# Question Paper

**MANIPAL INSTITUTE OF TECHNOLOGY**
MANIPAL
*(A constituent unit of MAHE, Manipal)*

III SEMESTER B.TECH END SEMESTER EXAMINATIONS, MARCH 2021

**OBJECT ORIENTED PROGRAMMING [CSE 2154]**

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

**A**

**Answer all the questions.**

| | | | |
|---|---|---|---|
| 1) | A) | Define two classes A and B each having one integer private data member. Write zero argument and parameterized constructors to initialize the data member and member functions to get, set and display the data member for these classes. Write a swap( ) function which takes the 2 arguments as class A and class B objects and exchanges the data members of these two objects. Write a main function which creates instances of the classes A and B, assigns values to each and swaps the value of data member of these objects using the swap ( ) function. Display the objects before and after swapping. | (5) |
| | B) | A company pays its employees on a weekly basis. The employees are of three types: i) Salaried employees are paid a fixed weekly salary regardless of the number of hours worked, ii) hourly employees are paid by the hour and receive overtime pay (i.e., 1.5 times their hourly salary rate) for all hours worked in excess of 40 hours, iii) commission employees are paid a percentage of their sales. Design the class hierarchy, include the constructors in each class with appropriate instance variables, make the instance variables private and method to print the employee name and salary. Declare the **overtime pay** and **commission to be paid** as static data members under respective classes. Write a test class to show all the functionalities. Use dynamic method dispatch. | (3) |
| | C) | Write a java program to display LCM of two given numbers. | (2) |
| 2) | A) | (i) What are the three main principles of object-oriented programming? Explain <br><br> (ii) Write a method isSorted() that uses a for loop to check whether the integer array argument is sorted from smallest to largest or not. Use a main method to check whether the given integer array is sorted or not by calling isSorted(). | (5) |
| | B) | Distinguish between Method overriding and Method overloading with appropriate example program. | (3) |
| | C) | What is an abstract class? Why do we need abstract classes? How an interface is different from abstract class? | (2) |
| 3) | A) | Write any two differences between the keyword "throw" and "throws". Write a Java program that prompts the user to enter a number to use as an array size, and then attempt to declare an array using the entered size. If the array is created successfully, display an appropriate message. Java generates a User defined exception namely Check if you attempt to create an array with a negative size. Use a catch block that executes if the array size is negative, displaying a message IncorrectArraySizeException that indicates the array was not created. | (5) |
| | B) | Write any three differences between sleep() and wait() methods in Java. | (3) |
| | C) | What happens when the following lines are compiled? Give reasons for your answer. <br><br> A. public class MyException< T> extends Exception {} | (2) |

B.

```
public class MyClass< T>
{
static T x;
T a[];
MyClass( T a1[], T x1,)
{ a=a1;
x=x1;
}
}
```

4)    Write a program to implement **Generic Doubly Linked List** with the following specification.    (5)

A)

    a. **Node** class with zero argument and parameterized constructors

    b. **DLL** class with the following methods

     i. InsertAtFront which takes an item to be inserted as parameter

     ii. removeAtRear which returns an item removed from the list

     iii. traverseFromEnd which displays the items of the list from the end

    c. DLLDemo class with main method to use the generic class created with Integer and Double types

B)    Explain the Javafx ListView control's constructor and methods. Write the code for creating a ListView with items("Train", "Car", "Airplane" ).    (3)

C)    Show the two different ways in which the synchronized keyword can be used to write concurrent parts of the applications to protect shared resources with appropriate syntax.    (2)

5)    Create a javafx application to perform the operation selected in the combo box (ADD, SUBTRACT, MULTIPLY, DIVIDE) and print the result in the label for the numbers entered by the user in 2 textfields. The UI is as shown in the figure 13.1. Use the controls- labels, textfields, button and a combo box. Write the complete program with import statements.    (5)
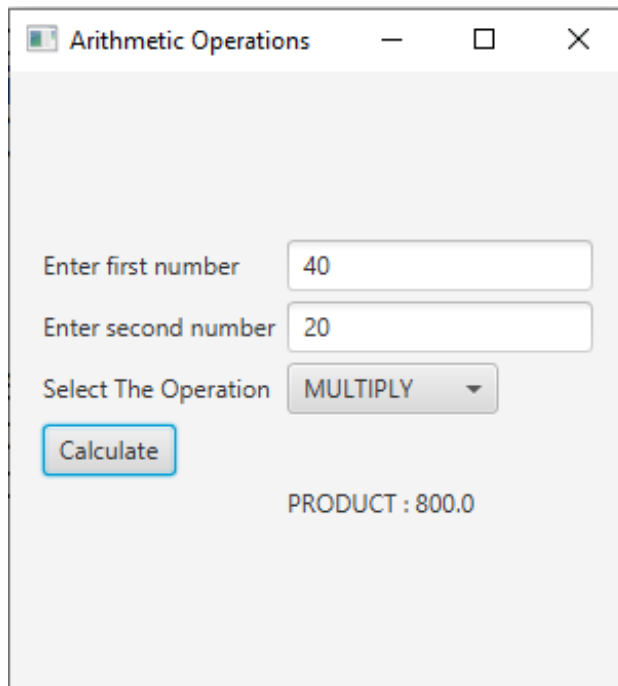
A)

Figure 13.1

B)    List any four rules for Numeric Types of CERT Oracle Secure Coding Standard for Java and explain  (3)
      any one with noncompliant code and compliant solution.

C)    List any two rules for Methods of CERT Oracle Secure Coding Standard for Java and explain any      (2)
      one with noncompliant code and compliant solution.

-----End-----