

## Chapter 8: The class string & File input output Handling

### Laboratory Exercises (5)

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#### EXAMPLE 8-14 (clear, empty, erase, length, AND size FUNCTIONS)

```
#include <iostream>

#include <string>

using namespace std;

int main()
{
    string firstName = "Elizabeth";
    string name = firstName + " Jones";
    string str1 = "It is sunny.";
    string str2 = "";
    string str3 = "computer science";
    string str4 = "C++ programming.";
    string str5 = firstName + " is taking " + str4;
    string::size_type len;

    cout << "Line 9: str3: " << str3 << endl;
    str3.clear();
    cout << "Line 11: After clear, str3: " << str3 << endl;
    cout << "Line 12: str1.empty(): " << str1.empty() << endl;
    cout << "Line 13: str2.empty(): " << str2.empty() << endl;
    cout << "Line 14: str4: " << str4 << endl;
    str4.erase(11, 4);
    cout << "Line 16: After erase(11, 4), str4: " << str4 << endl;
```

```

cout << "Line 17: Length of \"" << firstName << "\" = " << static_cast<unsigned int>
(firstName.length())<< endl;

cout << "Line 18: Length of \"" << name << "\" = " << static_cast<unsigned int> (name.length())<< endl;

cout << "Line 19: Length of \"" << str1 << "\" = " << static_cast<unsigned int> (str1.length())<< endl;

cout << "Line 20: Size of \"" << str5 << "\" = " << static_cast<unsigned int> (str5.size()) << endl;

len = name.length();

cout << "Line 22: len = " << static_cast<unsigned int> (len) << endl; return 0;

return 0;

}

```

---

#### EXAMPLE 8-15 (find FUNCTION)

```

#include <iostream>

#include <string>

using namespace std;

int main()
{
    string sentence = "Outside it is cloudy and warm.";
    string str = "cloudy";
    string::size_type position;

    cout << "Line 4: sentence = \"" << sentence << "\" << endl;

    cout << "Line 5: The position of \"is\" in sentence = " << static_cast<unsigned int> (sentence.find("is"))<<
    endl;

    cout << "Line 6: The position of 's' in sentence = " << static_cast<unsigned int> (sentence.find('s'))<<
    endl;

    cout << "Line 7: The position of \"" << str << "\" in sentence = " << static_cast<unsigned int>
(sentence.find(str))<< endl;

    cout << "Line 8: The position of \"the\" in sentence = " << static_cast<unsigned int>
(sentence.find("the"))<< endl;
}

```

```

cout << "Line 9: The first occurrence of 'i' in " << "sentence \n after position 6 = " <<
static_cast<unsigned int> (sentence.find('i', 8)) << endl;

position = sentence.find("warm");

cout << "Line 11: " << "Position = " << position << endl;

return 0;
}

```

---

#### **EXAMPLE 8-16 (insert AND replace FUNCTIONS)**

```

#include <iostream>

#include <string>

using namespace std;

int main()
{
    string firstString = "Cloudy and warm.";
    string secondString = "Hello there";
    string thirdString = "Henry is taking programming I.";
    string str1 = " very ";
    string str2 = "Lisa";

    cout << "Line 6: firstString = " << firstString << endl;
    firstString.insert(10, str1);
    cout << "Line 8: After insert; firstString = " << firstString << endl;

    cout << "Line 9: secondString = " << secondString << endl;
    secondString.insert(11, 5, '!');
    cout << "Line 11: After insert; secondString = " << secondString << endl;

    cout << "Line 12: thirdString = " << thirdString << endl;
}

```

```
thirdString.replace(0, 5, str2);

cout << "Line 14: After replace, thirdString = "<< thirdString << endl;

return 0;

}
```

---

**EXAMPLE 8-17 (substr FUNCTION)**

```
#include <iostream>

#include <string>

using namespace std;

int main()
{
    string sentence;
    string str;
    sentence = "It is cloudy and warm.";

    cout << "Line 4: substr(0, 5) in \"" << sentence << "\" = \"" << sentence.substr(0, 5) << "\" << endl;
    cout << "Line 5: substr(6, 6) in \"" << sentence << "\" = \"" << sentence.substr(6, 6) << "\" << endl;
    cout << "Line 6: substr(6, 16) in \"" << sentence << "\" = " << endl << "\" << sentence.substr(6, 16) <<
    "\" << endl;

    cout << "Line 7: substr(17, 10) in \"" << sentence << "\" = \"" << sentence.substr(17, 10) << "\" << endl;
    cout << "Line 8: substr(3, 6) in \"" << sentence << "\" = \"" << sentence.substr(3, 6) << "\" << endl;

    str = sentence.substr(0, 8);

    cout << "Line 10: " << "str = \"" << str << "\" << endl;

    str = sentence.substr(2, 10);

    cout << "Line 12: " << "str = \"" << str << "\" << endl;

    return 0;
}
```

```
}
```

---

### Challenge Program!

Write a program that read your full name (first and last) in one string using *getline()* function, and then prints back your last name.

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

```
int main()
{
    int Pos, lnamePos, lnameLength;
    string name;
    string lname;

    cout<<"Enter you first name and last name: ";
    getline(cin, name);
    Pos=name.find(' ');
    lnamePos= Pos+1;
    lnameLength=name.length()-lnamePos;

    lname=name.substr(lnamePos, lnameLength);

    cout<<"\n Your last name is: "<<lname<<endl;

    return 0;
}
```

## Objects and Classes in C++ Programming

---

```
// Program to illustrate the working of  
// objects and class in C++ Programming
```

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

```
// create a class
```

```
class Room {
```

```
public:
```

```
double length;
```

```
double breadth;
```

```
double height;
```

```
double calculateArea() {
```

```
    return length * breadth;
```

```
}
```

```
double calculateVolume() {
```

```
    return length * breadth * height;
```

```
}
```

```
};
```

```
int main() {
```

```
    // create object of Room class
```

```
    Room room1, room2;
```

```
// assign values to data members for room1
room1.length = 2.5;
room1.breadth = 3.8;
room1.height = 2.2;
// calculate and display the area and volume of room2
cout << "Area of Room = " << room1.calculateArea() << endl;
cout << "Volume of Room = " << room1.calculateVolume() << endl;

// assign values to data members for room2
cout<<"Enter the dimissions of room 2:"<<endl;
cin>>room2.length;
cin>>room2.breadth;
cin>>room2.height;

// calculate and display the area and volume of room2
cout << "Area of Room = " << room2.calculateArea() << endl;
cout << "Volume of Room = " << room2.calculateVolume() << endl;
return 0;
}
```

## Using public and private in C++ Class

---

```
// Program to illustrate the working of
// public and private in C++ Class

#include <iostream>

using namespace std;

class Room {

private:

    double length;
    double breadth;
    double height;

public:

    // function to initialize private variables
    void initData(double len, double brth, double hgt) {

        length = len;
        breadth = brth;
        height = hgt;
    }

    double calculateArea() {
        return length * breadth;
    }

    double calculateVolume() {
        return length * breadth * height;
    }
}
```



```
    }  
};  
  
int main() {  
  
    // create object of Room class  
    Room room1;  
  
    double l, b, h;  
    cin>>l;  
    cin>>b;  
    cin>>h;  
    // pass the values of private variables as arguments  
    room1.initData(l, b, h);  
  
    cout << "Area of Room = " << room1.calculateArea() << endl;  
    cout << "Volume of Room = " << room1.calculateVolume() << endl;  
  
    return 0;  
}
```

## Strings

**KEYWORDS:** Char array, Pass by reference.

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**Program 1:** Write a C++ program to count all the vowels in a string.

```
#include <iostream>

#include<string>

using namespace std;

int Vowel_Count(string a, int size)
{
    int ctr = 0;
    for(int i = 0; i < size ; i++){
        if (a[i] == 'a' || a[i] == 'e' || a[i] == 'i' || a[i] == 'o' || a[i] == 'u')
            ctr++;
        if (a[i] == 'A' || a[i] == 'E' || a[i] == 'I' || a[i] == 'O' || a[i] == 'U')
            ctr++;
    }
    return ctr;
}

int main() {
    string str;
    cout << "Enter a string:"<< endl;
    getline(cin, str);
    int s = static_cast<unsigned int> (str.length());
    cout << "number of vowels is "<<Vowel_Count(str, s) << endl;
    return 0;
}
```

**Program 2:** Write a program that prompts the user to input a string. The program then uses the function `substr` to remove all the vowels from the string. For example, if `str = "There"`, then after removing all the vowels, `str = "Thr"`. After removing all the vowels, output the string. Your program must contain a function to remove all the vowels and a function to determine whether a character is a vowel.

```
#include <iostream>

#include <string>

using namespace std;

string c_vowels = "aeiou";
string s_vowels = "AEIOU";

bool is_vowel(char c)
{
    for(int i = 0; i < c_vowels.length(); i++)
    {
        if(c == c_vowels[i])
            return true;

        if(c == s_vowels[i])
            return true;
    }

    return false;
}

string remove_vowels(string str)
{
    string temp = "";
    for(int i = 0; i < str.length(); i++)
    {
        if(!is_vowel(str[i]))
        {
            temp += str.substr(i,1);
        }
    }
}
```

```
    }  
    str = temp;  
    return str;  
}  
int main()  
{  
    string str;  
    cout<<"Input string: ";  
    cin>>str;  
    cout<<remove_vowels(str);  
    return 0;  
}
```

## File Input Output Handling

**KEYWORDS:** fstream, iomanip, inFile, outFile.

---

**Program 1:** Write a C++ program to write number 1 to 100 in a data file NOTES.TXT

```
#include<fstream>

using namespace std;

int main()
{
    ofstream fout;
    fout.open("NOTES.TXT");
    for(int i=1;i<=100;i++)
        fout<<i<<endl;
    fout.close();
    return 0;
}
```

**Program 2:** Write a program that reads a student name followed by five test scores from a file. The program should output the student's name, the five test scores, and the average test score to a file. Output the average test score with two decimal places. The data to be read is stored in a file called test.txt. The output should be stored in a file called testavg.out.

Input a file, test.txt, containing the student's name and the five test scores. A sample input is:

Andrew Miller 87.50 89 65.75 37 98.50

Output The student's name, the five test scores, and the average of the five test scores, saved to a file, testavg.txt.

```
#include <iostream>
#include <fstream>
#include <iomanip>
#include <string>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
    //Declare variables; Step 1
```

```
    ifstream inFile;
```

```
    ofstream outFile;
```

```
    double test1, test2, test3, test4, test5;
```

```
    double average;
```

```
    string firstName;
```

```
    string lastName;
```

```
    inFile.open("test.txt");
```

```
    outFile.open("testavg.out");
```

```
    outFile << fixed << showpoint;
```

```
    outFile << setprecision(2);
```

```
    cout << "Processing data" << endl;
```

```
    inFile >> firstName >> lastName;
```

```
    outFile << "Student name: " << firstName << " " << lastName << endl;
```

```
    inFile >> test1 >> test2 >> test3 >> test4 >> test5;
```

```
    outFile << "Test scores: " << setw(6) << test1 << setw(6) << test2 << setw(6) << test3 << setw(6) << test4 << setw(6) << test5 << endl;
```

```
    average = (test1 + test2 + test3 + test4 + test5) / 5.0;
```

```
    outFile << "Average test score: " << setw(6) << average << endl;
```

```
    inFile.close();
```

```
    outFile.close();
```

```
    return 0;
```

```
}
```