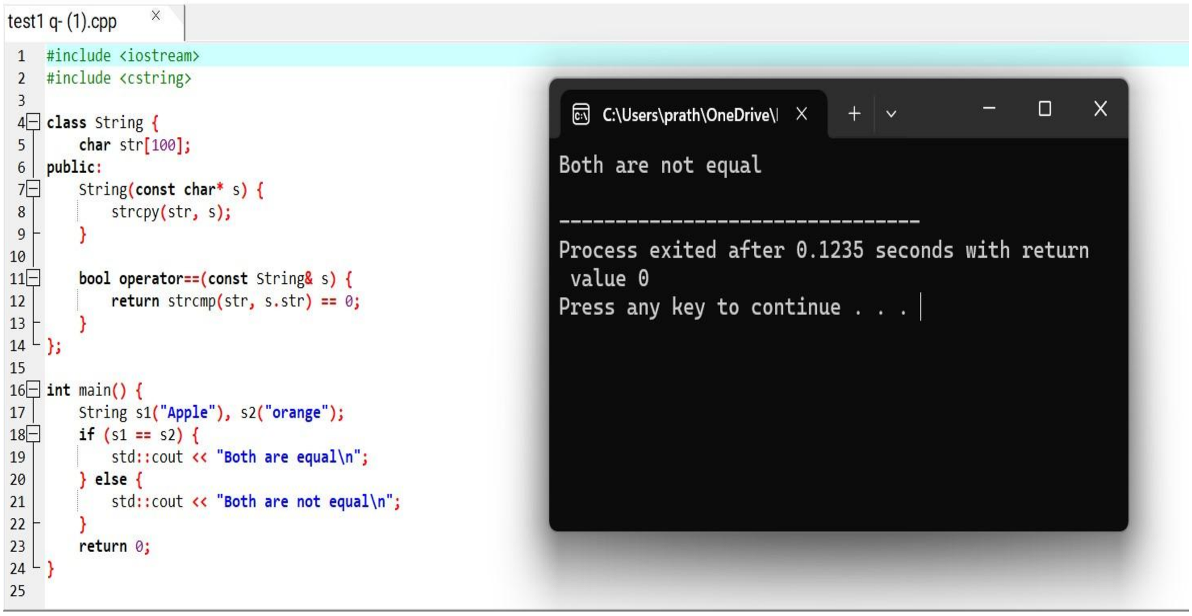
1. Define a Class String. Write overload function = = compare two strings.

Input: First string Apple

Second string orange

Output: Both not equal

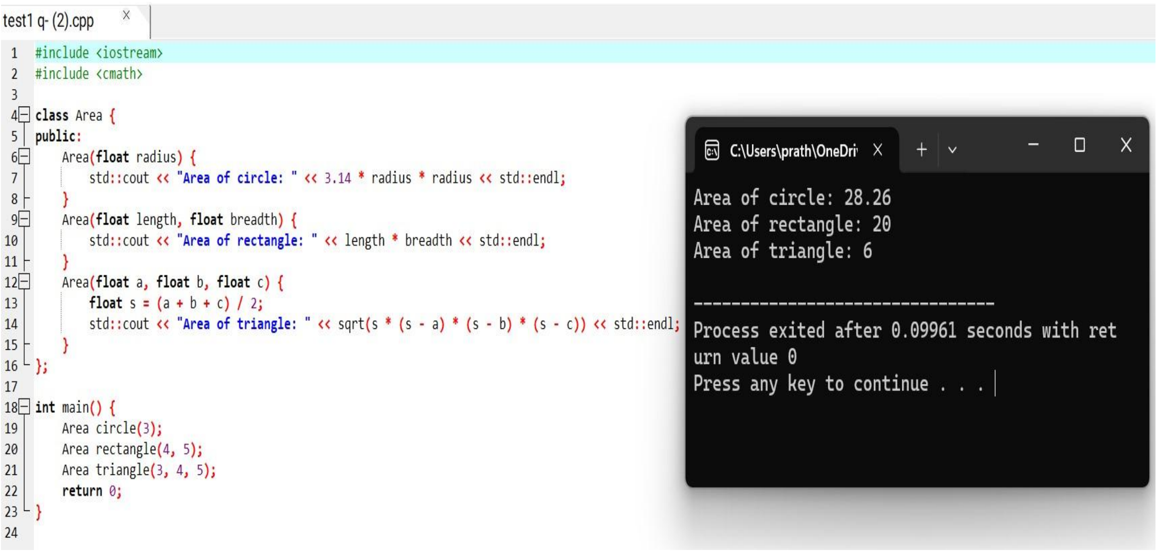


```cpp
#include <iostream>
#include <cstring>

class String {
    char str[100];
public:
    String(const char* s) {
        strcpy(str, s);
    }

    bool operator==(const String& s) {
        return strcmp(str, s.str) == 0;
    }
};

int main() {
    String s1("Apple"), s2("orange");
    if (s1 == s2) {
        std::cout << "Both are equal\n";
    } else {
        std::cout << "Both are not equal\n";
    }
    return 0;
}

```

```
Both are not equal

--------------------------------
Process exited after 0.1235 seconds with return
 value 0
Press any key to continue . . .
```

2. Write a program to find area of circle, rectangle and triangle using constructor overloading.

Input : a) 3   output : 28.26



```cpp
#include <iostream>
#include <cmath>

class Area {
public:
    Area(float radius) {
        std::cout << "Area of circle: " << 3.14 * radius * radius << std::endl;
    }
    Area(float length, float breadth) {
        std::cout << "Area of rectangle: " << length * breadth << std::endl;
    }
    Area(float a, float b, float c) {
        float s = (a + b + c) / 2;
        std::cout << "Area of triangle: " << sqrt(s * (s - a) * (s - b) * (s - c)) << std::endl;
    }
};

int main() {
    Area circle(3);
    Area rectangle(4, 5);
    Area triangle(3, 4, 5);
    return 0;
}

```

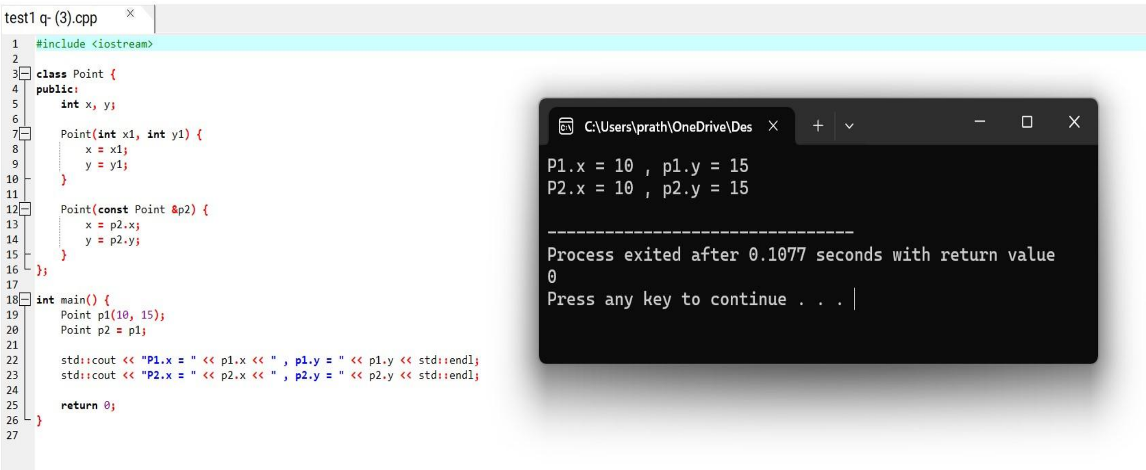
```
Area of circle: 28.26
Area of rectangle: 20
Area of triangle: 6

--------------------------------
Process exited after 0.09961 seconds with ret
urn value 0
Press any key to continue . . .
```

3. Write a C++ program to demonstrate the working of a copy constructor

Sample input & output (P1 & P2 are objects)

P1.x =10 , p1.y =15

P2.x = 10 , p2.y =15



```cpp
#include <iostream>

class Point {
public:
    int x, y;

    Point(int x1, int y1) {
        x = x1;
        y = y1;
    }

    Point(const Point &p2) {
        x = p2.x;
        y = p2.y;
    }
};

int main() {
    Point p1(10, 15);
    Point p2 = p1;

    std::cout << "P1.x = " << p1.x << " , p1.y = " << p1.y << std::endl;
    std::cout << "P2.x = " << p2.x << " , p2.y = " << p2.y << std::endl;

    return 0;
}
```

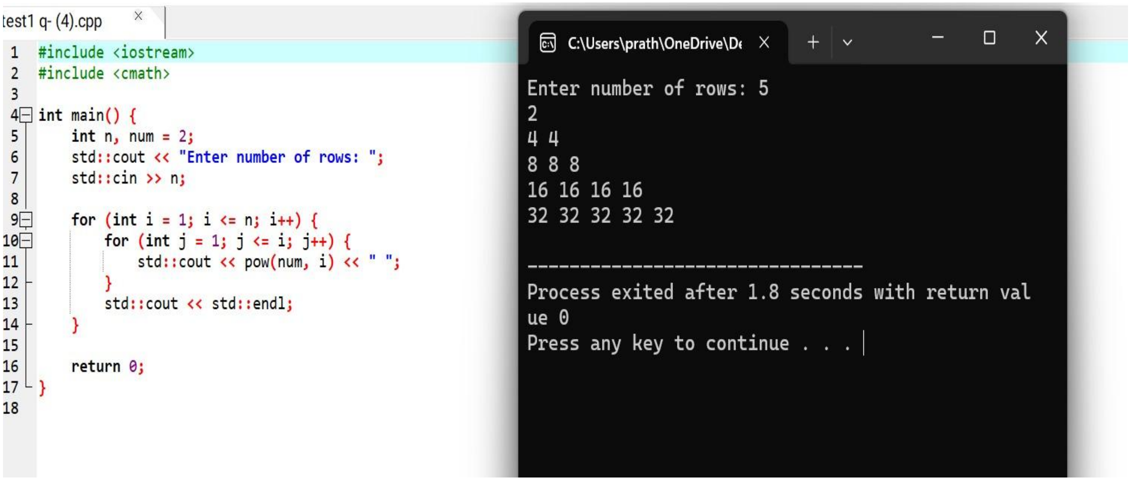
```
P1.x = 10 , p1.y = 15
P2.x = 10 , p2.y = 15

--------------------------------
Process exited after 0.1077 seconds with return value
0
Press any key to continue . . .
```

4. Write a Program to print the following pattern

Sample Inupt:

Number of rows: 5

```
2
4  4
16  16  16
256    256   2 56    256
65536     65536       65536       65536
```



```cpp
#include <iostream>
#include <cmath>

int main() {
    int n, num = 2;
    std::cout << "Enter number of rows: ";
    std::cin >> n;

    for (int i = 1; i <= n; i++) {
        for (int j = 1; j <= i; j++) {
            std::cout << pow(num, i) << " ";
        }
        std::cout << std::endl;
    }

    return 0;
}
```

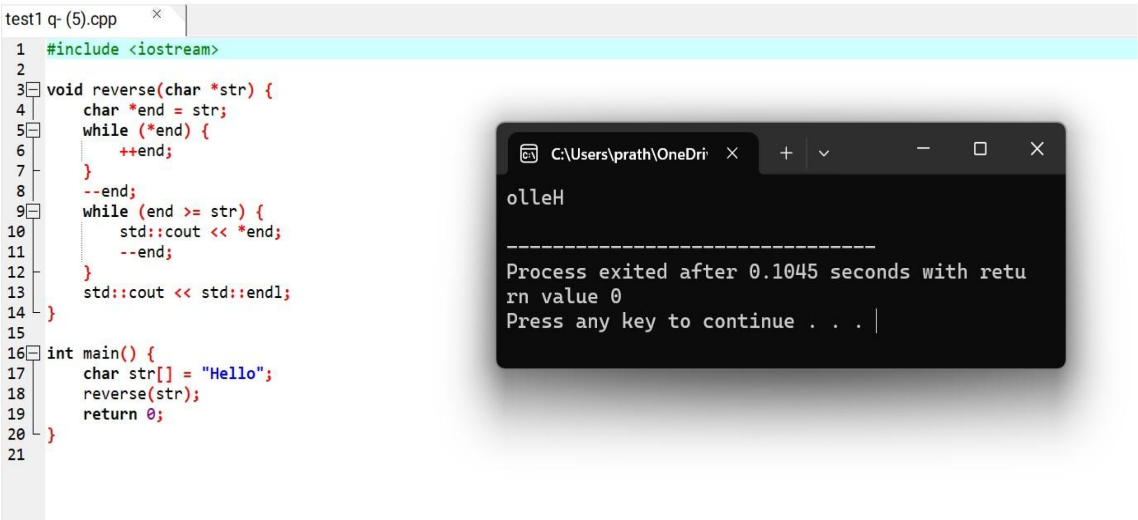
```
Enter number of rows: 5
2
4 4
8 8 8
16 16 16 16
32 32 32 32 32

--------------------------------
Process exited after 1.8 seconds with return val
ue 0
Press any key to continue . . .
```

5. Write a program in C++ to print a string in reverse using a pointer.

Input: Hello

Output:

olleH



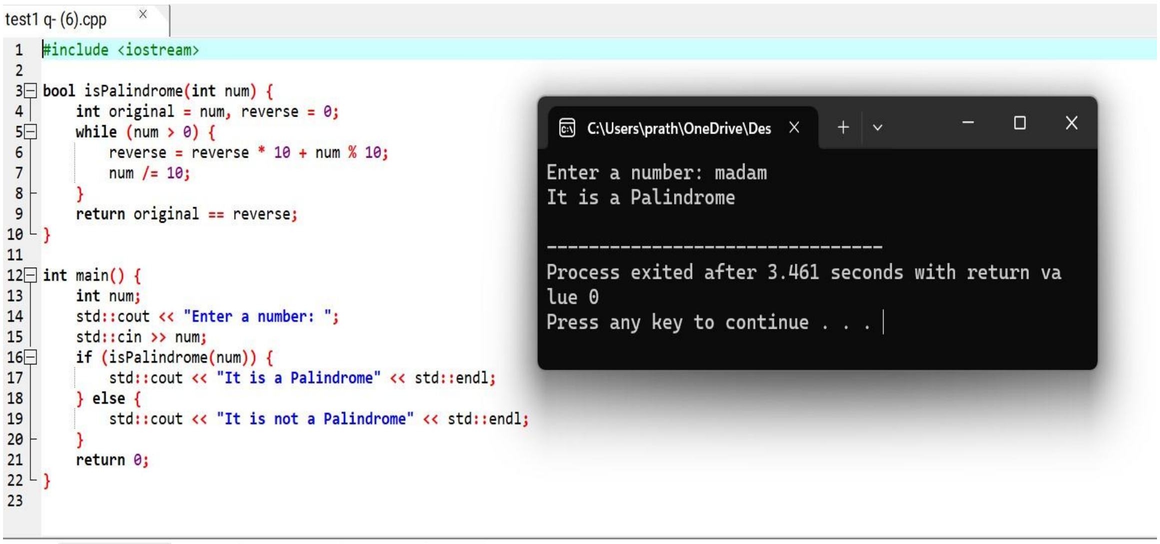
```cpp
#include <iostream>

void reverse(char *str) {
    char *end = str;
    while (*end) {
        ++end;
    }
    --end;
    while (end >= str) {
        std::cout << *end;
        --end;
    }
    std::cout << std::endl;
}

int main() {
    char str[] = "Hello";
    reverse(str);
    return 0;
}
```

```
olleH

--------------------------------
Process exited after 0.1045 seconds with retu
rn value 0
Press any key to continue . . .
```

6. Write a C++ Program to check whether a given number is palindrome or not

Input : 123321

Output : It is a Palindrome



```cpp
#include <iostream>

bool isPalindrome(int num) {
    int original = num, reverse = 0;
    while (num > 0) {
        reverse = reverse * 10 + num % 10;
        num /= 10;
    }
    return original == reverse;
}

int main() {
    int num;
    std::cout << "Enter a number: ";
    std::cin >> num;
    if (isPalindrome(num)) {
        std::cout << "It is a Palindrome" << std::endl;
    } else {
        std::cout << "It is not a Palindrome" << std::endl;
    }
    return 0;
}
```

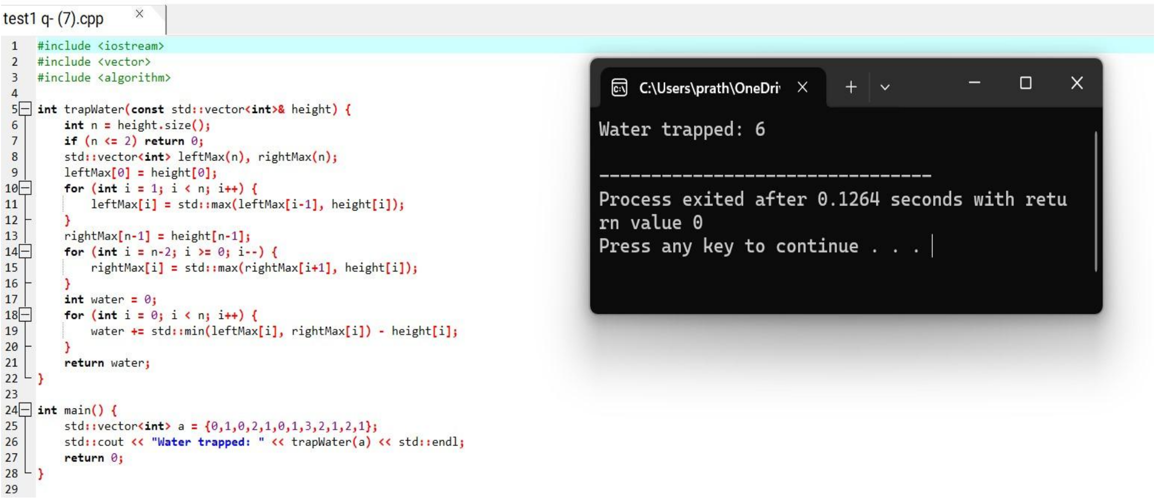
```
Enter a number: madam
It is a Palindrome

--------------------------------
Process exited after 3.461 seconds with return va
lue 0
Press any key to continue . . .
```

7. Given an integer array A[ ] consisting of N non-negative integers representing an elevation map, where

Examples:

Input: a[ ] = {0,1, 0,2,1,0, 1,3,2,1,2,1}

Output : 6



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

int trapWater(const std::vector<int>& height) {
    int n = height.size();
    if (n <= 2) return 0;
    std::vector<int> leftMax(n), rightMax(n);
    leftMax[0] = height[0];
    for (int i = 1; i < n; i++) {
        leftMax[i] = std::max(leftMax[i-1], height[i]);
    }
    rightMax[n-1] = height[n-1];
    for (int i = n-2; i >= 0; i--) {
        rightMax[i] = std::max(rightMax[i+1], height[i]);
    }
    int water = 0;
    for (int i = 0; i < n; i++) {
        water += std::min(leftMax[i], rightMax[i]) - height[i];
    }
    return water;
}

int main() {
    std::vector<int> a = {0,1,0,2,1,0,1,3,2,1,2,1};
    std::cout << "Water trapped: " << trapWater(a) << std::endl;
    return 0;
}
```

```
Water trapped: 6

--------------------------------
Process exited after 0.1264 seconds with retu
rn value 0
Press any key to continue . . .
```

8. Write a C++ program to find whether the person is eligible for vote or not. And if that particular person is not eligible, then print how many years are left to be eligible.

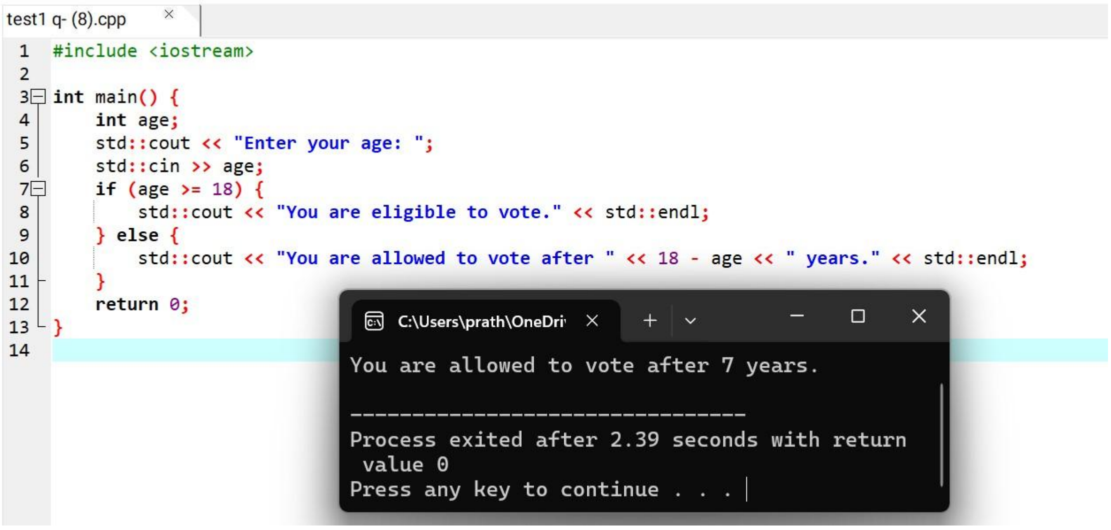
Input:

Enter your age: 7

Output:

You are allowed to vote after 11 years

Testcases-12



```cpp
#include <iostream>

int main() {
    int age;
    std::cout << "Enter your age: ";
    std::cin >> age;
    if (age >= 18) {
        std::cout << "You are eligible to vote." << std::endl;
    } else {
        std::cout << "You are allowed to vote after " << 18 - age << " years." << std::endl;
    }
    return 0;
}
```

```
You are allowed to vote after 7 years.

--------------------------------
Process exited after 2.39 seconds with return
 value 0
Press any key to continue . . .
```

9. Write a CPP program to find the Square root and Cube root of a number.

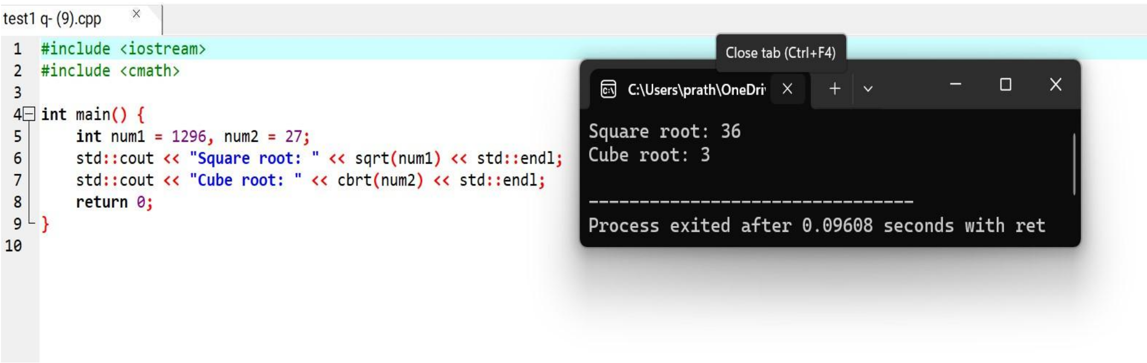
Square Root Input: 1296

Cube root Input: 27

Output:

36

3



```
#include <iostream>
#include <cmath>

int main() {
    int num1 = 1296, num2 = 27;
    std::cout << "Square root: " << sqrt(num1) << std::endl;
    std::cout << "Cube root: " << cbrt(num2) << std::endl;
    return 0;
}
```

```
Square root: 36
Cube root: 3

--------------------------------
Process exited after 0.09608 seconds with ret
```

10. Write a C++ program that reads an integer and print the least significant digit and the next least significant digit.

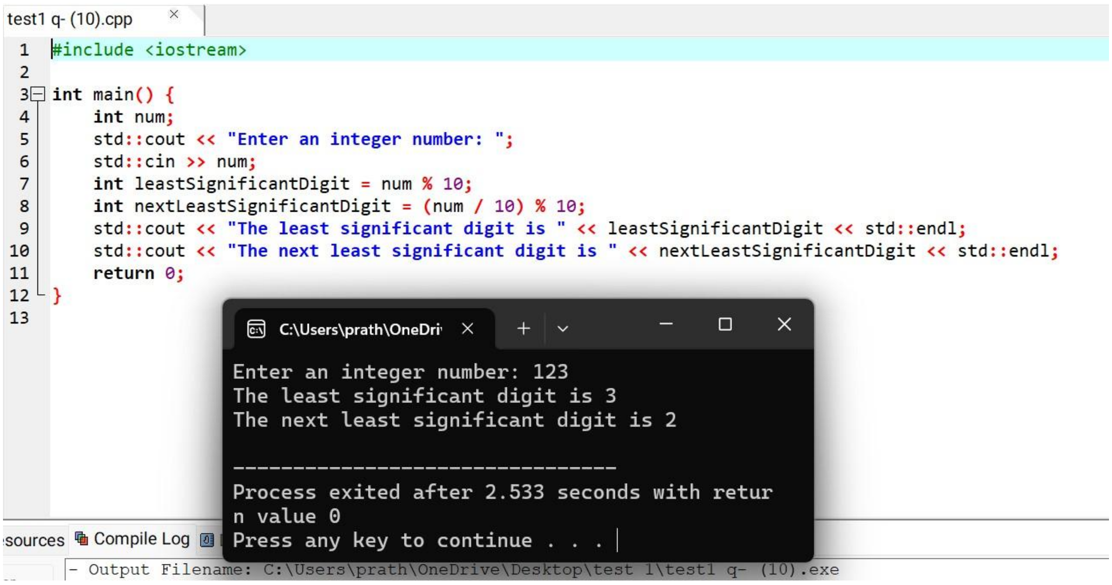
Example:

Input:

Enter an integer number : 7235

Output:

The least significant digit is 5 The next least significant digit is 3



```
#include <iostream>

int main() {
    int num;
    std::cout << "Enter an integer number: ";
    std::cin >> num;
    int leastSignificantDigit = num % 10;
    int nextLeastSignificantDigit = (num / 10) % 10;
    std::cout << "The least significant digit is " << leastSignificantDigit << std::endl;
    std::cout << "The next least significant digit is " << nextLeastSignificantDigit << std::endl;
    return 0;
}
```

```
Enter an integer number: 123
The least significant digit is 3
The next least significant digit is 2

--------------------------------
Process exited after 2.533 seconds with retur
n value 0
Press any key to continue . . .
```

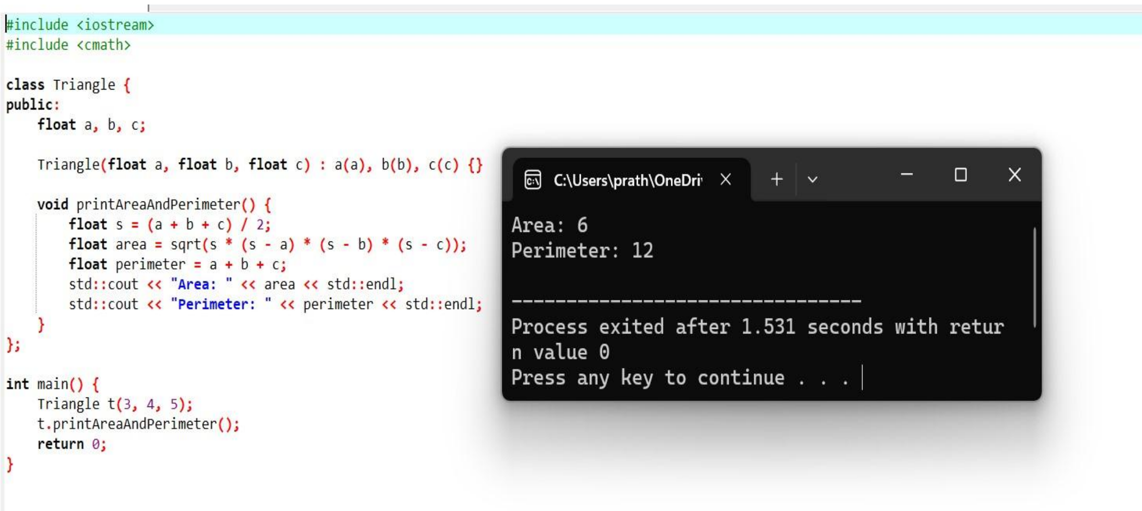
```
- Output Filename: C:\Users\prath\OneDrive\Desktop\test 1\test1 q- (10).exe
```

11. Given an integer array A[ ] consisting of N non-negative integers representing an elevation map, where

Examples:

Input : A[ ] { 0,1,0,2,1,0,1,3,2,1,2,1}

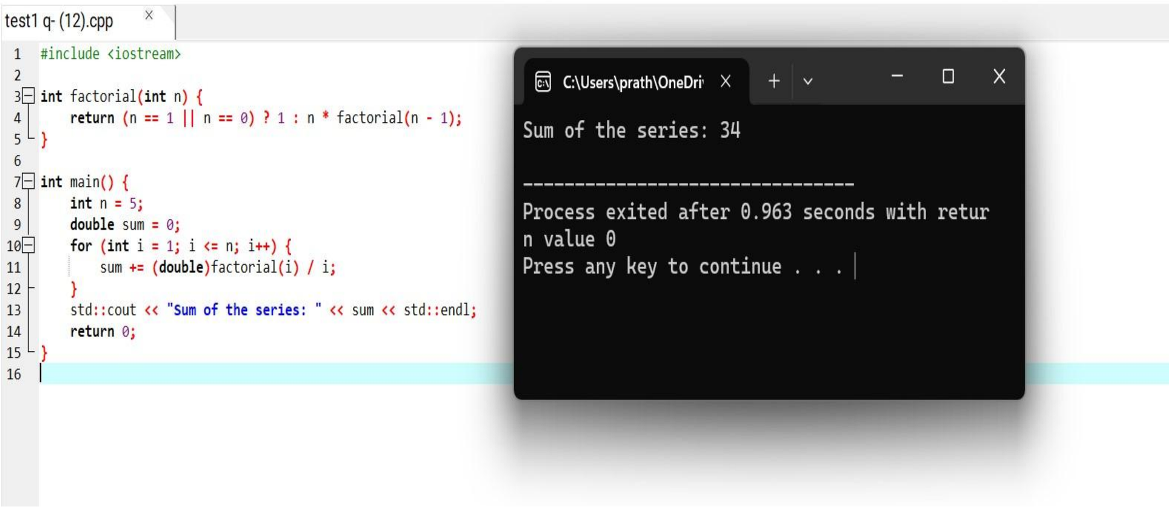
Output: 6



```cpp
#include <iostream>
#include <cmath>

class Triangle {
public:
    float a, b, c;

    Triangle(float a, float b, float c) : a(a), b(b), c(c) {}

    void printAreaAndPerimeter() {
        float s = (a + b + c) / 2;
        float area = sqrt(s * (s - a) * (s - b) * (s - c));
        float perimeter = a + b + c;
        std::cout << "Area: " << area << std::endl;
        std::cout << "Perimeter: " << perimeter << std::endl;
    }
};

int main() {
    Triangle t(3, 4, 5);
    t.printAreaAndPerimeter();
    return 0;
}
```

```
Area: 6
Perimeter: 12

--------------------------------
Process exited after 1.531 seconds with retur
n value 0
Press any key to continue . . .
```

12. Write a program to print the area and perimeter of a triangle having sides of 3,4 and 5 units by creating a class named ‘ Triangle’ With a function to print the area and perimeter.



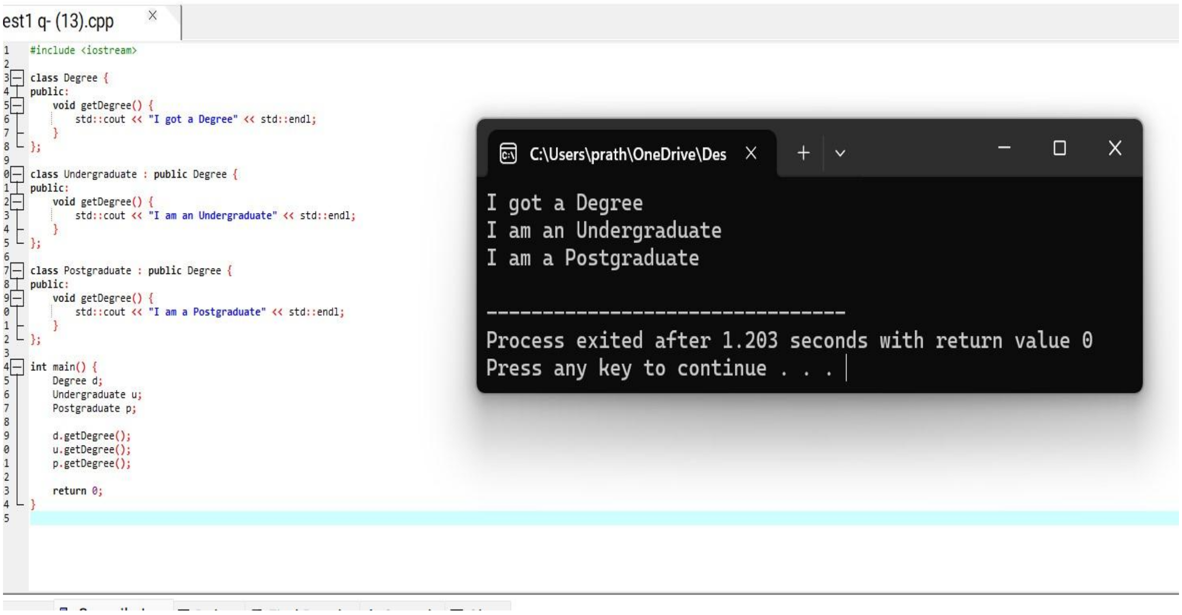
```cpp
#include <iostream>

int factorial(int n) {
    return (n == 1 || n == 0) ? 1 : n * factorial(n - 1);
}

int main() {
    int n = 5;
    double sum = 0;
    for (int i = 1; i <= n; i++) {
        sum += (double)factorial(i) / i;
    }
    std::cout << "Sum of the series: " << sum << std::endl;
    return 0;
}

```

```
Sum of the series: 34

--------------------------------
Process exited after 0.963 seconds with retur
n value 0
Press any key to continue . . .
```

13. rite a program to find the sum of the series 1!/1+2!/2+3!/3+4!/4+5!/5

Sample input : 5

Sample Output : 34

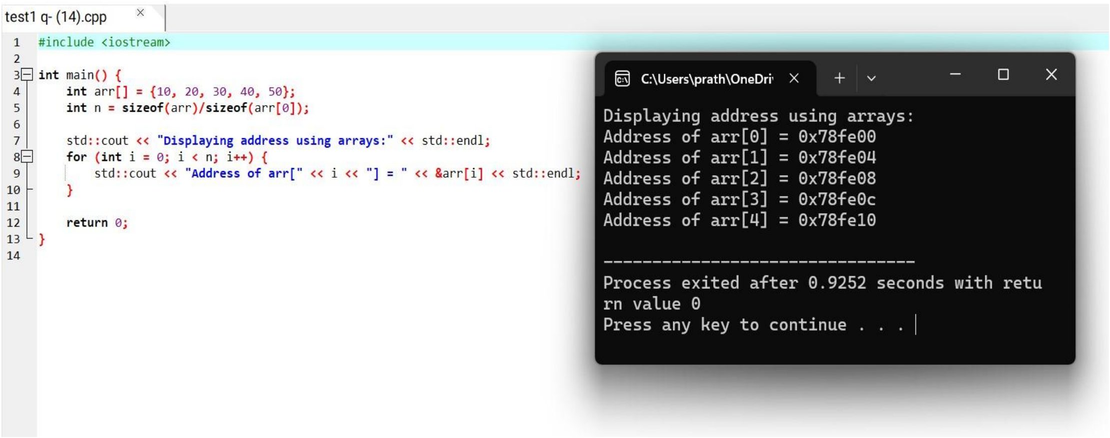


```cpp
#include <iostream>

class Degree {
public:
    void getDegree() {
        std::cout << "I got a Degree" << std::endl;
    }
};

class Undergraduate : public Degree {
public:
    void getDegree() {
        std::cout << "I am an Undergraduate" << std::endl;
    }
};

class Postgraduate : public Degree {
public:
    void getDegree() {
        std::cout << "I am a Postgraduate" << std::endl;
    }
};

int main() {
    Degree d;
    Undergraduate u;
    Postgraduate p;

    d.getDegree();
    u.getDegree();
    p.getDegree();

    return 0;
}
```

```
I got a Degree
I am an Undergraduate
I am a Postgraduate

--------------------------------
Process exited after 1.203 seconds with return value 0
Press any key to continue . . .
```

14. Create a class ‘ Degree’ having a function ‘get degree’ that prints “ I got a Degree”

It has tow subclasses namely ‘Undergraduate’ and postgraduate’ each having a function with the same that prints’ I am an Undergraduate’ and “ I am a postgraduate” respectively. Call the function by creating an object of each of the three classes.



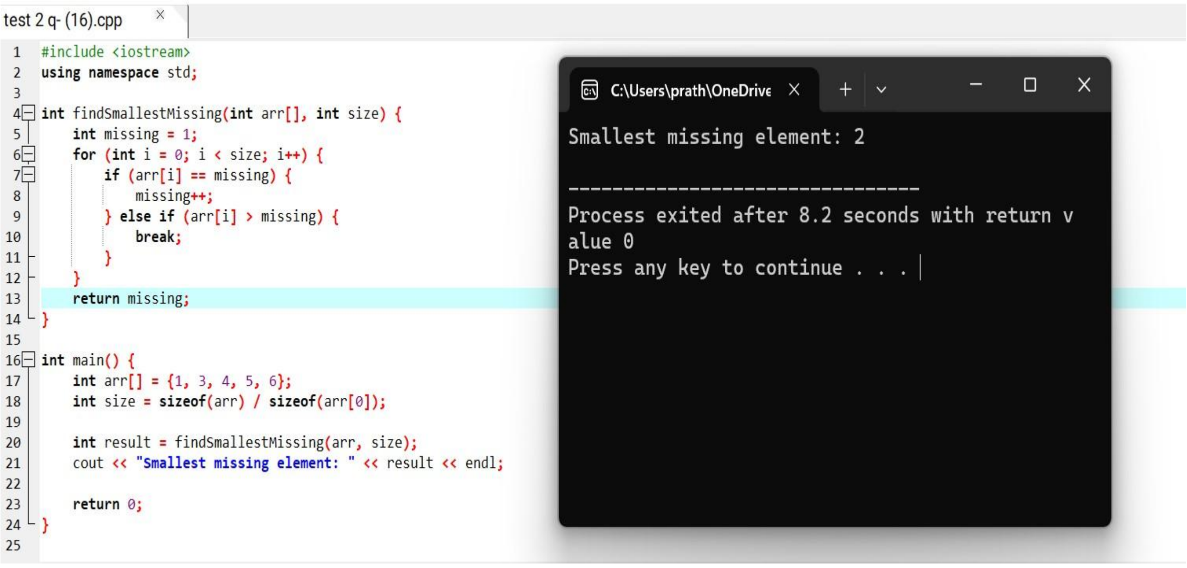
```cpp
#include <iostream>

int main() {
    int arr[] = {10, 20, 30, 40, 50};
    int n = sizeof(arr)/sizeof(arr[0]);

    std::cout << "Displaying address using arrays:" << std::endl;
    for (int i = 0; i < n; i++) {
        std::cout << "Address of arr[" << i << "] = " << &arr[i] << std::endl;
    }

    return 0;
}
```

```
Displaying address using arrays:
Address of arr[0] = 0x78fe00
Address of arr[1] = 0x78fe04
Address of arr[2] = 0x78fe08
Address of arr[3] = 0x78fe0c
Address of arr[4] = 0x78fe10

--------------------------------
Process exited after 0.9252 seconds with retu
rn value 0
Press any key to continue . . .
```

16. Write a c ++ program to find smallest element missing in a sorted natural numbers array?

Input : {1,3,4,5,6

Output : 2



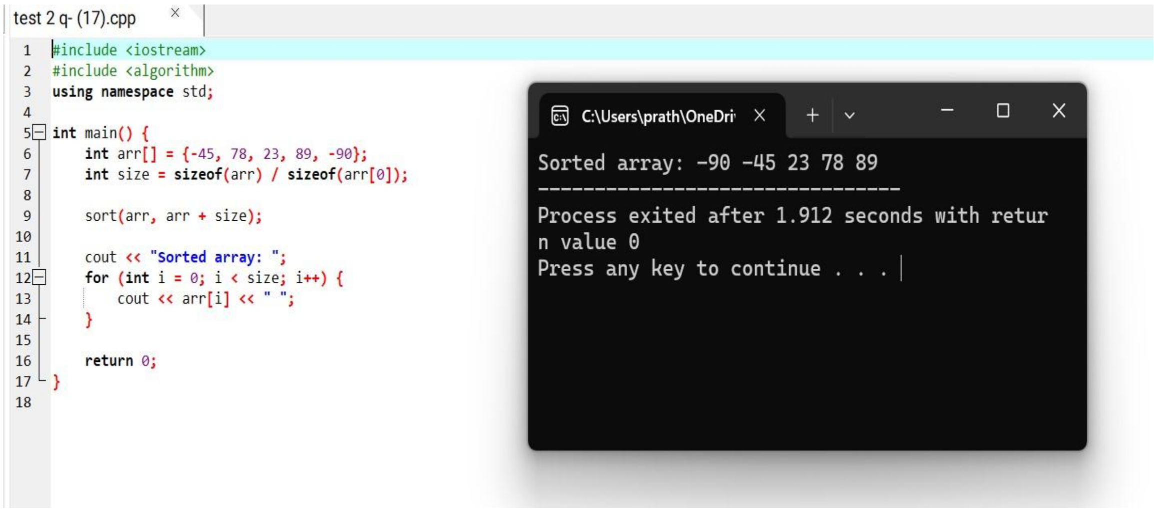
```
#include <iostream>
using namespace std;

int findSmallestMissing(int arr[], int size) {
    int missing = 1;
    for (int i = 0; i < size; i++) {
        if (arr[i] == missing) {
            missing++;
        } else if (arr[i] > missing) {
            break;
        }
    }
    return missing;
}

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

    int result = findSmallestMissing(arr, size);
    cout << "Smallest missing element: " << result << endl;

    return 0;
}
```

```
Smallest missing element: 2

--------------------------------
Process exited after 8.2 seconds with return v
alue 0
Press any key to continue . . .
```

17. Write a program to order the array of elements in non-Decreasing order.

Arr={ -45,78,23, 89,-90}

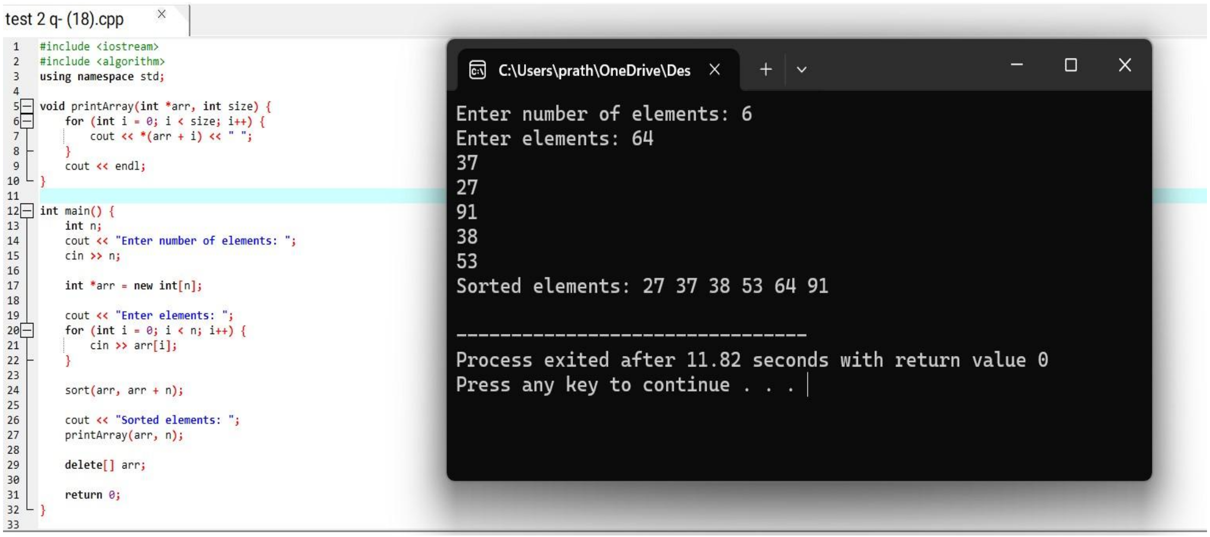
Output = { -90, -45, 23, 78,89)



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

int main() {
    int arr[] = {-45, 78, 23, 89, -90};
    int size = sizeof(arr) / sizeof(arr[0]);

    sort(arr, arr + size);

    cout << "Sorted array: ";
    for (int i = 0; i < size; i++) {
        cout << arr[i] << " ";
    }

    return 0;
}
```

```
Sorted array: -90 -45 23 78 89
--------------------------------
Process exited after 1.912 seconds with retur
n value 0
Press any key to continue . . .
```

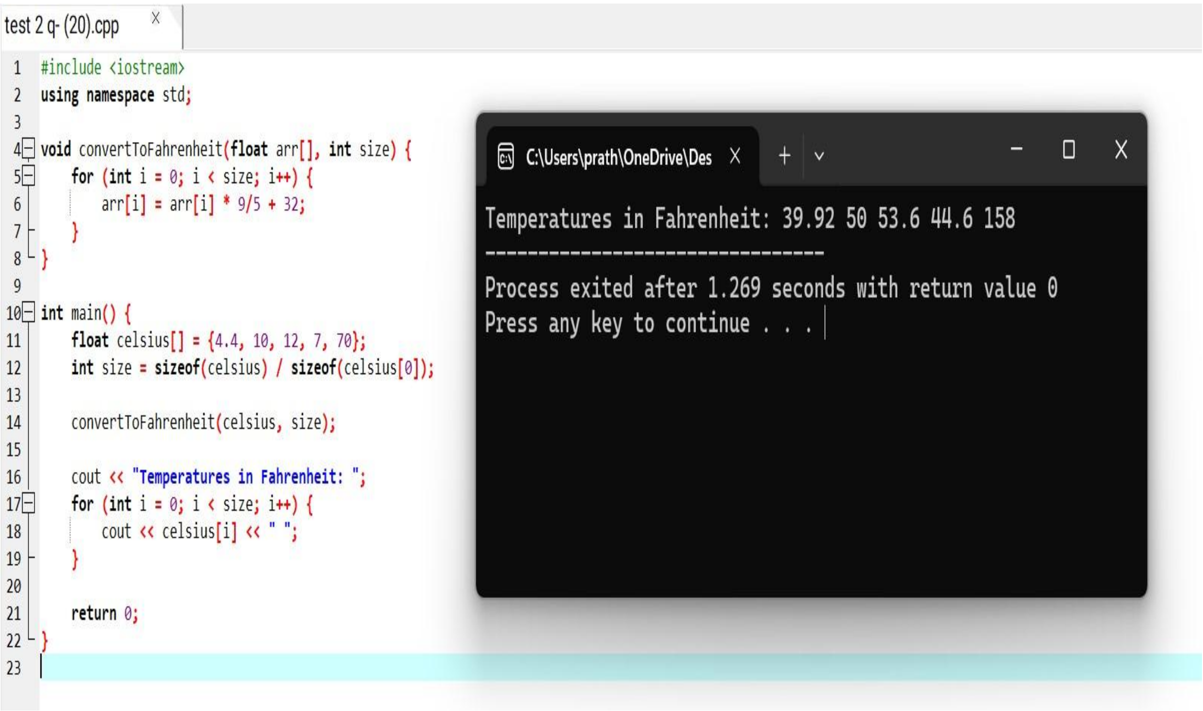
18. Write a program in C++ to store n elements in an array, sort and print the elements using pointer.



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

void printArray(int *arr, int size) {
    for (int i = 0; i < size; i++) {
        cout << *(arr + i) << " ";
    }
    cout << endl;
}

int main() {
    int n;
    cout << "Enter number of elements: ";
    cin >> n;

    int *arr = new int[n];

    cout << "Enter elements: ";
    for (int i = 0; i < n; i++) {
        cin >> arr[i];
    }

    sort(arr, arr + n);

    cout << "Sorted elements: ";
    printArray(arr, n);

    delete[] arr;

    return 0;
}
```

```
Enter number of elements: 6
Enter elements: 64
37
27
91
38
53
Sorted elements: 27 37 38 53 64 91

--------------------------------
Process exited after 11.82 seconds with return value 0
Press any key to continue . . .
```

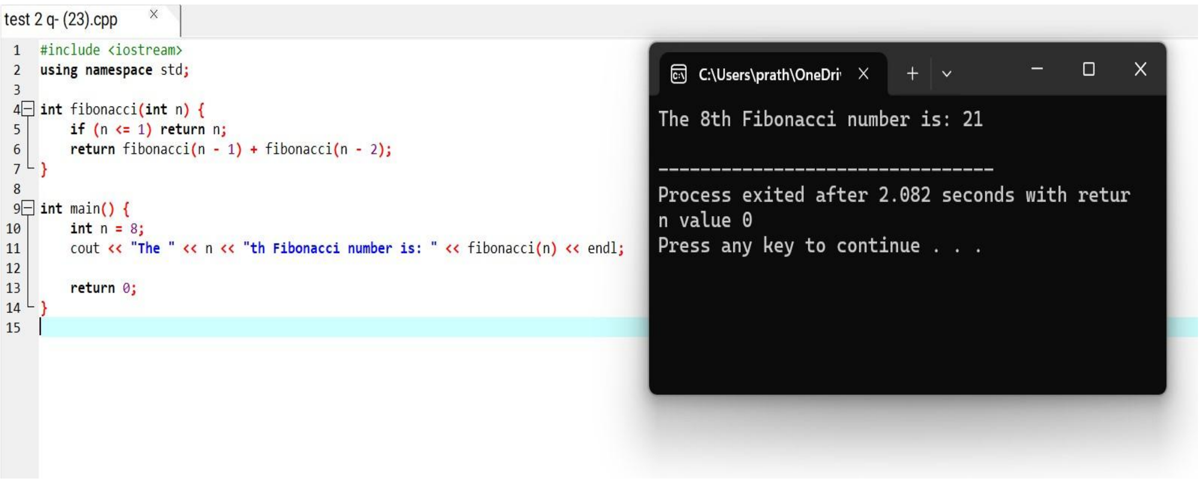
20. With a array consisting of celsious values you are asked to convert it into Fahrenheit.



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

void convertToFahrenheit(float arr[], int size) {
    for (int i = 0; i < size; i++) {
        arr[i] = arr[i] * 9/5 + 32;
    }
}

int main() {
    float celsius[] = {4.4, 10, 12, 7, 70};
    int size = sizeof(celsius) / sizeof(celsius[0]);

    convertToFahrenheit(celsius, size);

    cout << "Temperatures in Fahrenheit: ";
    for (int i = 0; i < size; i++) {
        cout << celsius[i] << " ";
    }

    return 0;
}
```

```
Temperatures in Fahrenheit: 39.92 50 53.6 44.6 158
--------------------------------
Process exited after 1.269 seconds with return value 0
Press any key to continue . . .
```

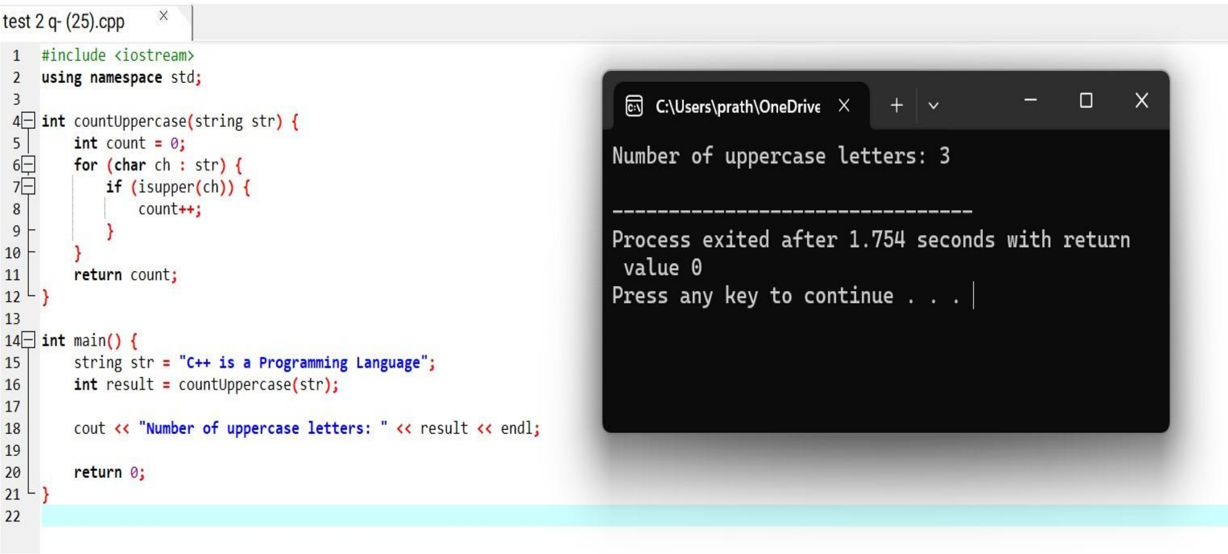
23. Write a program to find Nth Fibonacci number.
Input:8
Output:21



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

int fibonacci(int n) {
    if (n <= 1) return n;
    return fibonacci(n - 1) + fibonacci(n - 2);
}

int main() {
    int n = 8;
    cout << "The " << n << "th Fibonacci number is: " << fibonacci(n) << endl;

    return 0;
}
```

```
The 8th Fibonacci number is: 21

--------------------------------
Process exited after 2.082 seconds with retur
n value 0
Press any key to continue . . .
```

25. Write a function in C++ to count the number of Uppercase alphabets present in a text.
Input: str={C++ is a Programming Language }
Output:3.



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

int countUppercase(string str) {
    int count = 0;
    for (char ch : str) {
        if (isupper(ch)) {
            count++;
        }
    }
    return count;
}

int main() {
    string str = "C++ is a Programming Language";
    int result = countUppercase(str);

    cout << "Number of uppercase letters: " << result << endl;

    return 0;
}
```

```
Number of uppercase letters: 3

--------------------------------
Process exited after 1.754 seconds with return
 value 0
Press any key to continue . . .
```

27. Write a program to convert a string into uppercase and lowercase and find the reverse of it.

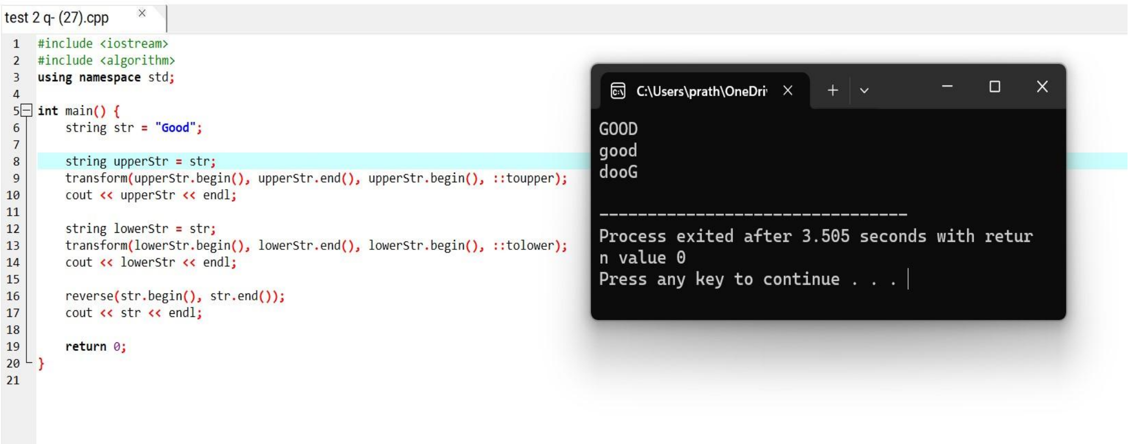
Input: Good

Output:

GOOD

good

Doog



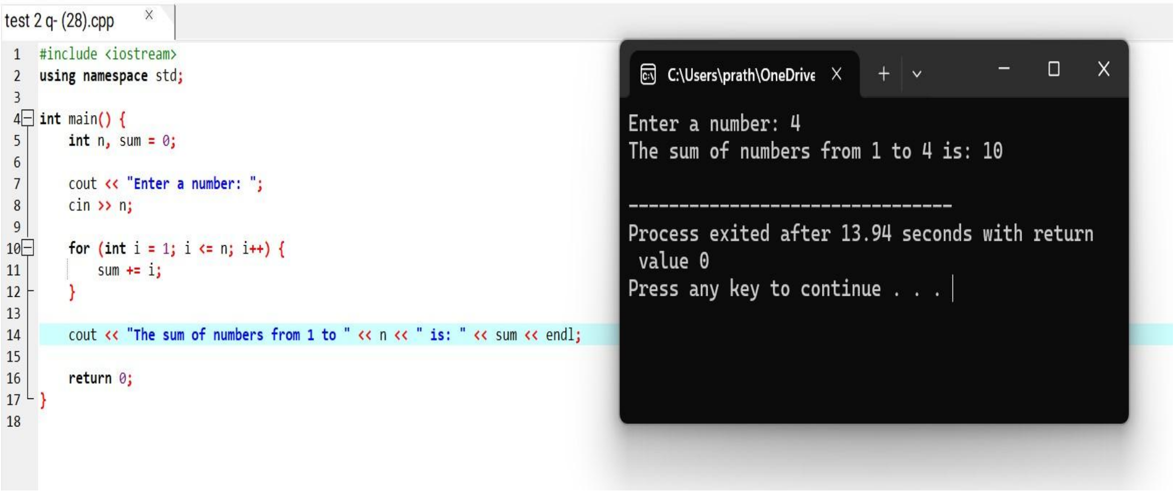
```cpp
#include <iostream>
#include <algorithm>
using namespace std;

int main() {
    string str = "Good";

    string upperStr = str;
    transform(upperStr.begin(), upperStr.end(), upperStr.begin(), ::toupper);
    cout << upperStr << endl;

    string lowerStr = str;
    transform(lowerStr.begin(), lowerStr.end(), lowerStr.begin(), ::tolower);
    cout << lowerStr << endl;

    reverse(str.begin(), str.end());
    cout << str << endl;

    return 0;
}
```

```
GOOD
good
dooG

--------------------------------
Process exited after 3.505 seconds with retur
n value 0
Press any key to continue . . .
```

28. Write a C++ Program to add all the numbers from 1 to a given number.

Input: 4

Output:10



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

int main() {
    int n, sum = 0;

    cout << "Enter a number: ";
    cin >> n;

    for (int i = 1; i <= n; i++) {
        sum += i;
    }

    cout << "The sum of numbers from 1 to " << n << " is: " << sum << endl;

    return 0;
}
```

```
Enter a number: 4
The sum of numbers from 1 to 4 is: 10

--------------------------------
Process exited after 13.94 seconds with return
 value 0
Press any key to continue . . .
```