**Ex No 5 ABSTRACT CLASS & INTERFACE**

**Date :**

**Aim:**

To develop a Java application using packages to implement the following currency converter –Dollar to Indian Rupees, Euro to Indian Rupees, Yen to Indian Rupees and vice versa.

**1 a**. Develop a Java application using packages to implement the following currency converter –  
Dollar to Indian Rupees, Euro to Indian Rupees, Yen to Indian Rupees and vice versa.

**Algorithm:**

1.START

2. Create a package to convert dollars to rupees and vice versa.

3. Create a package to convert euros to rupees and vice versa.

4. Create a package to convert yen to rupees and vice versa.

5. Import the created packages into the main program.

6. Create the necessary methods for each currency conversion.

7. Create necessary objects to call the packages within the method and to print the output

8.STOP

**Program:**

package pack1;  
public class Currency1  
{  
    public double dol\_rup(double d)  
    {  
        return d\*80;  
  
    }  
    public double rup\_dol(double r)  
    {  
        return r/80;  
    }  
                 
}

package pack2;  
public class Currency2  
{  
    public double euro\_rup(double e)  
    {  
       return e\*88.33;  
    }  
    public double rup\_euro(double r)  
    {  
       return r/88.33;  
    }  
     
}

package pack3;  
public class Currency3  
{  
   public double yen\_rup(double y)  
   {  
      return y\*0.56;  
   }  
   public double rup\_yen(double r)  
   {  
       return r/0.56;  
   }  
}

package javaapplication25;  
  
import java.util.Scanner;  
import pack1.Currency1;  
import pack2.Currency2;  
import pack3.Currency3;  
public class CurrencyCalculation  
{  
    public static void main(String[] args)  
    {  
       
      Scanner obj=new Scanner(System.in);  
      Currency1 obj1=new Currency1();  
      Currency2 obj2=new Currency2();  
      Currency3 obj3=new Currency3();  
      System.out.println("Currency Conversion Menu:");  
      System.out.println("1. Dollar to Indian Rupees");  
      System.out.println("2. Indian Rupees to Dollar");  
      System.out.println("3. Euro to Indian Rupees");  
      System.out.println("4. Indian Rupees to Euro");  
      System.out.println("5.  Yen to Indian Rupees");  
      System.out.println("6. Indian Rupees to Yen");  
      System.out.print("Enter your choice: ");  
      while(true){  
      int choice = obj.nextInt();  
      switch(choice)  
      {  
          case 1:  
              System.out.println("Enter the Dollar:");  
              double k=obj.nextDouble();  
              System.out.println("INDIAN RUPEES:"+obj1.dol\_rup(k));  
              break;  
           
          case 2:  
              System.out.println("Enter the Indian rupees:");  
              double x=obj.nextDouble();  
              System.out.println("DOLLARS:"+obj1.rup\_dol(x));  
              break;  
               
          case 3:  
              System.out.println("Enter the Euro :");  
              double d=obj.nextDouble();  
              System.out.println("INDIAN RUPEES:"+obj2.euro\_rup(d));  
              break;  
          case 4:  
              System.out.println("Enter the Indian rupees:");  
              double o=obj.nextDouble();  
              System.out.println("EURO:"+obj2.rup\_euro(o));  
              break;  
           
          case 5:  
              System.out.println("Enter the Yen :");  
              double z=obj.nextDouble();  
              System.out.println("INDIAN RUPEES:"+obj3.yen\_rup(z));  
              break;  
               
          case 6:  
              System.out.println("Enter the Indian rupees :");  
              double p=obj.nextDouble();  
              System.out.println("YEN:"+obj3.rup\_yen(p));  
              break;  
               
          default:  
                    System.out.println("Invalid choice. Please try again.");  
                    break;  
               
        }  
       
       }  
    }  
}

**Output:**

Currency Conversion Menu:

1.Dollar to Rupees

2.Rupees to Dollar

3.Euros to Rupees

4.Rupees to Euros

5.Yen to Rupees

6.Rupees to Yen

2. Creating Packages and Methods  
1. Create a Java package structure with the following levels: pack1, pack2, and pack3.  
2. In pack1, create a class named MathOperations with the following methods:  
• add(int a, int b) - This method should return the sum of two integers.  
• subtract(int a, int b) - This method should return the result of subtracting b from  
a.  
3. In pack2, create a class named StringOperations with the following methods:  
• concatenate(String str1, String str2) - This method should concatenate two  
strings and return the result.  
• reverse(String str) - This method should reverse a given string and return the  
reversed string.  
4. In pack3, create a class named Calculator with the following methods:  
• multiply(int a, int b) - This method should return the product of two integers.  
• divide(int a, int b) - This method should return the result of dividing a by b.  
Make sure to handle division by zero by returning an appropriate message.  
5. Create a Java application outside the packages to test these methods. In this application:  
• Create instances of the classes from pack1, pack2, and pack3.  
• Use these instances to demonstrate the functionality of the methods you created.  
• Print the results to the console.  
6. Compile and run your Java application to see the output.

**Algorithm:**

1. START
2. Create a package and a class for performing Math operations like addition and subtraction.
3. Create a package and a class for performing String operations like concatenation and reversals.
4. Create a package and a class for performing Calculator operations like multiplication and division.
5. Create a java application to implement these packages with appropriate input commands.
6. Finally call the objects and print the output.
7. STOP

**Program:**

package pack1;

public class MathOperations {

public int add(int a, int b) {

return a + b;

}

public int subtract(int a, int b) {

return a - b;

}

}

package pack2;

public class StringOperations {

public String concatenate(String str1, String str2) {

return str1 + str2;

}

public String reverse(String str) {

StringBuilder reversed = new StringBuilder(str);

return reversed.reverse().toString();

}

}

package pack3;

public class Calculator {

public int multiply(int a, int b) {

return a \* b;

}

public String divide(int a, int b) {

if (b == 0) {

return "Cannot divide by zero!";

} else {

return String.valueOf((double) a / b);

}

}

}

package javaapplication11;

import java.util.\*;

import pack1.MathOperations;

import pack2.StringOperations;

import pack3.Calculator;

public class TestApp {

public static void main(String[] args) {

MathOperations mathOps = new MathOperations();

StringOperations stringOps = new StringOperations();

Calculator calculator = new Calculator();

Scanner obj=new Scanner(System.in);

System.out.println("Enter Numbers for calculations ");

System.out.println("Enter 1st number: ");

int x=obj.nextInt();

System.out.println("Enter 2nd number: ");

int y=obj.nextInt();

System.out.println("Enter words for Concatination");

System.out.println("Enter 1st word: ");

String l=obj.next();

System.out.println("Enter 2nd word ");

String m=obj.next();

System.out.println("Enter word for reversing");

System.out.println("Enter a word ");

String n=obj.next();

int sum = mathOps.add(x, y);

int difference = mathOps.subtract(x, y);

String concatResult = stringOps.concatenate(l, m);

String reverseResult = stringOps.reverse(n);

int product = calculator.multiply(x,y);

String divisionResult = calculator.divide(x,y);

System.out.println("Sum: " + sum);

System.out.println("Difference: " + difference);

System.out.println("Concatenation: " + concatResult);

System.out.println("Reversed String: " + reverseResult);

System.out.println("Product: " + product);

System.out.println("Division: " + divisionResult);

}

}

**Output:**

Enter numbers for calculation

Enter 1st number: 10

Enter 2nd number: 5

Enter words for concatenation:

Enter 1st word: say

Enter 2nd word: what?!

Enter word for reversing:

Enter a word: olleh

Sum:15

Difference:5

Concatenation: saywhat?!

Reversed string: hello

Product: 150

Division: 2

3. Show how protected properties from the subclass can be accessed but not default properties.

**Algorithm:**

1. START
2. Create a public parent class with protected data members.
3. Import the package of the parent class.
4. While trying to access the information from the parent class a compiler error will arise.
5. The error will be caused by the default properties from the subclass but not from the protected properties.
6. STOP

**Program:**

package Program3.package1;

public class ParentClass {

protected String protectedProperty = "This is a protected property";

String defaultProperty = "This is a default property";

}

package Program3.package2;

import Program3.package1.ParentClass;

public class ChildClass extends ParentClass {

public void accessProperties() {

System.out.println(protectedProperty);

// System.out.println(defaultProperty); // This will cause a compile error

}

}

package Program3.package2;

public class Protected {

public static void main(String[] args) {

ChildClass child = new ChildClass();

child.accessProperties();

}

}

|  |  |
| --- | --- |
| **Code/output(15)** |  |
| **Quiz(5)** |  |
| **Record(5)** |  |
| **Total(25)** |  |
| **Initial** |  |

Result :

The given programs were executed and verified by using JAVA