

### Third Year B. Tech (EL & CE)

**Semester: V**

**Subject: Object-Oriented Programming Lab**

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**Class: TY**

**Roll No: 52**

**Batch: A3**

### Experiment No: 04

**Name of the Experiment: Bubble sort Algorithm**

**Performed on: 25/10/2023**

**Submitted on: 25/10/2023**

#### Problem Statement:

Friend Function in C++

In C++ define a class Box consisting of the following data members length, breadth and height member functions

- 1 one default constructor
- 2 Two overloaded operator member function '<<' and '>>' to display and read box dimensions
- 3 One member function '+' to add two box objects and one friend function to compute the volume and the box using operator overloading

#### Output:

```
//D:\Object Oriented Programming\exp4>cd "d:\Object Oriented Programming\exp4\" && g++
friend.c++ -o friend && "d:\Object Oriented Programming\exp4\"friend
Enter dimensions for Box 1:
Enter length: 10
Enter breadth: 20
Enter height: 30
Enter dimensions for Box 2:
Enter length: 50
Enter breadth: 60
Enter height: 70
Box 1: Length: 10 Breadth: 20 Height: 30
Box 2: Length: 50 Breadth: 60 Height: 70
Sum of Box 1 and Box 2: Length: 60 Breadth: 80 Height: 100
Volume of the sum of Box 1 and Box 2: 480000
```

## Code:

```
#include <iostream>

class Box {
private:
    double length;
    double breadth;
    double height;

public:
    // Default constructor
    Box() : length(0.0), breadth(0.0), height(0.0) {}

    // Overloaded '<<' operator to display box dimensions
    friend std::ostream& operator<<(std::ostream& os, const Box& box) {
        os << "Length: " << box.length << " Breadth: " << box.breadth << " Height: " << box.height;
        return os;
    }

    // Overloaded '>>' operator to read box dimensions
    friend std::istream& operator>>(std::istream& is, Box& box) {
        std::cout << "Enter length: ";
        is >> box.length;
        std::cout << "Enter breadth: ";
        is >> box.breadth;
        std::cout << "Enter height: ";
        is >> box.height;
        return is;
    }

    // Member function to add two Box objects
    Box operator+(const Box& other) {
        Box result;
        result.length = this->length + other.length;
        result.breadth = this->breadth + other.breadth;
        result.height = this->height + other.height;
        return result;
    }
}
```

```
// Friend function to compute the volume of the Box
friend double computeVolume(const Box& box) {
    return box.length * box.breadth * box.height;
}

};

int main() {
    Box box1, box2, result;

    std::cout << "Enter dimensions for Box 1:" << std::endl;
    std::cin >> box1;
    std::cout << "Enter dimensions for Box 2:" << std::endl;
    std::cin >> box2;

    std::cout << "Box 1: " << box1 << std::endl;
    std::cout << "Box 2: " << box2 << std::endl;

    result = box1 + box2;
    std::cout << "Sum of Box 1 and Box 2: " << result << std::endl;

    double volume = computeVolume(result);
    std::cout << "Volume of the sum of Box 1 and Box 2: " << volume << std::endl;

    return 0;
}
```

```

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exp4

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friend.c++
EXP4
~$reerang Mhatre_52...
friend.c++
friend.exe
Shreerang Mhatre_52...
tempCodeRunnerFile...

friend.c++
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55     result.height = this->height + other.height;
56     return result;
57 }
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63 };
64
65 int main() {
66     Box box1, box2, result;
67
68     std::cout << "Enter dimensions for Box 1:" << std::endl;
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72
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82     return 0;
83 }

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```

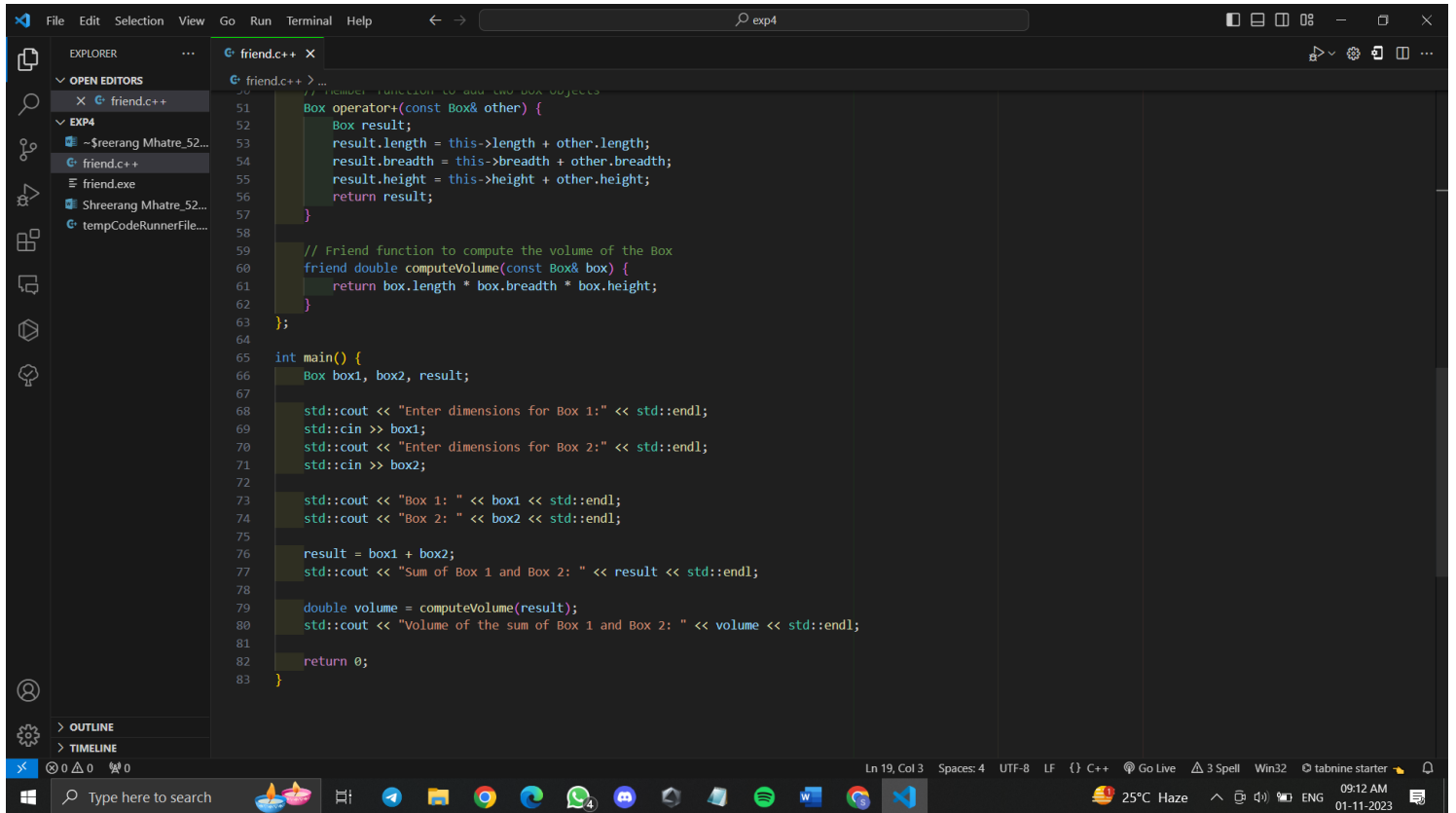
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exp4

EXPLORER
OPEN EDITORS
friend.c++
EXP4
~$reerang Mhatre_52...
friend.c++
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Shreerang Mhatre_52...
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46     is >> box.height;
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