NAME: RICHARD TAFIRENYIKA
STUDENT NUMBER: 51574268
ASSIGNMENT NUMBER: COS1511 Assignment 2
UNIQUE NUMBER: 393126

1a

```
//Check if student meets the criteria.
while (age >=30 || finalMark <= 65)
{
      // Print student not successful and prompt for next details.
      cout << "Student not successful." << endl;
      cout << "Enter age: ";
      cin >> age;
      cout << "Enter final mark for exam: ";
      cin >> finalMark;
}
// Print student successful once a qualifying student is found.
cout << "Student successful." << endl;
```

1b

	CODE	**OUTPUT**

example	`for (int i = 0; i < 10; i++)`
	`  cout << i;`
	`cout << endl;`
		0123456789

a.	`for (int i = 1; i <= 1; i++)`
	`  cout << "*";`
	`cout << endl;`
		*

b.	`for (int i = 2; i >= 2; i++)`
	`  cout << "*";`
	`cout << endl;`
		Infinity * printing on the console

c.	`for (int i = 1; i <= 1; i--)`
	`  cout << endl;`
	`cout << "*";`
		Infinity next line printing on the console

d.	`for (int = 12; i >= 9; i--)`
	`  cout << "*";`
	`cout << endl;`
		error: 'i' was not declared in this scope

e.	`for (int i = 0; i <= 5; i++)`
	`  cout << "*";`
	`cout << endl;`
		******

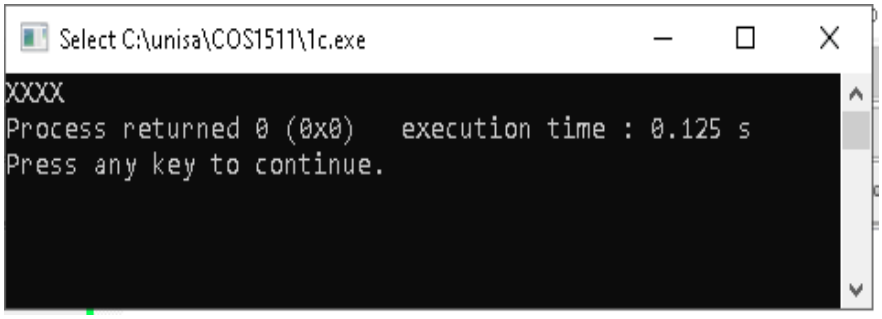
f.	`for (int i = 1; i <= 5; i++)`
	`  cout << "*";`
	`  i = i + 1;`
	`cout << endl;`
		error: 'i' was not declared in this scope

1c

```
#include <iostream>
using namespace std;
int main( )
{
    // Declare and initialise variables
    int n = 9, i = 0;

    while (i <= n)
    {
        // Check condition and print 'X' if met
        if (i < 5 && i != 2)
            cout << 'X';
        i++;
```

```
    }
    return 0;
}
```

OUTPUT



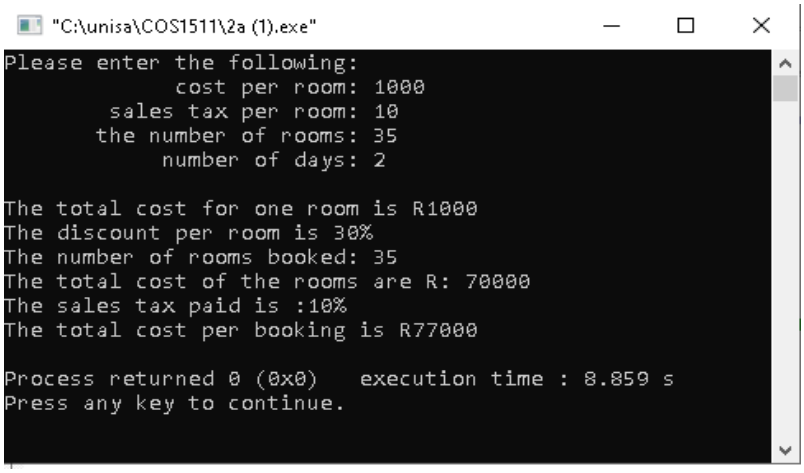
1d

```
#include <iostream>
using namespace std;

int main ()
{
    const int LIMIT = 10;
    int counter, number, zeros = 0, odds = 0, evens = 0;

    cout << "Please enter " << LIMIT << " integers, "
        << "positive, negative, or zeros." << endl;

    cout << "The numbers you entered are:" << endl;

    for (counter = 1; counter <= LIMIT; counter++)
    {
        cin >> number;

        switch (number % 2)
        {
            case 0:
                if (number == 0)
                    zeros++;
                else
                    evens++;
                break;

            case 1:
            case -1:
                odds++;
                break;
        }
    }

    cout << endl;

    cout << "There are " << evens << " evens, "
        << "which includes " << zeros << " zeros."
        << endl;
    cout << "The number of odd numbers is: " << odds
        << endl;
    return 0;
}
```

2a

```
#include <iostream>
#include <iomanip> // for setting column width and alignment
using namespace std;

int main( )
{
    // Declare variables
    int discount = 0, numRooms, daysBooked, roomCost, VAT, costExcl, costIncl;
    // Prompt user for booking details
    cout << setw(27) << "Please enter the following:"<< endl;
    cout << setw(28) << right << "cost per room: ";
    cin >> roomCost;
    cout << setw(28) << right << "sales tax per room: ";
    cin >> VAT;
    cout << setw(28) << right << "the number of rooms: ";
    cin >> numRooms;
    cout << setw(28) << right << "number of days: ";
    cin >> daysBooked;
    cout << endl;

    // Ensure that none of the inputs is zero.
    if (roomCost == 0 || VAT == 0 || numRooms == 0 || daysBooked == 0)
            cout << "Input of zero not allowed!" << endl;

    else
    {
        // Calculate number of rooms based discounts
        if (numRooms >= 30)
            discount = 30;
        else
            if (numRooms >= 20)
                discount = 20;
            else
                if (numRooms >= 10)
                    discount = 10;

        // Check for and add additional discount if applicable
        if (numRooms >= 10 && daysBooked >= 3)
            discount = discount + 5;

        // Calculate cost excluding and including sales tax
        costExcl = roomCost * numRooms * daysBooked;
        costIncl = costExcl * (100 + VAT) / 100;

        // Display output
        cout << "The total cost for one room is R" << roomCost << endl;
        cout << "The discount per room is " << discount << "%" << endl;
        cout << "The number of rooms booked: " << numRooms << endl;
        cout << "The total cost of the rooms are R: " << costExcl << endl;
        cout << "The sales tax paid is :" << VAT << "%" << endl;
        cout << "The total cost per booking is R" << costIncl << endl;
    }

    return 0;
}
```

OUTPUT

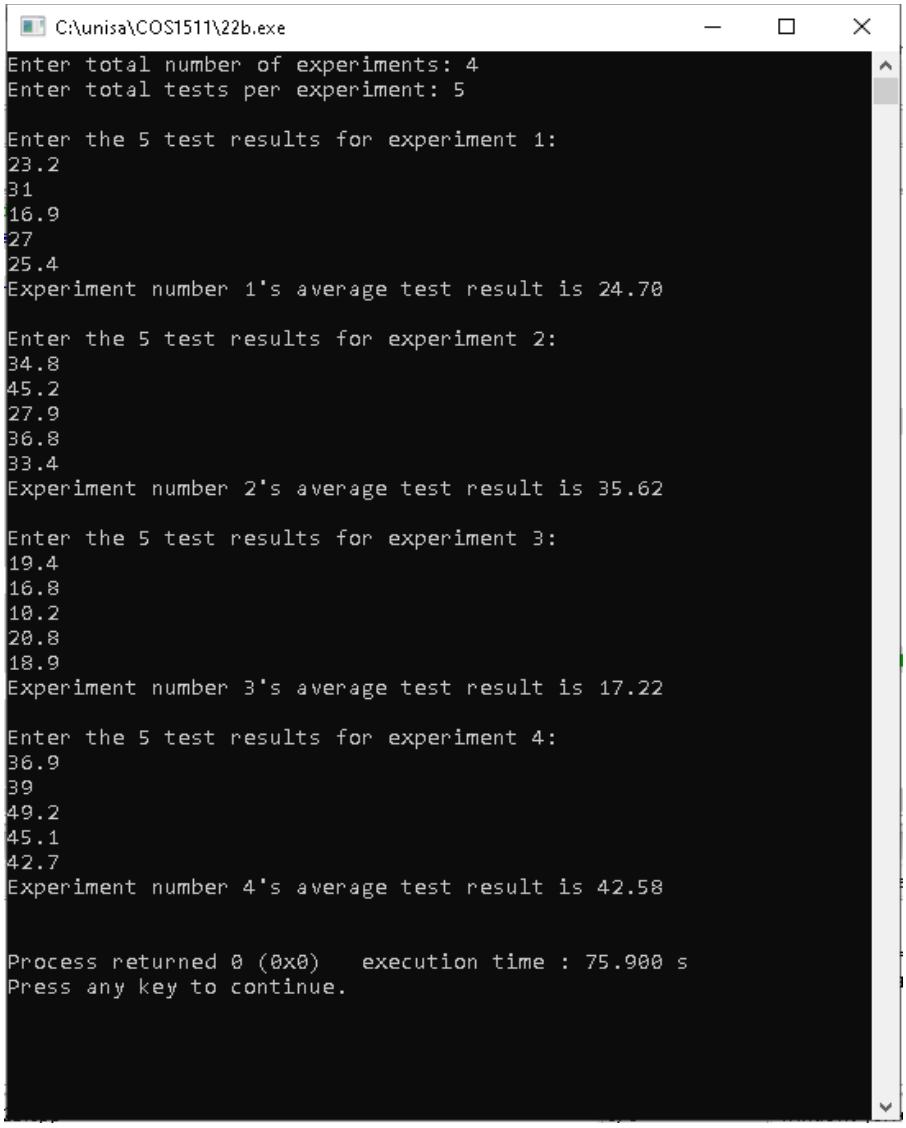


2b

```
#include <iostream>
using namespace std;

int main( )
{
    // Declare variables
    int NumExp, NumTests;
    float testResult, resultsTotal, avgresult;
    // Prompt user for total number of experiments and tests for each experiment
    cout << "Enter total number of experiments: ";
    cin >> NumExp;
    cout << "Enter total tests per experiment: ";
    cin >> NumTests;
    cout << endl;

    // Ensure that none of the total tests is zero.
    if (NumExp == 0 || NumTests == 0)
            cout << "Invalid total experiments or total tests!" << endl;

    else
    {
        for (int i = 1; i <= NumExp; i++)
        {
            //Input and calculate average for one experiment
            resultsTotal = 0.00;
            cout << "Enter the "<< NumTests <<" test results for experiment "
            << i << ":" <<endl;
            for (int j = 1; j <= NumTests; j++)
            {
                cin >> testResult;
                resultsTotal += testResult;
            }
            //Set the output format
            cout.setf(ios::fixed);
            cout.precision(2);

            //Calculate the average
            avgresult = resultsTotal / NumTests;

            //Print output
            cout << "Experiment number " << i << "'s average test result is "
            << avgresult << endl << endl;
        }
```

```
    }

    return 0;
}
```

OUTPUT

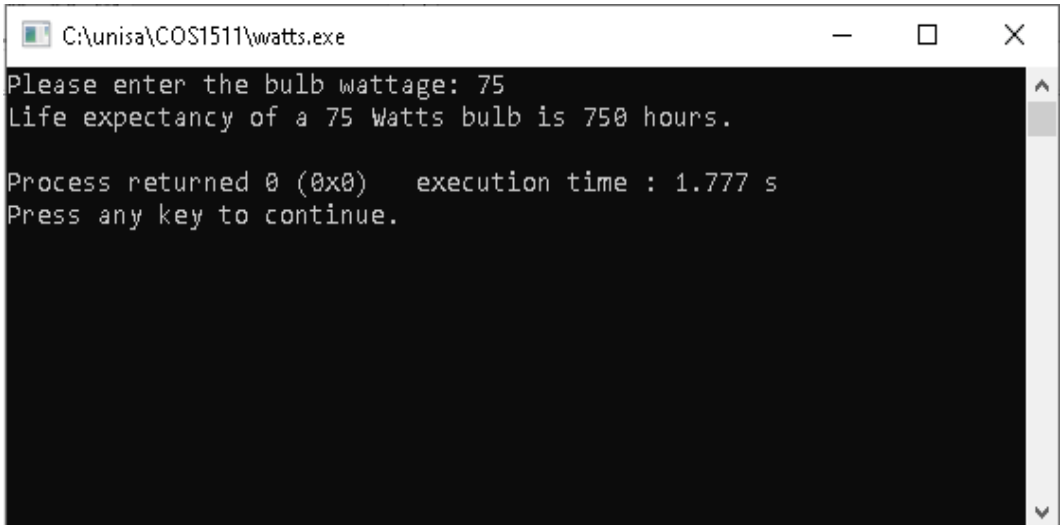


2c

```
// Calculate life expectancy of a bulb based on the watts.
#include <iostream>
using namespace std;

int main ()
{
    int watts;

    // Prompt user for the watts of the bulb
    cout << "Please enter the bulb wattage: ";
    cin >> watts;

    switch (watts)
    {
```

```
        case 0:
            cout << "A 0 Watts bulb does not exist." << endl;
            break;
        case 25:
            cout << "Life expectancy of a " << watts
            << " Watts bulb is 25000 hours." << endl;
            break;
        case 40:
        case 60:
            cout << "Life expectancy of a " << watts
            << " Watts bulb is 1000 hours." << endl;
            break;
        case 75:
        case 100:
            cout << "Life expectancy of a " << watts
            << " Watts bulb is 750 hours." << endl;
            break;
        default:
            cout << "Invalid wattage." << endl;
            break;
    }
    return 0;
}
```

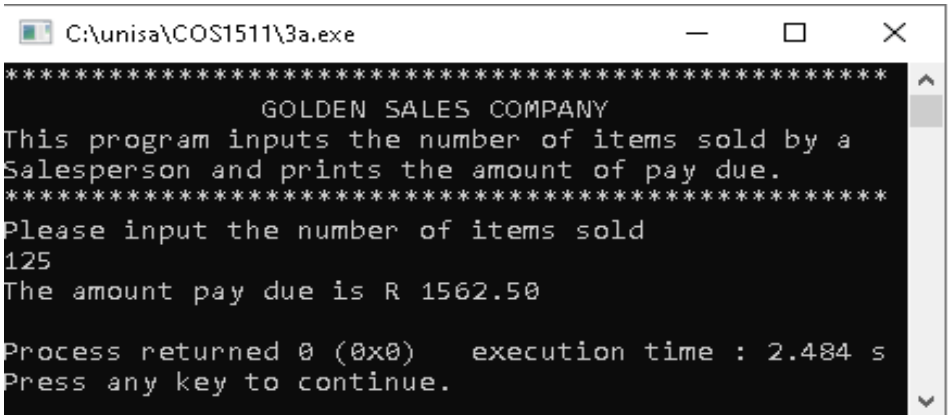
Output



3a

```
#include <iostream>
#include <iomanip> // for setting column width and alignment
using namespace std;

void printHeading()
{
    // Print out the heading
    cout << "*************************************************" << endl;
    cout << setw(35) << "GOLDEN SALES COMPANY" << endl;
    cout << "This program inputs the number of items sold by a" << endl;
    cout << "Salesperson and prints the amount of pay due." << endl;
    cout << "*************************************************" << endl;
}

void calculatePay(int i)
{
    // Declare variable
    float payout;

    //Set the output format
    cout.setf(ios::fixed);
    cout.precision(2);

    // calculate the payout and display
    payout = i * 12.50;
    cout << "The amount pay due is R " << payout << endl;
}

int main( )
{
    // Declare variables
    int itemsSold;
    // Print heading
    printHeading();

    // Prompt user for number of items sold
    cout << "Please input the number of items sold" << endl;
    cin >> itemsSold;

    // Calculate amount of pay due and display.
    calculatePay(itemsSold);

    return 0;
}
```

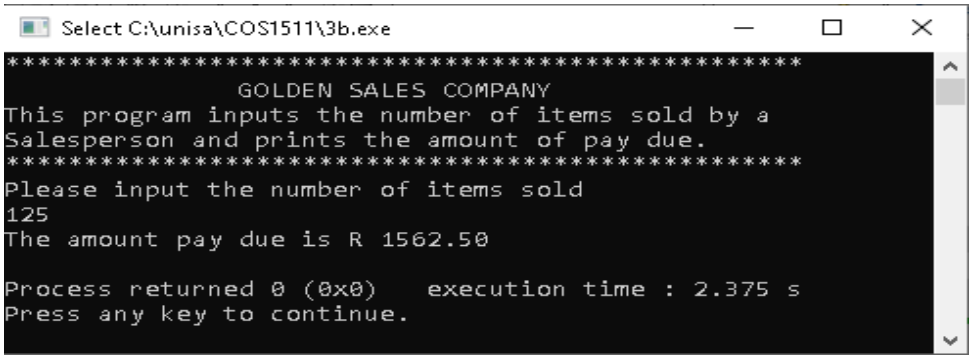
OUTPUT



3b

```
#include <iostream>
#include <iomanip> // for setting column width and alignment
using namespace std;

void printHeading()
{
    // Print out the heading
    cout << "*************************************************" << endl;
    cout << setw(35) << "GOLDEN SALES COMPANY" << endl;
    cout << "This program inputs the number of items sold by a" << endl;
    cout << "Salesperson and prints the amount of pay due." << endl;
    cout << "*************************************************" << endl;
}


float calculatePay(int i)
{
    // Declare variable
    float payout;

    // calculate the payout and return output
    payout = i * 12.50;
    return payout;
}


int main( )
{
    // Declare variables
    int itemsSold;
    float totalPay;
    // Print heading
    printHeading();

    // Prompt user for number of items sold
    cout << "Please input the number of items sold" << endl;
    cin >> itemsSold;

    //Set the output format
    cout.setf(ios::fixed);
    cout.precision(2);

    // Calculate amount of pay due and display.
    totalPay = calculatePay(itemsSold);
    cout << "The amount pay due is R " << totalPay << endl;

    return 0;
}
```

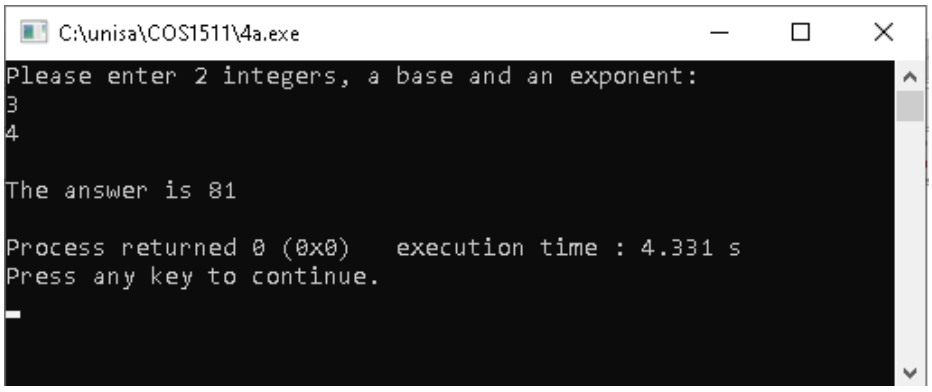
OUTPUT



4a

```
#include <iostream>
using namespace std;

int integerPower(int b, int e)
{
    int result = 1;
    for (int i = 0; i < e; i++)
        result = b * result;
    return result;
}


int main( )
{
    // Declare variables
    int base, exponent, answer;
    // Prompt user for the base and exponent
    cout << "Please enter 2 integers, a base and an exponent: " << endl;
    cin >> base >> exponent;

    // Calculate base to the power exponent
    answer = integerPower(base, exponent);

    // Display the answer
    cout << endl;
    cout << "The answer is " << answer << endl;

    return 0;
}
```

OUTPUT

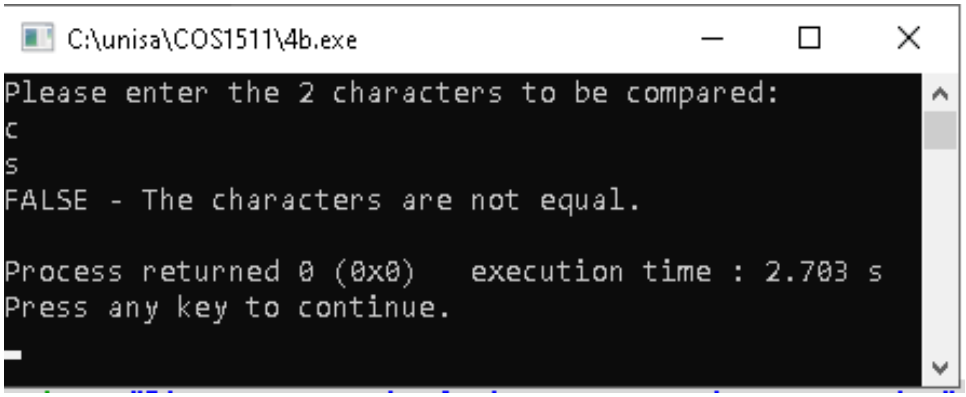


4b

```
#include <iostream>
using namespace std;

bool isEqual(char a, char b)
{
    if (a == b)
        return true;
    return false;
}


int main( )
```

```
{
    // Declare variables
    char c1, c2;
    // Prompt user for the base and exponent
    cout << "Please enter the 2 characters to be compared: " << endl;
    cin >> c1 >> c2;

    // Display the result of the comparison
    if (isEqual(c1,c2) == true)
        cout << "TRUE - The characters are equal." << endl;
    else
        cout << "FALSE - The characters are not equal." << endl;

    return 0;
}
```

OUTPUT

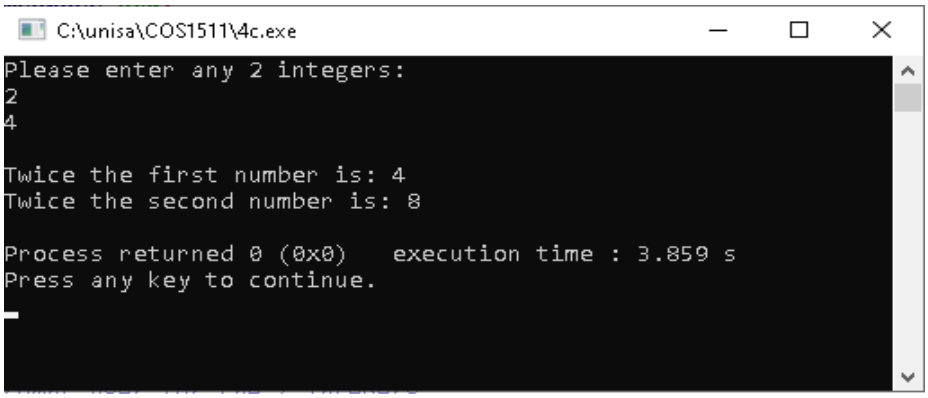


4c

```
#include <iostream>
using namespace std;

void twice(int x, int y, int & tx, int & ty)
{
    tx = x * 2;
    ty = y * 2;
}



int main( )
{
    // Declare variables
    int int1, int2, result1, result2;
    // Prompt user for the 2 integers
    cout << "Please enter any 2 integers: " << endl;
    cin >> int1 >> int2;

    // Call the twice function
    twice(int1, int2, result1, result2);

    // Display the result
    cout << endl;
    cout << "Twice the first number is: " << result1 << endl;
    cout << "Twice the second number is: " << result2 << endl;
```

```
    return 0;
}
```

OUTPUT



5.

```
#include <iostream>
using namespace std;

void getJudgeData(double & scoreP)
{
    // Prompt user for judge score
    cout << "Enter judge score: ";
    cin >> scoreP;
    do
    {
        // Repromt if judge score out of range or invalid input
        if (scoreP < 0 || scoreP > 10 || cin.fail()) //cin.fail() to check if user
input is type double
            {
            cin.clear(); // clear error state of input stream
            cin.ignore(256,'\n'); // discard remaining input on the current line
            cout << "Input invalid! Enter valid judge score: ";
            cin >> scoreP;
            }
    } while (scoreP < 0 || scoreP > 10 || cin.fail()); //cin.fail() to check if
user input is type double
}


double lowest(double score1P, double score2P, double score3P, double score4P,
double score5P)
{
    // Check for and return lowest score
    double min = score1P;
    if (score2P < min)
        min = score2P;
    if (score3P < min)
        min = score3P;
    if (score4P < min)
        min = score4P;
    if (score5P < min)
        min = score5P;
    return min;
}
```

```
double highest(double score1P, double score2P, double score3P, double score4P,
double score5P)
{
    // Check for and return highest score
    double max = score1P;
    if (score2P > max)
        max = score2P;
    if (score3P > max)
        max = score3P;
    if (score4P > max)
        max = score4P;
    if (score5P > max)
        max = score5P;
    return max;
}


double calcScore(double score1P, double score2P, double score3P, double score4P,
double score5P)
{
    // calculate the average of the 3 scores that remain after dropping the highest
and lowest scores the performer received.
    double totalScore, finalScore;
    totalScore = score1P + score2P + score3P + score4P + score5P;
    finalScore = (totalScore - lowest(score1P, score2P, score3P, score4P, score5P)
- highest(score1P, score2P, score3P, score4P, score5P) ) / 3;
    return finalScore;
}


void displayOutput(double finalScoreP)
{
    //Set the output format
    cout.setf(ios::fixed);
    cout.precision(2);

    //Display message and the final score
    cout << endl;
    cout << "The final score is: " << finalScoreP << endl;
}


int main()
{
    double score1, score2, score3, score4, score5;
                                        // 5 judge's scores
    double finalScore;

    // Call getJudgeData once for each score to be input
    getJudgeData(score1);
    getJudgeData(score2);
    getJudgeData(score3);
    getJudgeData(score4);
    getJudgeData(score5);

    // Call calcScore to calculate the contestant's final score
    finalScore = calcScore(score1, score2, score3, score4, score5);

    // Display output
    displayOutput(finalScore);
    return 0;
```

```
}// end of main function
```

OUTPUT