

Group A

1. Which feature of OOP indicates code reusability?
 - a) Abstraction
 - b) Polymorphism
 - c) Encapsulation
 - d) **Inheritance**
2. Which of the following is not an access modifier?
 - a) **Abstract**
 - b) Public
 - c) Private
 - d) Protected
3. Encapsulation is a way of combining both data members and member functions, which operate on those data members, into a single unit. We call it a class in OOP generally. This feature have helped us modify the structures used in C language to be upgraded into class in JAVA and other languages. Show the process encapsulation in JAVA.

```
import java.util.*;
public class Memberfunctions{
    private int data; //data is an instance variable
    public int getData(){//using get method
        return data;
    }
    public void setData(int data){ //using set method
        this.data=data;
    }
}
```

```
import java.util.*;
public class Memberfunction18{
    public static void main(String[] args){
        Memberfunctions n=new Memberfunctions();
        //setting value of data
        n.setData(121);
        System.out.println("the data is: " + n.getData());
    }
}
```

Output:

```
the data is: 121
```

Group B

1. Create a class named 'Student' with String variable 'name' and integer variable 'roll_no'. Assign the value of roll_no as '2' and that of name as "John" by creating an object of the class Student.

```
class Student{
    String name;
    int roll_no;
    public static void main(String[] args){
        Student stud=new Student();
        stud.name="John";
        stud.roll_no=2;
        System.out.println("Name: "+stud.name);
        System.out.println("Roll no: "+stud.roll_no);
    }
}
```

Output:

Name: John
Roll no: 2

2. A rectangle has the length of 6 centimeters and width 4cm. Create a method each to print the area and perimeter of the given rectangle.

```
import java.util.*;
class Rectangle{
    public int rectangle (int l, int b){
        int Area = l*b;
        return Area;
    }
    public int rectangle1 (int l, int b){
        int Perimeter = 2*(l+b);
        return Perimeter;
    }
    public static void main(String[] args){
        Rectangle rec=new Rectangle();
        int Area1=rec.rectangle(6, 4);
        int Perimeter1=rec.rectangle1(6, 4);
        System.out.println("the area is: "+Area1);
        System.out.println("the perimeter is: "+Perimeter1);
    }
}
```

Output:

the area is: 24
the perimeter is: 20

3. Write a program to print the simple interest by creating a class named "Savings" taking the values of its Principle, Time and Rate as parameters of a method named "Interest".

```
import java.util.*;
class Savings{
    public int Interest(int p, int t, int r){
        int SI=(p*t*r)/100;
        return SI;
    }
    public static void main(String[] args){
        Savings sav=new Savings();
        System.out.println("the simple interest is: "+sav.Interest(2000,6,12));
    }
}
```

Output:

the simple interest is: 1440

Group C

1. Write a program to find the sum of three numbers. Create a method findSum() of integer return type to print the sum.

```
import java.util.*;
class Sum{
    public int findSum(int n, int a, int o){
        int sum=n+a+o;
        return sum;
    }
    public static void main(String[] args){
        Sum ad=new Sum();
        System.out.print("the sum is: "+ad.findSum(2, 4, 6));
    }
}
```

Output:

the sum is: 12

2. Write the program to find the average of three input numbers by using a method returning a double value.

```
import java.util.*;
public class Average{
    public double Average(int r, int u, int e){
        double Average=(double) (r+u+e)/3;
        return Average;
    }
    public static void main(String[] args){
        Average ave=new Average();
        System.out.println("the Average is: " +ave.Average(3, 5, 7));
    }
}
```

Output:

the Average is: 5.0

3. Create a class named 'Employee' having the following members:

Data members:

- Name
- Age
- Phone number
- Address
- Salary

It also has a method named 'printSalary' which prints the salary of the members. Now, assign name, age, phone number, address and salary to an employee by making an object of both of these classes and print the same.

```
import java.util.*;
public class Employee{
    public int printSalary(){
        int Salary=1800;
        return Salary;
    }
    String name, address;
    int age;
    long phone;
    public static void main(String[] args){
        Employee emp=new Employee();
        emp.name="Martha";
        emp.address="Bhimphedi, Hetauda";
        emp.age=28;
        emp.phone=9845328562L;//for large value
        System.out.println("Employer's name: "+emp.name);
        System.out.println("Employer's age: "+emp.age);
        System.out.println("Employer's phone number: "+emp.phone);
        System.out.println("Employer's address: "+emp.address);
        System.out.println("Employer's Salary: "+emp.printSalary());
    }
}
```

Output:

```
Employer's name: Martha
Employer's age: 28
Employer's phone number: 9845328562
Employer's address: Bhimphedi, Hetauda
Employer's Salary: 1800
```

Group D

1. Create a simple calculator program using java OOP.

- Take two non-zero inputs.
- Create a method to print sum, difference, product and quotient.
- Ask the user to choose between options (1-4) for sum, difference, product and divide operations.
- Give the user choice of another operation.

```

import java.util.*;
public class Calculator{
    public static void main(String[] args){
        Scanner cal=new Scanner(System.in);
        System.out.println("enter 2 non-zero inputs= ");
        int num1=cal.nextInt();
        int num2=cal.nextInt();
        while(num1>=0 && num2>=0){
            System.out.println("the sum is: "+findSum(num1, num2));
            System.out.println("the difference is: "+findDifference(num1, num2));
            System.out.println("the product is: "+findProduct(num1, num2));
            System.out.println("the quotient is: "+findQuotient(num1, num2));
            System.out.println("enter another 2 non-zero inputs= ");
            num1=cal.nextInt();
            num2=cal.nextInt();
        }
        System.out.println("Calculator stopped due to immersable value.");
    }
    public static int findSum(int num1, int num2){
        int Sum=num1+num2;
        return Sum;
    }
    public static int findDifference(int num1, int num2){
        int Difference=num1-num2;
        return Difference;
    }
    public static int findProduct(int num1, int num2){
        int Product=num1*num2;
        return Product;
    }
    public static double findQuotient(int num1, int num2){
        double Quotient=(double) num1/num2;
        return Quotient;
    }
}

```

Output:

```
enter 2 non-zero inputs=
77
32
the sum is: 109
the difference is: 45
the product is: 2464
the quotient is: 2.40625
enter another 2 non-zero inputs=
23
0
the sum is: 23
the difference is: 23
the product is: 0
the quotient is: Infinity
enter another 2 non-zero inputs=
0
0
the sum is: 0
the difference is: 0
the product is: 0
the quotient is: NaN
enter another 2 non-zero inputs=
```