

# **ASSIGNMENT -1**

## **Java Programming Basics**

**a) Write a program in java to initialize an integer value n and compute  $4096n$  ,  $(1/1024)n$  using shift operator.**

**CODE :-**

```
public class Q1{  
    public static void main(String args[]){  
        int n = 76;  
        int mul = n << 12;  
        int div = n >> 10;  
        System.out.println("4096*" + n + " = " + mul);  
        System.out.println(n + "/1024 = " + div);  
    }  
}
```

**OUTPUT :-**

```
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA  
LAB PROGRAMS\Lab_Assignment_1\" ; if ($?) { javac Q1.java } ; if ($?) { java Q1 }  
4096*76 = 311296  
76/1024 = 0  
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1>
```

**b) Write a program to perform following conversions: i) Reads a number in feet, converts it to meters, ii) Enter the minutes (e.g., 1 billion) and displays the number of years and days for the minutes.**

**CODE :-**

```
import java.util.Scanner;

public class Q2 {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

        System.out.print("Enter a number(in metres) : ");
        double m1 = sc.nextDouble();
        System.out.println("In feet : " + m1 * 0.3048);

        System.out.print("Enter a number(in Minutes) : ");
        double y1 = sc.nextDouble();
        System.out.println("In Days : " + (y1 / (24 * 60)));
        System.out.println("In Years : " + (y1 / (24 * 60 * 365)));

    }

}
```

**OUTPUT :-**

```
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1\" ; if ($?) { javac Q2.java } ; if ($?) { java Q2 }
Enter a number(in metres) : 10
In feet : 3.048
Enter a number(in Minutes) : 525600
In Days : 365.0
In Years : 1.0
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1>
```

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**c) Write a program in java to create and initialize base and height of a triangle and compute its perimeter.**

**CODE :-**

```
public class Q3 {  
    public static void main(String[] args) {  
        double base = 3;  
        double height = 4;  
        double hypotenuse = Math.sqrt((base* base) + (height *  
height));  
        double perimeter = base + height + hypotenuse;  
        System.out.println("The Perimeter of the triangle is : " +  
perimeter);  
    }  
}
```

**OUTPUT :-**

```
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA LAB PR  
OGRAMS\Lab_Assignment_1\" ; if ($?) { javac Q3.java } ; if ($?) { java Q3 }  
The Perimeter of the triangle is : 12.0  
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1>
```

---

**d) Write a java program to apply mod operation for each entry and display multiplication table of modulo n. The example for multiplication table modulo 4 is given below.**

X	0	1	2	3
0	0	0	0	0
1	0	1	2	3
2	0	2	0	2
3	0	3	2	1

**CODE :-**

```
import java.util.Scanner;  
  
public class Q4 {  
  
    public static void main(String[] args) {  
  
        Scanner sc = new Scanner(System.in);  
  
        System.out.print("Enter a number : ");  
  
        int n = sc.nextInt();  
  
        System.out.print("X ");  
  
        for(int i = 0; i < n ; i++){  
  
            System.out.print(i + " ");  
  
        }  
  
        System.out.println("");  
  
        for(int i = 0; i < n ; i++){  
  
            System.out.print(i + " ");  
  
            for(int j = 0 ; j < n ; j++){  
  
                System.out.print(((i * j) % n) + " ");  
  
            }  
  
        }  
  
    }  
  
}
```

```

    }
    System.out.println("");
}
}
}

```

### **OUTPUT :-**

```

PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA LAB PR
OGRAMS\Lab_Assignment_1\" ; if ($?) { javac Q4.java } ; if ($?) { java Q4 }
> Enter a number : 5
X 0 1 2 3 4
0 0 0 0 0
1 0 1 2 3 4
2 0 2 4 1 3
3 0 3 1 4 2
4 0 4 3 2 1
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1>

```

**e) Write a program to input centre and radius of a circle with an arbitrary point and print whether the point is inside, outside, or on the boundary of the circle.**

### **CODE :-**

```

import java.util.Scanner;
public class Q5 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the x and y coordinates of center : ");
        int x1 = sc.nextInt();

```

```
int y1 = sc.nextInt();
System.out.print("Enter the radius : ");
int r = sc.nextInt();
System.out.print("Enter the x and y coordinates of the point : ");
int x2 = sc.nextInt();
int y2 = sc.nextInt();
double dis = Math.sqrt(((y2 - y1) * (y2 - y1)) + ((x2 - x1) * (x2 - x1)));
if(dis < r){
    System.out.println("Point lies inside the circle.");
}
else if(dis == r){
    System.out.println("Point lies on the boundary of the circle.");
}
else if(dis > r){
    System.out.println("Point lies outside the circle.");
}
}
```

**OUTPUT :-**

```

PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA LAB PR
OGRAMS\Lab_Assignment_1" ; if ($?) { javac Q5.java } ; if (?) { java Q5 }
> Enter the x and y coordinates of center : 0 0
Enter the radius : 6
Enter the x and y coordinates of the point : 3 4
Point lies inside the circle.
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1> cd "c:\Users\sujal\OneDrive\De
sktop\JAVA LAB PROGRAMS\Lab_Assignment_1" ; if ($?) { javac Q5.java } ; if (?) { java Q5 }
> Enter the x and y coordinates of center : 0 0
Enter the radius : 5
Enter the x and y coordinates of the point : 3 4
Point lies on the boundary of the circle.
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1> cd "c:\Users\sujal\OneDrive\De
sktop\JAVA LAB PROGRAMS\Lab_Assignment_1" ; if ($?) { javac Q5.java } ; if (?) { java Q5 }
> Enter the x and y coordinates of center : 0 0
Enter the radius : 5
Enter the x and y coordinates of the point : 3 5
Point lies outside the circle.
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1> []

```

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**f) Write a java program to input two vector of length n using array and compute the dot product using for-each loop.**

**CODE :-**

```

import java.util.Scanner;

public class Q6 {

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

        System.out.print("Enter a Number : ");

        int n = sc.nextInt();

        int[] vec1 = new int[n];
        int[] vec2 = new int[n];

        System.out.print("Enter the first vector : ");

        for(int i = 0; i < n ; i++){
            vec1[i] = sc.nextInt();
        }
    }
}

```

```

}

System.out.print("Enter the second vector : ");

for(int i = 0; i < n ; i++){
    vec2[i] = sc.nextInt();
}

int dot_product = 0;

int i = 0;

for(int vec : vec1){

    dot_product += vec * vec2[i];

    i++;
}

System.out.println("The dot product of two vectors is : " +
dot_product);

}
}

```

### **OUTPUT :-**

```

PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA LAB PR
OGRAMS\Lab_Assignment_1" ; if ($?) { javac Q6.java } ; if ($?) { java Q6 }
Enter a Number : 4
Enter the first vector : 1 4 5 7
Enter the second vector : 2 3 5 4
The dot product of two vectors is : 67
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1>

```

**g) Write a program to input endpoints of two lines and display whether two lines are parallel or intersecting each other.**

### **CODE :-**

```
import java.util.Scanner;

public class Q7 {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter the endpoints of the first line : ");

        int x1 = sc.nextInt();

        int y1 = sc.nextInt();

        int x2 = sc.nextInt();

        int y2 = sc.nextInt();

        System.out.println("Enter the endpoints of the second line : ");

        int x3 = sc.nextInt();

        int y3 = sc.nextInt();

        int x4 = sc.nextInt();

        int y4 = sc.nextInt();

        double slope_1, slope_2;

        if(x2 - x1 == 0 && x4 - x3 == 0){

            System.out.println("The two lines are parallel");

        }

        else if(x2 - x1 == 0 || x4 - x3 == 0){

            System.out.println("The two lines are intersecting");

        }

        else{

            slope_1 = (double)(y2 - y1) / (x2 - x1);

            slope_2 = (double)(y4 - y3) / (x4 - x3);

        }

    }

}
```

```

if(slope_1 == slope_2){

    System.out.println("The two lines are parallel");

}

else{

    System.out.println("The two lines are intersecting");

}

}

}

```

### **OUTPUT :-**

```

PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA LAB PR
OGRAMS\Lab_Assignment_1\" ; if ($?) { javac Q7.java } ; if ($?) { java Q7 }
Enter the endpoints of the first line :
1 2 3 4
Enter the endpoints of the second line :
2 4 3 8
The two lines are intersecting
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1>

```

---

**h) Write a program in java to input an integer n and approximate the value of e using formula  $e = 1 + 1/1! + 1/2! \dots + 1/n!$  .**

### **CODE :-**

```

import java.util.Scanner;

public class Q8 {

    public static double factorial(int n){

```

```

        if(n == 0 || n == 1) return 1;
        return n * factorial(n - 1);
    }

    public static double euler(int n){
        if(n == 0) return 1;
        else return (1 / factorial(n)) + euler(n - 1);
    }

    public static void main(String args[]){
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number : ");
        int n = sc.nextInt();
        double val = euler(n);
        System.out.println("The value of e is : " + val);
    }
}

```

## OUTPUT :-

```

PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS> cd "c:\Users\sujal\OneDrive\Desktop\JAVA LAB PR
OGRAMS\Lab_Assignment_1\" ; if ($?) { javac Q8.java } ; if ($?) { java Q8 }
Enter a number : 10
The value of e is : 2.7182818011463845
PS C:\Users\sujal\OneDrive\Desktop\JAVA LAB PROGRAMS\Lab_Assignment_1>

```

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