

KIET Group of Institutions

(Roll Number: _____)

(Department of IT)
IT/ B.tech, 6th Semester
Pre-University Examination, (2021-22) ODD Semester
Software Engineering (KCS-601)

Duration: 3 hrs

Max. Marks: 100

Note: - Attempt all the Questions.

		Section-A	(10X2=20)		
Q. No.		Question	Marks	CO	BL/ KC*
1.	a	Describe the limitation of RAD Model.	2	1	1/C
	b	Define software process.	2	1	1/F
	c	Discuss software scope.	2	2	2/C
	d	List some techniques of information modelling.	2	2	1/C
	e	Discuss about how to find the size of a software product.	2	3	2/C
	f	Write down steps in object-oriented design.	2	3	1/C
	g	Discuss Alpha and Beta testing.	2	4	2/C
	h	Explain the objective of regression testing.	2	4	2/C
	i	Define software re-engineering.	2	5	1/F
	j	Discuss what is risk and how it is managed.	2	5	2/C
Section-B					
Q. No.		Question			
2		Discuss which is more important-the product or process.			
		OR			
3		Discuss the characteristics of a software process.			
		OR			
4		Explain what a requirement is? Explain different types of requirements with examples.			
		OR			
5		Explain a typical SRS structure and its parts. Narrate the importance of software specification of requirements.			
		OR			
6		Explain what are structure Charts. Explain rules for drawing good Structure Charts diagrams with the help of a suitable example.			
		OR			
7		Explain what does it mean by a good design? How it is feasible to arrive at a good design? How evaluation of a design can be done?			
		OR			
8		Differentiate between black box and white box testing and explain how they can be used together in detecting defects during testing.			
		OR			
9		Explain types of integration testing with suitable examples. Why is testing done at different levels? What integration testing does?			
		OR			
10		Explain what do you mean by risk management. Explain one technique to manage risk.			
		OR			
11		Explain how COCOMO model is used in estimation of cost, effort, and schedule?			
		OR			
Section-C					
Q. No.		Question			
7		Explain the feasibility studies. What are the outcomes? Does it have either implicit or explicit effects on software requirement collection?			
		OR			
8		Explain how both waterfall model and prototyping model can be accommodated in the spiral process model. List several software process models.			
		OR			
9		Describe how software requirements are documented? State the importance of documentation.			
		OR			
10		Describe use case diagram along with its elements in detail with some example.			
		OR			
11		An application has the following: 10 low external inputs, 12 high external outputs, 20 low internal logical files, 15 high external inquiries, and a value of complexity adjustment factor of 1.10.			
		OR			
12		Evaluate the unadjusted and adjusted function point counts.			
		OR			

- **CO -Course Outcome** generally refer to traits, knowledge, skill set that a student attains after completing the course successfully.
- **Bloom's Level (BL)** - Bloom's taxonomy framework is planning and designing of assessment of student's learning.
- *Knowledge Categories (KCs): **F**-Factual, **C**-Conceptual, **P**-Procedural, **M**-Metacognitive



Software Project Planning

Solution

Unadjusted function point counts may be calculated using as:

$$UFP = \sum_{i=1}^5 \sum_{j=1}^3 Z_{ij} w_{ij}$$

$$= 10 \times 3 + 12 \times 7 + 20 \times 7 + 15 + 10 + 12 \times 4$$

$$= 30 + 84 + 140 + 150 + 48$$

$$= 452$$

$$FP = UFP \times CAF$$

$$= 452 \times 1.10 = 497.2.$$

OR

Consider the below program and determine Halstead measures like volume, difficulty, program level and language level.

```
int sort (int x[ ], int n)
{
    int i, j, save, im1;
    /*This function sorts array x in ascending order */
    If (n< 2) return 1;
    for (i=2; i<=n; i++)
    {
        im1=i-1;
        for (j=1; j<=im1; j++)
            if (x[i] < x[j])
            {
                Save = x[i];
                x[i] = x[j];
                x[j] = save;
            }
    }
    return 0;
}
```

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operators	occurrences	operands	occurrences
int	4	sort	1
()	5	x	7
,	4	n	3
[]	7	i	8
if	2	j	7
<	2	save	3
;	11	im1	3
for	2	2	2
=	6	1	3
–	1	0	1
<=	2	–	–
++	2	–	–
return	2	–	–
{}	3	–	–
n1=14	N1=53	n2=10	N2=38

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Therefore,

N = 91

n = 24

V = 417.23 bits

N[^] = 86.51

n2* = 3 (x:array holding integer to be sorted. This is used both as input and output)

V* = 11.6

L = 0.027

D = 37.03

L[^] = 0.038

T = 610 seconds

10

Consider a simple program to classify a triangle. Its inputs is a triple of positive integers (say x, y, z) and the data type for input parameters is integer greater than 0 and less than or equal to 100. The program output may be one of the following words: [Scalene; Isosceles; Equilateral; Not a triangle]
Determine the equivalence class test cases.

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Example : Equivalence Class Testing

Solution

Output domain equivalence classes are:

$O_1 = \{ \langle x, y, z \rangle : \text{Equilateral triangle with sides } x, y, z \}$

$O_2 = \{ \langle x, y, z \rangle : \text{Isosceles triangle with sides } x, y, z \}$

$O_3 = \{ \langle x, y, z \rangle : \text{Scalene triangle with sides } x, y, z \}$

$O_4 = \{ \langle x, y, z \rangle : \text{Not a triangle with sides } x, y, z \}$

The test cases are:

Test-case	x	y	z	Expected Output
1	50	50	50	Equilateral
2	50	50	99	Isosceles
3	100	99	50	Scalene
4	50	100	50	Not a triangle

10

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Example : Equivalence Class Testing

Input domain based classes are:

$I_1 = \{x: x < 1\}$

$I_2 = \{x: x > 100\}$

$I_3 = \{x: 1 \leq x \leq 100\}$

$I_4 = \{y: y < 1\}$

$I_5 = \{y: y > 100\}$

$I_6 = \{y: 1 \leq y \leq 100\}$

$I_7 = \{z: z < 1\}$

$I_8 = \{z: z > 100\}$

$I_9 = \{z: 1 \leq z \leq 100\}$

11

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Example : Equivalence Class Testing

Some inputs domain test cases can be obtained using the relationship amongst x,y and z.

$I_{10} = \{ \langle x, y, z \rangle : x = y = z \}$

$I_{11} = \{ \langle x, y, z \rangle : x = y, x \neq z \}$

$I_{12} = \{ \langle x, y, z \rangle : x = z, x \neq y \}$

$I_{13} = \{ \langle x, y, z \rangle : y = z, x \neq y \}$

$I_{14} = \{ \langle x, y, z \rangle : x \neq y, x \neq z, y \neq z \}$

$I_{15} = \{ \langle x, y, z \rangle : x = y + z \}$

$I_{16} = \{ \langle x, y, z \rangle : x > y + z \}$

$I_{17} = \{ \langle x, y, z \rangle : y = x + z \}$

$I_{18} = \{ \langle x, y, z \rangle : y > x + z \}$

$I_{19} = \{ \langle x, y, z \rangle : z = x + y \}$

$I_{20} = \{ \langle x, y, z \rangle : z > x + y \}$

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Example : Equivalence Class Testing

Test cases derived from input domain are:

Test case	x	y	z	Expected Output
1	0	50	50	Invalid input
2	101	50	50	Invalid input
3	50	50	50	Equilateral
4	50	0	50	Invalid input
5	50	101	50	Invalid input
6	50	50	50	Equilateral
7	50	50	0	Invalid input
8	50	50	101	Invalid input
9	50	50	50	Equilateral
10	60	60	60	Equilateral
11	50	50	60	Isosceles
12	50	60	50	Isosceles
13	60	50	50	Isosceles

13 (Contd.)...

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Example : Equivalence Class Testing

Test case	x	y	z	Expected Output
14	100	99	50	Scalene
15	100	50	50	Not a triangle
16	100	50	25	Not a triangle
17	50	100	50	Not a triangle
18	50	100	25	Not a triangle
19	50	50	100	Not a triangle
20	25	50	100	Not a triangle

14

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Example : Equivalence Class Testing

Test cases derived from input domain are:

Test case	X	y	z	Expected Output
1	0	50	50	Invalid input
2	101	50	50	Invalid input
3	50	50	50	Equilateral
4	50	0	50	Invalid input
5	50	101	50	Invalid input
6	50	50	0	Invalid input
7	50	50	101	Invalid input
8	0	0	50	Invalid input
9	0	50	50	Invalid input
10	50	0	0	Invalid input
11	101	101	50	Invalid input
12	101	50	101	Invalid input
13	50	101	101	Invalid input

15 (Contd.)...

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Example : Equivalence Class Testing

Test cases derived from input domain are:

Test case	x	y	z	Expected Output
14	0	101	50	Invalid input
15	101	0	50	Invalid input
16	0	50	101	Invalid input
17	101	50	0	Invalid input
18	50	0	101	Invalid input
19	50	101	0	Invalid input
20	0	101	101	Invalid input
21	101	0	101	Invalid input
22	101	101	0	Invalid input
23	101	0	0	Invalid input
24	0	101	0	Invalid input
25	0	0	101	Invalid input
26	0	0	0	Invalid input
27	101	101	101	Invalid input

16
(Contd.)...

Example : Equivalence Class Testing

Test case	x	y	z	Expected output
28	60	60	60	Equilateral
29	50	50	60	Isosceles
30	50	60	50	Isosceles
31	60	50	50	Isosceles
32	100	99	100	Scalene
33	100	50	50	Not a triangle
34	100	50	25	Not a triangle
35	50	100	50	Not a triangle
36	50	100	25	Not a triangle
37	50	50	100	Not a triangle
38	25	50	100	Not a triangle

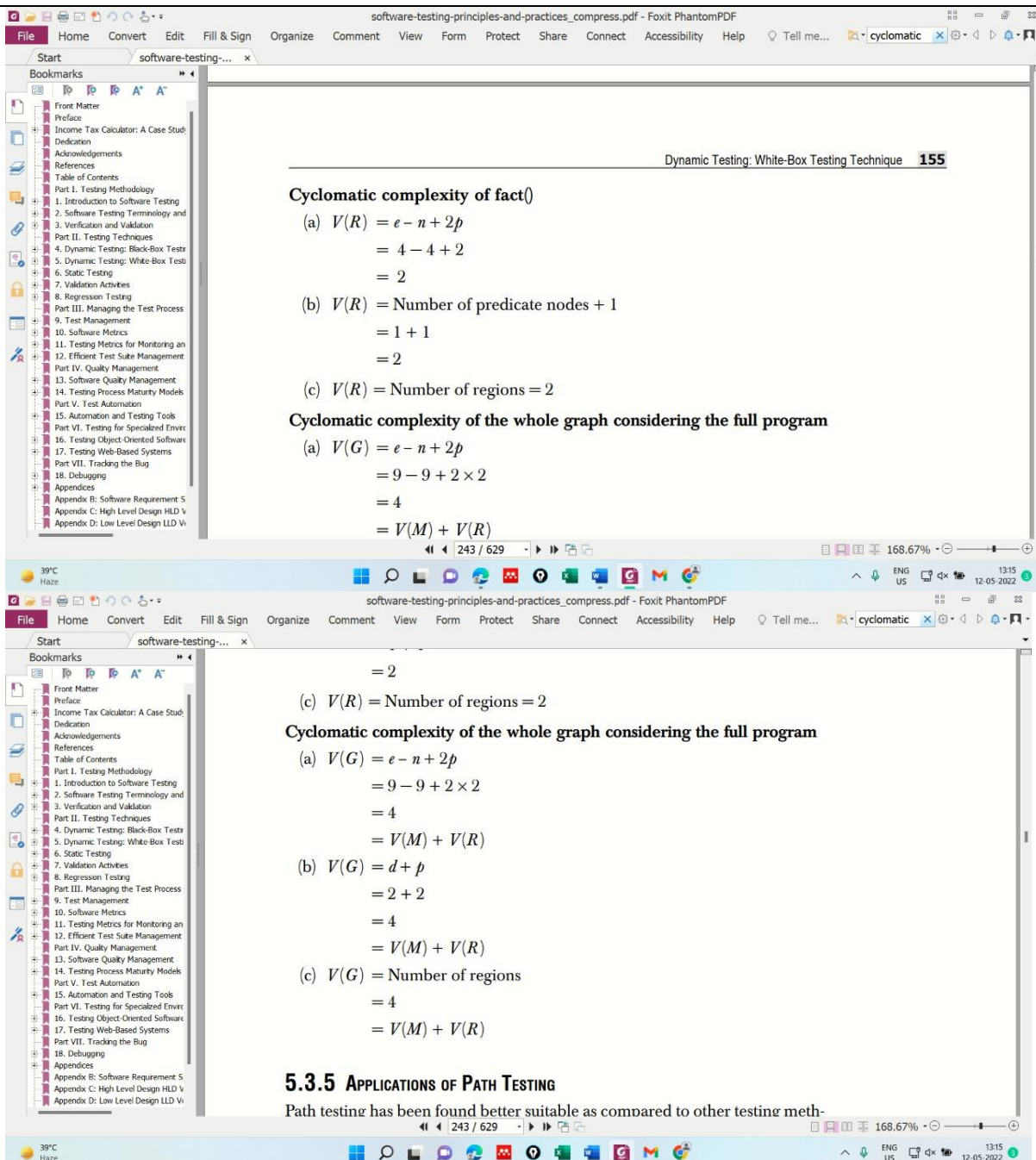
17

OR

Consider the following program for calculating the factorial of a number. It consists of main() program and the module fact(). Calculate cyclomatic complexity for main() and fact() and then the cyclomatic complexity for the whole program. Determine test cases from independent paths for the program.

```
main()
{ int number;
  int fact();
  clrscr();
  printf("enter the number whose factorial is to be found out");
  scanf("%d", & number);
  if (number < 0)
    printf("factorial cannot be defined for this number");
  else
    printf("factorial is %d", fact(number)); }
int fact( int number )
{ int index;
  int product=1;
  for ( index=1; index<=number; index++)product=product*index;
  return(product); }
```

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Diagnose the need of software maintenance. Describe its types with examples.

OR

Differentiate between Software Re- Engineering and Reverse Engineering in detail. Also explain how software versions are controlled

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