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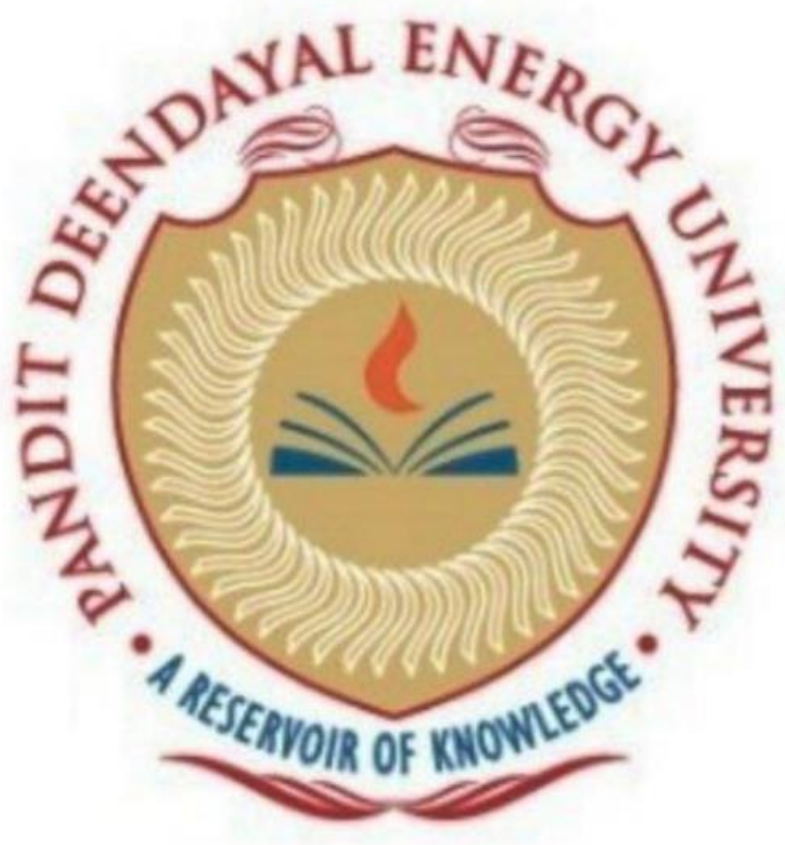
Sem – III

Div-5 , Group-10

Object Oriented Programming with Java Lab

Course Code – 20CP204P



Department of Computer Science Engineering
School of Technology,
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Date of Submission : 29-08-2022

Module-1

With regards to Learning and implementing the various concepts of java

List of Concepts covered

List of programs:

1. Write a program to print - “CODING IS FUN, ENJOY IT!”.

Code:

```
class javaBegins     // Creating class
{
        public static void main(String args[]) // Calling the main() method
{
        System.out.println("Coding in java is fun"); //  for display of a msg
}
}
```

Output:

```
Coding in java is fun
```

2. Write a program in Java to generate first n prime numbers.

Code:

```
import java.util.Scanner;   //import the Scanner class from the directory util

class nPrimeNumber         // Creating class
{
  public static void main(String args[])   // Calling the main() method
{
     int n;               // declaring variables
     int initial = 1;      // initialising a value
     int num = 3;

     Scanner scanner = new Scanner(System.in);
    System.out.println("Enter the value of n:"); // user input for value of n
      n = scanner.nextInt();          // entered value is stored in the var n

 if (n >= 1)       // using if condition for prime number
     {
       System.out.println("First "+n+" prime numbers are:");

       System.out.println(2); // since 2 is a known prime number
```

```
        }

        for ( int i = 2 ; i <=n ;  )  // implementing for loop for prime nos
        {
          for ( int j = 2 ; j <= Math.sqrt(num) ; j++ )
        {
            if ( num%j == 0 )
        {
              initial = 0;
              break;       // coming out of loop if value entered is zero
        }
        }

           if ( initial != 0 ) // for numbers entered other than zero
        {
            System.out.println(num);
            i++;
        }
          initial = 1;
          num++;
        }

    }

    }
```

Output:

```
Enter the value of n:
5
First 5 prime numbers are:
2
3
5
7
11
```

```
Enter the value of n:8
First 8 prime numbers are:
2
3
5
7
11
13
17
19
```

3. Write a program to enter two numbers and perform all arithmetic, comparison, logical and bitwise operations on them.

Code:

```
import java.util.Scanner;       // declaring scanner class
class Arithmetic_Operators
{
  public static void main(String args[])
  {
      int x,y,z;                // initialising variables to be used
      Scanner s = new Scanner(System.in);
      while(true)
      {
         System.out.println("");
         System.out.println("Enter the two numbers to perform operations ");
         System.out.print("Enter the first number : ");
          x = s.nextInt();
         System.out.print("Enter the second number : "); // for user defined input
          y = s.nextInt();
         System.out.println("Choose the operation you want to perform ");
         System.out.println("Press 1 for ADDITION");
         System.out.println("Press 2 for SUBTRACTION");
         System.out.println("Press 3 for MULTIPLICATION");
         System.out.println("Press 4 for DIVISION");
         System.out.println("Press 5 for MODULUS");
         System.out.println("Press 6 for Right Shift by 2:");
         System.out.println("Press 7 for Left Shift by 2:");
         System.out.println("Press 8 for Bitwise AND:");
         System.out.println("Press 9 for Bitwise OR by 2:");
         System.out.println("Press 10 for Bitwise Exclusive OR:");
         System.out.println("Press 11 for Bitwise NOT:");
         System.out.println("Press 12 for Logical AND :");
         System.out.println("Press 13 for Logical OR:");
         System.out.println("Press 14 for Logical NOT");
         System.out.println("Press 15 for equal to");
         System.out.println("Press 16 for not equal to");
         System.out.println("Press 17 for greater than");
         System.out.println("Press 18 for less than");
         System.out.println("Press 19 for greater or equal to");
         System.out.println("Press 20 for less than or equal to");
```

```
System.out.println("Press 21  for Exit");
System.out.println("");
System.out.print("Option:");
int n = s.nextInt();
switch(n)                    // using switch case condition for convenience
{
    // Cases 1-5 for arithmetic operators
    // cases 6-11 for bitwise operators
    // cases 12-14 for logical operators
    // cases 14-20 for comparison operators

   case 1:
   int add;
   add = x + y;
   System.out.println("Result : "+add);
   break;

   case 2:
   int sub;
   sub = x - y;
   System.out.println("Result : "+sub);
   break;

   case 3:
   int mul;
   mul = x * y;
   System.out.println("Result : "+mul);
   break;

   case 4:
   float div;
   div = (float) x / y;
   System.out.print("Result : "+div);
   break;

   case 5:
   int mod;
   mod = x % y;
   System.out.println("Result : "+mod);
```

```
break;

 case 6:
z = x << 2;
System.out.println("Result after left shift by 2:"+z);
break;

case 7:
z = y >> 2;
System.out.println("Result after right shift by 2:"+z);
break;

case 8:
z = x & y;
System.out.println("Result after bitwise AND:"+z);
break;

case 9:
z = x | y;
System.out.println("Result after bitwise OR:"+z);
break;

case 10:
z = x ^ y;
System.out.println("Result after bitwise Exclusive OR:"+z);
break;

case 11:
z = ~ x;
System.out.println("Result after bitwise NOT:"+z);
break;

case 12:
System.out.println((x > 3) && (y < 9));
break;

case 13:
System.out.println((x > 3) || (y < 9));
break;
```

```
            case 14:
            System.out.println(!(x>y));
            break;

            case 15:
              System.out.println(x == y);
               break;

             case 16:
              System.out.println(x != y);
               break;

             case 17:
             System.out.println(x > y);
               break;

             case 18:
             System.out.println(x < y);
               break;

             case 19:
             System.out.println(x >= y);
               break;

             case 20:
             System.out.println(x <= y);
               break;

             case 21:
             System.out.println(x <= y);
               break;
          }
       }
    }
}
```

Input:

```
Enter the first number : 345
Enter the second number : 178
Choose the operation you want to perform
Press 1 for ADDITION
Press 2 for SUBTRACTION
Press 3 for MULTIPLICATION
Press 4 for DIVISION
Press 5 for MODULUS
Press 6 for Right Shift by 2:
Press 7 for Left Shift by 2:
Press 8 for Bitwise AND:
Press 9 for Bitwise OR by 2:
Press 10 for Bitwise Exclusive OR:
Press 11 for Bitwise NOT:
Press 12 for Logical AND :
Press 13 for Logical OR:Press 14 for Logical NOT
Press 15 for equal to
Press 16 for not equal to
Press 17 for greater than
Press 18 for less thanPress 19 for greater or equal to
Press 20 for less than or equal to
Press 21  for Exit

Option:17
```

Output:

```
true
```

4. Write a program that scans marks and credits of 2 subjects of the student and calculate the following:

i)Grade of each subject (using else if ladder),

ii)Gradepoint of each subject from grade (using switch case),

iii)SPI using gradepoints and credits of 2 subjects.

Code:

```
import java.util.Scanner;          // declaring scanner class


public class spi_of_marks ;
{
   public static void main(String[] args)   //calling main() method
{
       Scanner sc = new Scanner(System.in);
       // Entries of marks
       System.out.println("Enter marks for Physics: ");
       int m1 = sc.nextInt();
       System.out.println("Enter marks for chemistry: ");
       int m2 = sc.nextInt();

       int ch1 = 4;    //initialising values to variables
       int ch2 = 3;
       char grd1, grd2;

       // condition for marks of physics
       if(m1>79){
```

```
    grd1 = 'O';
}
else if(m1>69){
    grd1 = 'A';
}
else if(m1>59){
    grd1 = 'B';
}
else {
    grd1 = 'C';
}

// condition for marks of chemistry
if(m2>79)
{
    grd2 = 'O';
}
else if(m2>69){
    grd2 = 'A';
}
else if(m2>59){
    grd2 = 'B';
}
else
{
    grd2 = 'C';
```

```
}

int gp1 = 0;
int gp2 = 0;

switch(grd1)          // switch case condition for grade to grade point
{
   case 'O': gp1 = 10;
   break;
   case 'A': gp1 = 9;
   break;
   case 'B': gp1 = 8;
   break;
   case 'C': gp1 = 7;
   break;
}

switch(grd2)
{
   case 'O': gp2 = 10;
   break;
   case 'A': gp2 = 9;
   break;
   case 'B': gp2 = 8;
   break;
   case 'C': gp2 = 7;
```

```
            break;
        }
        // display the required input to user
        System.out.println("Grade for 1st subject is:"+grd1);
        System.out.println("Grade for 1st subject is:"+grd2);
        System.out.println("Gradepoint for 1st subject is:"+gp1);
        System.out.println("Gradepoint for 2st subject is:"+gp2);

        float SPI = (float)(gp1*ch1 + gp2*ch2)/7;   // for calculating SPI
        System.out.println("SPI : " + SPI);
        sc.close();

    }
}
```

Output:

1.

```
Enter marks for Physics:
78
Enter marks for chemistry:
34
Grade for 1st subject is:A
Grade for 1st subject is:C
Gradepoint for 1st subject is:9
Gradepoint for 2st subject is:7
SPI : 8.142858
```

2.

```
Enter marks for Physics:
87
Enter marks for chemistry:
56
Grade for 1st subject is:O
Grade for 1st subject is:C
Gradepoint for 1st subject is:10
Gradepoint for 2st subject is:7
SPI : 8.714286
```

5. Write a program in Java to find maximum of three numbers using nested if-else and conditional operator.

Code:

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

   public static void main(String[] args)
{

      float num1,num2,num3;              // declaring variables
      Scanner sc = new Scanner(System.in);
      System.out.println("Enter 1st number:");
      num1=sc.nextFloat();
      System.out.println("Enter 2nd number:");
      num2=sc.nextFloat();
      System.out.println("Enter 3rd number:");
      num3=sc.nextFloat();


       // Using if-else condition
       if(num1 >= num2)
       {
          if(num1 >= num3)
             System.out.println(num1 + " is the largest number.");
          else
             System.out.println(num3 + " is the largest number.");
       } else
       {
          if(num2 >= num3)
             System.out.println(num2 + " is the largest number.");
          else
             System.out.println(num3 + " is the largest number.");
       }
}
}
```

Output:

1.

```
Enter 1st number:54
Enter 2nd number:
45
Enter 3rd number:
-9
54.0 is the largest number.
```

2.

```
Enter 1st number:
23
Enter 2nd number:
878
Enter 3rd number:
90
878.0 is the largest number.
```

6. Write a program to accept a line and check how many consonants and vowels are there in a line.

Code:

```
import java.util.Scanner;
 public class VcCount
{
  public static void main(String[] args)
{
    Scanner scanner = new Scanner(System.in);
    System.out.print("Input string : ")

    String str = scanner.nextLine();
    scanner.close();

    str = str.toLowerCase();

    int vc = 0, cc = 0;

    for (int i = 0; i < str.length(); i++)
{
      // Condition for Checking if the character is a vowel

      if (str.charAt(i) == 'a' || str.charAt(i) == 'e' || str.charAt(i) == 'i'
                          || str.charAt(i) == 'o' || str.charAt(i) == 'u')
{
       vc++;
}
      // Checking if the character is a consonant
      else if (str.charAt(i) >= 'a' && str.charAt(i) <= 'z')
{
       cc++;
}
    }

    System.out.println("Number of vowels: " + vc);

    System.out.println("Number of consonants: " + cc);
  }
}
```

Output:

1

```
Input string : Special task forces
Number of vowels: 6
Number of consonants: 11
```

2

```
Input string : Stumble guys
Number of vowels: 3
Number of consonants: 8
```

7. Write a program to count the number of words that start with capital letters.

Code:

```
import java.util.Scanner;
public class UppercaseLetters
{
 public static void main(String[] args)
{
       // for displaying string type input from user
   Scanner string = new Scanner(System.in);

   System.out.print("Enter string: ");
   String str = string.nextLine();



   char c;
   int cl=0;

   for(int i=0;i<str.length();i++)     // condition for words starting with uppercase
letters
{
   c=str.charAt(i);
   if(c>=65 && c<=90)        // char values as per ASCII
{
   cl++;
}
}
   System.out.println("total  number of words start with capital letters are :"+cl);
}
}
```

Output:

1

```
Enter string: Hey there What's up
total  number of words start with capital letters are :2
```

2

```
Enter string: Say Shazam
total  number of words start with capital letters are :2
```

8. Create a class which ask the user to enter a sentence, and it should display count of each vowel type in the sentence. The program should continue till user enters a word “quit”. Display the total count of each vowel for all sentences.

Code:

```
import java.util.Scanner;
class Vwlcount
{
   public static int a,e,i,o,u;       //As we need to be specific about vowels

   public static void main(String m[])
{

   Scanner in=new Scanner(System.in);
   String s=new String();
   while(true)
{

   int ta=0,te=0,ti=0,to=0,tu=0;

   System.out.println("Enter A line :");
   s=in.nextLine();

   if(s.equals("quit"))
{
   break;
}
   else
{
   int n=s.length()-1;

   for(int k=0;k<=n;k++)
{

   switch(s.charAt(k))     //for irrespective counting of uppercase or lowercase
{
case 'a' : case 'A' : a++; ta++; break;
```

```
case 'e' : case 'E' : e++; te++;break;
case 'i' : case 'I' : i++;  ti++; break;
case 'o' : case 'O' : o++; to++; break;
case 'u' : case 'U' : u++; tu++; break;
}

}

System.out.println("\n\n In this statement:");
System.out.println("a comes: "+ta+" times");
System.out.println("e comes :"+te+" times");
System.out.println("i comes :"+ti+" times");
System.out.println("o comes: "+to+" times");
System.out.println("u comes :"+tu+" times");
}
}

System.out.println("a comes "+a+" times");
System.out.println("e comes "+e+" times");
System.out.println("i comes "+i+" times");
System.out.println("o comes "+o+" times");
System.out.println("u comes "+u+" times");
}
}
```

Output:

1

```
Enter A line :
Tom and Jerry
In this statement:
a comes: 1 times
e comes :1 times
i comes :0 times
o comes: 1 times
u comes :0 times
```

2

```
Enter A line :
Scooby Doo
In this statement:
a comes: 0 times
e comes :0 times
i comes :0 times
o comes: 4 times
u comes :0 times
```

9. Write an interactive program to print a string entered in a pyramid form.

Code:

```
import java.util.Scanner;
public class printPyramid
{
   public static void main(String[] args)
{
   Scanner string = new Scanner(System.in);

   System.out.print("Enter the line: ");

   String str = string.nextLine();        // user input

      for (int i = 0; i <= str.length(); i++)     // for loop for creating pyramid
{

         for (int j = i; j < str.length(); j++)  // for rows

{
            System.out.print(" ");
}

         for (int j = 0; j < i; j++)           // regarding columns
{
            System.out.print(str.charAt(j) + " ");
}
         System.out.println("");
}
      string.close();
}
}
```

Output:

1

```
Enter the line: India
    I
   I n
  I n d
 I n d i
I n d i a
```

2

```
 Enter the line: Lynn
    L
   L y
  L y n
 L y n n
```

10. Write an interactive program to print a diamond shape.

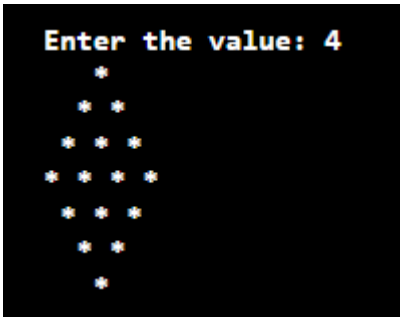
Code:

```
import java.util.Scanner;
public class diamondPattern
{
 public static void main(String[] args)
{
  int num;
  Scanner number = new Scanner(System.in);
  System.out.print("Enter the value: ");      // user input
   num = number.nextInt();

          // first half of diamond of incremation

      for (int i = 1; i <= num; i++)
{
      for (int j = 0; j < num - i; j++)
   {
              System.out.print(" ");
   }
          for (int j = 0; j < i; j++)
      {
              System.out.print("* ");
      }
              System.out.println();
```

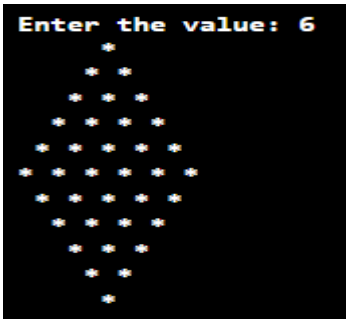
```
        }
        // Second half of diamond of Decrementation
            for (int i = num; i >= 0; i--)
        {
            for (int j = num - i; j >= 0; j--)
        {
                System.out.print(" ");
        }
            for (int j = 0; j < i - 1; j++)
        {
                System.out.print("* ");
        }
                System.out.println();
        }
        number.close();
    }
}
```

Output:

1



2



11. Develop minimum 4 program based on variation in methods i.e., passing by value, passing by reference, returning values and returning objects from methods.

1. Passing by value

Code:

```
// implementing concept of passing by value using swap function
import java.util.Scanner;
public class SwapFun
{
public static void main(String args[])

{

int x, y;

Scanner sc = new Scanner(System.in);

System.out.print("Enter the first number: ");

x = sc.nextInt();

System.out.print("Enter the second number: ");
y = sc.nextInt();

System.out.println("Before Swapping\nx = "+x+"\ny = "+y);
swap(x, y);

}

public static void swap(int a, int b)

{  a = a + b;
b = a - b;
a = a - b;
System.out.println("After Swapping x = "+a+"\ny = "+b);

   }
}
```

Output:

1

```
Enter the first number:34
Enter the second number:45
Before Swapping
x = 34
y = 45
After Swapping
x = 45
y = 34
```

2

```
Enter the first number:89
Enter the second number:2432
Before Swapping
x = 89
y = 2432
After Swapping
x = 2432
y = 89
```

2. Call by reference

Code:

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

int num1 = 434;
int num2 = 987;
System.out.println("The values before swapping are: num 1 = " + num1 + " and
num 2 = " + num2);

swapByReference(num1, num2);    // calling function by reference

System.out.println("The numbers before and after swapping will be same in
main:");
System.out.println("Once the swapping is done, the values will be back to
original: num1 = " + num1 + " and num2 is " + num2);

}

public static void swapByReference(int num1, int num2)
```

```
{

System.out.println("Before swapping in function, num1 = " + num1 + " num2 =
" + num2);

int temp = num1;
num1 = num2;
num2 = temp;

System.out.println("After swapping in function , num1 = " + num1 + " num2 = "
+ num2);

}

}
```

Output:

```
The values before swapping are: num 1 = 434 and num 2 = 987
Before swapping in function, num1 = 434 num2 = 987
After swapping in function , num1 = 987 num2 = 434

The numbers before and after swapping will be same in main:
Once the swapping is done, the values will be back to original: num1 = 434 and num2 is 987
```

3. Returning value

Code:

```
// Implementing return values using area
import java.util.Scanner;

public class Returnvalue
{
   public static void main(String[] args)
{
            double width, height, Area, Perimeter;
            Scanner sc = new Scanner(System.in);

            System.out.println(" Please Enter the Width of a Rectangle =  ");
            width = sc.nextDouble();
            System.out.println(" Please Enter the Height of a Rectangle = ");
            height = sc.nextDouble();

            Area = width * height;
            Perimeter = 2 * (width + height);

            System.out.format("  Area of Rectangle = %.2f\n",Area);
            System.out.format("  Perimeter of Rectangle = %.2f\n", Perimeter);
   }

}
```

Output:

```
Please Enter the Width of a Rectangle = 36
Please Enter the Height of a Rectangle = 72
 Area of Rectangle = 2592.00
 Perimeter of  Rectangle = 216.00
```

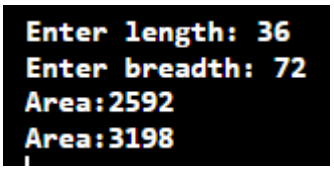
4. Returning objects

Code:

```
// Implementing how to return an object

import java.util.Scanner;
public class object_Return
{
   int length, breadth, area;

   Object_Pass_Ret area1(Object_Pass_Ret object1)
{
       obj1 = new Object_Pass_Ret();
       obj1.length = this.length;
       obj1.breadth = this.breadth;
       obj1.area = objt1.length * obj1.breadth;
       return obj1;

}

        Object_Pass_Ret area2(Object_Pass_Ret object2)

{
       obj2 = new Object_Pass_Ret();
       obj2.length = this.length + 5;
       obj2.breadth = this.breadth + 6;
       obj2.area = obj2.length * obj2.breadth;
       return obj2;
}

       public static void main(String[] args)

{
        Object_Pass_Ret obj = new Object_Pass_Ret();

        Scanner s = new Scanner(System.in);
       System.out.print("Enter length:");
       obj.length = s.nextInt();

        System.out.print("Enter breadth:");
       obj.breadth = s.nextInt();
```

```
        Object_Pass_Ret x = obj.area1(obj);

        Object_Pass_Ret y = obj.area2(obj);
        System.out.println("Area:"+x.area);

        System.out.println("Area:"+y.area);
    }
}
```

Output:



12. Write a Java Program to find area of Geometric figures using method Overloading.

Code:

```
class areaOverload
{
   void area(float x)    // for square
   {
      System.out.println(" area of the square is "+Math.pow(x, 2)+" sq units");
   }
   void area(float x, float y)  // for rectangle
   {
      System.out.println(" area of the rectangle is "+x*y+" sq units");
   }
   void area(double x,double y,double z)  // for trapezoid
   {
      double a = (x+y)*z/2;
      System.out.println(" area of the Trapezoid is "+a+" sq units");
   }
}
public class Overload
{
    public static void main(String args[])
    {
       areaOverload ar = new areaOverload();
       ar.area(8);
       ar.area(22,12);
       ar.area(2,5,6);
       }
}
```

Output:

```
area of the square is 64.0 sq units
area of the rectangle is 264.0 sq units
area of the Trapezoid is 21.0 sq units
```

13. Write a program in Java to create a simple scientific calculator using Math Class.

Code:

```
// Write a program in Java to create a simple scientific calculator using Math Class
import java.util.Scanner;
public class SciCalc
{
   //for addition
   static void Addition(int num1, int num2)
   {
      int add=num1+num2;
      System.out.println(("Answer: "+add));
   }
      //for subtraction
   static void Subtraction(int num1, int num2)
   {
      int sub=num1-num2;
      System.out.println(("Answer: "+sub));
   }
      //for multiplying
   static void Multiplication(int num1, int num2)

   {
      int mul=num1*num2;
      System.out.println(("Answer: "+mul));
   }
      //for division
   static void Division(int num1, int num2)
   {
      if (num2!=0)
      {
         int div=num1/num2;
         System.out.println(("Answer: "+div));
      }

      else
         System.out.println("Num2 cannot be zero.");
```

```
    }
    // for sqrt
static void squareRoot(int num)
{
    double root = Math.sqrt(num);
    System.out.println("The root of "+num+" is "+root);
}
    // for cuberoot
static void cubeRoot(int num)
{
    System.out.println("Num2 cannot be zero.");
    double root = Math.cbrt(num);
    System.out.println("The cube root of "+num+" is "+root);
}
        //for squaring
static void square(int num)
{
    double root = Math.pow(num,2);
    System.out.println("The square of "+num+" is "+root);
}
        // regarding trigonometric functions
static void trigo()
{
    System.out.println("-----------------");
    System.out.println("1.Sine");
    System.out.println("2.Cosine");
    System.out.println("3.Tangent");
    System.out.println("-----------------");

    Scanner s = new Scanner(System.in);
    int ch = s.nextInt();

    System.out.println("-----------------");
    System.out.println("Enter the angle :");
    double angle = s.nextDouble();
    angle = Math.toRadians(angle);      //math class for conversion to radians

    switch (ch)        //switch for different trigo functions
    {
        case 1:
```

```
            System.out.println("Math.sin(" + angle + ")=" + Math.sin(angle));
            break;

        case 2:
            System.out.println("Math.cos(" + angle + ")=" + Math.cos(angle));
            break;
        case 3:
            System.out.println("Math.tan(" + angle + ")=" + Math.tan(angle));
            break;

        default:
            System.out.println("The entered choice: ");
    }
}
    public static void main(String[] args)  // calling main function
    {
        System.out.println("---------------------------------- ");
        System.out.println("Enter the operation to be performed:");
        System.out.println("---------------------------------- ");
        System.out.println("1.Addition");
        System.out.println("2.Subtraction");
        System.out.println("3.Multiplication");
        System.out.println("4.Division");
        System.out.println("5.Square Root");
        System.out.println("6.Cube root");
        System.out.println("7.Square");
        System.out.println("8.Trigonometric Functions");
        System.out.println("---------------------------------- ");

        Scanner sc = new Scanner(System.in);
        float ch1 = sc.nextInt();

        if (ch1 == 1|| ch1==2||ch1==3||ch1==4) // two number input for choices 1-4
        {
            int num1,num2;
            System.out.println("Enter num1:");
            num1 = sc.nextInt();
            System.out.println("Enter num2:");
            num2 = sc.nextInt();
```

```
            if (ch1==1)
               Addition(num1, num2);

            else if(ch1==2)
               Subtraction(num1, num2)
            else if (ch1==3)
               Multiplication(num1, num2);

            else
               Division(num1, num2);
         }

         else if(ch1==5||ch1==6||ch1==7)
         {
            int num;

            System.out.println("Enter a number :");
            num = sc.nextInt();

            if (ch1==5)
               squareRoot(num);

            else if(ch1==6)
               cubeRoot(num);

            else if(ch1==7)
               square(num);

         }
            else if(ch1==8)
         {
            trigo();

         }
      }
   }
```

Output:

```
-----------------------------------
Enter the operation to be performed:
-----------------------------------
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Square Root
6.Cube root
7.Square
8.Trigonometric Functions
-----------------------------------
Choice:8
-----------------
1.Sine
2.Cosine
3.Tangent
-----------------
Choice:1
-----------------
Enter the angle :
45
Math.sin(0.7853981633974483)=0.7071067811865475
```

14. Write a program in Java to sort the elements of list so that they are in ascending order.

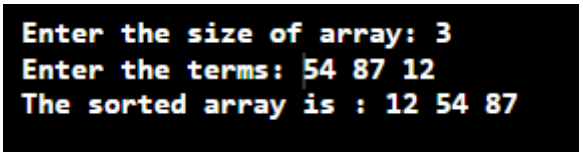
Code:

```
//Write a program in Java to sort the elements of list so that they are in ascending order.

import java.util.Scanner;

public class Sort
{
   static void swap(int[] arr, int i, int j)
   {
      int temp = arr[i];
      arr[i] = arr[j];
      arr[j] = temp;
   }
   static void sort(int[] arr)
   {
      int temp;
      boolean swwap;
      for(int i=0; i<arr.length; i++)
      { swwap = false;
         for(int j=1; j<arr.length-i; j++) if(arr[j-1] > arr[j])
         {
            swap(arr, j-1, j); swwap = true;
         }
         if(!swwap)
            break;
      }
      System.out.print("The sorted array is : ");
      for (int j : arr)
      {
         System.out.print(j +" ");
      }
   }
   static void input()
   {
      int n;
      Scanner sc=new Scanner(System.in);
```

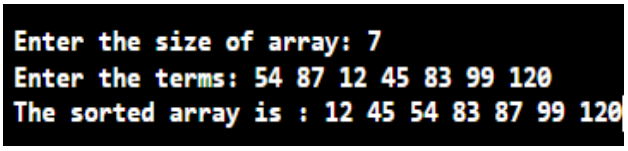
```
        System.out.println("Enter the size of array:");
        n=sc.nextInt();
        int[] arr =new int[n];
        System.out.println("Enter the terms: ");
        for (int i=0;i<n;i++){
            arr[i]=sc.nextInt();
        }
        sort(arr);
    }
    public static void main(String[] args)
    {
        input();
    }
}
```

Output:

1



2



15. Write a program in Java to multiply two matrixes.

Code:

```
import java.util.Scanner;
 class MulMatrix
{
public static void main(String args[])
{
int r1, r2,c1,c2,i,j,k,sum;
Scanner in = new Scanner(System.in);

System.out.println("Enter the number of rows of matrix1:");
r1 = in.nextInt();

System.out.println("Enter the number columns of matrix 1:");
c1 = in.nextInt();
System.out.println("Enter the number of rows of matrix2:");
r2 = in.nextInt();

System.out.println("Enter the number of columns of matrix 2:");
c2 = in.nextInt();

if(c1==r2)
{

int mat1[][] = new int[r1][c1];
int mat2[][] = new int[r2][c2];
int res[][] = new int[r1][c2];

System.out.println("Enter the elements of matrix1");

for ( i= 0 ; i < r1 ; i++ )
{

for ( j= 0 ; j < c1 ;j++ )
mat1[i][j] = in.nextInt();

}
System.out.println("Enter the elements of matrix2");
```

```
for ( i= 0 ; i < r2 ; i++ )
{

for ( j= 0 ; j < c2 ;j++ )
mat2[i][j] = in.nextInt();
}

System.out.println("\n\noutput matrix:-");

for ( i= 0 ; i < r1 ; i++ )

for ( j= 0 ; j <c2;j++)
{
sum=0;
for ( k= 0 ; k <r2;k++ )
{
sum +=mat1[i][k]*mat2[k][j] ;

}
res[i][j]=sum;
}
for ( i= 0 ; i < r1; i++ )
{
for ( j=0 ; j < c2;j++ )
System.out.print(res[i][j]+" ");

System.out.println();
}
}
else
System.out.print("Multipication DNE");
}
}
```

Output:

```
Enter  number of rows of matrix 1: 2
Enter  number columns of matrix 1: 3
Enter number of rows of matrix  2: 3
Enter number of columns of matrix 2: 2
Enter the elements of matrix 1: 12 3 54 65 23 98
Enter the elements of matrix 2: 25 54 76 87 21 45

output matrix:-

1662 3339
5431 9921
```