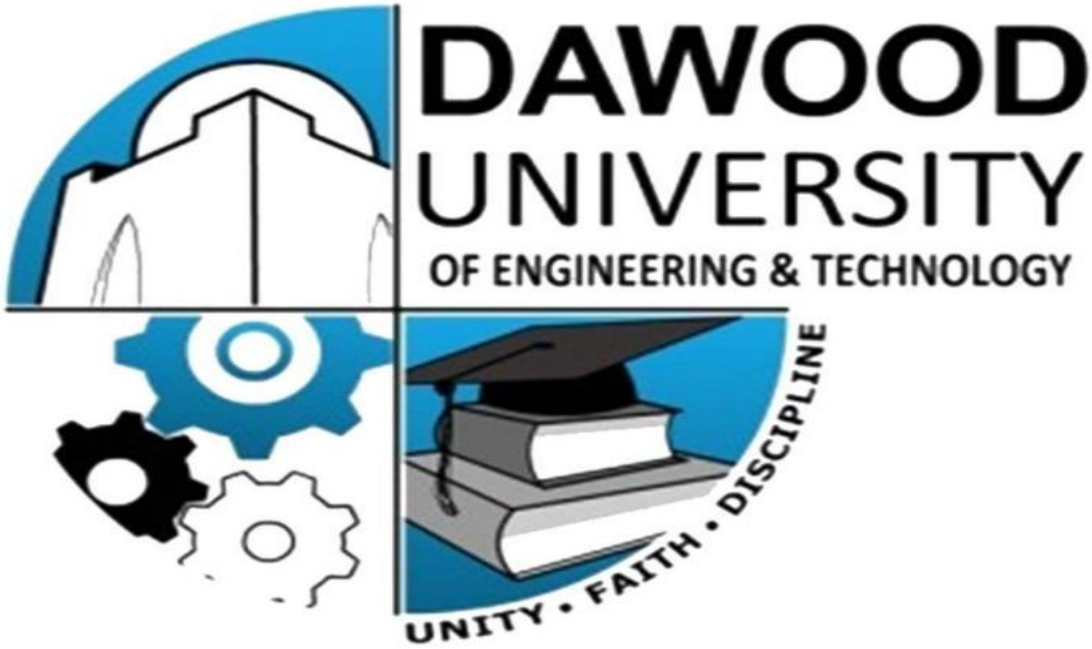


NAME: **SAFI AHMED**

ROLL NO: **22F-BSCS-35**

SUBJECT: **PROGRAMMING FUNDAMENTALS PRACTICAL**

SUBMITTED TO: **ENGR. SOFIA HAJANO**

Practical 08

PROBLEM STATEMENT 01

Write a C++ program that displays the Sum of all the elements of a one dimensional array.

Programiz C++ Online Compiler

main.cpp | Run | Output

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

int main() {
    int arr[] = {1, 2, 3, 4, 5};
    int size = sizeof(arr) / sizeof(arr[0]);
    int sum = 0;

    for (int i = 0; i < size; i++) {
        sum += arr[i];
    }

    cout << "The sum of all elements in the array is: " << sum <<
        endl;

    return 0;
}
```

```
/tmp/WiqX84rh8U.o
The sum of all elements in the array is: 15
```

PROBLEM STATEMENT 02

Write a C++ program that displays only the even numbers if present in the one dimensional array.

Programiz C++ Online Compiler

main.cpp | Run | Output

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

int main() {
    int arr[] = {1, 2, 3, 4, 5, 6};
    int size = sizeof(arr) / sizeof(arr[0]);

    cout << "Even numbers in the array: ";
    for (int i = 0; i < size; i++) {
        if (arr[i] % 2 == 0) {
            cout << arr[i] << " ";
        }
    }

    cout << std::endl;

    return 0;
}
```

```
/tmp/WiqX84rh8U.o
Even numbers in the array: 2 4 6
```

Practical 09

PROBLEM STATEMENT 01

Three sessional test are conducted in the subject of Computer Programming. Each of which having 05 maximum marks. The total sessional marks out of 10, for every student, are calculated by adding two best test marks. Write a program in C++ that inputs the roll number (Just the number not string) and marks of three sessional tests for five students and displays the total marks for each of the student.

	Roll No	Test 01	Test 02	Test 03	Total
Student 1	01	4	5	3	9
Student 2	03	5	5	4	10
Student 3	05	2	4	3	7
Student 4	07	0	4	1	5
Student 5	09	3	3	2	6

INPUT

```
#include <iostream> using namespace std; int main() {          const int
Rows=5;     const int Cols=5;     int marks[ Rows] [ Cols] =
{{1,4,5,3,0} , {3,5,5,4,0} ,{5,2,4,3,0} ,
{7,0,4,1,0} , {9,3,3,2,0}};
    for (size_t i = 0; i < Rows; i++)
    {         int sumOneTwo  = marks[i][1] + marks[i][2];
int sumOneThree= marks[i][1] + marks[i][3];         int sumTwoThree=
marks[i][2] + marks[i][3];          if (sumOneTwo >= sumOneThree &&
sumOneTwo >=sumTwoThree)         marks[i][4] = sumOneTwo;
else if (sumOneThree >= sumOneTwo && sumOneThree >=sumTwoThree)
marks[i][4] = sumOneThree;          else marks[i][4] = sumTwoThree;
}     for (size_t j = 0; j < Rows; j++)

    {
```

```
        cout << " Sessional marks of Roll nmber " << marks [j][0] << " = " <<
marks [j][4] << endl;
    }     return 0;
}
```

OUTPUT

```
PS E:\YouTube\codewithhrrynotes> cd "e:\YouTube\codewithhrrynotes\" ; if ($?)
{ g++ assignment.cpp -o assignment } ; if ($?) { .\assignment }
 Sessional marks of Roll nmber 1 = 9
 Sessional marks of Roll nmber 3 = 10
 Sessional marks of Roll nmber 5 = 7
 Sessional marks of Roll nmber 7 = 5
 Sessional marks of Roll nmber 9 = 6
```

PROBLEM STATEMENT 02

Write a program in C++ that initializes matrix A and B. The program should generate the matrix C which is given as:

$$C = (A + B^T)^T$$

Whereas,

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \qquad B = \begin{bmatrix} 3 & 1 & 9 \\ 7 & 8 & 0 \\ 5 & 3 & 6 \end{bmatrix}$$

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
#include <iostream>
#include <vector>

using namespace std;

// Function to initialize a matrix
void initializeMatrix(vector<vector<int>>& matrix, const vector
    <vector<int>>& values) {
    for (int i = 0; i < matrix.size(); i++) {
        for (int j = 0; j < matrix[0].size(); j++) {
            matrix[i][j] = values[i][j];
        }
    }
}

// Function to print a matrix
void printMatrix(const vector<vector<int>>& matrix) {
    for (int i = 0; i < matrix.size(); i++) {
        for (int j = 0; j < matrix[0].size(); j++) {
            cout << matrix[i][j] << " ";
        }
        cout << endl;
    }
}

```

```
/tmp/2REa38gVLZ.o
4 9 8
5 13 9
16 8 15
```

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
int main() {
    // Initialize matrix A
    vector<vector<int>> A = {{1, 2, 3},
                             {4, 5, 6},
                             {7, 8, 9}};

    // Initialize matrix B
    vector<vector<int>> B = {{3, 1, 9},
                             {7, 8, 0},
                             {5, 3, 6}};

    // Calculate matrix C
    vector<vector<int>> C(A.size(), vector<int>(A[0].size()));
    for (int i = 0; i < A.size(); i++) {
        for (int j = 0; j < A[0].size(); j++) {
            C[i][j] = A[i][j] + B[j][i]; // B^T
        }
    }

    // Print matrix C
    printMatrix(C);

    return 0;
}
```

/tmp/2REa38gVLZ.o
4 9 8
5 13 9
16 8 15

Practical 10

PROBLEM STATEMENT 01

Write a program in C++ that creates the following functions:

Function	Description
`int vowelCount(string str)`	Receives string object and returns number of vowels in it.
`int consonantCount(string str)`	Receives string object and returns number of consonants in it.
`int upperCount(string str)`	Receives string object and returns number of uppercase letters in it.
`int lowerCount(string str)`	Receives string object and returns number of lowercase letters in it.

Use all of the functions in main function.

INPUT

```cpp
#include <iostream> #include <string> using
namespace std;  int countVowels(const string& str)
{     int count
= 0;     string vowels = "aeiouAEIOU";     for
(char c : str) {         if (vowels.find(c) !=
string::npos)             count++;
    }     return count;
}  int countConsonants(const string& str) {     int count = 0;
string vowels = "aeiouAEIOU";     for (char c : str) {         if
(isalpha(c) && vowels.find(c) == string::npos)
count++;
    }     return count;
}  int countUppercase(const string& str) {
int count = 0;     for (char c : str) {
if (isupper(c))             count++;
    }     return count;
}  int countLowercase(const string& str) {
int count = 0;     for (char c : str) {
if (islower(c))             count++;
    }     return count;
}

 int main() {     string input;       cout << "Enter a string: ";
getline(cin, input);          cout << "Number of vowels: " <<
countVowels(input)<<endl;      cout << "Number of consonants: " <<
countConsonants(input)<<endl;     cout << "Number of uppercase letters:
" << countUppercase(input)<<endl;       cout << "Number of lowercase
letters: " << countLowercase(input)<<endl;      return 0;
}
```

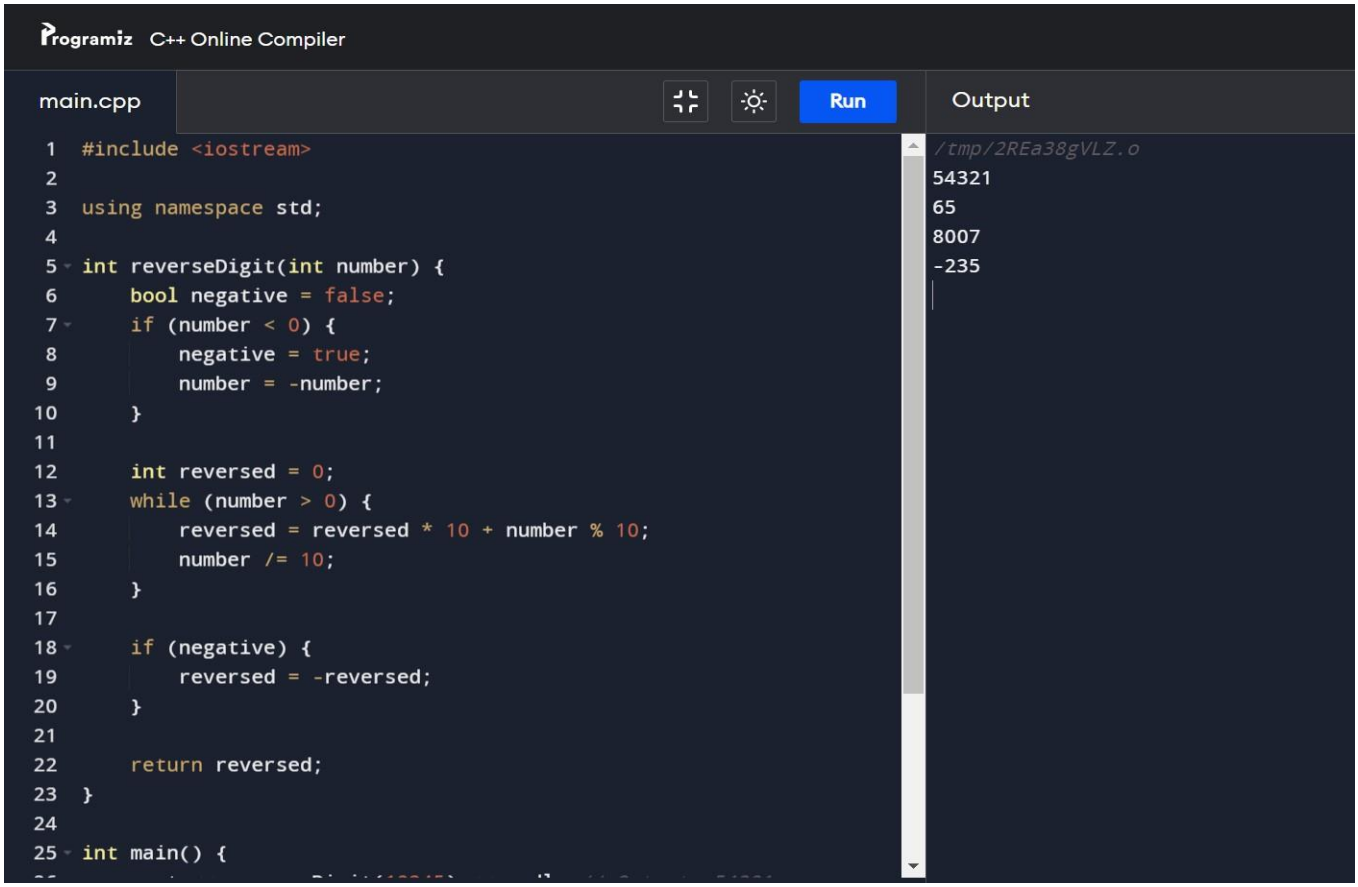
OUTPUT

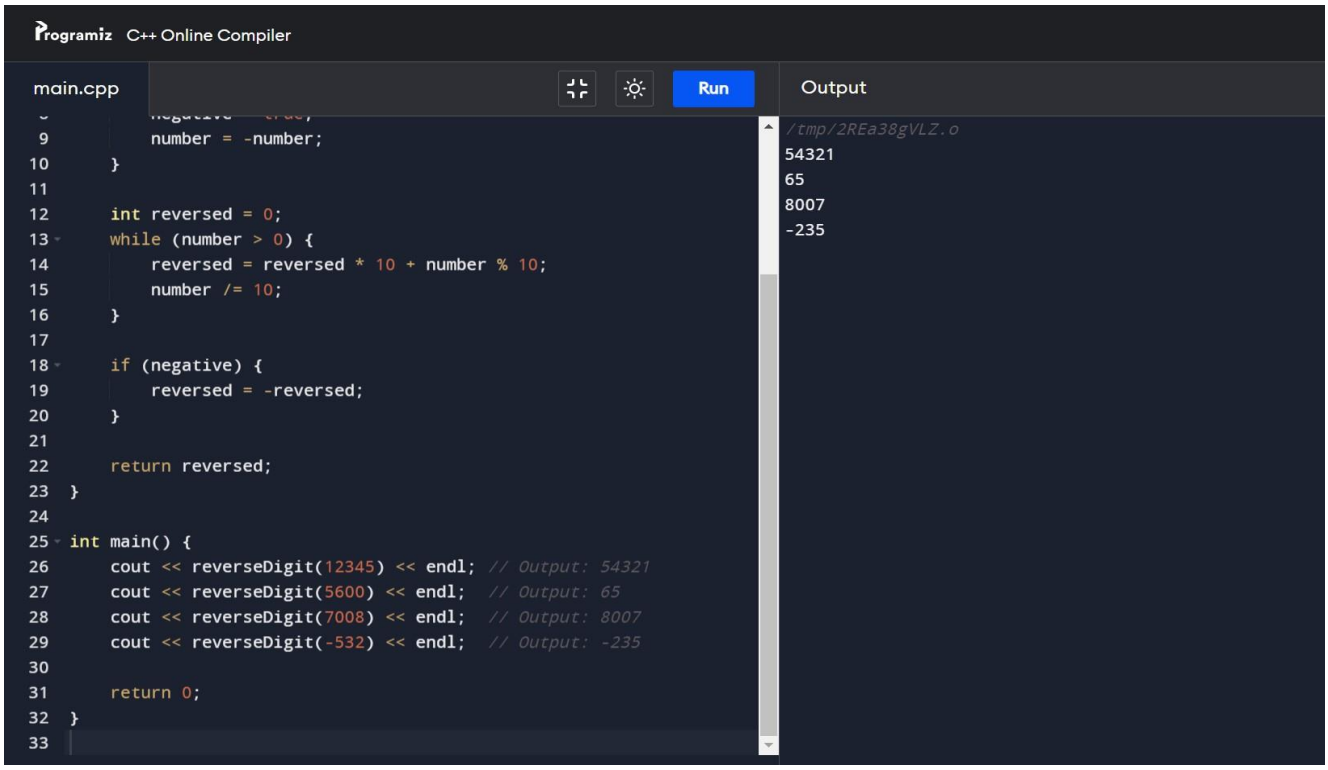
```
PS E:\YouTube\codewithhrrynotes> cd "e:\YouTube\codewithhrrynotes\" ; if ($?)
{ g++ assignment.cpp -o assignment } ; if ($?) { .\assignment }
Enter a string: Safi Ahmed
Number of vowels: 4
Number of consonants: 5
Number of uppercase letters: 2
Number of lowercase letters: 7
```

PROBLEM STATEMENT 02

Write a function, reverse Digit that takes an integer as a parameter and returns the number with its digits reversed.

For example, the value of reverseDigit(12345) is 54321; the value of reverseDigit(5600) is 65; the value of reverseDigit(7008) is 8007; and the value of reverseDigit(-532) is -235.





Practical 11

PROBLEM STATEMENT 01

Write a recursive function `power(base,exponent)` that, when invoked, returns

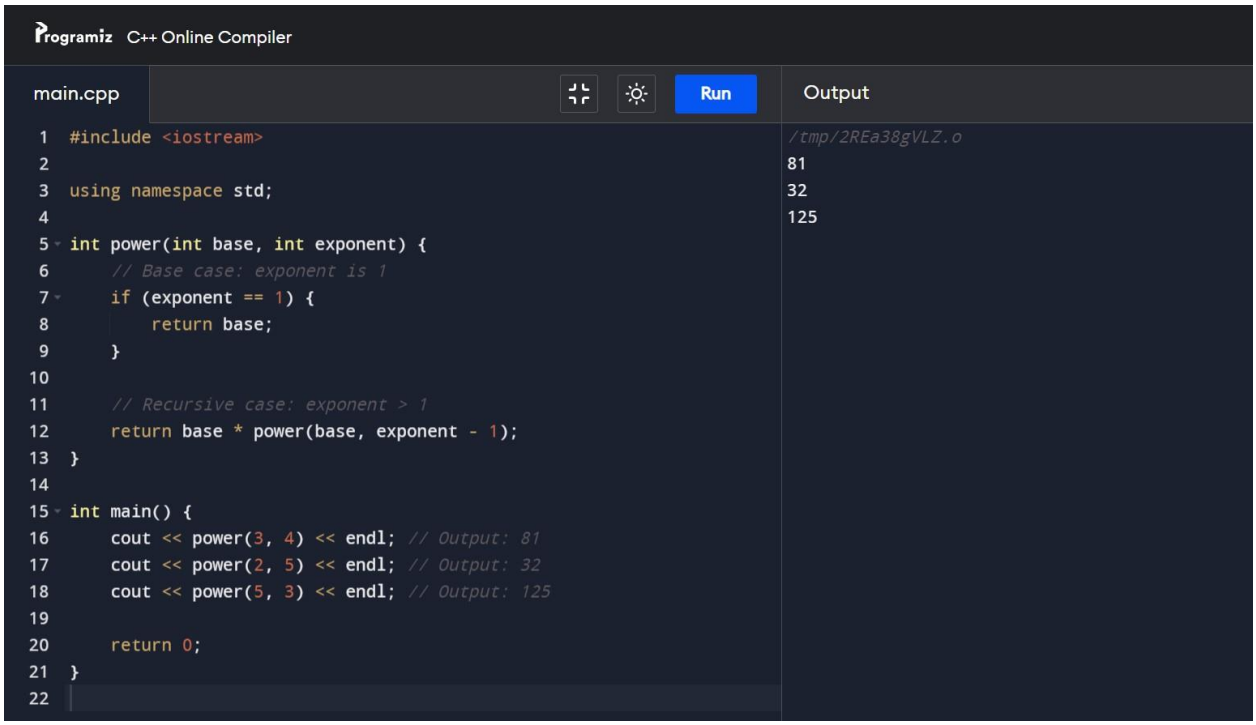
base *exponent*

For example, `power (3, 4) = 3 * 3 * 3 * 3`. Assume that exponent is an integer greater than or equal to 1. Hint: The recursion step would use the relationship.

base *exponent* = *base* . *base* *exponent - 1*

And the terminating condition occurs when exponent is equal to 1, because *base*

1 = *base* .

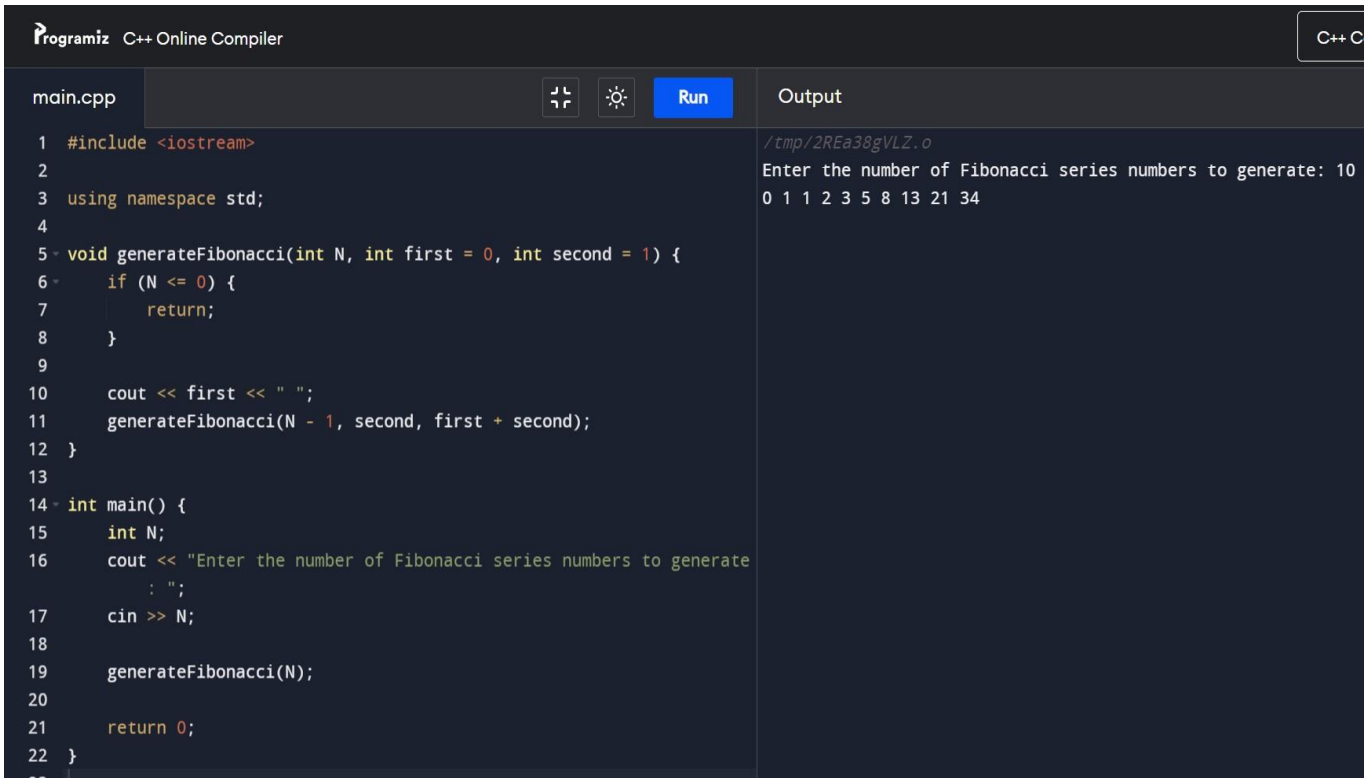


PROBLEM STATEMENT 02

The Fibonacci series

0, 1, 1, 2, 3, 5, 8, 13, 21, ...

Begins with the terms 0 and 1 and has the property that each succeeding term is the sum of the two preceding terms. Write a recursive function that generates N series numbers. Where N is the integer inputted by the user at runtime.

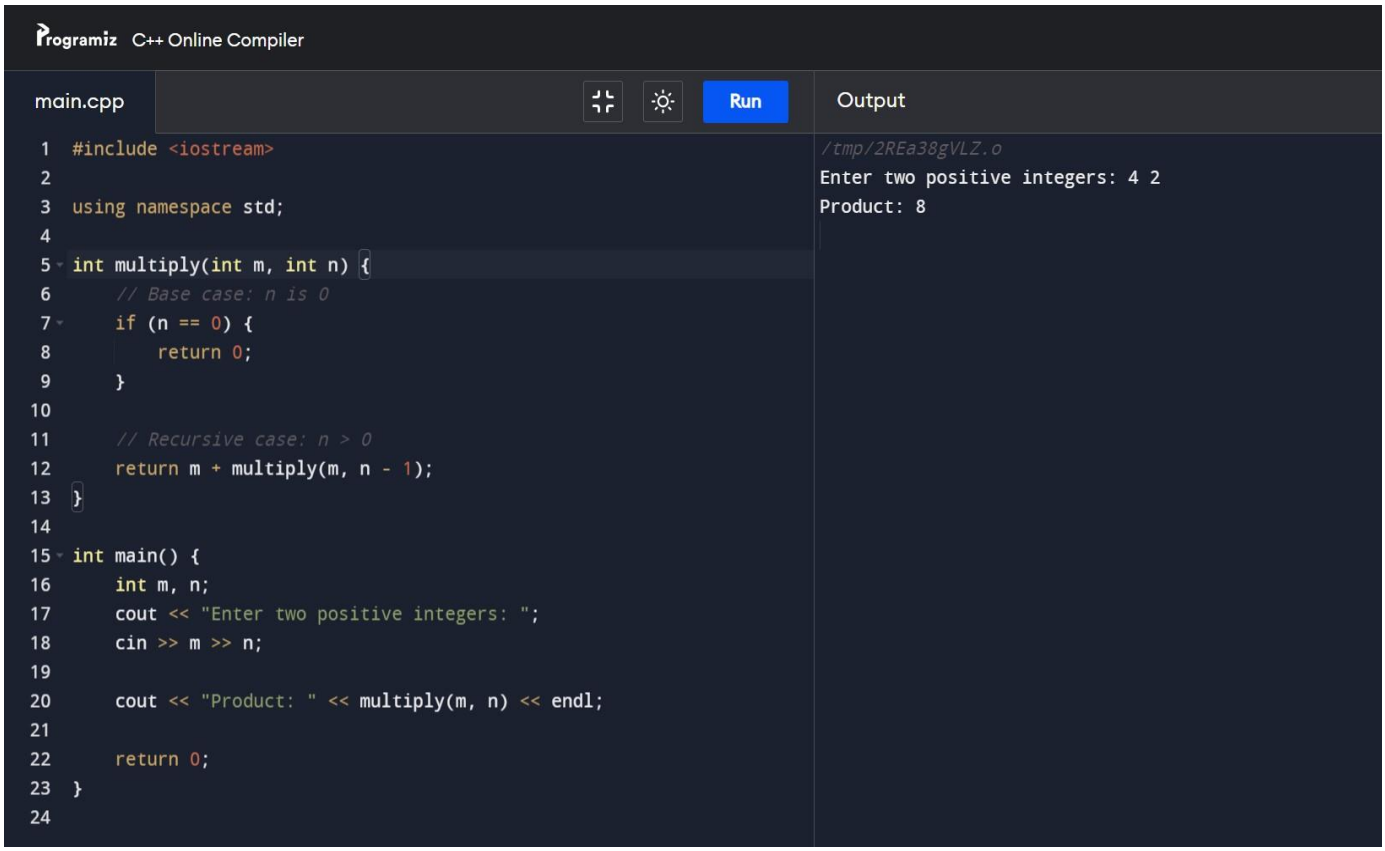


The Fibonacci series is 0-indexed, so the first number is considered to be 0, the second number is 1, and so on.

PROBLEM STATEMENT 03

Write a recursive algorithm to multiply two positive integers m and n using repeated addition.

Specify the base case and the recursive case.



Practical 12

PROBLEM STATEMENT 01

Create a structure called volume that uses three variables of type Distance (structure) to model the volume of a room. Initialize a variable of type volume to specific dimensions, and then calculate the volume it represent and print out the result.

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
#include <iostream>

using namespace std;

// Structure to represent distance
struct Distance {
    double feet;
    double inches;
};

// Structure to represent volume
struct Volume {
    Distance length;
    Distance width;
    Distance height;
};

// Function to calculate the volume
double calculateVolume(const Volume& room) {
    double lengthInInches = room.length.feet * 12 + room.length.inches;
    double widthInInches = room.width.feet * 12 + room.width.inches;
    double heightInInches = room.height.feet * 12 + room.height.inches;
```

```
/tmp/2REa38gVLZ.o
The volume of the room is: 1125.47 cubic feet
```

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
    double volumeInCubicFeet = lengthInInches * widthInInches * heightInInches / 12 / 12 / 12;

    return volumeInCubicFeet;
}

int main() {
    // Initialize a variable of type Volume
    Volume room;
    room.length.feet = 10;
    room.length.inches = 6;
    room.width.feet = 12;
    room.width.inches = 3;
    room.height.feet = 8;
    room.height.inches = 9;

    // Calculate the volume of the room
    double volume = calculateVolume(room);

    // Print the result
    cout << "The volume of the room is: " << volume << " cubic feet" << endl;

    return 0;
}
```

/tmp/2REa38gVLZ.o
The volume of the room is: 1125.47 cubic feet

2

Create a structure a type date that contains three members: the day, the month, the year, all of type int. Here the user enter a date in the format 10/9/2007, store it in a variable of type date, then retrieve the value form the variable and print them out in the same format.

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
#include <iostream>

using namespace std;

// Structure to represent a date
struct Date {
    int day;
    int month;
    int year;
};

int main() {
    Date date;

    // Prompt the user to enter a date
    cout << "Enter a date in the format day/month/year: ";
    char slash;
    cin >> date.day >> slash >> date.month >> slash >> date.year;

    // Print the date
    cout << "Entered date: " << date.day << "/" << date.month << "
        /" << date.year << endl;

    return 0;
}
```

```
/tmp/2REa38gVLZ.o
Enter a date in the format day/month/year: 10/9/2007
Entered date: 10/9/2007
```

Practical 13

PROBLEM STATEMENT 01

Write a program in C++ that inputs a text from the user and displays the number of uppercase letters and lowercase letters in it.

PROBLEM STATEMENT 0

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
#include <iostream>
#include <cctype>

using namespace std;

int main() {
    string text;
    cout << "Enter a text: ";
    getline(cin, text);

    int uppercaseCount = 0;
    int lowercaseCount = 0;

    for (char c : text) {
        if (isupper(c)) {
            uppercaseCount++;
        } else if (islower(c)) {
            lowercaseCount++;
        }
    }

    cout << "Number of uppercase letters: " << uppercaseCount <<
        endl;
    cout << "Number of lowercase letters: " << lowercaseCount <<
        endl;
```

```
/tmp/2REa38gVLZ.o
Enter a text: Dawood University Of Engineering and Technology
Number of uppercase letters: 5
Number of lowercase letters: 37
```

Programiz C++ Online Compiler

main.cpp

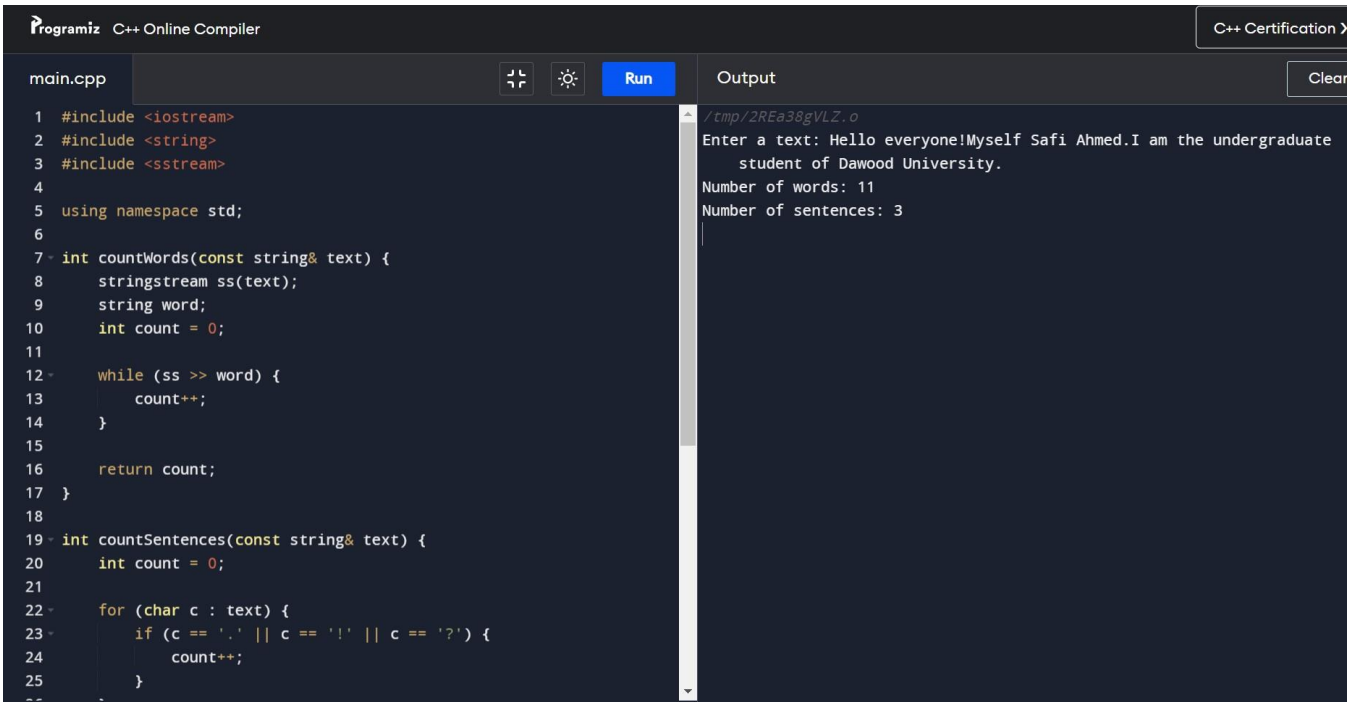
Run

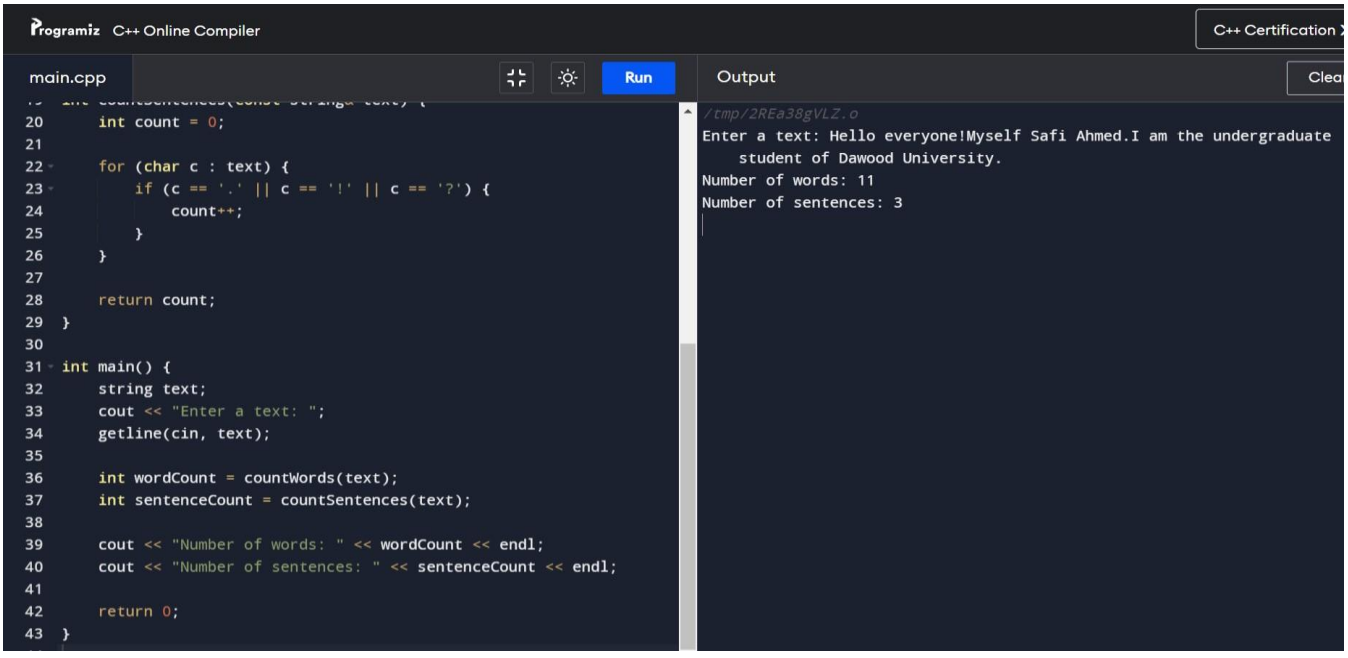
Output

```cpp
int main() {
    string text;
    cout << "Enter a text: ";
    getline(cin, text);

    int uppercaseCount = 0;
    int lowercaseCount = 0;

    for (char c : text) {
        if (isupper(c)) {
            uppercaseCount++;
        } else if (islower(c)) {
            lowercaseCount++;
        }
    }

    cout << "Number of uppercase letters: " << uppercaseCount <<
        endl;
    cout << "Number of lowercase letters: " << lowercaseCount <<
        endl;

    return 0;
}
```

```
/tmp/2REa38gVLZ.o
Enter a text: Dawood University Of Engineering and Technology
Number of uppercase letters: 5
Number of lowercase letters: 37
```

Write a program in C++ that inputs a text from the user and displays the number of words and sentences in it.



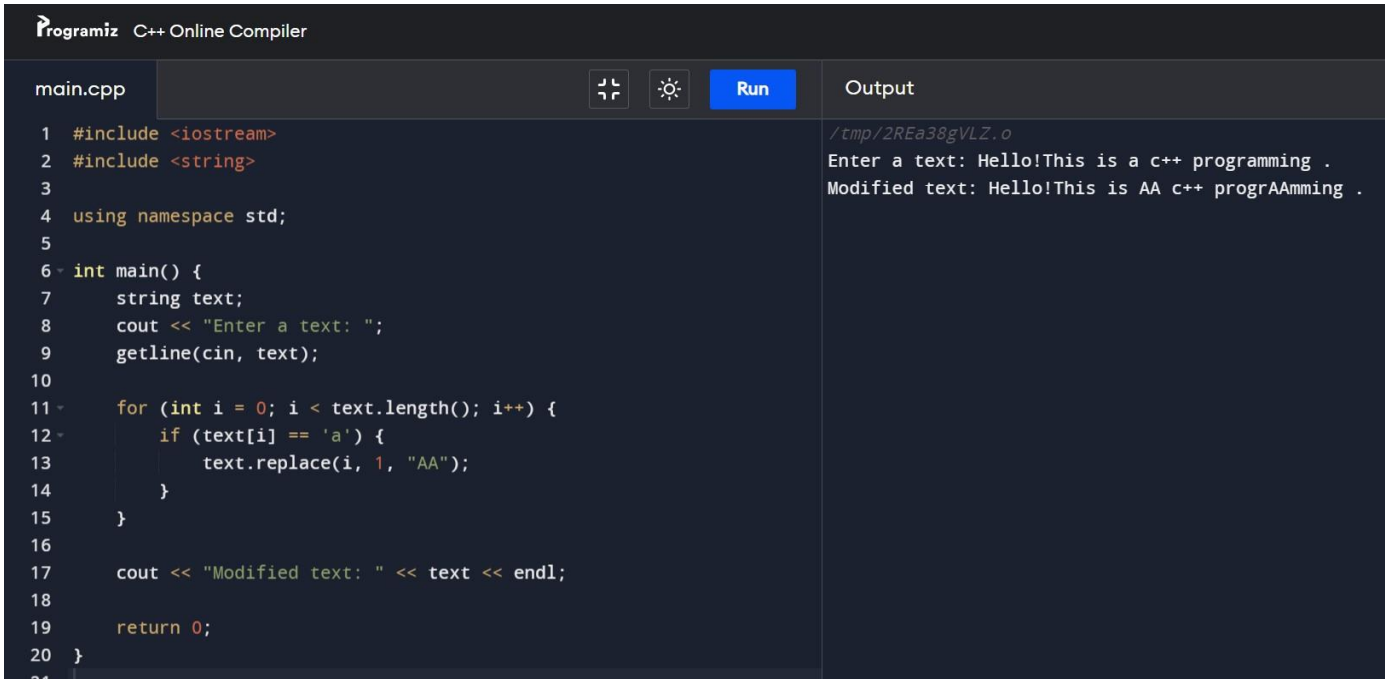


PROBLEM STATEMENT 0

Practical 14

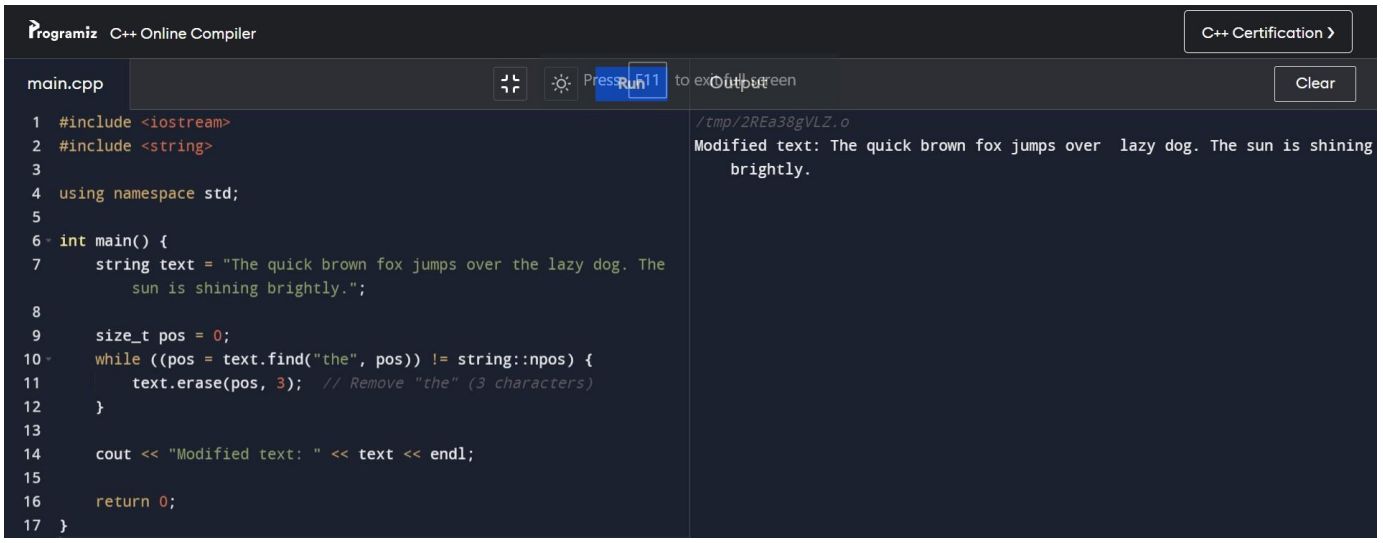
PROBLEM STATEMENT 01

Write a program in C++ that inputs a text from the user and replaces all the occurrences of lowercase letter ‘a’ to “AA”.



PROBLEM STATEMENT 02

Write a program in C++ that initializes a string object and deletes all the occurrences the word “the” in it.



Write a program in C++ that inputs three names and displays the name which comes first among them in alphabetical order.

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
#include <iostream>
#include <string>

using namespace std;

int main() {
    string name1, name2, name3;

    cout << "Enter the first name: ";
    cin >> name1;

    cout << "Enter the second name: ";
    cin >> name2;

    cout << "Enter the third name: ";
    cin >> name3;

    string firstAlphabeticalName = name1;

    if (name2 < firstAlphabeticalName) {
        firstAlphabeticalName = name2;
    }

    if (name3 < firstAlphabeticalName) {
        firstAlphabeticalName = name3;
```

```
/tmp/2REa38gVLZ.o
Enter the first name: SAFI
Enter the second name: RAFAY
Enter the third name: YOUSUF
The name that comes first in alphabetical order: RAFAY
```

Programiz C++ Online Compiler

main.cpp

Run

Output

```cpp
    cout << "Enter the first name: ";
    cin >> name1;

    cout << "Enter the second name: ";
    cin >> name2;

    cout << "Enter the third name: ";
    cin >> name3;

    string firstAlphabeticalName = name1;

    if (name2 < firstAlphabeticalName) {
        firstAlphabeticalName = name2;
    }

    if (name3 < firstAlphabeticalName) {
        firstAlphabeticalName = name3;
    }

    cout << "The name that comes first in alphabetical order: " <<
        firstAlphabeticalName << endl;

    return 0;
}
```

/tmp/2REa38gVLZ.o
Enter the first name: SAFI
Enter the second name: RAFAY
Enter the third name: YOUSUF
The name that comes first in alphabetical order: RAFAY

PROBLEM STATEMENT 04

Write a program in C++ that input your name and displays it in reverse order.

PROBLEM STATEMENT 0

Programiz C++ Online Compiler

main.cpp

Run

```cpp
#include <iostream>
#include <string>

using namespace std;

int main() {
    string name;

    cout << "Enter your name: ";
    getline(cin, name);

    cout << "Your name in reverse order: ";
    for (int i = name.length() - 1; i >= 0; i--) {
        cout << name[i];
    }

    cout << endl;

    return 0;
}
```

Output

```
/tmp/2REa38gVLZ.o
Enter your name: SAFI AHMED
Your name in reverse order: DEMHA IFAS
```