Shri Vile Parle 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)

Experiment No 2

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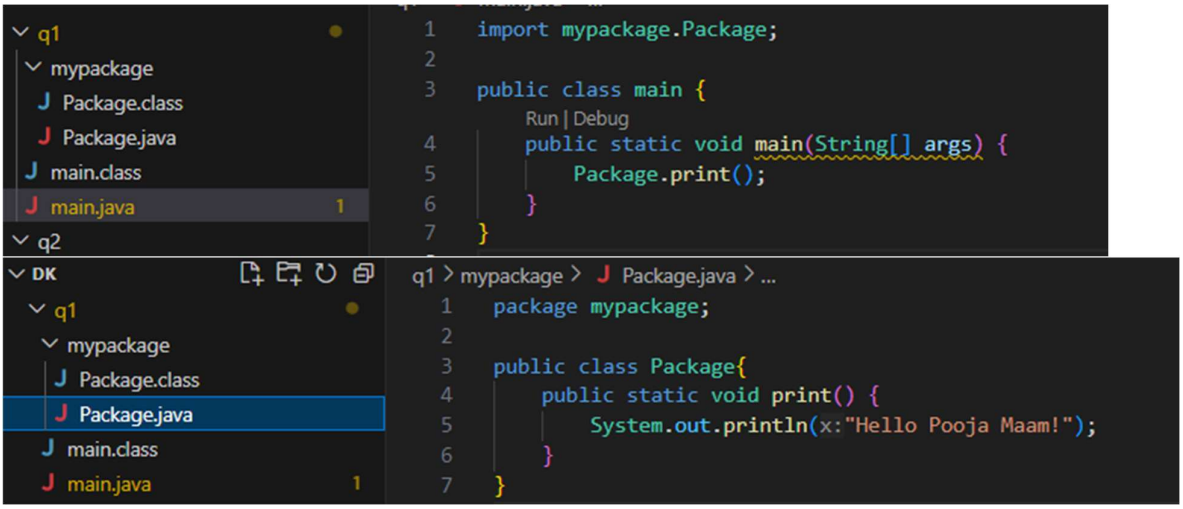
Aim: - Implement Classes, Object and Packages in Java

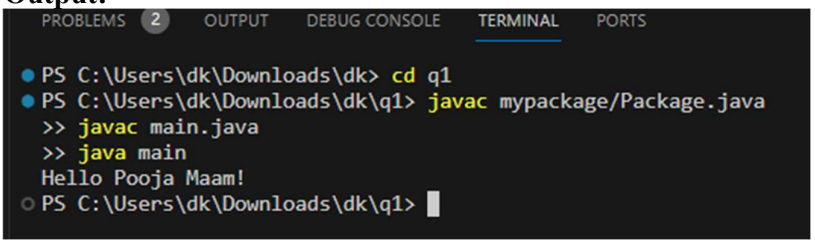
1. **Lab Assignments to complete in this session**

I. Write a Java program to create a user-defined package and function to print a message for the users and import the same package in another program.

Code:



Output:

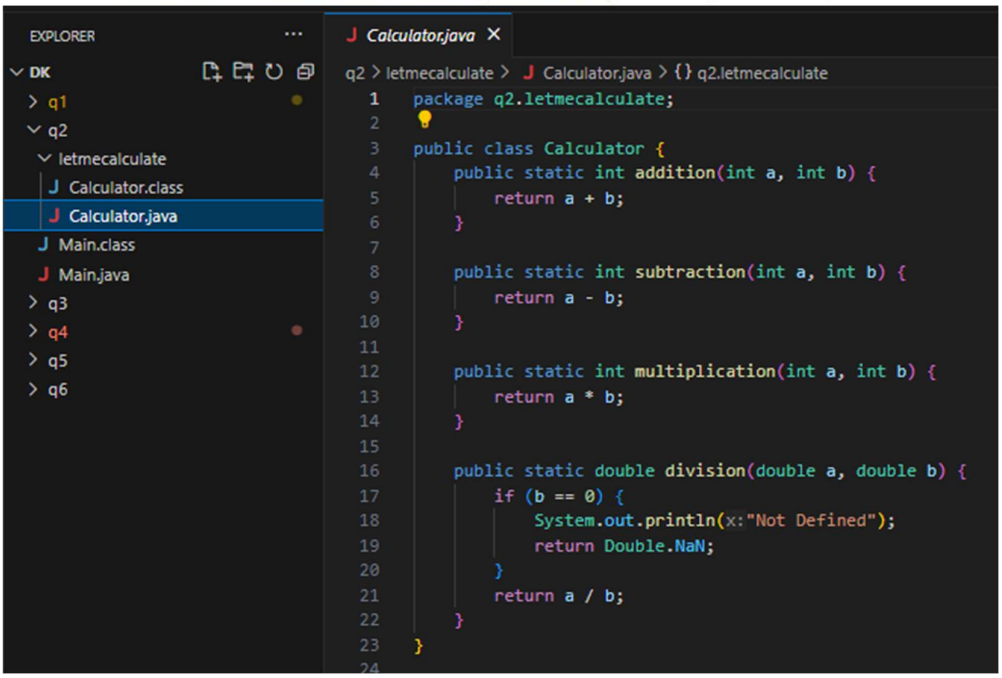


II. Write a java program to create a user-defined package letmecalculate having class calculator and functions addition, subtraction, multiplication, division. Import this package in another program to use the class calculator.

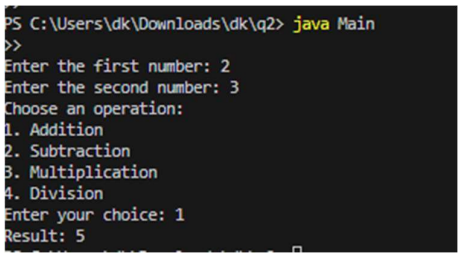
Code:

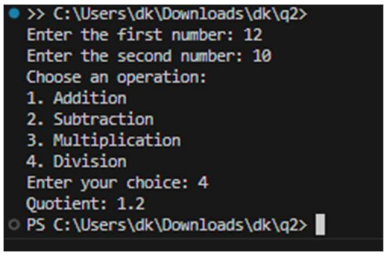
Main.java

```java
package q2;
import java.util.Scanner;
import q2.letmecalculate.Calculator;
public class Main {
    Run | Debug
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print(s:"Enter the first number: ");
        int num1 = scanner.nextInt();

        System.out.print(s:"Enter the second number: ");
        int num2 = scanner.nextInt();

        System.out.println(x:"Select operation:");
        System.out.println(x:"1. Addition");
        System.out.println(x:"2. Subtraction");
        System.out.println(x:"3. Multiplication");
        System.out.println(x:"4. Division");

        System.out.print(s:"Enter your choice : ");
        int choice = scanner.nextInt();

        double result = 0;

        switch (choice) {
            case 1:
                result = Calculator.addition(num1, num2);
                break;
            case 2:
                result = Calculator.subtraction(num1, num2);
                break;
            case 3:
                result = Calculator.multiplication(num1, num2);
                break;
            case 4:
                if (num2 == 0) {
                    System.out.println(x:"Division by zero is not allowed.");
                    break;
                }
                result = Calculator.division(num1, num2);
                break;
            default:
                System.out.println(x:"Invalid choice.");
        }

        System.out.println("Result: " + result);

        scanner.close();
    }
}
```



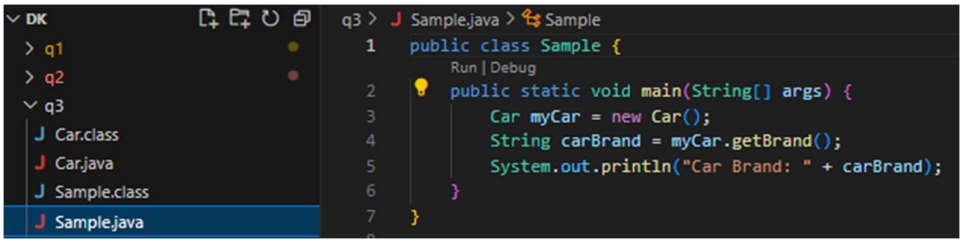
Output:

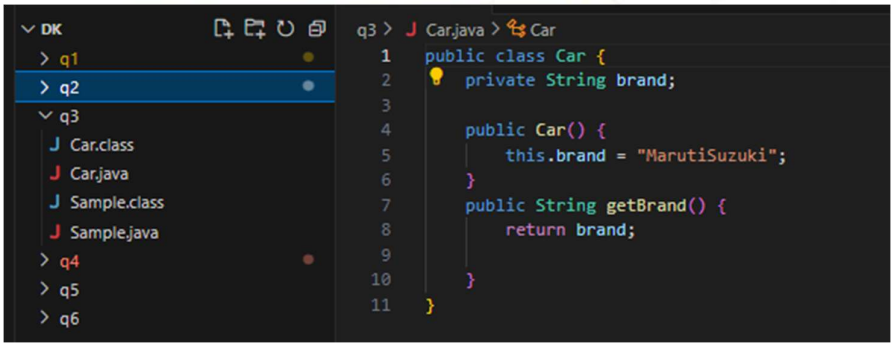




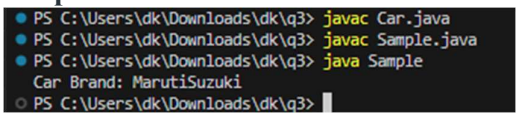
III. Write a constructor in the Car class given below that initializes the brand class field with the string “Ford”. Call the getBrand () method in the main method of the Sample class and store the value of the brand in a variable, and print the value.

Code:





Output:



IV. Write a program to print the names of students by creating a Student class. If no name ispassed while creating an object of Student class, then the name should be "Unknown", otherwise the name should be equal to the String value passed while creating object ofStudent class.

Code:

Output:

```
PS C:\Users\dk\Downloads\dk> cd q4
PS C:\Users\dk\Downloads\dk\q4> javac Student.java
PS C:\Users\dk\Downloads\dk\q4> java Student
Enter the name of the first student: Divyesh
Enter the name of the second student:
Student 1 Name: Divyesh
Student 2 Name: Unknown
```

V. Write a Java class Complex for dealing with complex number. Your class must have the following features:

Instance variables:

- **realPart** for the real part of type double
- **imaginaryPart** for imaginary part of type double.

Constructor:

- **public Complex ()**: A default constructor, it should initialize the number to 0, 0)
- **public Complex (double realPart, double imaginaryPart)**: A constructor with parameters, it creates the complex object by setting the two fields to the passed values.

Instance methods:

- **public void setRealPart (double realPart)**: Used to set the real part of this complex number.
- **public void setImaginaryPart (double realPart)**: Used to set the imaginary part of this complex number.
- **public double getRealPart ()**: This method returns the real part of the complex number
- **public double getImaginaryPart ()**: This method returns the imaginary part of the complex number

Write a separate class **ComplexDemo** with a main () method and test the Complex class methods.

Code:

Complex.java

q5 > Complex.java > Complex

```java
public class Complex {
    private double realPart;
    private double imaginaryPart;

    public Complex() {
        this.realPart = 0.0;
        this.imaginaryPart = 0.0;
    }

    public Complex(double realPart, double imaginaryPart) {
        this.realPart = realPart;
        this.imaginaryPart = imaginaryPart;
    }
    public void setRealPart(double realPart) {
        this.realPart = realPart;
    }

    public void setImaginaryPart(double imaginaryPart) {
        this.imaginaryPart = imaginaryPart;
    }

    public double getRealPart() {
        return realPart;
    }

    public double getImaginaryPart() {
        return imaginaryPart;
    }
}

```

ComplexDemo.java

q5 > ComplexDemo.java > ComplexDemo > main(String[])

```java
import java.util.Scanner;

public class ComplexDemo {
    Run | Debug
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        Complex complex1 = new Complex();


        System.out.print(s:"Enter the real part for Complex1: ");
        double realPartInput = scanner.nextDouble();
        complex1.setRealPart(realPartInput);

        System.out.print(s:"Enter the imaginary part for Complex1: ");
        double imaginaryPartInput = scanner.nextDouble();
        complex1.setImaginaryPart(imaginaryPartInput);

        System.out.println("Complex: Real Part = " + complex1.getRealPart() +", Imaginary Part = " + complex1.getImaginaryPart());
        System.out.println( complex1.getRealPart()+"+"+ complex1.getImaginaryPart()+"j");

        scanner.close();
    }
}

```

Output:

```
PS C:\Users\dk\Downloads\dk\q5> java ComplexDemo
Enter the real part for Complex1: 10
Enter the imaginary part for Complex1: 5
Updated Complex1: Real Part = 10.0, Imaginary Part = 5.0
10.0+5.0j
```

VI. 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 theclass Student.

Code:

```java
import java.util.Scanner;

public class Student {
    String name;
    int roll_no;

    Run | Debug
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Student student = new Student();


        System.out.print(s:"Enter student name: ");
        student.name = scanner.nextLine();

        System.out.print(s:"Enter student roll number: ");
        student.roll_no = scanner.nextInt();

        System.out.println("Name: " + student.name);
        System.out.println("Roll Number: " + student.roll_no);

        scanner.close();
    }
}
```

Output:

```
PS C:\Users\dk\Downloads\dk\q6> java Student
Enter student name: Divyesh
Enter student roll number: 116
Name: Divyesh
Roll Number: 116
```