JAVA DAY – 1 Assignments

Task 1: Data Types/Variables

Write a program that declares two integer variables, swaps their values without using a third variable, and prints the result.

```java
class swap{
    Run | Debug
    public static void main(String[] args){
        int a = 5;
        int b = 10;
        System.out.println("Before swapping \na = " + a);
        System.out.println("b = " + b);

        a = a+b;
        b = a-b;
        a = a-b;

        System.out.println("After swapping \na = " + a);
        System.out.println("b = " + b);

    }
}
```

Task 2: Operators

Create a program that simulates a simple calculator using command-line arguments to perform and print the result of addition, subtraction, multiplication, and division

```java
import java.util.Scanner;
public class simpleCal{
    Run | Debug
    public static void main(String[] args) {
        Scanner sc =new Scanner(System.in);
        System.out.println(x:"Enter the number a");
        double num1 = sc.nextDouble();

        System.out.println(x:"Enter the Operator (+, -, *, /)");
        char op = sc.next().charAt(index:0);

        System.out.println(x:"Enter the number b");
        double num2 = sc.nextDouble();

        double result = 0;

        switch (op) {
            case '+':
                result = num1 + num2;
                break;
            case '-':
                result = num1 - num2;
                break;
            case '*':
                result = num1 * num2;
                break;
            case '/':
                if(num2 != 0){
                    result = num1/num2;
                } else{
                    System.out.println(x:"Division by zero..!");
                    return;
                }
                break;
            default:
                System.out.println(x:"Invalid operator...!");
                return;
        }
        System.out.println("result is: " + result);
    }
}
```

Task 3: Control Flow

Write a Java program that reads an integer and prints whether it is a prime number using a for loop and if statements.

```java
public class prime {
    Run | Debug
    public static void main(String[] args) {
        int n = 6;
        boolean isPrime = true;
        if(n <=1){
            isPrime = false;
        }else{
            for(int i =2; i< n/2; i++){
                if(n % i == 0){
                    isPrime = false;
                    break;
                }
            }
        }
        if(isPrime){
            System.out.println(n + " is a prime number ");
        }
        else
            System.out.println(n + " is not a prime number ");
    }
}
```

Task 4: Constructors

Implement a Matrix class that has a constructor which initializes the dimensions of a matrix and a method to fill the matrix with values.

```java
public class matrix {
    int[][] matrix;

    public matrix(int rows,int cols){
        matrix = new int[rows][cols];
    }
    public void mat(int[][] values) {
        if(values.length != matrix.length || values[0].length != matrix[0].length){
            System.out.println(x:"Do Not match matrix dimensions");
            return;
        }
        for(int i=0; i < matrix.length; i++){
            for(int j=0; j < matrix[0].length; j++){
                matrix[i][j] = values[i][j];
            }
        }
    }
    public void display(){
        for(int i = 0; i< matrix.length; i++){
            for(int j=0; j< matrix[0].length;j++){
                System.out.print(matrix[i][j] + " ");
            }
            System.out.println();
        }
    }
    Run | Debug
    public static void main(String[] args){
        int[][] values = {
            {1,2,3},
            {4,5,6},
            {7,8,9}
        };
        matrix m = new matrix(rows:3, cols:3);
        m.mat(values);
        m.display();
    }
}
```

Task 5: Inheritance

Create a Shape class with a method area ( ) and extend it with Circle and Rectangle classes overriding the area() method appropriately.

```java
class shapes {
    public double area(){
        return 0.0;
    }
}

class circle extends shapes{
    private double radius;
    public circle(double radius){
        this.radius = radius;
    }
    public double area(){
        return Math.PI * radius * radius;
    }
}

class rectangle extends shapes{
    private double width;
    private double height;

    public rectangle(double width, double height){
        this.width = width;
        this.height = height;
    }
    public double area(){
        return width * height;
    }
}

public class shape{
    Run | Debug
    public static void main(String[] args) {
        circle c = new circle(radius:5);
        rectangle r = new rectangle(width:4,height:6);

        System.out.println("Area of a circle " +  c.area());
        System.out.println("Area of rectangle " + r.area());
    }
}
```