import java.util.Scanner;

public class LagrangePolynomial

{

       public static void main(String[] args)

       {

                      Scanner myScanner = new Scanner(System.in);

           //Declaration of variables

           int n; //Number of terms

           int count, count2; //Loop variables, for counting loops

           float [] arrayx = new float[200]; //Array limit 199

           float [] arrayy = new float[200]; //Array limit 199

           //The arbitrary value, x to be entered for

           //which the value of y can be known

           float x = 0;

           float y = 0; //The corresponding value, f(x)=y

           float numerator; //The numerator

           float denominator;  //The denominator

           //Promt a user to enter a value

        System.out.print("Enter the number of terms n: ");

        n = myScanner.nextInt(); //Store the value in n

           //Promt user to enter the array for X

        System.out.println("Enter the values that are in xi.");

            for(count = 0; count<n; count++) //Start the loop for X

            {

                 //Promp the user to enter the sequel for xi

                System.out.print("Enter the value for x" + count + ": ");

                //Store the sequel in the Array, arrayx

                arrayx[count] = myScanner.nextFloat();

            }

            //Promt user to enter the array for Y

            System.out.println("Enter the values that are in yi.");

            for(count = 0; count<n; count++) // loop for Y

            {

                //Promp the user to enter the sequel for yi

                System.out.print("Enter the value for y" + count + ": ");

                //Store the sequel in the Array, arrayy

                arrayy[count] = myScanner.nextFloat();

            }

            //Promp the user to enter any (the arbitray)

            //value x to get the corresponding value of y

            System.out.print("Enter the arbitrary value x for which you want the value y: ");

            x = myScanner.nextFloat();  //Store the value in x

            //first Loop for the polynomial calculation

            for(count = 0; count<n; count++)

            {

                 //Initialisation of variable

                numerator = 1; denominator = 1;

                //second Loop for the polynomial calculation

                for(count2 = 0; count2<n; count2++)

                {

                    if (count2 != count)

                    {

                      numerator = numerator \* (x - arrayx[count2]);

                      denominator = denominator \* (arrayx[count] - arrayx[count2]);

                    }

                }

                y = y + (numerator/denominator) \* arrayy[count];

            }

            System.out.println("When x = " + x + "," + " y = " +  y);

    }

}