SHRI VILEPARLE KELAVANI MANDAL'S
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC ACCREDITED with "A" GRADE (CGPA : 3.18)

Object Oriented Programming using Java Laboratory (DJS22FEL22)

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5. To implement class with members and methods (static, non-static, recursive and overloaded methods)

a. WAP to find value of y using recursive function, where y=x^n

Code:

Expriment5A.java > ...

```java
import java.util.Scanner;

public class Expriment5A {

    Run | Debug
    public static void main(String[] args) {
        System.out.println(x: "Enter a base and an exponent: ");
        Scanner sc = new Scanner(System.in);
        int base = sc.nextInt();
        int pow = sc.nextInt();

        System.out.println("Result of " + base + "^" + pow + " is " + power(base, pow));
    }

    private static int power(int x, int n) {
        if(n == 0) return 1;
        return x * power(x,n-1);

    }
}

```

Output:

```
Enter a base and an exponent:
40 2
Result of 40^2 is 1600
PS C:\60003220216Sujal\Expriment5>
```

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b. WAP to display area of square and rectangle using the concept of overloaded functions.

Code:

Expriment5B.java > Expriment5B > main(String[])

```java
import java.util.Scanner;

public class Expriment5B {
    Run | Debug
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println(x: "Enter side, l,b:");
        int side = sc.nextInt();

        int l = sc.nextInt();
        int b = sc.nextInt();

        int areaSquare = area(side);
        int recSquare = area(l,b);

        System.out.println("Area of Square: "+ areaSquare);
        System.out.println("Area of Rectangle: "+ recSquare);
    }

    private static int area(int side){
        return side * side;
    }

    private static int area(int length, int bredth){
        return length * bredth;
    }
}

```

Output:

```
Enter side, l,b:
40 5  50
Area of Square: 1600
Area of Rectangle: 250
PS C:\60003220216Sujal\Expriment5>
```

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WAP to perform mathematical operations on 2 complex numbers by passing and returning object as argument

Code:

Expriment5C.java > Expriment5C > main(String[])

```
1   class Complex {
2
3     public double x;
4     public double y;
5
6     Complex(double x, double y) {
7       this.x = x;
8       this.y = y;
9     }
10
11    public static Complex add(Complex first, Complex second) {
12      return new Complex(first.x + second.x, first.y + second.y);
13    }
14
15    public static Complex sub(Complex first, Complex second) {
16      return new Complex(first.x - second.x, first.y - second.y);
17    }
18
19  }
20
21  public class Expriment5C {
22
        Run | Debug
23    public static void main(String[] args) {
24      Complex c1 = new Complex(x: 3,y: 0.3);
25      Complex c2 = new Complex(-2,y: 5.6);
26
27      Complex c3 = Complex.add(c1, c2);
28      Complex c4 = Complex.sub(c1, c2);
29
30
31      System.out.println("Add result {X: " + c3.x + ", Y:" + c3.y + "}" );
32      System.out.println("Sub result {X: " + c4.x + ", Y:" + c4.y + "}" );
33
34
35    }
36  }
37
```

Output:

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```
PS C:\60003220216Sujal\Expriment5>  & 'C:\Prog
\workspaceStorage\673788ba3d62fc660482f3083735
Add result {X: 1.0, Y:5.8999999999999995}
Sub result {X: 5.0, Y:-5.3}
PS C:\60003220216Sujal\Expriment5>
```

WAP to count the number of objects made of a particular class using static variable and static method to display the same.

Expriment5D.java > Expriment5D > main(String[])

```
1   class Counter {
2
3     private static int mCount = 0;
4
5     {
6       mCount++;
7     }
8
9     public static int getCount() {
10      return mCount;
11    }
12  }
13
14  public class Expriment5D {
15
      Run | Debug
16    public static void main(String[] args) {
17      new Counter();
18      new Counter();
19      new Counter();
20      new Counter();
21      new Counter();
22      new Counter();
23
24      System.out.println(Counter.getCount());
25    }
26  }
27
```

Output:

```
AppData\Roaming\Code\User\workspaceStorage\673
6
PS C:\60003220216Sujal\Expriment5>
```

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e. WOOP to arrange the names of students in descending order of their total marks, input data consists of students details such as names, ID.no, marks of maths, physics, chemistry. (Use array of objects)

Code:

Expriment5E.java > Student > chemistryMarks

```java
import java.util.Scanner;

class Student {

  public int id;
  public String name;
  public int mathMarks;
  public int physicsMarks;
  public int chemistryMarks;

  public int total;

  Student(int id, String name, int math, int physics, int chem) {
    this.id = id;
    this.name = name;
    this.mathMarks = math;
    this.physicsMarks = physics;
    this.chemistryMarks = chem;

    this.total = math + physics + chem;
  }
}

public class Expriment5E {

  Run | Debug
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    System.out.println(x: "Enter the size of students:");
    int size = sc.nextInt();
    Student[] students = new Student[size];

    for (int i = 0; i < size; i++) {
      System.out.println(
        x: "Enter a Student details: id, name, math, physics, chemistry "
      );
      students[i] =
        new Student(
          sc.nextInt(),
          sc.next(),
          sc.nextInt(),
          sc.nextInt(),
          sc.nextInt()
        );
    }
```

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```
45
46      for (int i = 0; i < students.length; i++) {
47        for (int j = 0; j < students.length - 1; j++) {
48          if (students[i].total > students[j].total) {
49            Student temp = students[i];
50            students[i] = students[j];
51            students[j] = temp;
52          }
53        }
54      }
55
56      for (Student s : students) {
57        System.out.println(s.id + ":" + s.name + " -> " + s.total);
58      }
59    }
60  }
61
```

Output:

```
Enter the size of students:
6
Enter a Student details: id, name, math, physics, chemistry
1 A 1 2 3
Enter a Student details: id, name, math, physics, chemistry
2 B 2 3 4
Enter the size of students:
3
Enter a Student details: id, name, math, physics, chemistry
1 A 1 2 3
Enter a Student details: id, name, math, physics, chemistry
2 Bb 3 4 5
Enter a Student details: id, name, math, physics, chemistry
3 C 5 6 7
3:C -> 18
2:Bb -> 12
1:A -> 6
```