Object Oriented Programming Lab

Assignment 3

Submitted by:

Navdeep Singh

12th August 2025

Roll No: 24124073
Group: 3
Branch: Information Technology
Year: 2nd Year

Practice Question to parctice Structures in C++ (Make a Simple struct Student with name ROll No and Marks take input from user and display it)

Code

```cpp
#include<bits/stdc++.h>
using namespace std;

struct Student{
    private :
    string name;
    int rollNo;
    float marks;

    public:
    void takeInputs(Student &s1){
        cout<<"Inside take inputs Functions !!\n";
        cout<<"Enter Name of Student : ";
        getline(cin,s1.name);
        cout<<"Enter Roll No of Student : ";
        cin>>s1.rollNo;
        cout<<"Enter Marks of Student : ";
        cin>>s1.marks;
    }

    void display(Student &s1){
        cout<<"Inside Diaplay Function !!\n";
        cout<<"Name of the Student : " <<s1.name <<endl;
        cout<<"Roll No of the Student : " <<s1.rollNo <<endl;
        cout<<"Marks of the Student : " <<s1.marks <<endl;
    }
};

int main(){
    Student s1;
    s1.takeInputs(s1);
    s1.display(s1);
}
```

Sample Output

```
Inside take inputs Functions !!
Enter Name of Student : Navdeep Singh
Enter Roll No of Student : 24124073
Enter Marks of Student : 95
Inside Diaplay Function !!
Name of the Student : Navdeep Singh
Roll No of the Student : 24124073
Marks of the Student : 95
```

1. Write overloaded versions of the function multiply() to: Multiply two integers, Multiply a float and an integer (any order), Multiply two doubles.

Code

```
float multiply(int a,int b){
    return a*b;
}

float multiply(int a,float b){
    return a*b;
}

float multiply(float a,float b){
    return a*b;
}

int main1(){
    cout<<multiply(3.5,3) <<endl;
    cout<<multiply(3,3) <<endl;
    cout<<multiply(3.5f,3.5f) <<endl; // By default it is considered as
        double
}
```

Sample Output

```
9
9
12.25
```

2. Write overloaded version of the function compare () to, compare two integers, compare two strings, and compare two characters.

Code

```
void compare(int a,int b){
    if(a>b) cout<<a <<" is Greater than "<<b <<endl;
    else if(a<b) cout<<b<<" is Greater than "<<a <<endl;
    else cout<<"Both " <<a <<" and " <<b <<" are equal"<<endl;
}

void compare(char a,char b){
    if(a>b) cout<<a <<" is Greater than "<<b <<endl;
    else if(a<b) cout<<b<<" is Greater than "<<a <<endl;
    else cout<<"Both " <<a <<" and " <<b <<" are equal" <<endl;
}

void compare(string a,string b){
    if(a>b) cout<<a <<" is Greater than "<<b <<endl;
    else if(a<b) cout<<b<<" is Greater than "<<a <<endl;
    else cout<<"Both " <<a <<" and " <<b <<" are equal" <<endl;
```

```
}

int main2(){
    compare('a','b');
    compare(1,2);
    compare("Hello","World");
}
```

Sample Output

```
b is Greater than a
2 is Greater than 1
World is Greater than Hello
```

3. Write overloaded version of the function reverse () to, reverse an integer, reverse a string, and reverse a float.

Code

```
void reverse(int a){
    int reversedNum = 0;
    while(a){
        int rem = a%10;
        reversedNum = reversedNum * 10 + rem;
        a /= 10;
    }
    cout<<reversedNum<<endl;
}

void reverse(string s){
    int start = 0;
    int end = s.size()-1;
    while(start<=end){
        swap(s[start],s[end]);
        start++;
        end--;
    }
    cout<<s<<endl;
}

void reverse(float a){
    // logic of reversing float number
}


int main3(){
    reverse(201);
    reverse("Navdeep");
}
```

Sample Output

```
102
peedvaN
```

4. Define a struct Book with members char title [50], char author [50], and float price. Create three Book variables using designated initialization and display their details.

Code

```
struct Book{
    char title[50];
    char author[50];
    float price;

    void display(Book &b) {
        cout << "Book Details:" << endl;
        cout << "Title: " << b.title << endl;
        cout << "Author: " << b.author << endl;
        cout << "Price: " << b.price << endl;
    }
};

int main4(){
    Book b1 = {"Metamorphosis","Franz Kafka",106};
    Book b2 = {"White Nights","Fyodor Dostoevsky",89.5};
    Book b3 = {"To Kill a Mockingbird","Harper Lee",120.0};

    b1.display(b1);
    b2.display(b2);
    b3.display(b3);

    return 0;
}
```

Sample Output

```
Book Details:
Title: Metamorphosis
Author: Franz Kafka
Price: 106
Book Details:
Title: White Nights
Author: Fyodor Dostoevsky
Price: 89.5
Book Details:
Title: To Kill a Mockingbird
Author: Harper Lee
Price: 120
```

5. Define a struct named Employee with int empId, char name [50], and float salary. Write a function printEmployee(Employee) to print employee details. Call this function from main() after taking input from the user.

Code

```
struct Employee{
    int empId;
    char name[50];
    float salary;

    void printEmployee(Employee emp){
        cout << "Employee ID: " << emp.empId << endl;
        cout << "Name: " << emp.name << endl;
        cout << "Salary: " << emp.salary << endl;
    }
};


int main5(){
    Employee emp;
    cout << "Enter Employee ID: ";
    cin >> emp.empId;
    cout << "Enter Name: ";
    cin.ignore();
    cin.getline(emp.name,50);
    cout << "Enter Salary: ";
    cin >> emp.salary;
    emp.printEmployee(emp);
    return 0;
}
```

Sample Output

```
Enter Employee ID: 45
Enter Name: Navdeep Singh
Enter Salary: 450000
Employee ID: 45
Name: Navdeep Singh
Salary: 450000
```

6. Define a struct Product with int productId, char name [50], float price. Write a program to input details of n products and display the product with the highest price.

Code

```
struct Product{
    int productId;
    char name[50];
    float price;
};

int main6(){
    int n;
    cout<<"Enter Number of Products : ";
    cin>>n;
    vector<Product>p(n);

    for(int i=0; i<n; i++){
```

```
        cout<<"Enter details for product "<<i+1<<":"<<endl;
        cout<<"Enter Product ID: ";
        cin>>p[i].productId;
        cout<<"Enter Product Name: ";
        cin>>p[i].name;
        cout<<"Enter Product Price: ";
        cin>>p[i].price;
    }

    Product maxProduct = p[0];
    for(int i=1; i<n; i++){
        if(p[i].price > maxProduct.price){
            maxProduct = p[i];
        }
    }

    cout<<"Product with Highest Price: "<<endl;
    cout<<"ID: "<<maxProduct.productId<<endl;
    cout<<"Name: "<<maxProduct.name<<endl;
    cout<<"Price: "<<maxProduct.price<<endl;
}
```

Sample Output

```
Enter Number of Products : 3
Enter details for product 1:
Enter Product ID: 34
Enter Product Name: ProductA
Enter Product Price: 34
Enter details for product 2:
Enter Product ID: 56
Enter Product Name: ProductB
Enter Product Price: 50
Enter details for product 3:
Enter Product ID: 78
Enter Product Name: ProductC
Enter Product Price: 45
Product with Highest Price:
ID: 56
Name: ProductB
Price: 50
```

7. Define two structures Date with day, month, year, and Person with name, Date dob (date of birth). Write a program to input and display a person's name and date of birth.

Code

```
struct Date{
    int day;
    int month;
    int year;
};

```

```
struct Person{
    char name[50];
    Date dob;
};

int main7(){
    Person p;
    cout << "Enter Name: ";
    cin.getline(p.name,50);
    cout << "Enter Date of Birth (dd mm yyyy): ";
    cin >> p.dob.day >> p.dob.month >> p.dob.year;

    cout << "Name: " << p.name << endl;
    cout << "Date of Birth: " << p.dob.day << "/" << p.dob.month << "/"
        << p.dob.year << endl;

    return 0;
}
```

Sample Output

```
Enter Name: John Doe
Enter Date of Birth (dd mm yyyy): 31 08 2006
Name: John Doe
Date of Birth: 31/8/2006
```

Calling all main1 , main2 .. etc from main

Code

```
int main(){
    main1();
    main2();
    main3();
    main4();
    main5();
    main6();
    main7();
}
```