

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:

```
import mypackage.Package;
   mypackage
   J Package.class
   J Package.java
                                              public static void main(String[] args) {
 J main.class
                                                   Package.print();

√ q2

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                                    q1 > mypackage > J Package.java > ...
                                           package mypackage;

✓ mypackage

                                           public class Package{
    J Package.class
                                                public static void print() {
    Package.java
                                                    System.out.println(x:"Hello Pooja Maam!");
   J main.class
   J main.java
Output:
                          DEBUG CONSOLE
                                          TERMINAL
```

PROBLEMS (2) OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\dk\Downloads\dk\ cd q1

PS C:\Users\dk\Downloads\dk\q1> javac mypackage/Package.java

>> javac main.java

>> java main

Hello Pooja Maam!

PS C:\Users\dk\Downloads\dk\q1>

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.

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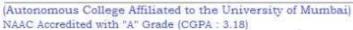


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```
J Main.java X
q2 > J Main.java > {} q2
  1 package q2;
       port java.util.Scanner;
      import q2.letmecalculate.Calculator;
      public class Main {
          public static void main(String[] args) {
              Scanner scanner = new Scanner(System.in);
              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.");
                       result = Calculator.division(num1, num2);
                       break;
                  default:
                       System.out.println(x:"Invalid choice.");
              System.out.println("Result: " + result);
              scanner.close();
```

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```
EXPLORER
                                J Calculator.java X
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                                q2 > letmecalculate > J Calculator.java > {} q2.letmecalculate
> q1
∨ q2

✓ letmecalculate

                                           public static int addition(int a, int b) {
 J Calculator.class
 J Main.class
                                           public static int subtraction(int a, int b) {
 J Main.java
                                          public static int multiplication(int a, int b) {
 > q6
                                              return a * b;
                                           public static double division(double a, double b) {
                                                  System.out.println(x:"Not Defined");
                                                   return Double.NaN;
```

Output:

```
PS C:\Users\dk\Downloads\dk\q2> java Main
>>
Enter the first number: 2
Enter the second number: 3
Choose an operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
Enter your choice: 1
Result: 5
```

```
>> C:\Users\dk\Downloads\dk\q2>
Enter the first number: 12
Enter the second number: 10
Choose an operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
Enter your choice: 4
Quotient: 1.2
PS C:\Users\dk\Downloads\dk\q2>
```

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.

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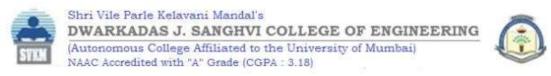
```
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                                g3 > J Car.java > 😫 Car
                                     public class Car {
   private String brand;
 > q1
 > q2
 ∨ q3
                                           public Car() {
 J Car.class
                                              this.brand = "MarutiSuzuki";
  J Sample.class
                                           public String getBrand() {
                                              return brand;
  > q6
```

Output:

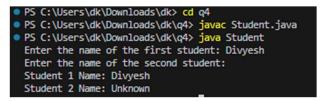
```
    PS C:\Users\dk\Downloads\dk\q3> javac Car.java
    PS C:\Users\dk\Downloads\dk\q3> javac Sample.java
    PS C:\Users\dk\Downloads\dk\q3> java Sample
    Car Brand: MarutiSuzuki
    PS C:\Users\dk\Downloads\dk\q3>
```

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 of Student class.

```
q4 > J Student.java > ...
      import java.util.Scanner;
      public class Student {
         String name;
          public Student(String studentName) {
              if (studentName != null && !studentName.isEmpty()) {
                 name = studentName;
                  name = "Unknown";
          public static void main(String[] args) {
              Scanner scanner = new Scanner(System.in);
              System.out.print(s:"Enter the name of the first student: ");
              String name1 = scanner.nextLine();
              Student student1 = new Student(name1);
              System.out.print(s: "Enter the name of the second student: ");
              String name2 = scanner.nextLine();
              Student student2 = new Student(name2);
              System.out.println("Student 1 Name: " + student1.name);
              System.out.println("Student 2 Name: " + student2.name);
              scanner.close();
 30
```



Output:



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

Instance variables:

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



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```
J Complex.java X
q5 > J Complex.java > 😂 Complex
      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;
```

```
J ComplexDemo.java X
q5 > J ComplexDemo.java > 😂 ComplexDemo > 😭 main(String[])
    import java.util.Scanner;
      public class ComplexDemo {
          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();
      0
 22
```

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 the class Student.

Code:

```
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();
}

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
```



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