1.WRITE A JAVA PROGRAM FOR SINGLE DIMENSIONAL ARRAY
PROGRAM:

```
class Testarray
{
   public static void main(String args[])
   {
      int a[]={33,3,4,5};
      for (int i=0;i<a.length;i++)
      {
         System.out.println(a[i]);
      }
   }
}
```

OUTPUT:
33
3
4
5

2.WRITE A JAVA PROGRAM TO CALCULATE AVERAGE MARKS OF 15 STUDENTS.
PROGRAM:
```
import java.util.Scanner;

public class AverageMarks {

   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      int Students = 15;
      int[] marks = new int[Students];
      int totalMarks = 0;

      for (int i = 0; i < Students; i++) {
         System.out.print("Enter marks for student " + (i+1) + ": ");
         marks[i] = scanner.nextInt();
         totalMarks += marks[i];
      }

      float averageMarks = totalMarks / Students;

      System.out.println("Total marks: " + totalMarks);
      System.out.println("Average marks: " + averageMarks);
   }
}
```
OUTPUT:
Enter marks for student 1: 96
Enter marks for student 2: 96
Enter marks for student 3: 90
Enter marks for student 4: 95
Enter marks for student 5: 90
Enter marks for student 6: 92
Enter marks for student 7: 92
Enter marks for student 8: 94
Enter marks for student 9: 95
Enter marks for student 10: 99
Enter marks for student 11: 93
Enter marks for student 12: 91

Enter marks for student 13: 93
Enter marks for student 14: 98
Enter marks for student 15: 97
Total marks: 1411
Average marks: 94.0

3.WRITE A JAVA PROGRAM FOR MATRIX ADDITION

Method 1:
```java
public class MatrixAddition {
    public static void main(String args[]) {
        int i, j;
        int a[][] = {{1, 3, 4}, {2, 4, 3}, {3, 4, 5}};
        int b[][] = {{1, 3, 4}, {2, 4, 3}, {1, 2, 4}};
        int c[][] = new int[3][3];

        for (i = 0; i < 3; i++) {
            for (j = 0; j < 3; j++) {
                c[i][j] = a[i][j] + b[i][j];
            }
        }

        for (i = 0; i < 3; i++) {
            for (j = 0; j < 3; j++) {
                System.out.print(c[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```
OUTPUT:
2 6 8 4 8 6 4 6 9

Method 2:

```java
public class MatrixAddition
{
    public static void main(String args[])
    {
        int i,j;
        int a[][]={{1,3,4},{2,4,3},{3,4,5}};
        int b[][]={{1,3,4},{2,4,3},{1,2,4}};
        int c[][]=new int[3][3];
        for(i=0;i<3;i++)
        {
            for(j=0;j<3;j++)
            {
                c[i][j]=a[i][j]+b[i][j];
                System.out.print(c[i][j]+" ");
            }
        }

    }
}
```

OOPS CONCEPT
4.WRITE A JAVA PROGRAM FOR AREA OF RECTANGLE.
```java
import java.util.*;
public class Rectangle
```

```java
{
    int height,width;
    Rectangle()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter the height of rectangle: ");
        height=s.nextInt();
        System.out.println("Enter the width of rectangle: ");
        width=s.nextInt();
    }
    void cal()
    {
        int result=height*width;
        System.out.println("Area of rectangle= "+result);
    }
    public static void main(String[] arg)
    {
        Rectangle obj=new Rectangle();
        obj.cal();
    }
}
```

OUTPUT:

```
Enter the height of rectangle:
10
Enter the width of rectangle:
5
Area of rectangle= 50
```

5.WRITE A JAVA PROGRAM FOR AREA OF CIRCLE.
```java
import java.util.*;
class Circle
{
    float radius;
    float p=22/7;
    void area() {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the radius:");
        radius= s.nextFloat();

    }
    void cal()
    {
        float result = p*radius*radius;
        System.out.println("Area of circle=" +result);
    }
}
class cir
{
    public static void main(String []arg)
    {
        Circle obj=new Circle();
        obj.area();
        obj.cal();
    }
}
```

OUTPUT:
```
Enter the radius:
6
```

Area of circle=108.0

6.WRITE A JAVA PROGRAM FOR SUM OF SERIES.
```java
import java.util.*;
public class SumofSeries
{
    int n,sum=0;
    void sum()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter a number:");
        n=s.nextInt();
    }
    void cal()
    {
        for(int i=0;i<=n;i++)
        {
            sum=sum+i;
        }
        System.out.println("Sum = "+sum);
    }
    public static void main(String[] arg)
    {
        SumofSeries obj=new SumofSeries();
        obj.sum();
        obj.cal();
    }
}
```

OUTPUT:

Enter a number:
10
Sum = 55

7.WRITE A JAVA PROGRAM FOR AREA OF TRIANGLE.
```java
import java.util.*;
class Triangle
{
    int base,height;
    void area()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter the base of triangle: ");
        base=s.nextInt();
        System.out.println("Enter the height of triangle: ");
        height=s.nextInt();
    }
    void cal()
    {
        int result=base*height*1/2;
        System.out.println("Area of triangle= "+result);
    }
    public static void main(String[] arg)
    {
        Triangle obj=new Triangle();
        obj.area();
        obj.cal();
    }
}
```

OUTPUT:
Enter the base of triangle:

8.WRITE A JAVA PROGRAM TO CALCULATE AREA OF RECTANGLE USING CONSTRUCTOR

```java
import java.util.*;
public class Box
{
    double width,height,depth;
    Box(double w,double h,double d)
    {
        width=w;
        height=h;
        depth=d;
    }
    double volume()
    {
        return width*height*depth;
    }
    public static void main(String[] arg)
    {
        Box obj=new Box(10.5,20.5,30.4);
        double res3=obj.volume();
        System.out.println("result3: "+res3);
    }
}
```

OUTPUT:
result3: 6543.599999999999

Assignment2 (05-10-'23)

1. Implement a class Account. An account has

- a balance

- functions to add

- and withdraw money,

- and a function to inquire about the current balance.

Condition:

1. Pass a value into a constructor to set an initial balance.

2. If no value is passed the initial balance should be set to $0.

3. Charge a $5 penalty if an attempt is made to withdraw more money than is available in the account.

4. Enhance the Account class to compute interest on the current balance.

```java
public class Account {
    double balance;
    double interestRate;

    public Account(double initialBalance) {
        if (initialBalance < 0) {
            System.out.println("Initial balance cannot be negative. Setting balance to $0.");
            balance = 0;
        } else {
            balance = initialBalance;
        }
        interestRate = 0.02;
    }

    public void deposit(double amount) {
        if (amount > 0) {
            balance += amount;
            System.out.println("$" + amount + " deposited successfully.");
        } else {
            System.out.println("Invalid deposit amount. Please enter a positive amount.");
        }
    }

    public void withdraw(double amount) {
        if (amount > 0) {
            if (balance >= amount) {
                balance -= amount;
                System.out.println("$" + amount + " withdrawn successfully.");
            } else {
                System.out.println("Insufficient funds. A $5 penalty will be charged.");
                balance -= 5;
            }
        } else {
            System.out.println("Invalid withdrawal amount. Please enter a positive amount.");
        }
    }

    public double getBalance() {
        return balance;
    }

    public void computeInterest() {
        double interest = balance * interestRate;
        balance += interest;
        System.out.println("Interest of $" + interest + " added to the account.");
    }

    public static void main(String[] args) {
        Account myAccount = new Account(500);
        System.out.println("Initial balance: $" + myAccount.getBalance());
        myAccount.deposit(500);
        myAccount.deposit(100);
        myAccount.withdraw(800);
```

```
        myAccount.withdraw(400);
        myAccount.computeInterest();
        double currentBalance = myAccount.getBalance();
        System.out.println("Current balance: $" + currentBalance);
    }
}
```

OUTPUT:
Initial balance: $500.0
$500.0 deposited successfully.
$100.0 deposited successfully.
$800.0 withdrawn successfully.
Insufficient funds. A $5 penalty will be charged.
Interest of $5.9 added to the account.
Current balance: $300.9

2. Write a class called Triangle that can be used to represent a triangle. It should include the following methods that return Boolean values indicating if the particular property holds:

- isRight (a right triangle)

- isScalene (no two sides are the same length)

- isIsosceles (exactly two sides are the same length)

- isEquilateral (all three sides are the same length)

```
class Triangle {
    private double a;
    private double b;
    private double c;

    public Triangle(double a, double b, double c) {
        this.a = a;
        this.b = b;
        this.c = c;
    }

    private double max(double x, double y, double z) {
        if (x >= y && x >= z) {
            return x;
        } else if (y >= x && y >= z) {
            return y;
        } else {
            return z;
        }
    }

    public boolean isRight() {
        double hypotenuse = max(a, b, c);
        if (hypotenuse == a) {
            return a * a == b * b + c * c;
        } else if (hypotenuse == b) {
            return b * b == a * a + c * c;
        } else {
            return c * c == a * a + b * b;
```

```java
        }
    }

    public boolean isScalene() {
        return a != b && a != c && b != c;
    }

    public boolean isIsosceles() {
        return a == b || a == c || b == c;
    }

    public boolean isEquilateral() {
        return a == b && a == c;
    }
}

public class TriangleTest {
    public static void main(String[] args) {
        Triangle triangle1 = new Triangle(3, 4, 5);
        System.out.println("Is triangle1 a right triangle? " + triangle1.isRight());
        System.out.println("Is triangle1 scalene? " + triangle1.isScalene());
        System.out.println("Is triangle1 isosceles? " + triangle1.isIsosceles());
        System.out.println("Is triangle1 equilateral? " + triangle1.isEquilateral());

        Triangle triangle2 = new Triangle(5, 5, 5);
        System.out.println("Is triangle2 a right triangle? " + triangle2.isRight());
        System.out.println("Is triangle2 scalene? " + triangle2.isScalene());
        System.out.println("Is triangle2 isosceles? " + triangle2.isIsosceles());
        System.out.println("Is triangle2 equilateral? " + triangle2.isEquilateral());
    }
}
```

OUTPUT:
Is triangle1 a right triangle? true
Is triangle1 scalene? true
Is triangle1 isosceles? false
Is triangle1 equilateral? false
Is triangle2 a right triangle? false
Is triangle2 scalene? false
Is triangle2 isosceles? true
Is triangle2 equilateral? True

3. Write a program for matrix multiplication.

Sample Input:

Mat1 =   1 2

           5 3

Mat2 =   2   3

           4   1

Sample Output:

Mat Sum = 10   5

           22   18

```java
import java.util.*;
```

```java
public class mt {

    public static void main(String[] args) {
        int i, j, k,n;
        int a[][] = new int[4][4];
        int b[][] = new int[4][4];
        int c[][] = new int[4][4];
        Scanner s = new Scanner(System.in);
        System.out.println("enter no of rows and column:");
        n=s.nextInt();
        System.out.println("enter the elements of matrix1:");
        for(i=0;i<n;i++)
        {
            for(j=0;j<n;j++)
            {
                a[i][j]=s.nextInt();
            }
        }
        System.out.println("enter the elements of matrix1:");
        for(i=0;i<n;i++)
        {
            for(j=0;j<n;j++)
            {
                b[i][j]=s.nextInt();
            }
        }
        System.out.println("multipled matrix  :");
        for(i=0;i<n;i++)
        {
            for(j=0;j<n;j++)
            {
                c[i][j] = 0;
                for(k=0;k<n;k++)
                {
                    c[i][j]+=a[i][k] * b[k][j];
                }
                System.out.print(c[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

OUTPUT:
enter no of rows and column:
2
enter the elements of matrix1:
1
2
5
3
enter the elements of matrix1:
2
3
4
1
multipled matrix :
10 5
22 18