponding CO and PO are written in the right margin with brackets.

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1. **a)** Define '*Driver*' and '*Stub*'. Explain their usage with code example. 2+2 (CO1) (PO1)

b) Consider the following program: 3+3+3+6 (CO3) (PO5)

```
main() {
    int work;
    double payment = 0;
    scanf("%d", &work);
    if (work > 0) {
        payment = 40;
        if (work > 20) {
            if (work <= 30)
            payment = payment + (work- 25) * 0.5;
            else {
                payment = payment + 50 + (work- 30) * 0.1;
                if (payment >= 3000)
                    payment = payment * 0.9;
            }
        }
    }
  printf("Final payment %d", payment);
}
```

i. Draw a **CFG** graph for the program.
ii. Calculate the **cyclomatic complexity** of the program using all the methods.
iii. Draw the **data flow** graph for all the variables.
iv. Derive all **AU**, **APU** and **ACU** paths using data flow testing.

c) Differentiate between : 3+3 (CO1) (PO1)
i. Load and Stress Testing
ii. Alpha and Beta Testing

2. **a)** ABBL wants to develop a new mobile banking application for their customers. What security issues and test conditions are needed to be considered for **Security Testing** of such application? 7 (CO2) (PO3)

b) Figure 1 shows the MM-path as a darken line. Perform **path-based integration** calculating source nodes, sink nodes, MEPs, and MM-path graph. 12 (CO3) (PO3)

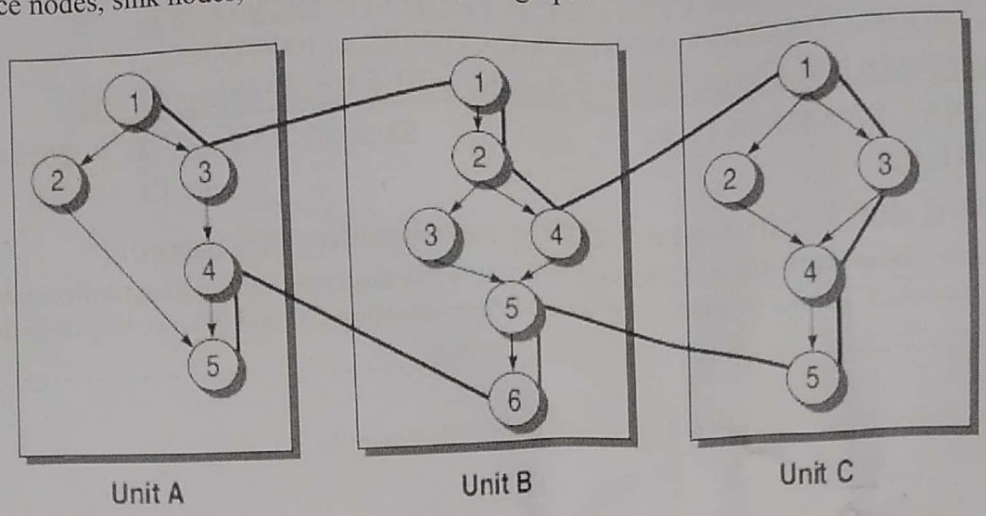

Figure 1: MM- Path

c) Explain the process of function testing. Differentiate between unit and function testing. 4+2 (CO1) (PO1)

3. a) Perform **top-down** and **bottom-up** integration procedure from the system hierarchy given in Figure 2. 10 (CO3) (PO3)

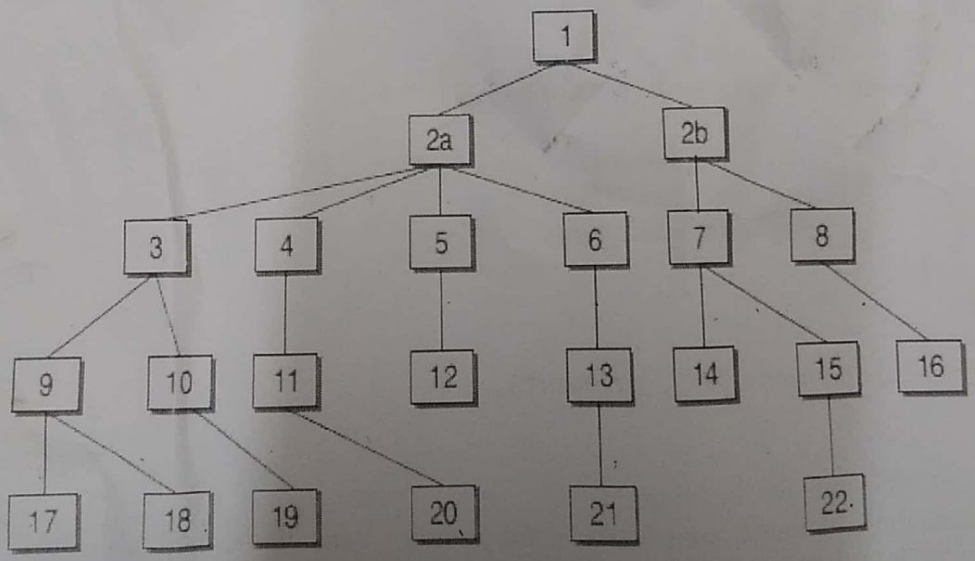

Figure 2: Decomposition Tree

b) Calculate the **number of test sessions** for the decomposition tree shown in Figure 2. 10 (CO3) (PO1)

c) Design a modified sandwich testing approach for Figure 2. 5 (CO3) (PO1)

4. a) Is regression testing a problem? Discuss with an example. Explain Regression Test Prioritization technique. 2+3+5 (CO2) (PO1)

b) T contains 90 tests of which 20 are modification-revealing for P and P′ and M selects 12 of these 20 tests, then calculate the **inclusiveness** and **precision** of M relative to P, P′, and T. 5+5 (CO3) (PO3)

c) What is selective retest technique? Describe the Strategies for Test Case Selection of selective retest technique. 1+4 (CO2) (PO3)

5. There is a system for railway reservation system. There are many functionalities in the system, as given in Table 1:

Table 1: Functionalities for railway reservation system

S. NO.	Functionality	Function ID	Test Cases
1	Login the System	F3.4	T1
2	View Reservation Status	F3.5	T2
3	View Train Schedule	F3.6	T3
4	Reserve Seat	F3.7	T4
5	Cancel Seat	F3.8	T5
6	Exit the System	F3.9	T6

a) Design **six test cases** corresponding to T1, T2, T3, T4, T5, T6 for railway reservation system given in Table 1. 12 (CO4) (PO3)

b) Define Test Log. To check the functionality corresponding to 'View Reservation Status' create a **test specification report** and corresponding **test log**. 1+6+6 (CO4) (PO1)

6. a) Consider a project with the following parameters: EI= 60, EO= 40, EQ = 45, ILF =06, ELF = 08. Assume all weighing factors are average. In addition, the system requires significant data communications, performance is very critical, designed code may be moderately reusable, and other factors are average. Compute the function points using **FPA**. 10 (CO4) (PO1)

b) Calculate the number of test sessions for the **pair-wise** and **neighbourhood** call graph based integration testing for the call graph shown in Figure 3. 5+5 (CO1) (PO1)

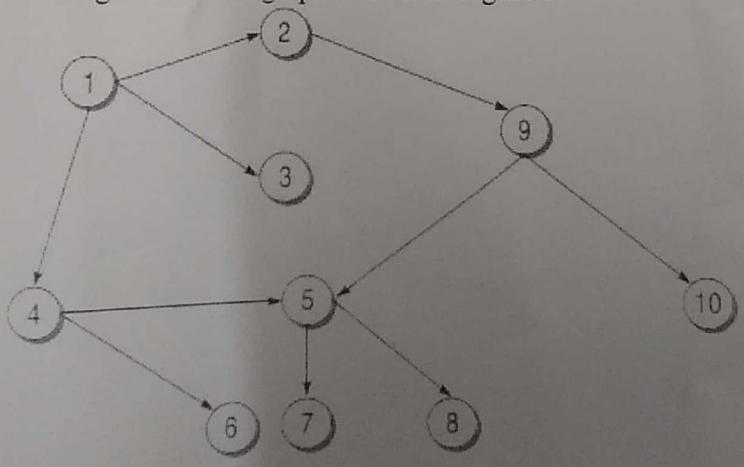

Figure 3: Call Graph

c) Draw a **connection matrix** for the call graph given in in Figure 3. 5 (CO1) (PO1)

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Examination: Quiz 1 **Time:** 30 Minutes **Full Marks:** 15

SWE 4603- Software Testing and Quality Assurance

1. Define Software Quality, Quality Assurance and Testing. Briefly discuss the goals of software testing. [5]
2. Draw the extended V-V diagram. [3]
3. Calculate cyclomatic complexity for the following code using a CFG [2]

```
i = 0;
n=4; //N-Number of nodes present in the graph

while (i<n-1) do
j = i + 1;

while (j<n) do

if A[i]<A[j] then
swap(A[i], A[j]);

end do;
i=i+1;

end do;
```

4. A program calculates the total salary of an employee with the conditions that if the working hours are less than or equal to 48, then give normal salary. The hours over 48 on normal working days are calculated at the rate of 1.25 of the salary. However, on holidays or Sundays, the hours are calculated at the rate of 2.00 times of the salary. Design test cases using decision table testing [5]

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Examination: Quiz 3 **Time:** 30 Minutes **Full Marks:** 15

SWE 4603- Software Testing and Quality Assurance

1. Discuss Driver and Stubs in the perspective of Unit and Integration testing. [5]
2. What are the factors that guide sandwich integration testing? [5]
3. Explain the following – [5]
    a. Load VS Stress Testing
    b. Alpha VS Beta Testing