Experiment Number : 8 **Date:**

Implementation of Packages in Java

Aim:

Write a Java program to implement built-in, user-defined packages and accessing all classes in a package.

PRE LAB EXERCISE

QUESTIONS

1. **What is java.util package and what collection framework does it contain?**

   java.util is a built-in Java package that provides utility classes for data structures, date & time, random numbers, and more; it contains the Java Collection Framework including interfaces and classes like List, Set, Map, Queue, ArrayList, HashSet, HashMap, etc.

2. **What are the two types of packages in Java?**

   The two types of packages in Java are Built-in (Predefined) packages and User-defined packages.

IN LAB EXERCISE

Objective

To understand and implement the concepts of built-in, user-defined packages and accessing all classes in a package in Java.

Built-in Packages comprise a large number of classes that are part of the Java API. Some of the commonly used built-in packages are:

- java.lang: Contains language support classes(e.g, classes that define primitive data types, math operations). This package is automatically imported.
- java.io: Contains classes for supporting input/output operations.
- java.util: Contains utility classes that implement data structures such as Linked Lists and Dictionaries, as well as support for date and time operations.

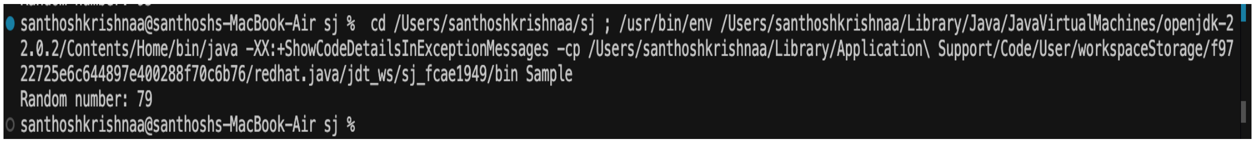
- java.applet: Contains classes for creating Applets.
- java.awt: Contains classes for implementing the components for graphical user interfaces (like buttons, menus, etc).

Source Code

```
import java.util.Random;   // built-in package

public class Sample{

       public static void main(String[] args) {

         // using Random class

        Random rand = new Random();

        // generates a number between 0–99

        int number = rand.nextInt(100);

        System.out.println("Random number: " + number);

    }

}
```

Output

```
Random number: 49
```



```
● santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-2
  2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f97
  22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin Sample
  Random number: 79
○ santhoshkrishnaa@santhoshs-MacBook-Air sj %
```

User-defined Packages are the packages that are defined by the user.

Source code

```
package com.myapp;

public class Helper {

    public static void show() {

        System.out.println("Hello from Helper!");

    }

}
```

==To use this in another class==

```
import com.myapp.Helper;
```

```
public class Test {
    public static void main(String[] args) {
        Helper.show();
    }
}
```

Output:

```
Hello from Helper!
```

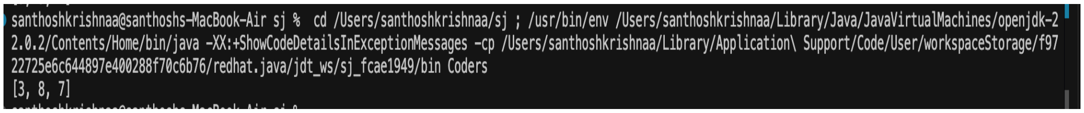
//Importing all classes from a package.

Source code

```
import java.util.Vector;
public class Coders {
      public Coders() {
              // java.util.Vector is imported, We are able to access it directly in our code.
        Vector v = new Vector();
        java.util.ArrayList l = new java.util.ArrayList();
        l.add(3);
        l.add(5);
        l.add(7);
        System.out.println(l);
    }
    public static void main(String[] args) {
       new Coders();
    }
}
```

Output

```
[3,5,7]
```



```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-2
2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f97
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin Coders
[3, 8, 7]
```

POST LAB EXERCISE

1. **What will happen if two classes in different packages have the same name and are imported in a Java file?**

   If two classes in different packages have the same name and are imported, a compile-time ambiguity error occurs and you must use the fully qualified class name to resolve it.

2. **What is the purpose of using packages in Java?**

   Packages in Java are used to organize classes, avoid name conflicts, and provide access control and modularity**.**

3. **Which built-in Java package would you use if you want to create a GUI window and display a message?**

   A. **java.util**

   B. **java.sql**

   C. **java.awt**

   D. **java.net**

java.awt, which is used to create GUI windows and display messages.

ASSESSMENT

Description	**Max Marks**	**Marks Awarded**
Pre Lab Exercise	**5**	
In Lab Exercise	**10**	
Post Lab Exercise	**5**	
Viva	**10**	
Total	**30**	
Faculty Signature		

Experiment Number : 9 **Date:**

Implementation of a Java Program to import packages using different methods

Aim:

Write a Java program to import packages using different methods for different use cases.

PRE LAB EXERCISE

QUESTIONS

1. **How to import a single class and multiple classes from a package in Java?**

   single class is imported using import packageName.ClassName; and multiple classes using import packageName.*;.

2. **Which package is always imported by default in every Java class?**

   The **java.lang** package is always imported by default in every Java class.

IN LAB EXERCISE

Objective

To understand and implement the Java packages using different methods and import them.

Problem

Define a package named ‘useFul’ with a class names ‘UseMe’ having following methods:

1) area()- To calculate the area of given shape.

2) salary()- To calculate the salary given basic Salary,da,hRA.

3) percentage()-To calculate the percentage given total marks and marks obtained.

4) Develop a program named ‘Package Use’ to import the above package ‘useFul’ and use the method area().

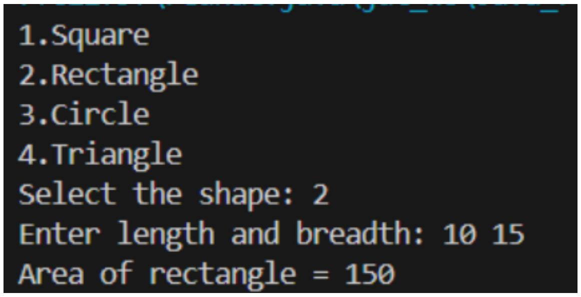
5) Develop a program named ‘manager’

Source Code

```
//Package Creation:
package useFull;
import java.util.*;
public class UseMe
{
          Scanner obj=new Scanner(System.in);
public static void area()
        {
              class method{
               void aos(int a)
              {
                 System.out.print("\nArea of square with length "+a+" is "+(a*a));
               }
              void aor(int a,int b)
              {
                 System.out.print("\nArea of reactangle with dimensions "+a+" & "+b+" is "+(a*b));
               }
               void aoc(int r)
              {
                double a=3.14*r*r;
               }
              System.out.print("\nArea of circle with radius "+r+" is "+a);
          }
          void aot(int a,int b)
           {
              float ar=(a*b)/2;
              System.out.print("\nArea of triangle with dimensions "+a+" &"+b+" is "+ar);
            } }
          Scanner obj=new Scanner(System.in);
          method m=new method();
          System.out.print("\n1.Square\n2.Rectangle\n3.Circle\n4.Triangle\nSelect the shape\n");
          int ch=obj.nextInt();
          UseMe u=new UseMe();
          switch(ch)
                  {
                  case 1:System.out.print("\nEnter the length of side of square : ");
                          int s=obj.nextInt();m.aos(s);
                          break;
                  case 2:System.out.print("\nEnter the dimensions of rectangle : ");
                          int l=obj.nextInt();
                          int b=obj.nextInt();
                          m.aor(l,b);
                          break;
                  case 3:System.out.print("\nEnter the radius of circle : ");
                          int r=obj.nextInt();
                          m.aoc(r);
                          break;
                  case 4:System.out.print("\nEnter the dimensions of triangle : ");
                          int ba=obj.nextInt();
                          int w=obj.nextInt();
                          m.aot(ba,w);
                          break; } }
public void salary()
   {
          int ba,da,hra;
          System.out.print("\nEnter the basic salary : ");
          ba=obj.nextInt();
          System.out.print("\nEnter the dearness allowance :");
          da=obj.nextInt();
          System.out.print("\nEnter the house rent allowance : ");
          hra=obj.nextInt();
          System.out.print("\nThe total Gross salary of employee is : "+(ba+da+hra));
      }
public void percentage()
      {
          int n,sum=0;
          float p;
          System.out.print("\nEnter the total number of subjects : ");
          n=obj.nextInt();
          int m[]=new int[n];
          System.out.print("\nEnter the marks of "+n+" subjects : ");
          for(int i=0;i<n;i++)
          {
             m[n]=obj.nextInt();
          }
          for(int i=0;i<n;i++)
          {
              sum=sum+m[i];
          }
          p=sum/n;
          {
                  System.out.print("\nPercentahe of student : "+p);
          }
       }
```

```
}
//Package Implementation-1:
        import useFull.UseMe;
        class packageUse
        {
                public static void main(String args[])
                {
                UseMe o=new UseMe();o.area();
                }
        }
```

Output



```
1.Square
2.Rectangle
3.Circle
4.Triangle
Select the shape: 2
Enter length and breadth: 10 15
Area of rectangle = 150
```

```
javac packageUse.java
java packageUse
```

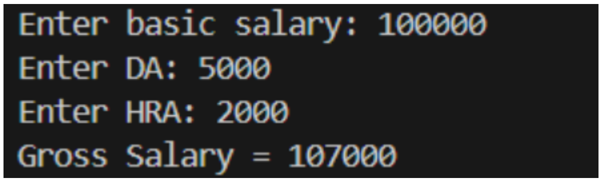
1. Square
2. Rectangle
3. Circle
4. Triangle
   Select the shape
   2

   Enter the dimensions of the rectangle: 10 15
   Area of the rectangle with dimensions 10&15 is 150

```
//Package Implementation-2:
        import useFull.UseMe;
        class manager
```

```
{
   public static void main(String args[])
   {
    UseMe obj=new UseMe();obj.salary();
    }
}
```

Output



```
Enter basic salary: 100000
Enter DA: 5000
Enter HRA: 2000
Gross Salary = 107000
```

```
javac manager.java
java manager

Enter the basic salary: 100000
Enter the dearness allowance: 5000
Enter the house rent allowance: 2000
The total Gross salary of employee is: 107000
```

POST LAB EXERCISE

1. **Find the key differences between java.util and java.lang packages.**

   java.lang is automatically imported and provides core classes like String, Math, and System, while java.util must be imported manually and provides utility classes like collections, date/time, and random utilities.

2. **List some of the subpackages of java.util**

   Somesubpackagesof java.util include java.util.concurrent, java.util.function, java.util.logging, and java.util.stream

ASSESSMENT

Description	Max Marks	Marks Awarded
Pre Lab Exercise	**5**	
In Lab Exercise	**10**	
Post Lab Exercise	**5**	
Viva	**10**	
Total	**30**	
Faculty Signature		

Experiment Number : 10 **Date:**

Implementation of Access Modifiers in Java

Aim:

Write a Java program to implement different access modifiers.

PRE LAB EXERCISE

QUESTIONS

1. **What are the 4 access modifiers available in Java?**

   The four access modifiers in Java are public, protected, default (no modifier), and private.

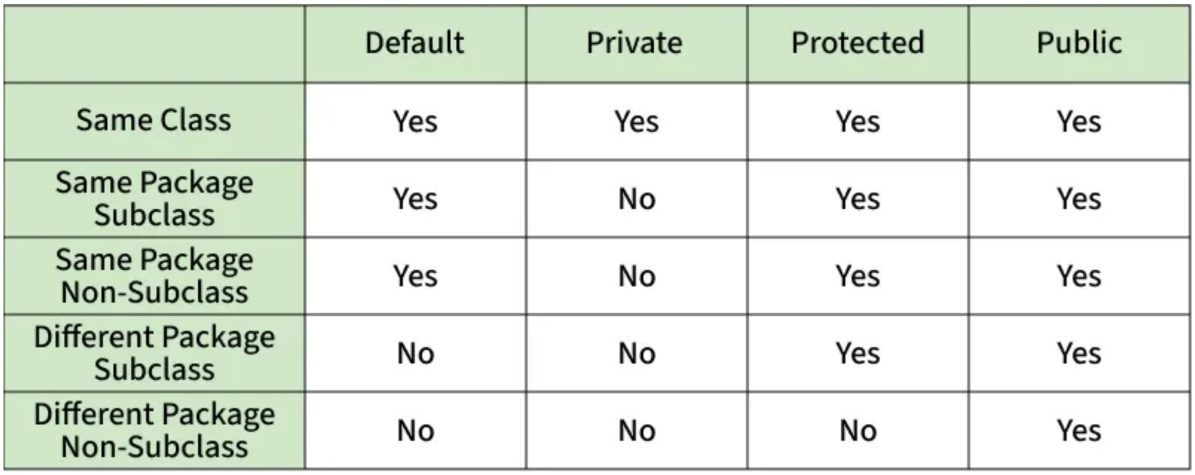
2. **Which access modifiers can be used in Java to control access to class members?**

   The access modifiers used to control access to class members
   are public, protected, default, and private

IN LAB EXERCISE

Objective

To demonstrate different access modifiers such as Default, Private, Protected and Public using Java programs.



	Default	Private	Protected	Public
Same Class	Yes	Yes	Yes	Yes
Same Package Subclass	Yes	No	Yes	Yes
Same Package Non-Subclass	Yes	No	Yes	Yes
Different Package Subclass	No	No	Yes	Yes
Different Package Non-Subclass	No	No	No	Yes

Fig: Comparison table of Access Modifiers in Java

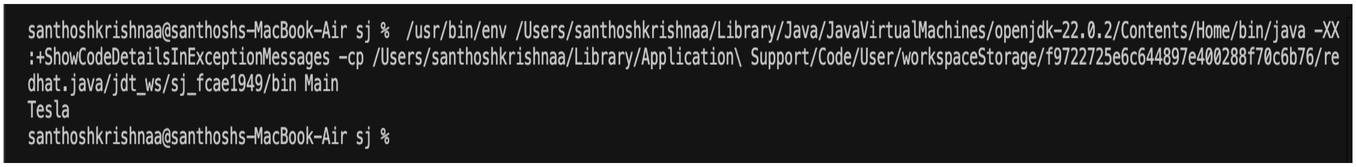
Source Code

// Default Access modifier

```
class Car {
    String model; // default access
}
public class Main {
       public static void main(String[] args){
        Car c = new Car();
        c.model = "Tesla"; // accessible within the same package
        System.out.println(c.model);
    }
}
```

Output:

Tesla



```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-22.0.2/Contents/Home/bin/java -XX
:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f9722725e6c644897e400288f70c6b76/re
dhat.java/jdt_ws/sj_fcae1949/bin Main
Tesla
santhoshkrishnaa@santhoshs-MacBook-Air sj %
```

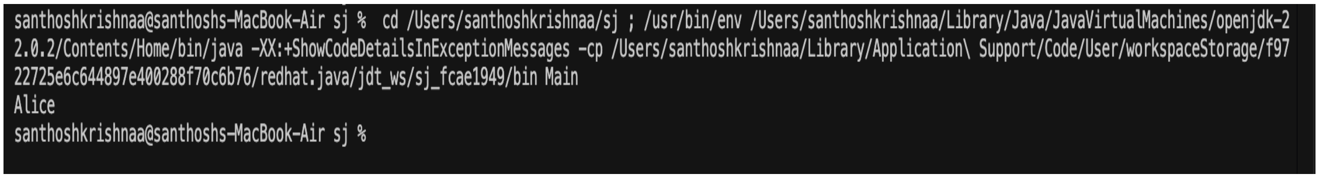
//Private Access Modifier

```
class Person {
    // private variable
    private String name;
    public void setName(String name)  {
     this.name = name; // accessible within class
    }
    public String getName() {
            return name;
   }
}
```

```
public class Geeks {
    public static void main(String[] args)
    {
       Person p = new Person();
        p.setName("Alice");

        // System.out.println(p.name);
        // Error: 'name'
        // has private access
        System.out.println(p.getName());
    }
}
```

Output

Alice



```
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2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f97
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin Main
Alice
santhoshkrishnaa@santhoshs-MacBook-Air sj %
```
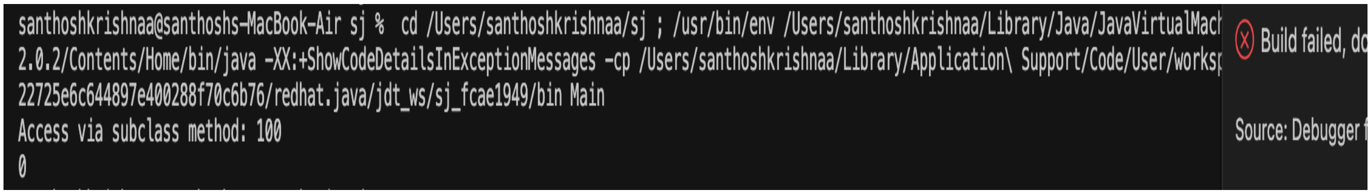

//Protected Access Modifier

```
class Vehicle {
    protected int speed; // protected member
}
class Bike extends Vehicle {
    void setSpeed(int s)
    {
        speed = s; // accessible in subclass
    }
    int getSpeed()
    {
        return speed; // accessible in subclass
    }
}
public class Main {
    public static void main(String[] args){
        Bike b = new Bike();
        b.setSpeed(100);
        System.out.println("Access via subclass method: "+ b.getSpeed());
        Vehicle v = new Vehicle();
        System.out.println(v.speed);
    }
}
```

Output

```
Access via subclass method: 100
0
```



```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMach
2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/worksp
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin Main
Access via subclass method: 100
0
```

ⓧ Build failed, do

Source: Debugger f

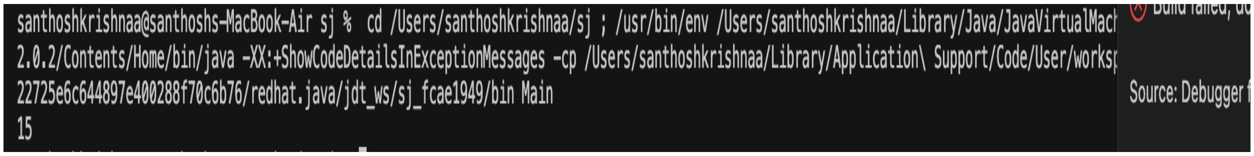
//Public Access Modifier

```
class MathUtils {
        public static int add(int a, int b) {
        return a + b;
    }
}
public class Main {
        public static void main(String[] args) {
```

```
        System.out.println(MathUtils.add(5, 10)); // accessible anywhere
    }
}
```

Output

15



```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMach
2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/worksp
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin Main
15
```

POST LAB EXERCISE

1. **Write a Java program to implement Default access modifier which has a default class within the same package and a default class from a different package**

   Default (no modifier) allows access only within the same package, so a default class can be accessed in the same package but not from a different package.

2. **Which access modifier provides the highest level of access?**

   The public access modifier provides the highest level of access.

ASSESSMENT

Description	Max Marks	Marks Awarded
Pre Lab Exercise	5	
In Lab Exercise	10	
Post Lab Exercise	5	
Viva	10	
Total	**30**	
Faculty Signature		

Experiment Number :11 **Date:**

Implementation of multiple inheritance in Java using Interface

Aim:

Write a Java program to implement multiple inheritance using Interface.

PRE LAB EXERCISE

QUESTIONS

1.**Why Java does not support multiple inheritance using classes like that of C?**

Java does not support multiple inheritance with classes to avoid ambiguity problems like the Diamond Problem and to maintain simplicity.

2.What is the primary purpose of an interface in Java?

A. To store data using instance variables

B. To define a contract of methods a class must implement

D. To allow creation of objects

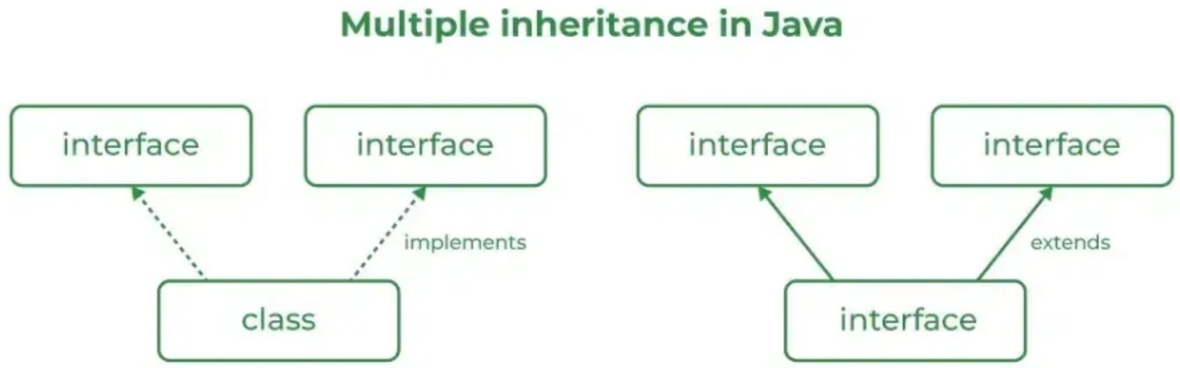
D. To improve runtime performance

B. To define a contract of methods a class must implement.

IN LAB EXERCISE

Objective

To demonstrate how an interface in Java defines constants and abstract methods, which are implemented by a class.

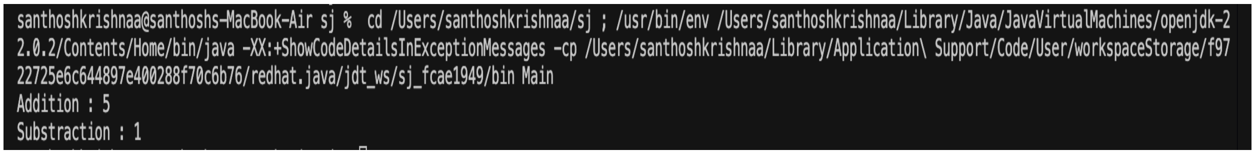


Source Code

```
import java.io.*;
  // Add interface
interface Add{
    int add(int a,int b);
  }
// Sub interface
interface Sub{
            int sub(int a,int b);
  }
// Calculator class implementing Add and Sub
class Cal implements Add , Sub
  {
// Method to add two numbers
            public int add(int a,int b){
            return a+b;
    }
        // Method to sub two numbers
        public int sub(int a,int b){
        return a-b;
    }
}
class Example{
    // Main Method
    public static void main (String[] args){

        // instance of Cal class
        Cal x = new Cal();
        System.out.println("Addition : " + x.add(2,1));
        System.out.println("Substraction : " + x.sub(2,1));
    }
}
```

Outputs

```
Addition : 3
Subtraction : 1
```



```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-2
2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f97
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin Main
Addition : 5
Substraction : 1
```

POST LAB EXERCISE

1. **Can a functional interface extend another interface?**

   Yes, a functional interface can extend another interface (as long as it still has only one abstract method).

2. **Which feature was introduced in interfaces starting from Java 8?**

   A. Constructors

   B. Private methods

   C. Default and static methods

   D. Final classes

C. Default and static methods

ASSESSMENT

Description	Max Marks	Marks Awarded
Pre Lab Exercise	**5**	
In Lab Exercise	**10**	
Post Lab Exercise	**5**	
Viva	**10**	
Total	**30**	
Faculty Signature		

Experiment Number : 12 **Date:**

Implementation of exception handling in Java

Aim:

Write a java program to implement exception handling.

PRE LAB EXERCISE

QUESTIONS

1. **What is exception handling in Java?**
   Exception handling in **Java** is a mechanism to handle runtime errors and maintain normal program flow

2. **What is the purpose of using try-catch blocks in exception handling?**
   The purpose of try-catch blocks is to catch and handle exceptions to prevent program termination

IN LAB EXERCISE

Objective

To understand and implement exception handling through try-catch and finally blocks.

Source Code

```
import java.util.InputMismatchException;

import java.util.Scanner;

public class ExceptionHandlingExample {

 public static void main(String[] args) {

            Scanner scanner = new Scanner(System.in);

             try {

            System.out.print("Enter an integer: ");

            int num = scanner.nextInt();

             int result = 10 / num;

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

```
        } catch (InputMismatchException e) {
        System.out.println("Invalid input! Please enter an integer.");
        } catch (ArithmeticException e) {
        System.out.println("Cannot divide by zero!");
        } finally {
        scanner.close();
        System.out.println("Program execution completed.");
        } }
}
```

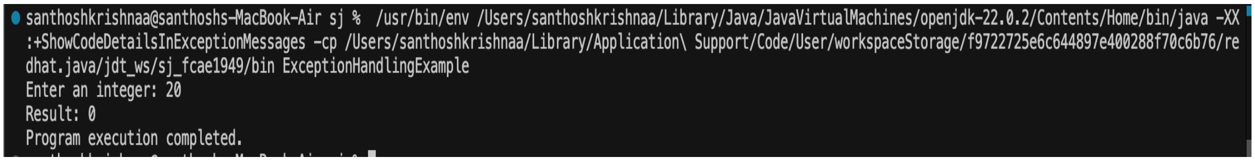
Outputs

Output 1 (Valid Input - Non-zero Integer):

Enter an integer: 5

Result: 2

Program execution completed.



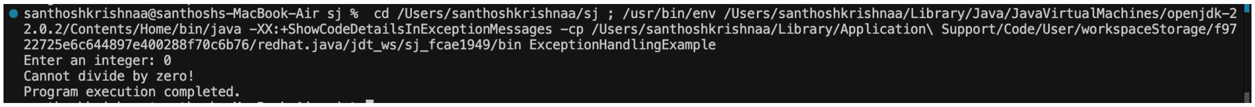
```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-22.0.2/Contents/Home/bin/java -XX
:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f9722725e6c644897e400288f70c6b76/re
dhat.java/jdt_ws/sj_fcae1949/bin ExceptionHandlingExample
Enter an integer: 20
Result: 0
Program execution completed.
```

Output 2 (Valid Input - Zero):

Enter an integer: 0

Cannot divide by zero!

Program execution completed.



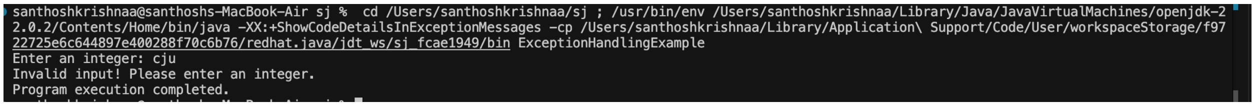
```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-2
2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f97
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin ExceptionHandlingExample
Enter an integer: 0
Cannot divide by zero!
Program execution completed.
```

Output 3 (Invalid Input - Non-integer):

Enter an integer: abc

Invalid input! Please enter an integer.

Program execution completed.



```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-2
2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f97
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin ExceptionHandlingExample
Enter an integer: cju
Invalid input! Please enter an integer.
Program execution completed.
```

POST LAB EXERCISE

1. **What is the purpose of the Scanner object in the Java program?**
   The Scanner object in **Java** is used to read user input from the console.

2. **What exceptions are expected to be thrown in the code within the try block? Why?**
   Common exceptions include InputMismatchException (wrong input type) and ArithmeticException (like division by zero) depending on the code inside the try block.

ASSESSMENT

Description	**Max Marks**	**Marks Awarded**
Pre Lab Exercise	**5**	
In Lab Exercise	**10**	
Post Lab Exercise	**5**	
Viva	**10**	
Total	**30**	
Faculty Signature		

Experiment Number : 13 **Date:**

Implementation of User-defined Exception in Java

Aim:

Write a java program to implement User-defined Exception.

PRE LAB EXERCISE

QUESTIONS

1. **What is Java custom exception?**

   A custom exception in Java is a user-defined exception class created by extending Exception or RuntimeException.

2. **What are the two types of custom exceptions in Java?**

   The two types of custom exceptions are checked exceptions and **u**nchecked exceptions**.**

IN LAB EXERCISE

Objective

To understand and implement Checked and Unchecked custom exceptions.

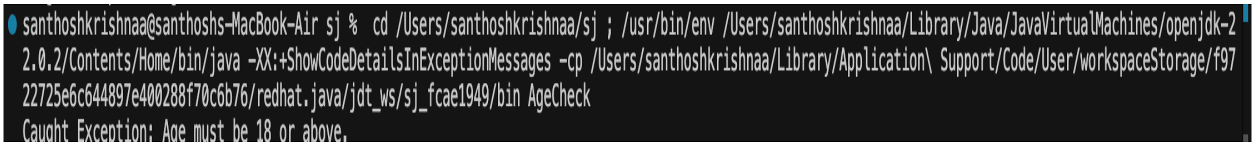
Source Code

Ex 1: // Custom Checked Exception

```
class InvalidAgeException extends Exception {

   public InvalidAgeException(String m) {

       super(m);

   }

}

// Using the Custom Exception

public class AgeCheck{
   public static void validate(int age)
     throws InvalidAgeException {
       if (age < 18) {
           throw new InvalidAgeException("Age must be 18 or above.");
       }
       System.out.println("Valid age: " + age);
   }
public static void main(String[] args) {
  try {
           validate(12);
       } catch (InvalidAgeException e) {
           System.out.println("Caught Exception: " + e.getMessage());
       }
   }
}
```

Output 1

Caught Exception: Age must be 18 or above.



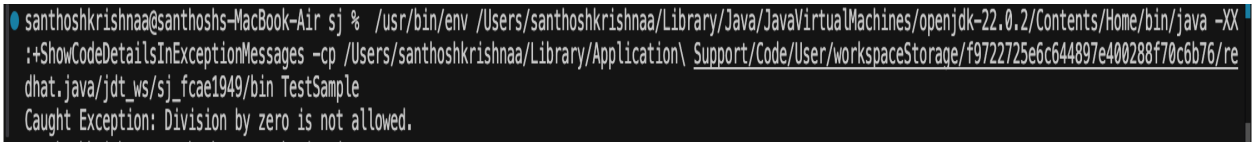
```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  cd /Users/santhoshkrishnaa/sj ; /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-2
2.0.2/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f97
22725e6c644897e400288f70c6b76/redhat.java/jdt_ws/sj_fcae1949/bin AgeCheck
Caught Exception: Age must be 18 or above.
```

Ex 2: // Custom Unchecked Exception

```
class DivideByZeroException extends RuntimeException {
    public DivideByZeroException(String m) {
        super(m);
    }
}
// Using the Custom Exception
public class TestSample {
    public static void divide(int a, int b) {
        if (b == 0) {
            throw new DivideByZeroException("Division by zero is not allowed.");
        }
        System.out.println("Result: " + (a / b));
    }
public static void main(String[] args) {
 try {
            divide(10, 0);
        } catch (DivideByZeroException e) {
            System.out.println("Caught Exception: " + e.getMessage());
        }
    }
}
```

Output 2

Caught Exception: Division by zero is not allowed.



```
santhoshkrishnaa@santhoshs-MacBook-Air sj %  /usr/bin/env /Users/santhoshkrishnaa/Library/Java/JavaVirtualMachines/openjdk-22.0.2/Contents/Home/bin/java -XX
:+ShowCodeDetailsInExceptionMessages -cp /Users/santhoshkrishnaa/Library/Application\ Support/Code/User/workspaceStorage/f9722725e6c644897e400288f70c6b76/re
dhat.java/jdt_ws/sj_fcae1949/bin TestSample
Caught Exception: Division by zero is not allowed.
```

POST LAB EXERCISE

1. **What is required to create a custom exception in Java?**

   A. Extend the Object class
   B. Extend the Throwable class

   C. Extend Exception or RuntimeException

   D. Implement the Serializable interface

C. Extend Exception or RuntimeException in Java.

2. **List some use cases for the checked and unchecked exceptions.**

   Checked exceptions are used for recoverable conditions like file or database errors, while unchecked exceptions are used for programming errors like null pointer or arithmetic errors.

ASSESSMENT

Description	Max Marks	Marks Awarded
Pre Lab Exercise	**5**	
In Lab Exercise	**10**	
Post Lab Exercise	**5**	
Viva	**10**	
Total	**30**	
Faculty Signature		