LAB MANUAL

COURSE TITLE: Object Oriented Programming

COURSE CODE: CE-113L

STUDENT NAME : MUHAMMAD SUHAIB SALMAN

REG # : 200768

SECTION: BEEE-3A

Q2. Make a struct “Cylinder”. Choose appropriate attributes. The struct should include input methods. It should be able to calculate:
Surface Area of Cylinder (formula A = 2πr2 + 2πrh = 2πr (r + h))
Volume of cylinder (formula V = πr2h)

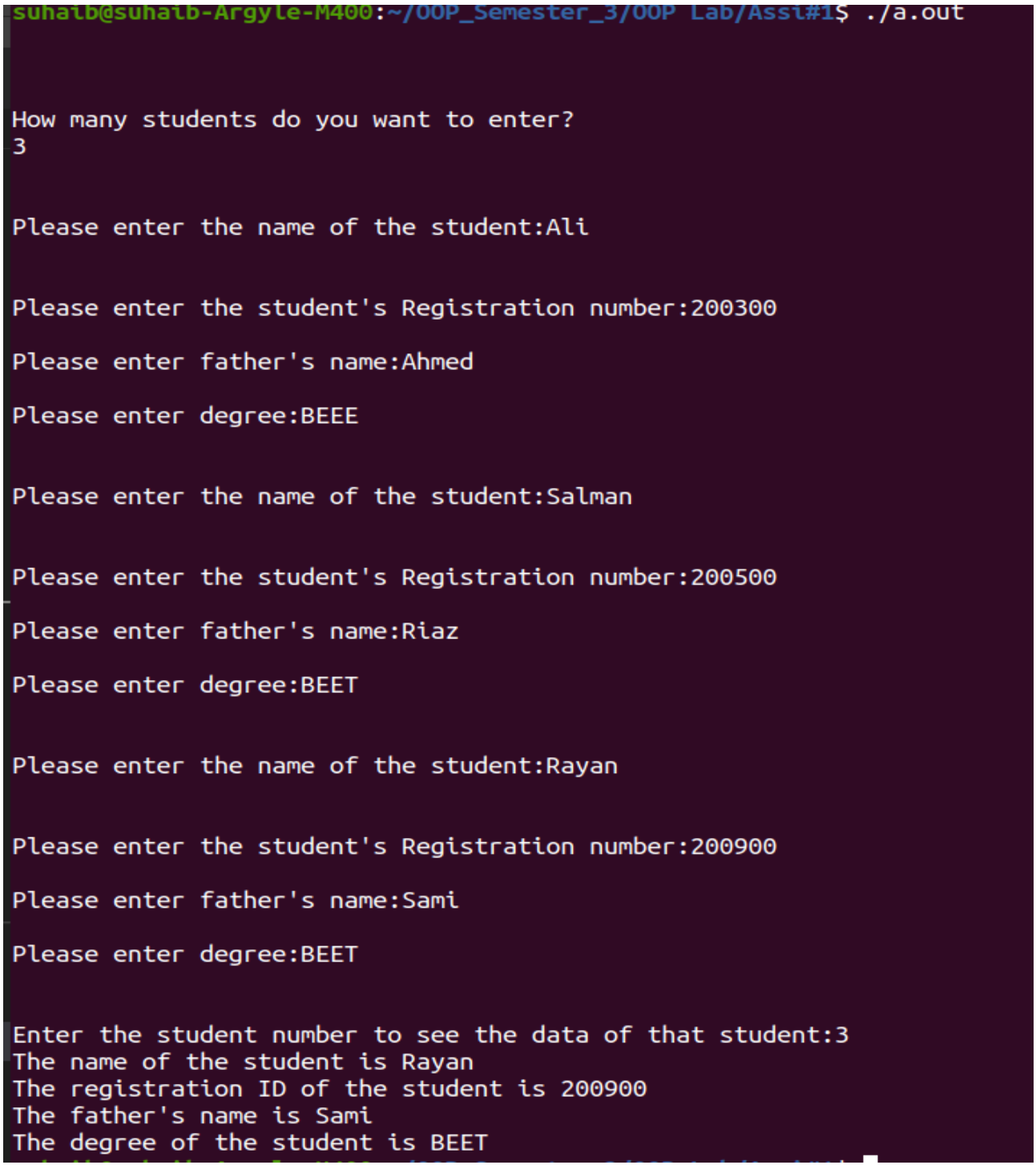
```cpp
#include <iostream>
using namespace std;

struct Cylinder
{
    int rad , height;

    float Area(){
        return 2*3.14*rad*2+2*3.14*height;
    }
    float Volume(){
        return 3.14*rad*2*height;
    }
};

int main()
{
    Cylinder C1;
    cout<<"\n\nPlease enter the height and radius of cylinder:";
    cout<<"\n\nHeight:";
    cin>>C1.height;
    cout<<"\n\nRadius:";
    cin>>C1.rad;
    cout<<"The surface area of the cylinder is:"<<C1.Area();
    cout<<"\n\nThe Volume of the cylinder is:"<<C1.Volume()<<"\n\n\n\n";

}
```

```
suhaib@suhaib-Argyle-M400: ~/OOP_Semester_3/OOP Lab/Assi#1
suhaib@suhaib-Argyle-M400:~/OOP_Semester_3/OOP Lab/Assi#1$ ./a.out


Please enter the height and radius of cylinder:

Height:23


Radius:32
The surface area of the cylinder is:546.36

The Volume of the cylinder is:4622.08
```

Q3. Create a struct Student where attributes associated with each student are his name, registration number, father name, degree and department. One can view the details of any student and can also overwrite the details.

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

struct Student
{
    string student_name,father_name,reg_num,degree;

    void input()
    {
        cout<<"\n\nPlease enter the name of the student:";
        cin>>student_name;
        cout<<"\n\nPlease enter the student's Registration number:";
        cin>>reg_num;
        cout<<endl<<"Please enter father's name:";
        cin>>father_name;
        cout<<endl<<"Please enter degree:";
        cin>>degree;
    }

    void display()
    {
        cout<<"The name of the student is "<<student_name<<endl;
        cout<<"The registration ID of the student is "<<reg_num<<endl;
        cout<<"The father's name is "<<father_name<<endl;
        cout<<"The degree of the student is "<<degree<<endl;
    }
};


int main()
{
    int num_of_students=0;
    cout<<"\n\n\nHow many students do you want to enter?"<<endl;
    cin>>num_of_students;
    struct Student s[num_of_students];

    for (int i=0;i<num_of_students;i++)
    {
        s[i].input();
    }
    cout<<"\n\nEnter the student number to see the data of that student:";
    int student_number=0;
    cin>>student_number;
    student_number=student_number-1;
    s[student_number].display();
    return 0;}
```

OUTPUT


suhaib@suhaib-Argyle-M400:~/OOP_Semester_3/OOP Lab/Assi#1$ ./a.out
How many students do you want to enter?
3
Please enter the name of the student:Ali
Please enter the student's Registration number:200300
Please enter father's name:Ahmed
Please enter degree:BEEE
Please enter the name of the student:Salman
Please enter the student's Registration number:200500
Please enter father's name:Riaz
Please enter degree:BEET
Please enter the name of the student:Rayan
Please enter the student's Registration number:200900
Please enter father's name:Sami
Please enter degree:BEET
Enter the student number to see the data of that student:3
The name of the student is Rayan
The registration ID of the student is 200900
The father's name is Sami
The degree of the student is BEET

Q4. Create a struct complex Number choose the attributes accordingly. Provide Following functions

A function to take input for the attributes of complex number.

A function Zero to check if the complex number is 0? Function should return 1 if the complex number is zero and return 0 otherwise.

A function is Greater Than (compare two complex Number and return 1 if first complex number is greater than second)

A function Add that adds two complex numbers and return their sum as another complex number.

si#1 > Q3.cpp > main()

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

struct ComplexNumber
{
    int ima_part_1,real_part_1,ima_part_2,real_part_2;
    void input()
    {
        cout<<"\n\nEnter a complex number."<<endl;
        cout<<"Enter the real part of the complex number: ";
        cin>>real_part_1;
        cout<<"\nEnter the imaginary part of the complex number:";
        cin>>ima_part_1;
        cout<<"\nEnter the real part of the second complex number:";
        cin>>real_part_2;
        cout<<"\nEnter the imaginary part of the second complex number:";
        cin>>ima_part_2;
    }

    int first_zero()
    {
        if (real_part_1==0 && ima_part_1==0)
        {
            return 1;
        }
        else{
            return 0;
        }
    }

    int second_zero()
    {
        if (real_part_2==0 && ima_part_2==0)
        {
            return 1;
        }
        else{
            return 0;
        }
    }

```

```
65  int main()
66  {
67      struct ComplexNumber C1;
68      C1.input();
69      int first_complex=C1.first_zero(),second_complex=C1.second_zero();
70      if (first_complex==0)
71      {
72          cout<<"\nThe second complex number is zero"<<endl;
73      }
74      else if (second_complex==0)
75      {
76          cout<<"\nThe first complex number is zero"<<endl;
77      }
78      else{
79          ;
80      }
81      C1.Greater_then();
82      int ima=0,real=0;
83      ima = C1.Add_real();
84      real = C1.Add_ima();
85      cout<<"\n\nThe sum of both the complex numbers is : "<<real<<" + ("<<ima<<"i)\n\n\n";
86
87  }
88
```


```
65  int main()
66  {
67      struct ComplexNumber C1;
68      C1.input();
69      int first_complex=C1.first_zero(),second_complex=C1.second_zero();
70      if (first_complex==0)
71      {
72          cout<<"\nThe second complex number is zero"<<endl;
73      }
74      else if (second_complex==0)
75      {
76          cout<<"\nThe first complex number is zero"<<endl;
77      }
78      else{
79          ;
80      }
81      C1.Greater_then();
82      int ima=0,real=0;
83      ima = C1.Add_real();
84      real = C1.Add_ima();
85      cout<<"\n\nThe sum of both the complex numbers is : "<<real<<" + ("<<ima<<"i)\n\n\n";
86
87  }
88
```

OUTPUT

```
Enter a complex number.
Enter the real part of the complex number: 3

Enter the imaginary part of the complex number:2

Enter the real part of the second complex number:4

Enter the imaginary part of the second complex number:6

The second complex number is zero


The second complex number is greater than the first complex number


The sum of both the complex numbers is : 8 + (7i)
```

CONCLUSION:

In this lab I learned how to use structs in C++ which is the base of object oriented programming. I also learned that struct is a blue print of object and many different objects can be created from a single struct. Moreover, I also learned about member functions and member variables.