Question Paper

Exam Date & Time: 25-Jan-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH. (INFORMATION TECHNOLOGY) EXAMINATIONS - JAN/FEB 2023
SUBJECT : ICT 2155 - OBJECT ORIENTED PROGRAMMING
(MAKEUP)

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

1A) Assume that a bank maintains two kinds of accounts for the customers namely Savings account and Current account. The savings account provides compound interest and withdrawal facilities but no Cheque book facility. The current account provides Cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Write an object oriented program in java using inheritance concept. Use suitable methods and constructors. Write the main method to demonstrate the following: (5)
i) Accept an amount to deposit from a customer and update the balance
ii) Display the balance
iii) Compute deposit interest
iv) Permit withdrawal and update the balance
v) Check for the minimum balance, impose penalty and update the balance.

1B) How do you solve instance variable hiding problem with this and super keyword? Discuss with code snippets. (3)

1C) Write the output of the following code snippet. (2)

```
class examset1
{
  public static void main(String args[])
{
   int x1=0,y1=0,z1=1;
    x1=(++x1 + y1--) * z1++;
   System.out.println(x1);
   System.out.println(z1); }
}
```

2A) Create a class Compute with a method Sum(String part) which performs a summation of the array elements. The part parameter specifies the summation of an array's first half or second half. Create two child threads, where the first thread computes the summation of the first half, and the second child performs the summation of the second half of an array of elements. The main thread computes the total sum obtained from each child thread and displays it. Write a multithreaded program to perform the above operation. Assume a square matrix. (5)
Note: If n is the order of matrix, then $n^2/2$ number of elements will be first half.

2B) Given an integer array nums, return all the triplets [nums[i], nums[j], nums[k]] such that i != j, i != k, and j != k, and nums[i] + nums[j] + nums[k] == 0. (3)
Notice that the solution set must not contain duplicate triplets.

Example 1:
Input: nums = [-1,0,1,2,-1,-4]
Output: [[-1,-1,2],[-1,0,1]]
Explanation:
nums[0] + nums[1] + nums[2] = (-1) + 0 + 1 = 0.
nums[1] + nums[2] + nums[4] = 0 + 1 + (-1) = 0.
nums[0] + nums[3] + nums[4] = (-1) + 2 + (-1) = 0.
The distinct triplets are [-1,0,1] and [-1,-1,2].
Notice that the order of the output and the order of the triplets does not matter.
Example 2:
Input: nums = [0,1,1]
Output: []
Explanation: The only possible triplet does not sum up to 0.
Example 3:
Input: nums = [0,0,0]
Output: [[0,0,0]]
Explanation: The only possible triplet sums up to 0.

2C) Write the suitable missing statements in the following code snippet to get the below output. (2)

Output :
Reg is 100
name is Raj
Emp is 200
name is Tom
Objcount is 12

```
class Person {
   static int Objcount = 10;
   String name ;
   Person(){  }
void get(String val){ name= val; }
void disp(){ System.out.println(" name is " + name ); }
}

class Student extends Person {
   int regno = 100;
   void disp(){
      System.out.println("Reg is "+ regno);
}
}
class Employee extends Person{
   int empid = 200;
   void disp(){
      System.out.println("Emp is "+ empid);
}
}

class demo
{
public static void main(String args[])  {
   Person  obj = new Student();
   obj.get("Raj");
   obj.disp();
   obj = new Employee();
   obj.get("Tom");
   obj.disp();
   System.out.println("Objcount is "+ obj.Objcount);
 }
}
```

3A)	Create a class Student with data members name, mark, and Id. Use a suitable constructor to initialize the student object. Write a program to write five student objects into a student.txt file. Also, read the contents of the student.txt file and display only the student with more than 80 marks.	(5)
3B)	Write a multi-threaded program to do the following: a) Write thread writes 5 strings to a file - "Stringfile2.txt" b) Read thread reads "Stringfile2.txt" and displays the String with maximum number of characters and minimum number of characters among 5 strings. c) The main thread accepts 5 strings and display the 3 character words present in strings.	(3)
3C)	Write the output of the following code snippets and Justify your answer.	(2)

```
class Counter
        { static int a=25; int b=10,c;
                Counter() {c =a-b; a++; b++;}
                void disp(){ System.out.println(c); }}
        class prg4{
        public static void main(String args[]) {
        Counter d1 = new Counter();
        Counter d2 = new Counter();
        d2.disp();
        Counter d3 = new Counter();d3.disp();}}
```

4A) Write a program which reads the integer value (in the range of 1-100). During the process of reading, if a user enters a value other than the range, then it will throw **IllegalArgumentException** exception. On the occurrence of such an exception, your program should print "You entered invalid range." If there is no such exception it will print the square root of the value. (5)

4B) Write a Java program with a class Cyclist having the information about cyclistID, name, and activityDuration in minutes. Create an array of Cyclist class objects, pass it to a method called void displayActivists(Cyclist[]) which prints the details of the longest activity in hours and minutes for each cyclist.
Note: Consider a minimum of three cyclists for this program. (3)

4C) What will be the output of the following program. Give reasons. (2)

```
class MyThread extends Thread
{
   MyThread()
   {
      System.out.print(" MyThread");
   }
   public void run()
   {
      System.out.print(" Running");
   }
   public void run(String s)
   {
      System.out.println(" Running "+s);
   }
}
public class Test
{
   public static void main (String [] args)
   {
      Thread t = new MyThread()
      {
         public void run()
         {
            System.out.println(" Walking");
         }
      };
      t.start();
   }
}
```

5A) Create a swing GUI application to compute string comparison operation. Your GUI contains separate text fields for receiving two string inputs and output in the third text box which will display (5)

either "Text boxes has same strings" in case of equal, else display "Strings are different". Your program should display the result when the user presses a button.

5B) Analyze the following program and complete the program as per the instructions given in the comment section. (3)

```
Class Student
{
 //Overridden method
 void display()
{
System.out.println("Student class method");
 }
}
class Dayscholar extends Student
{
 //Overriding method
 void display()
{
System.out.println("Dayscholar class method");
 }
 void printMsg()
{
/*call the display() method defined in Student class*/

}
 public static void main(String args[])
   {
/*Create an instance of subclass and call all the possible methods of
Dayscholar class and Student class*/
      }
    }
```

5C) Write a sample code to demonstrate how do wrapper classes are used in Java programming. (2)

-----End-----