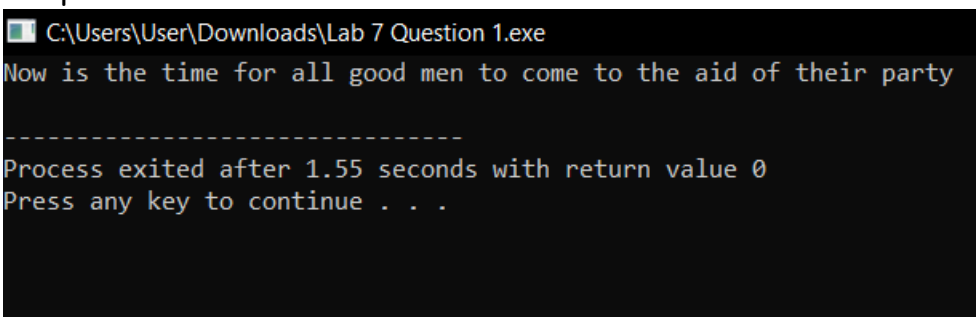
```cpp
// Lab 7 Question 1
// LEONG ZI QI

#include <iostream>
using namespace std;

void WriteProverb();

int main(){

    WriteProverb();     // call function

    return 0;

}

void WriteProverb()
{
    cout << "Now is the time for all good men to come to the aid of their party\n";
}
```

Output:



```cpp
// Lab 7 Question 2
// LEONG ZI QI

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

double calcVolume(double, double);

int main(){

    double radius, height;
    double volume;

    cout << "Please input the radius of the cylinder.\n";
    cin >> radius;
    cout << "Please input the height of the cylinder.\n";
    cin >> height;

    volume = calcVolume(radius, height);

    cout << "\nThe volume of the cylinder is " << volume << " litre.\n";

    return 0;

}

double calcVolume(double radius,  double height)
{
    double volume;
    const double PI = 3.14;

    volume = PI * pow(radius, 2) * height;

    return volume;
}
```

Output:

```
C:\Users\User\Downloads\Lab 7 Question 2.exe
Please input the radius of the cylinder.
3
Please input the height of the cylinder.
6

The volume of the cylinder is 169.56 litre.

--------------------------------
Process exited after 2.593 seconds with return value 0
Press any key to continue . . .
```

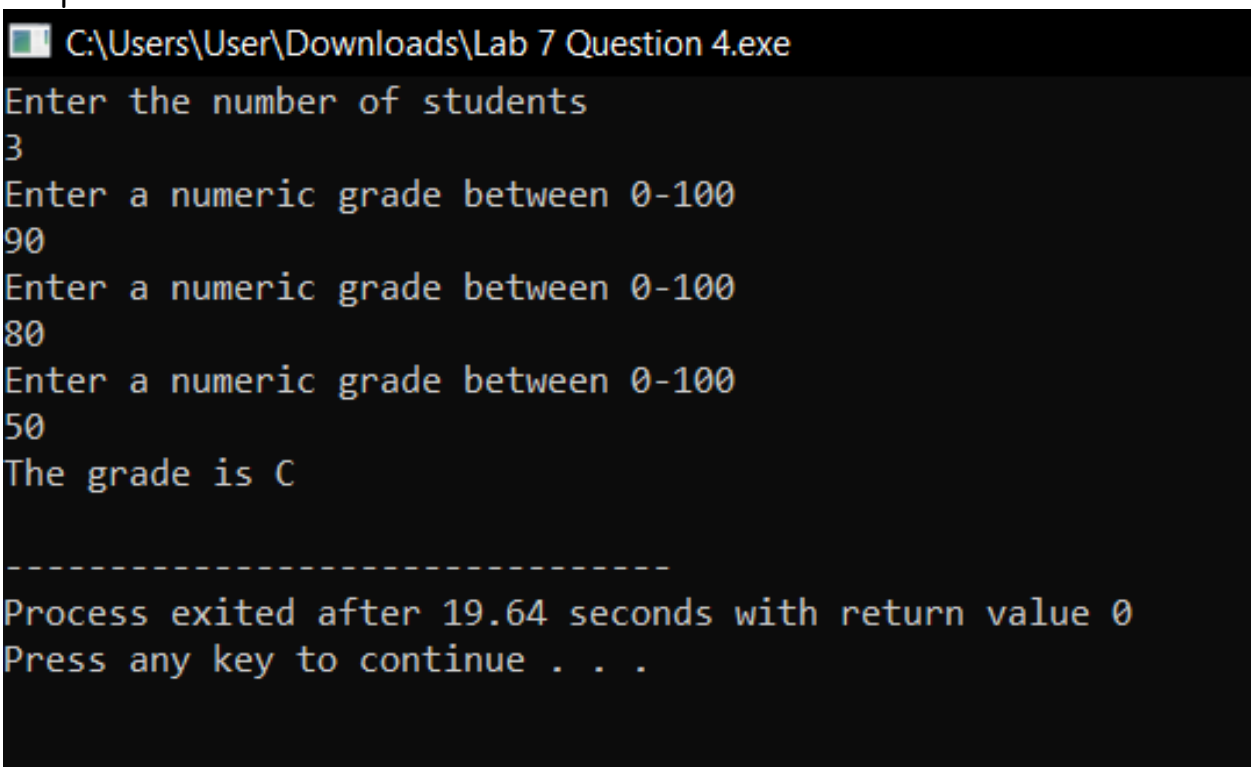
```cpp
// Lab 7 Question 3
// LEONG ZI QI

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

double calcSpeed(double, double);

int main(){

    double miles, hours, speed;
    cout << setprecision(2) << fixed;

    cout << "Please input the miles traveled\n";
    cin >> miles;
    cout << "Please input the hours traveled\n";
    cin >> hours;

    speed = calcSpeed(miles, hours);

    cout << "Your speed is " << speed << " miles per hour\n";

    return 0;

}

double calcSpeed(double miles, double hours)
{
    double speed = miles / hours;
    return speed;
}
```

Output:

```
C:\Users\User\Downloads\Lab 7 Question 3.exe
Please input the miles traveled
475
Please input the hours traveled
8
Your speed is 59.38 miles per hour

--------------------------------
Process exited after 10.67 seconds with return value 0
Press any key to continue . . .
```

```cpp
// Lab 7 Question 4
// LEONG ZI QI

#include <iostream>
using namespace std;

// 2 parameters only
int calcAverageGrade(int, int);

int main()
{
    int sumOfScore, totalStudent, averageMark;
    char grade;

    cout << "Enter the number of students\n";
    cin >> totalStudent;
    // return averageMark
    averageMark = calcAverageGrade(0, totalStudent);

    if(averageMark >= 90)
        grade = 'A';
    else if(averageMark >= 80)
        grade = 'B';
    else if(averageMark >= 70)
        grade = 'C';
    else if(averageMark >= 60)
        grade = 'D';
    else
        grade = 'F';

    cout << "The grade is " << grade << endl;

    return 0;

}

int calcAverageGrade(int sumOfScore, int totalStudent)
{
    int score;
    int averageMark;

    for(int i = 0; i < totalStudent; i++){
        do{
            cout << "Enter a numeric grade between 0-100\n";
            cin >> score;

            if(score < 0 || score > 100)
                cout << "Invalid Input.\n";
        }
        while(score < 0 || score > 100);

        sumOfScore += score;
    }

    averageMark = sumOfScore / totalStudent;

    return averageMark;
}
```

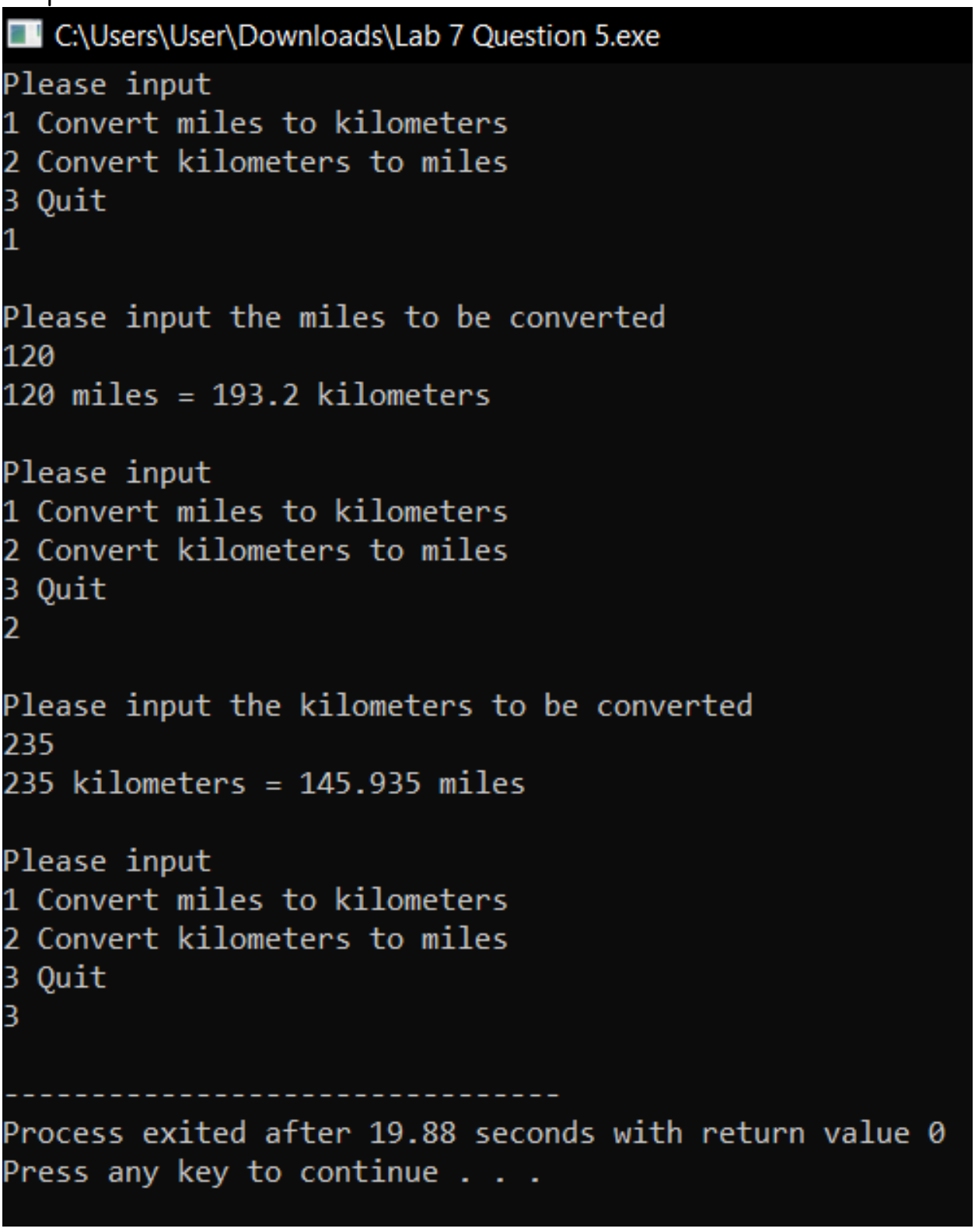
Output:


C:\Users\User\Downloads\Lab 7 Question 4.exe
Enter the number of students
3
Enter a numeric grade between 0-100
90
Enter a numeric grade between 0-100
80
Enter a numeric grade between 0-100
50
The grade is C

Process exited after 19.64 seconds with return value 0
Press any key to continue . . .

```cpp
// Lab 7 Question 5
// LEONG ZI QI

#include <iostream>
using namespace std;

int converter(int, double&, double&);

int main(){

    int select;
    double convert, convert2;

    cout << "Please input\n";
    cout << "1 Convert miles to kilometers\n";
    cout << "2 Convert kilometers to miles\n";
    cout << "3 Quit\n";
    cin >> select;

    if(select == 1 || select == 2)
        converter(select, convert, convert2);

    switch(select){
        case  1:    cout << convert << " miles = " << convert2 << " kilometers\n\n";
                    break;
        case  2:    cout << convert << " kilometers = " << convert2 << " miles\n\n";
                    break;
        case  3:    return 0;
                    break;
    }

    main();
}

int converter(int select, double& convert, double& convert2)
{
    int selection[2] = {1, 2};
    string unit[2] = {"miles", "kilometers"};

    for(int i = 0; i < 2; i++)
        if(select == selection[i]){
            do{
                cout << "\nPlease input the " << unit[i] << " to be converted\n";
                cin >> convert;
            }
            while(convert < 0);

            if(select == 1){
                convert2 = convert * 1.61;
            }
            else if(select == 2){
                convert2 = convert * 0.621;
            }
        }
}
```

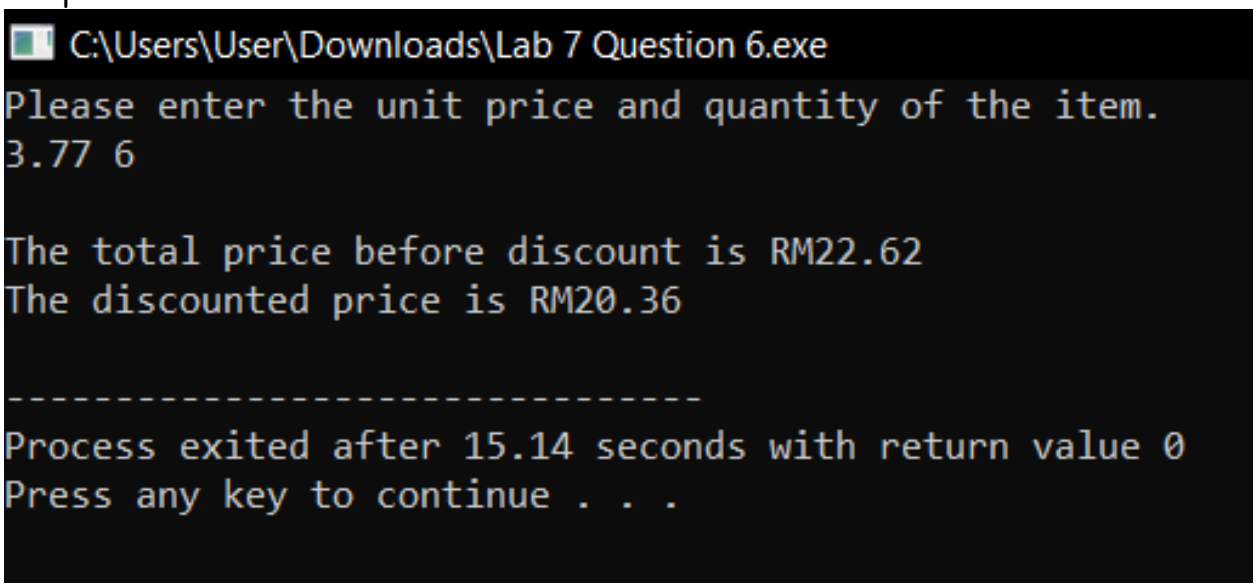
Output:


C:\Users\User\Downloads\Lab 7 Question 5.exe
Please input
1 Convert miles to kilometers
2 Convert kilometers to miles
3 Quit
1
Please input the miles to be converted
120
120 miles = 193.2 kilometers
Please input
1 Convert miles to kilometers
2 Convert kilometers to miles
3 Quit
2
Please input the kilometers to be converted
235
235 kilometers = 145.935 miles
Please input
1 Convert miles to kilometers
2 Convert kilometers to miles
3 Quit
3

Process exited after 19.88 seconds with return value 0
Press any key to continue . . .

```cpp
// Lab 7 Question 6
// LEONG ZI QI

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

double totalPrice(double, int);
double DiscountPrice(double, double&);

int main(){

    int qty;
    double price, total, discountRate = 0.9, discp;

    cout << setprecision(2) << fixed;

    cout << "Please enter the unit price and quantity of the item.\n";
    cin >> price >> qty;

    total = totalPrice(price, qty);
    cout << "\nThe total price before discount is RM" << total << endl;

    discp = DiscountPrice(total, discountRate);
    cout << "The discounted price is RM" << discp << endl;

    return 0;
}

double totalPrice(double price, int qty)
{
    double total;
    total = price * qty;
    return total;
}

double DiscountPrice(double total, double& discountRate)
{
    double discp;
    discp = total * discountRate;

    return discp;
}
```

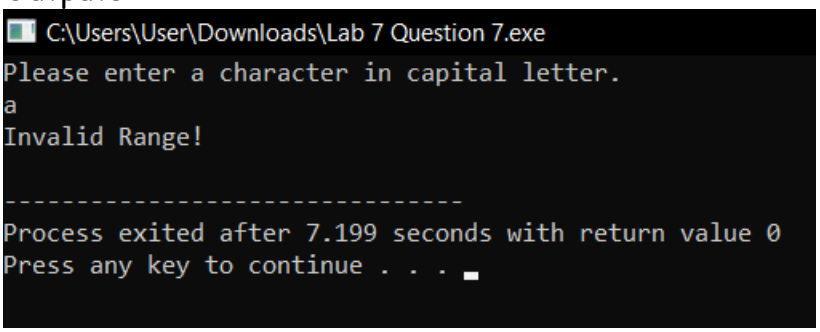
Output:

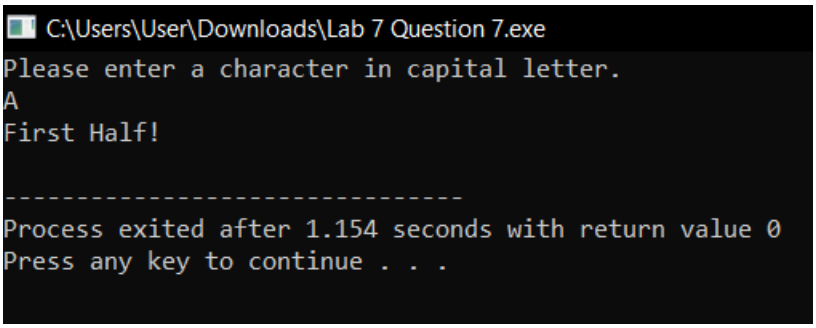

C:\Users\User\Downloads\Lab 7 Question 6.exe
Please enter the unit price and quantity of the item.
3.77 6
The total price before discount is RM22.62
The discounted price is RM20.36

Process exited after 15.14 seconds with return value 0
Press any key to continue . . .

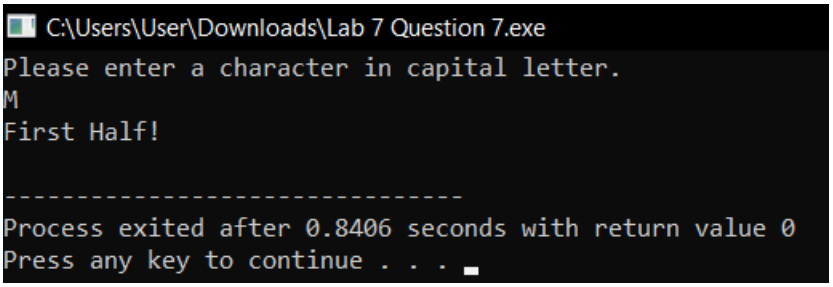
```cpp
// Lab 7 Question 7
// LEONG ZI QI

#include <iostream>
using namespace std;

void checkCharRange(char);

int main(){

    char ch;

    cout << "Please enter a character in capital letter.\n";
    cin >> ch;
    checkCharRange(ch);

    return 0;

}

void checkCharRange(char ch)
{
    // cannot put into for loop
    // will keep looping causing multiple outputs
    if(ch < 'A' || ch > 'Z')
        cout << "Invalid Range!\n";
    else
        for(char check = 'A'; check <= 'Z'; ++check)
            if(check == ch && check <= 'M')
                cout << "First Half!\n";
            else if(check == ch && check <= 'Z')
                cout << "Second Half!\n";

}
```

Outputs:

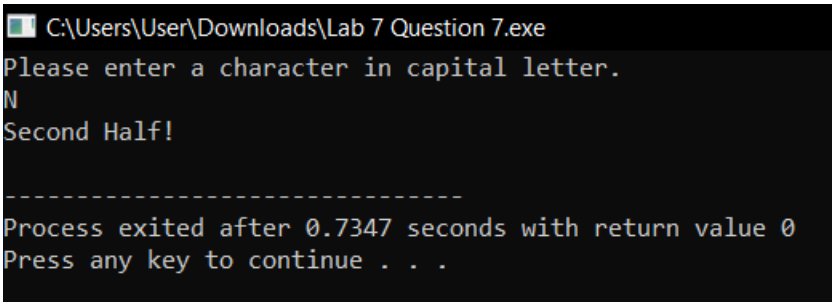



C:\Users\User\Downloads\Lab 7 Question 7.exe
Please enter a character in capital letter.
A
First Half!

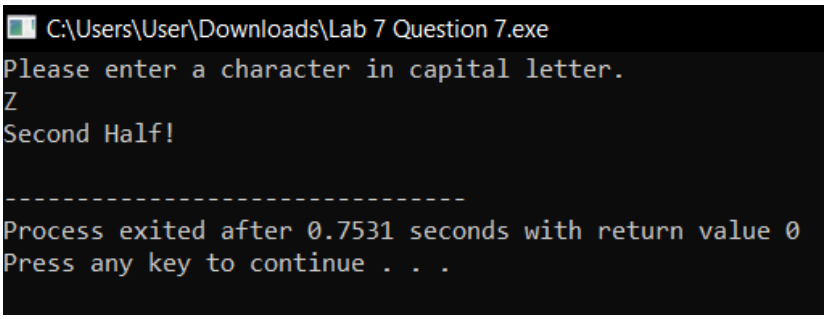
Process exited after 1.154 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 7.exe
Please enter a character in capital letter.
M
First Half!

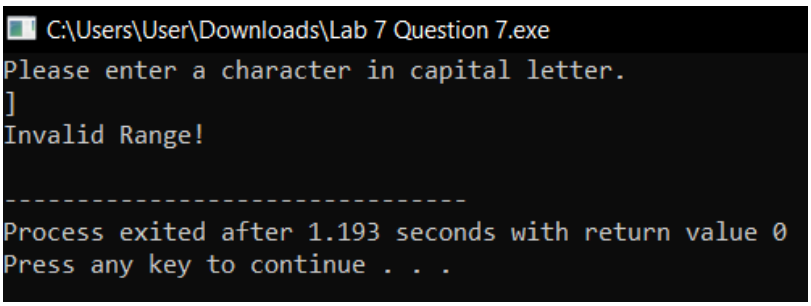
Process exited after 0.8406 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 7.exe
Please enter a character in capital letter.
N
Second Half!

Process exited after 0.7347 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 7.exe
Please enter a character in capital letter.
Z
Second Half!

Process exited after 0.7531 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 7.exe
Please enter a character in capital letter.
]
Invalid Range!

Process exited after 1.193 seconds with return value 0
Press any key to continue . . .

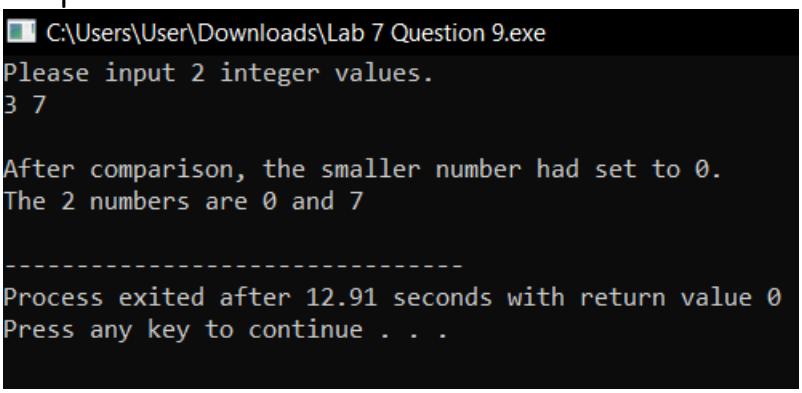
```cpp
// Lab 7 Question 8
// LEONG ZI QI

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

int getRange(int a[3]);

int main(){

    int a[3], diff;

    cout << "Please input 3 integer values.\n";
    cin >> a[0] >> a[1] >> a[2];
    diff = getRange(a);

    cout << "\n\nThe different between the lowest value and highest value is " << diff << endl;

    return 0;

}

int getRange(int a[3])
{
    int diff;
    // need to add {} to include all of the values that needed to be compare
    diff = max({a[0], a[1], a[2]}) - min({a[0], a[1], a[2]});

    return diff;
}
```

Output:

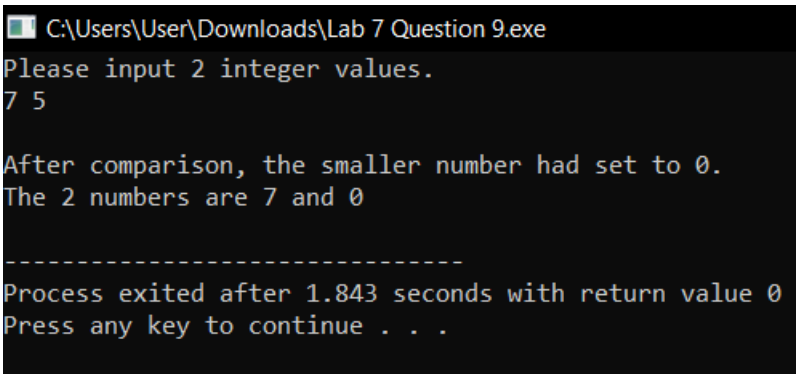
```
C:\Users\User\Downloads\Lab 7 Question 8.exe
Please input 3 integer values.
1 4 6


The different between the lowest value and highest value is 5

--------------------------------
Process exited after 9.69 seconds with return value 0
Press any key to continue . . .
```

```cpp
// Lab 7 Question 9
// LEONG ZI QI

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

void zero_small(int&, int&);

int main(){

    int a, b;

    cout << "Please input 2 integer values.\n";
    cin >> a >> b;

    // won't enter function if both the same
    if(a != b)
        zero_small(a, b);

    cout << "\nAfter comparison, the smaller number had set to 0.\n";
    cout << "The 2 numbers are " << a << " and " << b << endl;

    return 0;

}

void zero_small(int& a, int& b)
{
    if(a == min(a, b))
        a = 0;
    else
        b = 0;
}
```

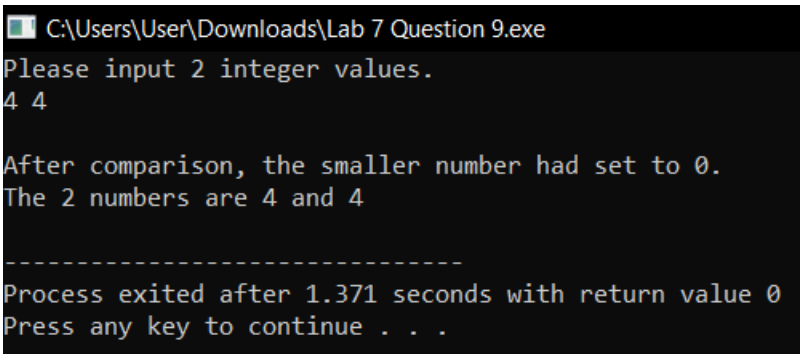
Outputs:


C:\Users\User\Downloads\Lab 7 Question 9.exe
Please input 2 integer values.
3 7
After comparison, the smaller number had set to 0.
The 2 numbers are 0 and 7

Process exited after 12.91 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 9.exe
Please input 2 integer values.
7 5
After comparison, the smaller number had set to 0.
The 2 numbers are 7 and 0

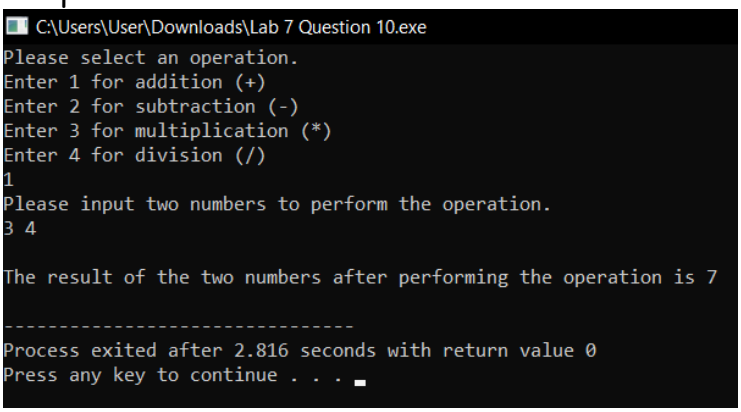
Process exited after 1.843 seconds with return value 0
Press any key to continue . . .

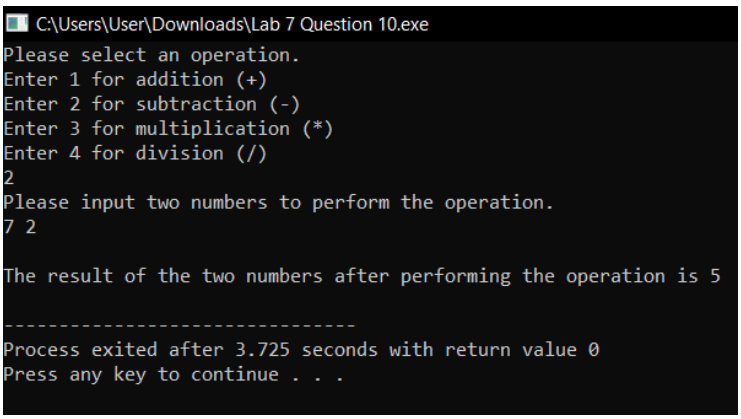

C:\Users\User\Downloads\Lab 7 Question 9.exe
Please input 2 integer values.
4 4
After comparison, the smaller number had set to 0.
The 2 numbers are 4 and 4

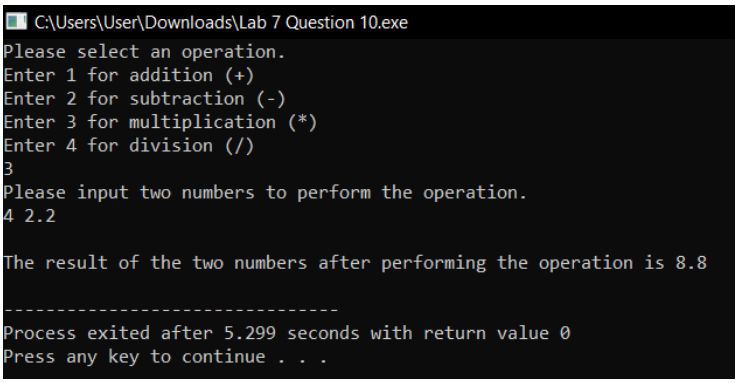
Process exited after 1.371 seconds with return value 0
Press any key to continue . . .

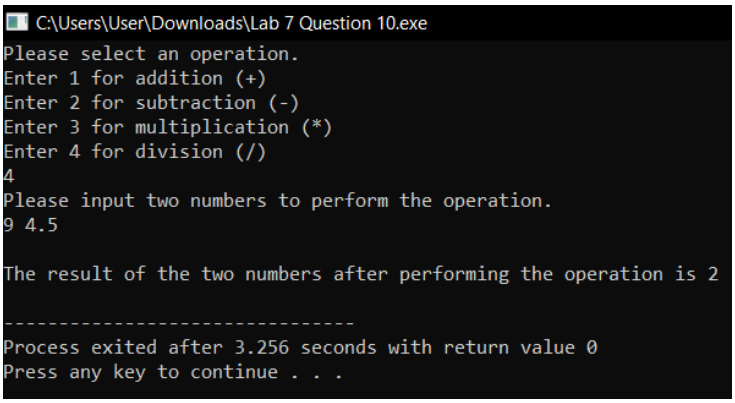
```cpp
// Lab 7 Question 10
// LEONG ZI QI

#include <iostream>
using namespace std;

void showChoice();
double add(double, double);
double subtract(double, double);
double multiply(double, double);
double divide(double, double);

int main(){

    int select;
    double num1, num2, result;

    showChoice();
    do{
        cin >> select;

        if(select < 1 || select > 4)
            cout << "Invalid Input. Please try again.\n";
    }
    while(select < 1 || select > 4);

    cout << "Please input two numbers to perform the operation.\n";
    cin >> num1 >> num2;
    cout << endl;

    switch(select){
        case  1:    result = add(num1, num2);
                    break;
        case  2:    result = subtract(num1, num2);
                    break;
        case  3:    result = multiply(num1, num2);
                    break;
        case  4:    result = divide(num1, num2);
                    break;
    }

    cout << "The result of the two numbers after performing the operation is " << result << endl;

    return 0;

}

void showChoice()
{
    cout << "Please select an operation.\n";
    cout << "Enter 1 for addition (+)\n";
    cout << "Enter 2 for subtraction (-)\n";
    cout << "Enter 3 for multiplication (*)\n";
    cout << "Enter 4 for division (/)\n";
}

double add(double num1, double num2)
{
    double result;

    result = num1 + num2;

    return result;
}

double subtract(double num1, double num2)
{
    double result;

    result = num1 - num2;

    return result;
}

double multiply(double num1, double num2)
{
    double result;

    result = num1 * num2;

    return result;
}

double divide(double num1, double num2)
{
    double result;

    result = num1 / num2;

    return result;
}
```

Outputs:


C:\Users\User\Downloads\Lab 7 Question 10.exe
Please select an operation.
Enter 1 for addition (+)
Enter 2 for subtraction (-)
Enter 3 for multiplication (*)
Enter 4 for division (/)
1
Please input two numbers to perform the operation.
3 4
The result of the two numbers after performing the operation is 7
Process exited after 2.816 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 10.exe
Please select an operation.
Enter 1 for addition (+)
Enter 2 for subtraction (-)
Enter 3 for multiplication (*)
Enter 4 for division (/)
2
Please input two numbers to perform the operation.
7 2
The result of the two numbers after performing the operation is 5
Process exited after 3.725 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 10.exe
Please select an operation.
Enter 1 for addition (+)
Enter 2 for subtraction (-)
Enter 3 for multiplication (*)
Enter 4 for division (/)
3
Please input two numbers to perform the operation.
4 2.2
The result of the two numbers after performing the operation is 8.8
Process exited after 5.299 seconds with return value 0
Press any key to continue . . .


C:\Users\User\Downloads\Lab 7 Question 10.exe
Please select an operation.
Enter 1 for addition (+)
Enter 2 for subtraction (-)
Enter 3 for multiplication (*)
Enter 4 for division (/)
4
Please input two numbers to perform the operation.
9 4.5
The result of the two numbers after performing the operation is 2
Process exited after 3.256 seconds with return value 0
Press any key to continue . . .