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**Q1) Write a program that implement the concept of Encapsulation.**

**Ans :-**

---

**// Java program to demonstrate encapsulation**

```
class Encapsulate {
    // private variables declared
    // these can only be accessed by public methods of class
    private String Name;
    private int Roll;
    private int Age;

    // get methods for age, name and roll
    //to access private variables
    public int getAge() { return Age; }
    public String getName() { return Name; }
    public int getRoll() { return Roll; }

    // set methods for age, name and roll
    //to access private variable Age
    public void setAge(int newAge) { Age = newAge; }
    public void setName(String newName) { Name = newName; }
    public void setRoll(int newRoll) { Roll = newRoll; }
}

public class TestEncapsulation {
    public static void main(String[] args)
    {
        Encapsulate obj = new Encapsulate();
        // setting values of the variables
        obj.setName("manish");
        obj.setAge(21);
        obj.setRoll(5527);

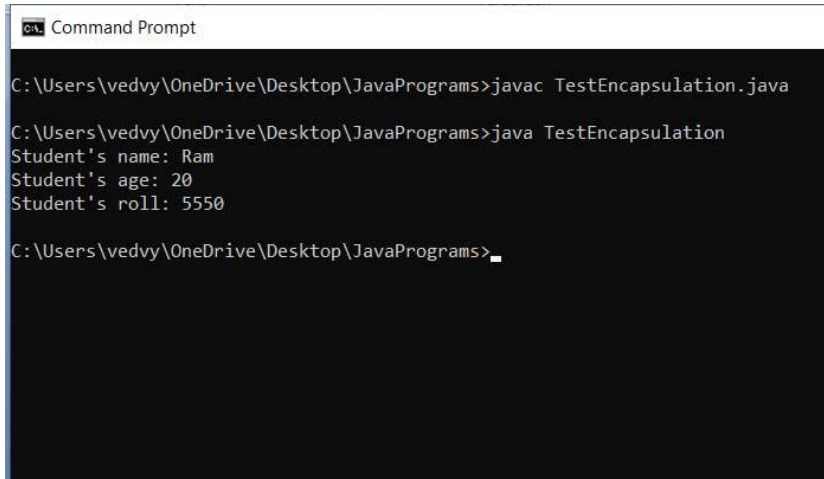
        // Displaying values of the variables
        System.out.println("Student's name: " +
obj.getName());
        System.out.println("Student's age: " + obj.getAge());
        System.out.println("Student's roll: " +
obj.getRoll());

        // Direct access of Roll is not possible
        // due to encapsulation
        // System.out.println("Student's roll: " + obj.Name);
    }
}
```

---

**Output :-**

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```
Command Prompt
C:\Users\vedvy\OneDrive\Desktop\JavaPrograms>javac TestEncapsulation.java
C:\Users\vedvy\OneDrive\Desktop\JavaPrograms>java TestEncapsulation
Student's name: Ram
Student's age: 20
Student's roll: 5550
C:\Users\vedvy\OneDrive\Desktop\JavaPrograms>
```

Figure 1

**Q2) Write a program to demonstrate the concept of function overloading of Polymorphism.**

**Ans :-**

---

// Java program to demonstrate concept of function overloading of Polymorphism

```
class Adder{
    //Method Overloading: changing no. of arguments
    static int add(int a,int b){return a+b;}
    static int add(int a,int b,int c){return a+b+c;}

    //Method Overloading: changing data type of arguments
    static double add(double a, double b){return a+b;}

    static String add(String a, String b)
    {String str = "Four"; return str; }

    //Method Overloading: Sequence of data type of arguments
    static void disp(String c, int num)
    {System.out.println(c + " "+ num);}

    static void disp(int num, String c)
    {System.out.println(num + " "+ c);}
}
class TestOverloading{
    public static void main(String[] args){
        //Method Overloading: changing no. of arguments
        System.out.println(Adder.add(11,11));
        System.out.println(Adder.add(11,11,11));

        //Method Overloading: changing data type of arguments
        System.out.println(Adder.add(12.3,12.6));
        System.out.println(Adder.add("One","Three"));

        //Method Overloading: Sequence of data type of arguments
        Adder.disp("manish",5527);
        Adder.disp(9399,"hello");
    }
}
```

---

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## Output:

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac TestOverloading.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java TestOverloading
22
33
24.9
Four
Bhupen 5507
9399 hello
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q3) Write a program to demonstrate concept of construction overloading of Polymorphism.**

**Ans :-**

```
// Java program to illustrate Constructor Overloading
class Box
{
    double width, height, depth;
    // constructor used when all dimensions specified
    Box(double w, double h, double d)
    {
        width = w;        height = h;        depth = d; }

    // constructor used when no dimensions specified
    Box(){width = height = depth = 0;}

    // constructor used when cube is created
    Box(double len){width = height = depth = len;}

    // compute and return volume
    double volume() {return width * height * depth;}
}
public class Test
{
    public static void main(String args[])
    {
        // create boxes using the various constructors
        Box mybox1 = new Box(12, 21, 13);
        Box mybox2 = new Box();
        Box mycube = new Box(7);
        double vol;

        // get volume of first box
        vol = mybox1.volume();
        System.out.println(" Volume of mybox1 is " + vol);

        // get volume of second box
        vol = mybox2.volume();
        System.out.println(" Volume of mybox2 is " + vol);

        // get volume of cube
        vol = mycube.volume();
        System.out.println(" Volume of mycube is " + vol);
    }
}
```

---

## Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Test.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Test
Volume of mybox1 is 3276.0
Volume of mybox2 is 0.0
Volume of mycube is 343.0
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q4) Write a program the use Boolean data type and print the prime number series up to 50.**

**Ans :-**

---

```
// Java program to print the prime number series up to 50
public class PrimeNumber
{
    public static void main(String []args)
    {
        int num=50,i;

        System.out.println("\n Prime numbers upto 50 :\n");
        for(i=2;i<=num;i++)
        {
            boolean a=true;
            for(int j=2;j<=i-1;j++)
            {
                if(i%j==0)
                {
                    a=false;
                    break;
                }
            }
            if(a==true)
            {
                System.out.print("  "+i);
            }
        }
        System.out.println();
    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac PrimeNumber.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java PrimeNumber
Prime numbers upto 50 :
 2 3 5 7 11 13 17 19 23 29 31 37 41 43 47
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```



**Q5) Write a program to print first 10 number of the following Series using Do-while Loops 0,1,1,2,3,5,8,11.**

**Ans :-**

---

// Java program to print the Fibonacci number series up to 50

```
public class Fibonacci
{
    public static void main(String []args)
    {
        // Function to print N Fibonacci Number
        int N=10,b=-1,c=1,sum,i=1;

        do
        {
            sum=b+c;
            System.out.print("  "+sum);
            // Swap
            b=c;
            c=sum;
            i++;
        }
        // Iterate till i is N
        while(i<=N);

        System.out.println();
    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Fibonacci.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Fibonacci
0 1 1 2 3 5 8 13 21 34
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q6) Write a program to check the given number is Armstrong or not.**

**Ans :-**

---

```
// Java program to find Nth Armstrong Number
import java.util.Scanner;
public class Armstrong
{
    public static void main(String []args)
    {
        int n,sum=0,count=0;

        Scanner input= new Scanner(System.in);
        System.out.print("\nEnter a number to check Armstrong or
        not : ");
        int number =input.nextInt();
        int num=number;
        // Find total digits in num
        while(num!=0)
        {
            num=num/10;
            count++;
        }
        //Copy the value for number in num
        num=number;

        // Calculate sum of power of digits
        while (num != 0)
        {
            n=num%10;
            sum=sum+(int)Math.pow(n,count);
            num=num/10;
        }
        if (number == sum )
            System.out.println("\n"+number + " is an Armstrong
            number ");
        else
            System.out.println("\n"+number + " is not an
            Armstrong number ");
    }
}
```

---

## Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Armstrong.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Armstrong
Enter a number to check Armstrong or not : 185
185 is not an Armstrong number
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Armstrong
Enter a number to check Armstrong or not : 153
153 is an Armstrong number
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q7) Write a program to find the factorial of any given number.**

**Ans :-**

---

```
// Java program to find factorial of given number
import java.util.Scanner;
class Test
{
    // Method to find factorial of given number
    static int factorial(int n)
    {
        int res = 1, i;
        for (i=2; i<=n; i++)
            res *= i;
        return res;
    }

    // Driver method
    public static void main(String[] args)
    {
        Scanner input=new Scanner(System.in);
        System.out.print("\nEnter a number to find factorial : ");
        int num=input.nextInt();

        System.out.println("Factorial of "+ num + " is " +
            factorial(num));
    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Test.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Test
Enter a number to find factorial : 6
Factorial of 6 is 720
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q8) Write a program to sort the element of One Dimensional Array in Ascending order**

**Ans :-**

---

```
// Java Program to Sort Array of Integers using Arrays.sort() Method
import java.util.Scanner;
import java.util.Arrays;

public class ArraySort{

    public static void main(String args[]){

        int []arr = new int[7];
        Scanner enter = new Scanner(System.in);
        System.out.println("\nPlease! Enter 7 numbers to perform
sorting:");
        for(int i=0; i<arr.length; i++)
        {
            arr[i]=enter.nextInt();
        }

        // Applying sort() method over to above array
        // by passing the array as an argument
        Arrays.sort(arr);

        System.out.println("\nSorting in Ascending order :\n");
        for(int i=0;i<arr.length;i++)
        {
            System.out.print("  "+arr[i]);
        }
        System.out.println( );
    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac ArraySort.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java ArraySort
Please! Enter 7 numbers to perform sorting:
12 21 2 9 11 1 20

Sorting in Ascending order :

1 2 9 11 12 20 21
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q9) Write a program for matrix multiplication using input/output Stream.**

**Ans :-**

---

```
// Java Program for matrix multiplication using input/output Stream
import java.util.Scanner;
public class MatrixMultiplication{
    public static void main(String []args)
    {
        Scanner input=new Scanner(System.in);
        System.out.print("Enter number of rows : ");
        int r=input.nextInt();
        System.out.print("Enter number of columns : ");
        int c=input.nextInt();

        if(r!=c)
        {
            System.out.println("\nSorry! matrix multiplication cannot
            be performed..!");
            System.exit(0);
        }
        else
        {
            int m1[][]=new int[r][c];
            int m2[][]=new int[r][c];
            int m3[][]=new int[r][c];
            int sum;

            System.out.println("Enter the elements of First
            matrix row wise: ");
            for(int i=0;i<r;i++)
            {
                for(int j=0;j<c;j++)
                {
                    m1[i][j]=input.nextInt();
                }
            }

            System.out.println("Enter the elements of second
            matrix row wise: ");
            for(int i=0;i<r;i++)
            {
                for(int j=0;j<c;j++)
                {
                    m2[i][j]=input.nextInt();
                }
            }

            for(int i=0;i<r;i++)
            {
```

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```
        for(int j=0;j<c;j++)
        {
            sum=0;

            for(int k=0;k<r;k++)
            {
                sum=sum + m1[i][k]*m2[k][j];
            }
            m3[i][j]=sum;
        }
    }

    System.out.println("Product of two matrices : ");
    for(int i=0;i<r;i++)
    {
        for(int j=0;j<c;j++)
        {
            System.out.print("  "+ m3[i][j]);
        }
        System.out.println();
    }
    input.close();
}
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac MatrixMultiplication.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java MatrixMultiplication
Enter number of rows : 3
Enter number of columns : 3
Enter the elements of First matrix row wise:
  3 2 4
  1 5 1
  4 3 2
Enter the elements of second matrix row wise:
  2 4 3
  5 6 4
  1 3 2
Product of two matrices :
 20 36 25
 28 37 25
 25 40 28
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q10) Write a program for matrix addition using input/output Stream.**

**Ans :-**

---

```
// Java Program for matrix addition using input/output Stream
import java.util.Scanner;
public class MatrixAddition{
    public static void main(String []args)
    {
        Scanner input=new Scanner(System.in);
        System.out.println("Enter number of rows : ");
        int r=input.nextInt();
        System.out.println("Enter number of columns : ");
        int c=input.nextInt();

        int m1[][]=new int[r][c];
        int m2[][]=new int[r][c];
        int m3[][]=new int[r][c];

        System.out.println("Enter the elements of First matrix
        row wise:");
        for(int i=0;i<r;i++)
        {
            for(int j=0;j<c;j++)
            {
                m1[i][j]=input.nextInt();
            }
        }

        System.out.println("Enter the elements of second matrix
        row wise:");

        for(int i=0;i<r;i++)
        {
            for(int j=0;j<c;j++)
            {
                m2[i][j]=input.nextInt();
            }
        }
        for(int i=0;i<r;i++)
        {
            for(int j=0;j<c;j++)
            {
                m3[i][j]=m1[i][j]+m2[i][j];
            }
        }

        System.out.println("Sum of two matrices : ");
```



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```
        for(int i=0;i<r;i++)
        {
            for(int j=0;j<c;j++)
            {
                System.out.print("  " +m3[i][j]);
            }
            System.out.println();
        }
        input.close();
    }
}
```

---

### Output: -

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac MatrixAddition.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java MatrixAddition
Enter number of rows : 3
Enter number of columns : 3
Enter the elements of First matrix row wise:
  5 2 3
  3 4 6
  7 8 3
Enter the elements of second matrix row wise:
  3 5 6
  6 2 3
  2 1 4
Sum of two matrices :
  8 7 9
  9 6 9
  9 9 7
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q11) write a program for matrix transpose using input/output stream class.**

**Ans :-**

---

```
// Java Program for matrix transpose using input/output stream class.
import java.util.Scanner;
public class MatrixTranspose{
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int original[][]=new int[3][3] ;
        System.out.println("Enter the elements of matrix: ");
        for(int row = 0; row<3; row++)
        {
            for(int col = 0; col<3; col++)
            {
                original[row][col] = input.nextInt();
            }
        }
        int transpose[ ][ ] = new int[3][3];
        for(int row = 0; row<3; row++)
        {
            for(int col = 0; col<3; col++)
            {
                transpose[row][col] = original[col][row];
            }
        }
        System.out.println("Transpose of matrix : \n");
        for(int row = 0; row<3; row++)
        {
            for(int col = 0; col<3; col++)
            {
                System.out.print("  "+ transpose[row][col] );
            }
            System.out.print("\n");
        }
    }
}
```

---

## Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac MatrixTranspose.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java MatrixTranspose
Enter the elements of matrix:
  1 2 3
  4 5 6
  7 8 9
Transpose of matrix :
  1 4 7
  2 5 8
  3 6 9
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q12) Write a program to add the element of Vectors as arguments of main method(Run time ) and rearrange them, and copy it into an array.**

**Ans :-**

---

```
// Java Program to Demonstrate Working of Vector via Creating and Using It
// Importing required classes
import java.io.*;
import java.util.*;
class VectorExample{
    public static void main(String[] args)
    {        // Size of the Vector
        int n = 5;
        Scanner input = new Scanner(System.in);
        // Declaring the Vector with initial size n
        Vector<Integer> list = new Vector<Integer>(n);

        // Appending new elements at the end of the vector
        try{ for(int i=0;i<5;i++)
            list.add(Integer.parseInt(args[i]));

            // Printing elements of list
            System.out.println("\n"+list);

            // Remove element at index 3
            list.remove(3);

            //Displaying the vector after deletion
            System.out.println(list);

            // iterating over vector elements usign for loop
            System.out.println("Printing the list using list.get() ---");
            for (int i = 0; i<list.size(); i++)
                // Printing elements one by one
                System.out.print(" "+list.get(i));

            // Creating the array and using toArray()
            Object[] arr = list.toArray();
            System.out.println("\nPrinting the list using Array() ---");
            for (int i = 0; i<arr.length; i++)
                System.out.print(" "+arr[i]);
            System.out.println();
```

```
    }  
    catch(Exception e)  
    {  
        System.out.println("\nProgram ended.....");  
        System.out.println("Exception : "+e.getMessage());  
    }  
}
```

---

## Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac VectorExample.java  
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java VectorExample  
Program ended.....  
Exception : Index 0 out of bounds for length 0  
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java VectorExample 11 12 13 14 15  
[11, 12, 13, 14, 15]  
[11, 12, 13, 15]  
Printing the list using list.get() -----  
11 12 13 15  
Printing the list using Array() -----  
11 12 13 15  
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q13) write a program to check that the given String is palindrome or not.**

**Ans :-**

---

```
// Java Program to check that the given String is palindrome or not.
import java.util.Scanner;
public class Palindrome{
    // Function that returns true if str is a palindrome
    static boolean isPalindrome(String str)
    {
        // Pointers pointing to the beginning and the end of the string
        int i = 0, j = str.length() - 1;

        // While there are characters to compare
        while (i < j)
        {
            // If there is a mismatch
            if (str.charAt(i) != str.charAt(j))
                return false;

            // Increment first pointer and decrement the other
            i++; j--;
        }
        // Given string is a palindrome
        return true;
    }

    public static void main(String[] args)
    {
        Scanner input= new Scanner(System.in);
        System.out.print("\nEnter a string to check : ");
        String str=input.nextLine();

        if (isPalindrome(str))
            System.out.println(str + " is a palindrome.");
        else
            System.out.println(str + " is not a
            palindrome.");
    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Palindrome.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Palindrome
Enter a string to check : ABCDCBA
ABCDcba is a palindrome.
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q14) write a program to arrange the String in alphabetical order.**

**Ans :-**

---

```
// Java Program to arrange the String in alphabetical order
import java.util.Scanner;
public class StringArrange{
    public static void main(String[] args)
    {
        int count;
        String temp;
        Scanner scan = new Scanner(System.in);

        //User will be asked to enter the count of strings
        System.out.print("\nEnter number of strings you
        would like to enter:");
        count = scan.nextInt();

        String str[] = new String[count];
        Scanner scan2 = new Scanner(System.in);

        //User is entering the strings and they are stored
        in an array
        System.out.println("Enter the Strings one by one:");
        for(int i = 0; i < count; i++)
        {
            str[i] = scan2.nextLine();
        }
        scan.close();
        scan2.close();

        //Sorting the strings
        for (int i = 0; i < count; i++)
        {
            for (int j = i + 1; j < count; j++)
            {
                if (str[i].compareTo(str[j])>0)
                {
                    temp = str[i];
                    str[i] = str[j];
                    str[j] = temp;
                }
            }
        }

        //Displaying the strings after sorting them based on
        alphabetical order
        System.out.println("\nStrings in Sorted Order : ");
```



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```
        for (int i = 0; i <= count - 1; i++)
        {
            System.out.print(str[i] + ", ");
        }
        System.out.println();
    }
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac StringArrange.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java StringArrange
Enter number of strings you would like to enter: 6
Enter the Strings one by one:
Bhupendra
Manish
Jayesh
Vedvyash
Anurag
Jeetu

Strings in Sorted Order :
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C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q15) write a program for StringBuffer class which perform the all methods of that class.**

**Ans :-**

---

**// Java Program for StringBuffer class which perform the all methods of that class**

```
import java.util.*;
public class StringBufferExample{

    public static void main(String args[]){

        //initialized StringBuffer object
        StringBuffer sb = new StringBuffer("Good
Morning...");
        System.out.println("\n"+sb);
        //append to String1
        sb.append(" Hello!!");
        //prints "Good Morning... Hello!!" after appending
        System.out.println(sb);
        //insert Namste!! with beginning position 0
        sb.insert(0,"Namste!! ");
        //prints "Namste!! Good Morning... Hello!!"
        System.out.println(sb);
        // replace Morning with Evening
        sb.replace(13,20," Evening");
        //prints "Namste!! Good Morning... Hello!!"
        System.out.println(sb);
        //delete string beginning with position 0 to 3
        sb.delete(0,8);
        //prints "Good Morning... Hello!!"
        System.out.println(sb);
        //StringBuffer reverse() Method
        sb.reverse();
        System.out.println(sb);
        //prints capacity of buffer
        System.out.println("capacity of buffer is: " +
sb.capacity());
    }
}
```

---

## Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac StringBufferExample.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java StringBufferExample
Good Morning...
Good Morning... Hello!!
Namste!! Good Morning... Hello!!
Namste!! Good Eveningg... Hello!!
Good Eveningg... Hello!!
!!olleH ...ggninevE dooG
capacity of buffer is: 64
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q16) write a program to calculate Simple interest using the Wrapper class.**

**Ans :-**

---

**// Java Program to calculate Simple interest using the Wrapper class.**

```
import java.util.Scanner;
class SimpleInterest{

    public static void main(String args[]){

        int principleAmount, rate, time ,si;
        Scanner input = new Scanner(System.in);

        System.out.print("\nEnter principle amount : ");
        String p = input.nextLine();

        System.out.print("Enter rate : ");
        String r = input.nextLine();

        System.out.print("Enter time : ");
        String t = input.nextLine();

        principleAmount = Integer.parseInt(p);
        rate = Integer.parseInt(r);
        time = Integer.parseInt(t);

        si = (principleAmount * rate * time )/100;
        System.out.println("Simple Interest is : " + si );

    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac SimpleInterest.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java SimpleInterest
Enter principle amount : 10000
Enter rate : 10
Enter time : 1
Simple Interest is : 1000
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q17) write a program to calculate Area of various geometrical figures using the abstract class.**

**Ans :-**

---

```
// Java Program to calculate Simple interest using the Wrapper class.
import java.util.*;
//abstract class
abstract class Shape{
    //abstract method declaration, Abstract method (does not
    have a body)
    abstract public void areaCalculation();
    abstract public void readData();
}

class Rectangle extends Shape{
    private int a,b;
    //method overriding
    public void readData(){
        System.out.print("\n\nEnter two sides of Rectangle : ");
        Scanner sidein = new Scanner(System.in);
        a = sidein.nextInt();
        b = sidein.nextInt();
    }
    public void areaCalculation(){
        int area;
        area = a * b;
        System.out.println("Area of Rectangle is : " + area);
        System.out.println("\n<----->");
    }
}

class Circle extends Shape{
    private double radius;
    //method overriding
    public void readData(){
        System.out.print("\nEnter Radius of circle : ");
        Scanner radiusin = new Scanner(System.in);
        radius= radiusin.nextDouble();
    }
    public void areaCalculation(){
        double area = (22/7) * radius * radius;
        System.out.println("Area of circle is : " + area);
    }
}
```

```
public class AbstractArea{
    public static void main(String args[]){
        //Reference variable of Shape
        Shape s;

        s= new Rectangle();    // Creating object of abstract class
        s.readData();
        s.areaCalcultion();

        s=new Circle(); // Creating object of abstract class
        s.readData();
        s.areaCalcultion();

    }
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac AbstractArea.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java AbstractArea

Enter two sides of Rectangle : 12 15
Area of Rectangle is : 180

<----->

Enter Radius of circle : 21
Area of circle is : 1323.0

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```

**Q18) write a program where Single class implements more than one interfaces and with help of interface reference variable user call the methods.**

**Ans :-**

---

```
// Java Program to calculate Simple interest using the Wrapper class.
import java.util.*;
//interface
interface CircleArea{
    final static float pi = 3.14F;
    float compute(float x); //interface method
}
interface RectangleArea{
    int calculate(int l,int w); //interface method
}
//Test implements interface CircleArea and RectangleArea
class Test implements CircleArea,RectangleArea
{
    //the body of compute provided here
    public float compute(float x) {    return(pi*x*x);    }

    //the body of calculate provided here
    public int calculate(int l,int w) {    return(l*w);    }

}
class Interface{

    public static void main(String args[]){
        CircleArea cir;
        RectangleArea rect;

        //Creates a Test object
        Test Area = new Test();
        cir = Area;
        System.out.println("\nArea of circle : "+
        cir.compute(49));

        rect = Area;
        System.out.println("Area of Rectangle : " +
        rect.calculate(5,20));

    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Interface.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Interface
Area of circle : 7539.14
Area of Rectangle : 100
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```



**Q19) write a program that use the multiple catch statements within the try-catch mechanism.**

**Ans :-**

---

```
//Java Program for Multiple Catch Exceptions
public class MultipleCatch {

    public static void main(String[] args) {

        try
        {
            int a[]=new int[5];
            a[5]=30/0;
        }
        //Arithmetic Exception occurs
        catch(ArithmeticException e)
        {
            System.out.println("\nArithmetic Exception
occurs");
        }
        //Array Index Out Of Bounds Exception occurs
        catch(ArrayIndexOutOfBoundsException e)
        {
            System.out.println("ArrayIndexOutOfBoundsException
occurs");
        }
        //Other Exception occurs
        catch(Exception e)
        {
            System.out.println("Parent Exception occurs");
        }
        System.out.println("rest of the code");
    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac MultipleCatch.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java MultipleCatch
Arithmetic Exception occurs
rest of the code
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q20) write a program where user will create a self- Exception using the “throw” keyword.**

**Ans :-**

---

//Java Program for user will create a self- Exception using the “throw” keyword

```
import java.lang.Exception;
class Throw{
    public static void main(String args[]){
        int balance=5000;
        int withdrawlAmount=6000;
        try
        {
            if(balance< withdrawlAmount)
            {
                throw new
                ArithmeticException("Insufficient balance");
            }
            balance=balance-withdrawlAmount;
            System.out.println("Transaction successfully
            completed");
        }
        catch(ArithmeticException e)
        {
            System.out.println("\nException: "+ e.getMessage());
        }
        finally
        {
            System.out.println("Program continue.....");
        }
    }
}
```

---

**Output:-**

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Throw.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Throw
Exception: Insufficient balance
Program continue.....
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q21) write a program for multithread using is Alive(), join() and synchronized() methods of thread class**

**Ans :-**

---

```
//Java Program for multithread using is Alive(), join() and
// synchronized() methods of thread class
class Booking
{
    int total_seats=20;

    //Synchronized function
    synchronized void bookseat(int seats)
    {
        if(total_seats>=seats)
        {
            System.out.println("\nSeat Book Successfull...!!");
            total_seats=total_seats-seats;
            System.out.println("Total seat Left : "+total_seats);
        }
        else
        {
            System.out.println("\nSeat cannot be Booked");
            System.out.println("Only "+total_seats + "
available");
        }
    }
}

//Extending thread class
class cutomer extends Thread
{
    static Booking b1=new Booking();
    int seat;
    public void run()
    {
        try
        {
            b1.bookseat(seat);
        }

        catch(NullPointerException e)
        {
            e.printStackTrace();
        }
    }
}

public class Synchro
{
    public static void main(String[] args)
```

```
{
    cutomer C1=new cutomer();
    cutomer C2=new cutomer();
    C2.seat=19;
    C1.seat=8;

    C1.start();
    C2.start();
    //isAlive() method
    System.out.println(C1.isAlive());
    try
    {
        //Thread sleep() and join method
        C2.sleep(2000);
        C1.join();
    }
    catch (Exception e)
    {
        System.out.println("Exception : "+e.getMessage());
    }
}
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Synchro.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Synchro
true

Seat Book Successfull...!!
Total seat Left : 1

Seat cannot be Booked
Only 1 available

C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Synchro.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Synchro
true

Seat Book Successfull...!!
Total seat Left : 12

Seat cannot be Booked
Only 12 available

C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q22) write a program to create a package using command and one package will import another package.**

**Ans :-**

---

```
//Java Program to create a package using command
// Save by ArithmeticOperations.java and
//compile as > javac -d . ArithmeticOperations.java
package Pack1; //Creating package
import java.util.Scanner;
public class ArithmeticOperations
{
    private Scanner input = new Scanner(System.in);

    public int Addition(){
        int a = input.nextInt();
        int b = input.nextInt();
        return a+b;
    }

    public int Subtract(){
        int a = input.nextInt();
        int b = input.nextInt();
        return a-b;
    }

    public int Multiplication(){
        int a = input.nextInt();
        int b = input.nextInt();
        return a*b;
    }

    public float Division(){
        float a = input.nextFloat();
        float b = input.nextFloat();
        return a/b;
    }
}
```

---

---

```
//Main class and method
//Save by ExamplePackage.java
import Pack1.ArithmeticOperations;    //Importing Pack1.
ArithmeticOperations class
class ExamplePackage
{
    public static void main(String args[])
    {
        ArithmeticOperations obj = new ArithmeticOperations();
        System.out.print("\nAddition : Enter Two Number - ");
        float result = obj.Addition();
        System.out.println("Result is :"+result);

        System.out.print("\nSubtraction : Enter Two Number - ");
        result = obj.Subtract();
        System.out.println("Result is :"+ result);

        System.out.print("\nMultiplication : Enter Two Number - ");
        result = obj.Multiplication();
        System.out.println("Result is :"+result);

        System.out.print("\nDivision : Enter Two Number - ");
        result = obj.Division();
        System.out.println("Result is :"+result);
    }
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac -d . ArithmeticOperations.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac ExamplePackage.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java ExamplePackage
Addition : Enter Two Number - 12 18
Result is :30.0
Subtraction : Enter Two Number - 45 21
Result is :24.0
Multiplication : Enter Two Number - 19 17
Result is :323.0
Division : Enter Two Number - 22 7
Result is :3.142857
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q23) write a program for JDBC to insert the values into the existing table by using prepared statement.**

**Ans :-**

---

//Java Program to insert the values into the existing table by using prepared statement.

```
import java.io.*;
import java.sql.*;
import java.util.*;
public class Database{
    public static void main(String args[]){
        int roll;
        String name,city, str;
        try{            //step1 load the driver class
            Class.forName("oracle.jdbc.driver.OracleDriver");

            //step2 create the connection object
            Connection con =
            DriverManager.getConnection("jdbc:oracle:thin:@localhost:
            1521:xe","bhupendra","dbms@12");
            System.out.println("\nDatabase connection is done !");

            //step3 create the statement object
            Statement stmt = con.createStatement();

            //step4 execute query
            System.out.println("\n<---STUDENT table is selected ---
            >");
            InputStreamReader input= new InputStreamReader(System.in);

            BufferedReader buffer = new BufferedReader(input);

            System.out.print("\nEnter rollno : " );
            str = buffer.readLine();
            roll = Integer.parseInt(str);

            System.out.print("Enter name : " );
            name = buffer.readLine();
```

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```
System.out.print("Enter Address : " );
city = buffer.readLine();

int count = stmt.executeUpdate("Insert into Students
values("+roll+", '"+name+"', '"+city+"'");

if (count>0)
    System.out.println("\n<-----Data inserted
successfully----->\n");
else
    System.out.println("Data insertion failed!!!!!!");

//step5 close the connection object
con.close();
}
catch(Exception e)
{
    System.out.println(e);
}
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac Database.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java Database
Database connection is done !
<---STUDENT table is selected --->
Enter rollno : 5507
Enter name : Bhupendra
Enter Address : Raipur
<-----Data inserted successfully----->
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```



**Q24) write a program for JDBC to display the records from the existing table.**

**Ans :-**

---

**//Java Program for JDBC to display the records from the existing table.**

```
import java.lang.*;
import java.sql.*;
public class OracleCon{
    public static void main(String args[]){
        String sname,city;
        int id;

        try{
            //step1 load the driver class
            Class.forName("oracle.jdbc.driver.OracleDriver");

            //step2 create the connection object
            Connection con =
            DriverManager.getConnection("jdbc:oracle:thin:@localhost:
            1521:xe","bhupendra","dbms@12");
            System.out.println("\nDatabase connection done");

            //step3 create the statement object
            Statement stmt = con.createStatement();

            //step4 execute query
            ResultSet rs = stmt.executeQuery("select * from
            Students");
            while(rs.next())
            {
                id = rs.getInt("S_ID");
                sname = rs.getString("S_NAME");
                city = rs.getString("S_ADDRESS");

                System.out.println("\t|"+id+"\t| "+sname+" \t|
                "+city+"\t|");
            }
            //step5 close the connection object
            con.close();
        }
    }
}
```

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```
        catch(Exception e)
        {
            System.out.println("Exception occur : ");
            System.out.println(e);
        }
    }
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac OracleCon.java
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java OracleCon
Database connection done
    5507    Bhupendra    Raipur
    1101    Gaurav    Raipur
    1102    Radhika    Dhamtari
    1103    Nitish    Raigarh
    1104    Raghu    Raipur
    1105    Manisha    Kanker
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```

**Q25) write a program for demonstrate of switch statement ,continue and break.**

**Ans :-**

---

```
//Java Program to demonstrate the example of Switch statement
import java.util.*;
public class SwitchExample {
    public static void main(String[] args) {

        Scanner input=new Scanner(System.in);
        System.out.print("\nEnter number of day :");
        int Day = input.nextInt();
        switch (Day) {
            case 7:
                System.out.println("Today is Sunday");
                break;
            case 1:
                System.out.println("Today is Monday");
                break;
            case 2:
                System.out.println("Today is Tuesday");
                break;
            case 3:
                System.out.println("Today is Wednesday");
                break;
            case 4:
                System.out.println("Today is Thursday");
                break;
            case 5:
                System.out.println("Today is Friday");
                break;
            case 6:
                System.out.println("Today is Saturday");
                break;
        }
        System.out.println("\n<<----->>\n");
        System.out.println("Java program to demonstrates the
        continue");
        for (int i = 0; i < 10; i++)
        {    // If the number is 2 skip and continue
            if (i == 2)
                continue;

            System.out.print(i + " ");
```

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```
    }  
    System.out.println();  
}  
}
```

---

### Output:-

```
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>javac SwitchExample.java  
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>java SwitchExample  
Enter number of day : 5  
Today is Friday  
  
<<----->>  
  
Java program to demonstrates the continue  
0 1 3 4 5 6 7 8 9  
  
C:\Users\credible-computer\Desktop\batch\JAVA\New folder>
```