

Birla Institute of Technology & Science, Pilani
First Semester 2021-2022

Mid-Semester Test

Course No. : SS ZG552
Course Title : SOFTWARE TESTING METHODOLOGIES
Nature of Exam : Open Book
Weightage : 35%
Duration : 2 Hours
Date of Exam : 26/09/2021 (FN)

No. of Pages	= 3
No. of Questions	= 5

Note to Students:

1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Q.1Set. (A) A leading Eye care hospital accepts donation under *NetraDhan* scheme to care for indigent patients. Under *NetraDhan* – Donation amount Rs. 40000/- is accepted for performing one cataract surgery on a specified date every year by the donor for a period of 12 years. For a non-leap year February 29th is treated as Mar 1st. The program validates the date specified at the time of initial donation. Every year after performing the surgery, the module sends out an email giving details about the beneficiary. At the 11 th year, it sends out an email stating that the donation has been expended, requesting for more donation if the services are to be extended. If no donation is received, the scheme for this donor is discontinued and the donor informed. Develop a decision table for the above.[8 Marks]

Q.1Set. (B) Consider the following program

```
1 #include<stdio.h>
2 void main(void)
3 {
4 char str1[25],str2[25];
5 int i=0,j=0;
6 printf("\nEnter First String:");
7 gets(str1);
8 printf("\nEnter Second String:");
9 gets(str2);
10 while(str1[i]!='\0')
11 i++;
12 while(str2[j]!='\0')
13 {
14 str1[i]=str2[j];
15 j++;
16 i++;
17 }
18 str1[i]='\0';
```

```
19 printf("\nConcatenated String is %s",str1);
20 }
```

Identify all DU pairs for all the variables . For all the use nodes, specify whether it is a C-Use or P-Use. **[8 Marks]**

Q.1Set. (C) Electoral reform process is attempting to check duplication of voters in electoral rolls. The following key parameters must match exactly if duplicate records are there, namely, photo image, name of the voter, name of the relative mentioned, date of birth and address. If exact match is there all duplicating records are deleted , one entry is retained which has the earliest registration date. If there is a spelling mismatch in name and relative name, there is an algorithm to check the mismatch level and a confidence factor is returned by the algorithm. If the confidence factor is greater than 95% , one record which has the earliest registered date is retained and the other records are deleted. No other tolerance factor is applied and all records which mismatch in all other parameters are deleted from electoral rolls and all such records are moved to a database for further research. Draw a decision table for identify the test cases to be tested for the above problem situation. **[8 Marks]**

Q.2 Set (A) The following is a Program to Check a number is Palindrome or not. Go through the program and answer the questions.

```
1.  #include <stdio.h>
2.  int main()
3.  {
4.  int number,t, rev=0, rmndr;
5.  printf("Please enter a number to check Palindrome:");
6.  scanf("%d",&number);
7.  printf("\nEntered number: %d", number);
8.  t = number;
9.  while (number > 0)
10. {
11.  rmndr = number%10;
12.  rev = rev*10 + rmndr;
13.  number = number/10;
14. }
15. printf("\nReversed number: %d", rev);
16. if (t == rev)
17. {
18.  printf("\nEntered number %d is a palindrome", t);
19. }
20. else
21. {
22.  printf("\nEntered number %d is not a palindrome", t);
23. }
24. return 0;
25. }
```

Draw the control flow graph for the given algorithm. Mark all regions and all predicate nodes in the graph drawn. Calculate Cyclomatic Complexity using all the three methods.

[8Marks]

Q2. Set (B). The following is a Program to Check a number is Palindrome or not. Go through the program and answer the questions.

```
1. #include <stdio.h>
2. int main()
3. {
4.     int number,t, rev=0, rmndr;
5.     printf("Please enter a number to check Palindrome:");
6.     scanf("%d",&number);
7.     printf("\nEntered number: %d", number);
8.     t = number;
9.     while (number > 0)
10.    {
11.        rmndr = number%10;
12.        rev = rev*10 + rmndr;
13.        number = number/10;
14.    }
15.    printf("\nReversed number: %d", rev);
16.    if (t == rev)
17.    {
18.        printf("\nEntered number %d is a palindrome", t);
19.    }
20.    else
21.    {
22.        printf("\nEntered number %d is not a palindrome", t);
23.    }
24.    return 0;
25. }
```

Identify all DU pairs for all the variables. For all the use nodes, specify whether it is a C-Use or P-Use and why?

[8 Marks]

Q2. Set (C). We have a graph, given by N (Set of nodes) = {1, 2, 3, 4, 5, 6, 7} N_0 (Set of initial node) = {1}, N_f (Set of accepting nodes) = {7}, E = {(1, 2), (1, 7), (2, 3), (2, 4), (3, 2), (4, 5), (4, 6), (5, 6), (6, 1)}

a) Draw the graph

b) List test paths that achieve node coverage but not edge coverage.

[8 Marks]

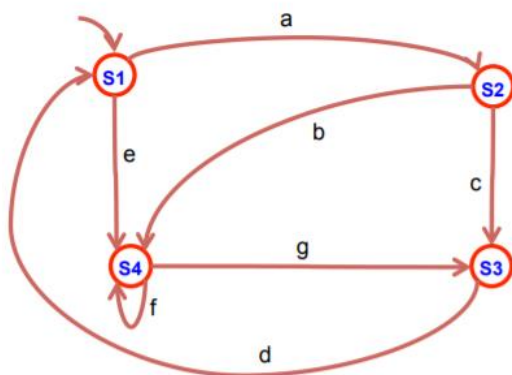
Q3. Set (A) Write an EFSM for a calculator accepting (positive) integers, different operators (*, +, -, /), a reset operation, and parenthesis. Assume numbers are full integers (not a string of digits)

Assume that there is no need to check for division by zero. The result is given when entering "=" (no need to "calculate" the result). After pressing "=" the result should be given and the calculator is reset, i.e., it is not possible enter an expression "1+2=+4" and expect to get 7 as result (computing 1+2 first and adding 4 to the result). For this first version: Assume that inputs with only one operator between two operands is accepted (i.e. something like "1+*2" is not accepted) [6 Marks]

Q3. Set(B) Let the following FSM (Figure 1) represent the model of a SUT:

Give a solution to the following transition-based structural model coverage criteria (give the sequence of actions to be performed to satisfy the corresponding criteria): (6 marks)

- a) All-states
- b) All-transition-pairs (from each state)
- c) All-loop-free-paths
- d) All-one-loop-paths
- e) All-transitions



Q3. Set(C) Below you will find 5 statements about different issues related to testing. Determine whether the statements are true or false. If a statement is false in your opinion, then justify your answer giving clear arguments to defend your judgment (state why the answer is false and provide the correct fact). Your answer will not be considered complete if you do not justify it when false. [6Marks]

- 1) There are two kinds of testing: dynamic and static.
- 2) Validation testing is about showing that the software meets its requirements.
- 3) Testing is just another name for debugging.

Q.4Set. (A) Comment with Yes/ No for the following statements. Provide a justification to each one of them.

[10Marks]

- a. Does 100% p-use coverage gives 100% block/statement coverage?
- b. Does 100% all-use coverage gives 100% block/statement coverage?
- c. Does 100% condition coverage gives 100% condition-decision coverage?
- d. 100% condition coverage gives 100% condition-decision coverage?

Q5. Set (A)(i) [3Marks]

___coverage is a necessary but not sufficient criterion for logic coverage.

- (a) Loop
- (b) Branch
- (c) Statement
- (d) Condition

Q5. Set (A)(ii)

A node with more than one arrow leaving it is called ___ node.

- (a) Junction
- (b) Condition
- (c) Region
- (d) Edge

Q5 Set (A)(iii)

_____ considers only independent paths.

- (a) Path testing
- (b) Cyclomatic complexity
- (c) Basis path testing
- (d) None