Shahjalal University of Science and Technology
Institute of Information and Communication Technology
3rd Year 2nd Semester Final Examination' 2019
Session: 2016-17

Course Code: SWE 333 Credits: 2 Course Title: Software Verification and Validation
Time: 2 hrs. Total Marks: 50

Group A

[Answer all the questions]

1. **Answer any FIVE** 5x1=5

a) What is Cyclomatic Complexity?
b) Write down the Software Development Life Cycle steps.
c) Why Must the Process of underlying software be written?
d) What are the basic activities of Spiral model?
e) What is software quality assurance?
f) Define Source node and Sink node for path based integration.
g) How can you verify a code?

2. **Answer any FOUR** 4x2.5=10

a) Write down the difference between White box testing and Black box testing. 2.5
b) Describe the waterfall model. 2.5
c) What is static testing? What are the different steps of inspections? 2.5
d) Describe the logic coverage criteria in white box testing. 2.5
e) What is the Equivalence class testing? Explain the identification of equivalent class. 2.5
f) Describe the states of the bugs. 2.5

3. **Answer any One** 10x1=10

a) Consider the following code segment: 10

```
Void insertion_procedure (int a[], int p [], int N)
{
  int i,j,k;
  for (i=1; i<=N; i++) p[i] = i;
  for (i=2; i<=N; i++)
  {
    k = p[i];
    j = i-1;
```

2.5

a) Consider the following code segment: 10x1=10

```
void insertion_procedure (int a[], int p [], int N)
{
  int i,j,k
  for (i=0; i<=N; i++) p[i] = i;
  for (i=2; i<=N; i++)
  {
    k = p[i];
    j = i;
    while (a[p[j-1]] > a[k]) {p[j] = p[j-1]; j--}
    p[j] = k;
  }
}
```

(a) Draw a Control Flow Graph (CFG) for the above code. Calculate the Cyclomatic Complexity. 10

(b) Prepare a test case for each of the independent paths require to cover the CFG.

b) i) A program reads an integer number within the range [1,100] and determines whether it is a prime number or not. Design test cases for this program using BVC, robust testing, and worst-case testing methods. 6 + 4 = 10

ii) Write down the formation of Decision table formation criteria.

Group B

[Answer all the questions]

4. **Answer any FIVE** 5x1=5

a) How Driver class helps in unit testing?
b) Write down the types of Integration testing.
c) What is Defect in software?
d) Define the attributes of a Test case.
e) Explain the properties of Control Flow Graph.
f) Draw the Diagram of Inspection Process.
g) What is the Ramp up period?

5. **Answer any FOUR** 4x2.5=10

a) Explain Rapid Prototyping model of Software development. 2.5
b) What is software crisis? State with an example. 2.5
c) Why incremental integration testing is preferred rather than using the non-incremental approach? 2.5
d) What is the benefit of TDD over the traditional unit testing approach? 2.5

e) What is the difference between debugging and testing? 2.5

f) Show the difference between effective testing and exhaustive testing. 2.5

6. Answer any ONE 10x1=10

a) A wholesaler has three commodities to sell and has three types of customers. Discount is given as per the following procedure: 10

(i) For DGS & D orders, 10% discount is given irrespective of the value of the order.
(ii) For orders of more than Tk 50,000, agents get a discount of 15% and the retailer gets a discount of 10%.
(iii) For orders of Tk 20,000 or more and up to Tk 50,000, agents get 12% and the retailer gets 8% discount.
(iv) For orders of less than Tk 20,000, agents get 8% and the retailer gets 5% discount.
The above rules do not apply to the furniture items wherein a flat rate of 10% discount is admissible to all customers irrespective of the value of the order.

Design test cases for this system using decision table testing.

b) Consider the following registration page for using the tax web portal – 10

National Id

Email Adress

Username

Password

Submit

The fields in the form have the following properties

discount of 10%.

(iii) For orders of Tk 20,000 or more and up to Tk 50,000, agents get 12% and the retailer gets 8% discount.

(iv) For orders of less than Tk 20,000, agents get 8% and the retailer gets 5% discount.

The above rules do not apply to the furniture items wherein a flat rate of 10% discount is admissible to all customers irrespective of the value of the order.

Design test cases for this system using decision table testing.

b) *Consider the following registration page for using the tax web portal* 10

National Id

Email Adress

Username

Password

Submit

The fields in the form have the following properties -

i) The National Id is a 17-digit number where the first 4 digits indicate the birth year. The birth year should be such so that at the current year, the person's age falls within the range of 18 to 65. For this problem the current year is 2014.

ii) The pattern of the email address is as follows: it has two parts separated by the symbol @. The first part is alphanumeric, should not start with a number and it should be 6-12-character long. The second part should be 6-20 character long and must end with a top level domain (for this problem consider only *com* and *org*) preceded by the *dot* symbol.

iii) The user name should be alphanumeric, should not start with a number, 8-16 character long and must have any of these characters – *dot* and *underscore*.

iv) The password should be 6-24 characters long and must have a special character.

Now answer the following questions –

(a) List valid and invalid equivalence classes for each of the form fields.

(b) Propose the boundary values for this scenario.

Software Engineering

Course Code: SWE-333 **Term Test** # 1

Total Marks: 20 **Date:** 5th September, 2019

1. What are the states of bug? Briefly describe with pictorial representation. 5
2. What is the difference between verification and validation? Draw and describe the V-testing model. 6
3. What is Software crisis? State with an example. 3
4. Define these terms with example: Failure, Error, SDLC, STLC 6

Software Engineering

Course Code: SWE-333 **Term Test # 2**

Total Marks: 20 **Date:** 17th November, 2019

1. A program computes a b where a lies in the range [1,10] and b within [1,5]. Design test cases for this program using BVC, robust testing. 12

2. 8

```
main() {
    int num, small;
    int i, j, sizelist, list[10], pos, temp;
    clrscr();
    printf("\nEnter the size of list : \n ");
    scanf("% d",& sizelist);

    for (i = 0; i < sizelist; i++) {
        printf("\nEnter the number");
        scanf("% d",& list[i]);
    }

    for (i = 0; i < sizelist; i++) {
        small = list[i]; pos = i;
        for (j = i + 1; j < sizelist; j++) {

            if (small > list[j]) {
                small = list[j]; pos = j;
            }
        }
        temp = list[i];
        list[i] = list[pos];
        list[pos] = temp;
    }
    printf("\nList of the numbers in ascending order : ");
    for (i = 0; i < sizelist; i++)
        printf("\n % d", list[i]);

    getch();
}
```

(a) Draw the DD graph for the program.

(b) Calculate the cyclomatic complexity of the program using all the methods.

(c) List all independent paths.

Term Test 01

Course: Software Verification and Validation

Course Code: SWE 333

Marks: 20 Time: 60 mins

6.12

6

6/12/2

12

1. What are testing bugs? - 01
2. What is exhaustive testing? Why should it be avoided? - 02
3. Explain the following terminologies: Failure, Bug, Error. - 02
4. Distinguish between Verification and Validation activities. - 03
5. A program reads two numbers, A and B within the range (0, 100] and calculate the GCD of those numbers. Design test cases for this program using BVC, robust testing, and worst-case testing methods. - 06
6. Passengers who travel more than 50,000 km. per calendar year and in addition, pay cash for tickets or have been traveling regularly for more than eight years are to receive a free round trip ticket around India. Passengers who travel less than 50,000 km. per calendar year and have been availing railway services regularly for more than eight years also get a free round ticket around India.

   Design test cases for this system using decision table testing. - 06

100 2, 25

Shahjalal University of Science and Technology
Institute of Information and Communication Technology (IICT)
Software Engineering

3rd Year 2nd Semester Final Examination' Dec 2022 (Session: 2018-19)
Course Code: SWE 333 Credits: 2 Course Title: Software Verification and Validation
Time: 2 hrs Total Marks: 50

Group A

[Answer all the questions]

1. Answer any FIVE 5x1=5

a) What is Regression Testing?

b) Who is responsible for unit testing?

c) What is "Bug model"?

d) What is a race condition bug?

e) Write down the Software Development Life Cycle steps.

f) What is Cyclomatic Complexity?

g) What is system testing?

2. Answer any FOUR 4x2

a) What is exhaustive testing? Why should it be avoided?

b) Write down the difference between Top-Down and Bottom-Up Integration Testing.

c) "Testing is not a single phase in SDLC" - discuss briefly.

d) Explain the elements of security testing.

e) Draw the diagram of the life cycle of a bug.

f) Write a short note on the state of a bug in its life cycle.

3. Answer any TWO 2x5=

a) A wholesaler has three commodities to sell and has three types of customers. Discount is given as per the following procedure:
(i) For DGS & D orders, a 10% discount is given irrespective of the value of the order.
(ii) For orders of more than Tk 50,000, agents get a discount of 15% and the retailer gets a discount of 10%.
(iii) For orders of Tk 20,000 or more and up to Tk 50,000, agents get 12% and the retailer gets an 8% discount.
(iv) For orders of less than Tk 20,000, agents get 8% and the retailer gets 5% discount.
The above rules do not apply to the furniture items wherein a flat rate of 10% discount is admissible to all customers irrespective of the value of the order.

Design test cases for this system using decision table testing.

b) A program reads three numbers, A, B, and C, with a range (1, 50) and prints the largest number. Design test cases for this program using equivalence class testing technique.

c)

```
#include < stdio.h >
main() {
float x, y, z;
clrscr();
  printf("enter the three variables x, y, z");
  scanf("% f % f % f",& x,& y,& z);
  if (x > y) {
  if (x > z)
    printf("x is greatest");
  else
    printf("z is greatest");
  }
else {
  if (y > z)
    printf("y is greatest");
  else
    printf("z is greatest");
  }
  getch();
}
```

(a) Draw the DD graph for the program.
(b) Calculate the cyclomatic complexity of the program using all four methods.

Group B

[Answer all the questions]

4. Answer any FIVE **5x1=5**

a) What is inspection testing?
b) What will happen if we test the whole system directly?
c) What type of test plan can we make after verifying the SRS?
d) What is High-Level design of a software system?
e) Who are the stakeholders of regression testing?
f) Give 2 examples of validation testing techniques.
g) What is Software Crisis?

5. Answer any FOUR **4x2.5=10**

a) Distinguish between Verification and Validation activities.
b) Classify bugs based on criticality.
c) Write the differences between Validation and Verification activities.
d) Draw and explain the V-testing model.
e) What is the difference between debugging and testing?
f) What is Dynamic testing technique? State different types of dynamic testing.

6. **Answer any TWO**

a) A program reads two numbers, A and B within the range (0, 100] and calculates the GCD of those numbers. Design test cases for this program using BVC and robust testing methods.

b) A program takes as input three angles and determines the type of triangle. If all the three angles are less than 90, it is an acute angled triangle. If one angle is greater than 90, it is an obtuse angled triangle. If one angle is equal to 90, it is a right angled triangle. Design test cases for this program using equivalence class testing technique.

c) What is the difference between software Verification and Validation? What are the outcomes of each step in V&V activities?

Shahjalal University of Science & Technology

Institute of Information and Communication Technology

Discipline: Software Engineering

3rd Year 2nd Semester Examination, 2020

Session: 2017-18

Course: **SWE333(Software Verification and Validation)**

Group - A

[Answer all the questions]

1) Consider the following code segment: **7**

```
int remove_duplicate(int arr[], int n)
{
  if (n == 0 || n == 1)
    return n;

  int temp[n];

  int j = 0;
  int i;
  for (i = 0; i< n - 1; i++)
    if (arr[i] != arr[i + 1])
      temp[j++] = arr[i];
  temp[j++] = arr[n - 1];

  for (i = 0; i< j; i++)
arr[i] = temp[i];

  return j;
}
```

(a) Draw a Control Flow Graph (CFG) for the above code. Calculate the Cyclomatic Complexity.

(b) Prepare a test case for each of the independent paths require to cover the CFG.

2) "Nested loops are problematic areas for testers". Comment on this. **3**

3) What is CMMI? What new maturity levels are required to move from CMMI level 3 to level 5? **3**

4) Explain *worst-case testing method.* **2**

Group – B

[Answer all the questions]

5) **i)** A wholesaler has three commodities to sell and has three types of customers. Discount is given as per the following procedure: **6 + 2**

(i) For DGS & D orders, 10% discount is given irrespective of the value of the order.

(ii) For orders of more than Tk 50,000, agents get a discount of 15% and the retailer gets a discount of 10%.

(iii) For orders of Tk 20,000 or more and up to Tk 50,000, agents get 12% and the retailer gets 8% discount.

(iv) For orders of less than Tk 20,000, agents get 8% and the retailer gets 5% discount. The above rules do not apply to the furniture items wherein a flat rate of 10% discount is admissible to all customers irrespective of the value of the order.

Design test cases for this system using decision table testing.
ii) Write down the formation of Decision table formation criteria.

6) What is the difference between verification and validation? Draw and describe the V-testing model. **3**

7) Suppose you are assigned to perform a static testing process for a Hospital Management System. How you build your team for this process? Shortly discuss the steps required for inspection. **4**

TT #02 Course: Software Verification and Validation (**SWE 333**)

Marks: 20 Time: **35 mins**

1. Draw the DD graph for the following program. Calculate the cyclomatic complexity of the program using all four methods. **5 + 8**

```
main()
{
char string [80];
 int index;
1. printf("Enter the string for checking its characters");
2. scanf("%s", string);
3. for(index = 0; string[index] != '\0'; ++index) {
4. if((string[index] >= '0' && (string[index] <='9'
5. printf("%c is a digit", string[index]);
6. else if ((string[index] >= 'A' && string[index] <'Z')) ||
((string[index] >= 'a' && (string[index] <'z')))
7. printf("%c is an alphabet", string[index]);
8. else
9. printf("%c is a special character", string[index]);
10. }
11. }
```

7

2. Write a short note on White box and Black box testing.