Master of Computer Applications
MCAE512: Software Quality Assurance and Testing
Unique Paper Code: 223402512
Semester V
Nov-Dec 2022
Year of admission: 2020

Time: Three Hours **Max. Marks: 70**

Instructions:

1. All questions are compulsory.
2. Attempt all the parts of a question together.

1. (a) Differentiate among software Errors, Faults, and Failures. (3)
   (b) What is the role of a tester in software development? (3)
   (c) What are the limitations of testing? (4)

2. (a) What is Software Reliability? State its significance in software testing and quality assurance. (5)
   (b) Explain debugging. Compare and contrast the role of debugging goals and policies in testing. (5)

3. (a) Explain Mutation Testing with a suitable example. Also, list all the assumptions. (5)
   (b) Why is Integration Testing required? Which type of errors can be identified with this testing technique? (5)

4. (a) What is a test case? List attributes of a good test case. (2)

Consider the following procedure `average` to compute the sum of maximum 100 numbers (ignoring number -999) lying between `minimum` and `maximum`.

```
PROCEDURE average;
   INTERFACE RETURNS average, total, input, total.valid;
   INTERFACE ACCEPTS value, minimum, maximum;
   TYPE value [1:100]IS SCALAR ARRAY;
   TYPE average, total.input, total.valid;
   minimum, maximum, sum IS SCALAR;
   TYPE i IS INTEGER;
   i = 1;
   total.input = total.valid = 0;
   sum = 0;
   DO WHILE value[i] <> -999 AND total.input <100
        Increment total.input by 1;
        IF value[i] > = minimum AND value[i]< = maximum
             THEN increment total.valid by 1;
```

```
                sum = sum + value[i]
            ELSE skip
            ENDIF
            Increment i by 1;
    ENDDO
    IF total.valid > 0
        THEN average = sum/total.valid;
    ELSE average = -999;
    ENDIF
END average
```

Answer the following questions based on the procedure `average`.

(b) Draw a flow graph for the given procedure. (2)
(c) Calculate the cyclomatic complexity of the resultant flow graph. (2)
(d) Determine the basis set of linearly independent paths. (2)
(e) Write the test cases to execute each path in the basis set. (2)

5. (a) Differentiate between Quality Control and Quality Assurance with suitable examples. (5)
(b) Briefly explain any four tools that can be employed by problem-solving teams to fix errors. (5)

6. (a) How the use of software quality standards has changed over time? (4)
(b) Briefly explain SQuaRE. (3)
(c) What are metrics? Explain with the help of an example. (3)

7. (a) What is the cost of quality? Explain different cost of quality. (5)
(b) What is Total Quality Management? Explain the main parts of Total Quality Management. (5)