

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), May 2019

B. Tech. in Computer Science & Engg. (CSE)/CSE-IBM, Semester VI

Roll No.....

CSE 604: Software Engineering

Time: 2 hours

Max. Marks: 40

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Assume suitable data wherever required and mention it clearly.
 3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
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Q.1 Draw the structure chart for the following program: 05

```
main ()
{
    int x, y;
    x=0; y=0;
    a (); b();
}
a ()
{
    x=x+y;
    y=y+5;
}
b ()
{ x=x+5; y=y+x;
  a ();
}
```

How would you modify this program to improve the modularity?

Q.2 Define the steps to analyze and design Object Oriented System. Consider the process of ordering a pizza over the phone. Draw an activity diagram representing each step of the process, from the moment you pick up the phone to the point where you start eating the pizza. Do not represent any exceptions. Include activities that others need to perform. 05

Q.3 An application has the following: 05

10 low external inputs, 12 high external outputs, 20 low internal logical files, 15 high external interface files, 12 average external inquiries, and a value of complexity adjustment factor of 1.10. What are the unadjusted and adjusted function point counts?

[Note: EI:3(low), 4(Average), 6(High), EO:4(low), 5(Average), 7(High), EQ:3(low), 4(Average), 6(High), ILF:7(low), 10(Average), 15(High), EIF:5(low), 7(Average), 10(High)].

Q.4 Consider a program for determining the day of the week. Its input is a triple of day, month and year with the values in the range 05
 $1 \leq \text{month} \leq 12$
 $1 \leq \text{day} \leq 31$
 $1900 \leq \text{year} \leq 2058$
 The possible outputs would be day of the week or invalid input date. Design the boundary value test cases.

Q.5 Consider a program as given below for the classification of a triangle. Its input is a triple of positive integers (say a,b,c) from the interval [1,100]. The output may be [Scalene, Isosceles, Equilateral, Not a triangle]. 10
 Draw the flow graph & DD Path graph. Also find the independent paths from the DD Path graph.

```
#include <stdio.h>
#include <conio.h>
1  int main()
2  {
3      int a,b,c,validInput=0;
4      printf("Enter the side 'a' value: ");
5      scanf("%d",&a);
6      printf("Enter the side 'b' value: ");
7      scanf("%d",&b);
8      printf("Enter the side 'c' value:");
9      scanf("%d",&c);
10     if ((a > 0) && (a <= 100) && (b > 0) && (b <= 100) && (c > 0)
        && (c <= 100)) {
11         if ( (a + b) > c) && ((c + a) > b) && ((b + c) > a)) {
12             validInput = 1;
13         }
14     }
15     else {
16         validInput = -1;
17     }
18     If (validInput==1) {
19         If ((a==b) && (b==c)) {
20             printf("The trinagle is equilateral");
21         }
22         else if ( (a == b) || (b == c) || (c == a) ) {
23             printf("The triangle is isosceles");
24         }
25         else {
26             printf("The trinagle is scalene");
27         }
28     }
29     else if (validInput == 0) {
30         printf("The values do not constitute a Triangle");
31     }
32     else {
33         printf("The inputs belong to invalid range");
34     }
35     getch();
36     return 1;
37 }
```

Q.5 A software has to be developed for automating the manual library of a University. The system should be stand alone in nature. It should be designed to provide functionality's as explained below: 10

Issue of Books:

- A student of any course should be able to get books issued.
- Books from General Section are issued to all but book bank books are issued only for their respective courses.
- A limitation is imposed on the number of books a student can issue.
- A maximum of 4 books from book bank and 3 books from general section is issued for 15 days only.
- The software takes the current system date as the date of issue and calculates date of return.
- A bar code detector is used to save the student as well as book information.
- The due date for return of the book is stamped on the book.

Return of Books:

- Any person can return the issued books.
- The student information is displayed using the bar code detector.
- The system displays the student details on whose name the books were issued as well as the date of issue and return of the book.
- The system operator verifies the duration for the issue.
- The information is saved and the corresponding updating take place in the database

Query Processing:

The system should be able to provide information like:

- Availability of a particular book.
- Availability of book of any particular author.
- Number of copies available of the desired book.

The system should also be able to generate reports regarding the details of the books available in the library at any given time. The corresponding printouts for each entry (issue/return) made in the system should be generated. Security provisions like the login authenticity should be provided. Each user should have a user id and a password. Record of the users of the system should be kept in the log file. Provision should be made for full backup of the system.

From the above problem description design the following:

- Use cases
- Use case diagram
- Sequence diagrams for login, issue book.

- Q.6 Draw a flowchart describing the code inspection process. Identify the types of defects that you would be able to detect during the following: 05
- Code inspection
 - Code walkthrough
- Q.7 Assume that a system for simple student registration in a course is planned to be developed and its estimated size is approximately 10,000 lines of code. The organization is proposed to pay 25,000/- per month to software engineers. Compute the development effort, development time, average staff size, productivity and the total cost for product development. 05
- (Note: **Organic:** $a_b = 2.4$, $b_b = 1.05$, $c_b = 2.5$, $d_b = .38$; **Semidetached:** $a_b = 3.0$, $b_b = 1.12$, $c_b = 2.5$, $d_b = .35$; **Embedded:** $a_b = 3.6$, $b_b = 1.20$, $c_b = 2.5$, $d_b = .32$)