Foundation University Islamabad

School of Science and Technology

Name: Hunaina Yasir **Roll Number:** 073

Subject: PF Lab **Section:** B

STRUCTURE LAB EXERCISE

Exercise 1:

Create a structure named **Student** with members: roll number, name, and GPA. Input data for 3 students and display it.

SOURCE CODE:

```
#include <iostream>
#include <conio.h>
using namespace std;

struct Student {
   int roll;
   string name;
   float gpa;
};

int main() {
   cout << "Hunaina Yasir" << endl;
   cout << "Roll number: 073" << endl << endl;

   Student s[3];

   for (int i = 0; i < 3; i++) {
      cout << "Enter roll number: ";
      cin >> s[i].roll;

      cout << "Enter name: ";
      cin >> s[i].name;

      cout << "Enter GPA: ";
      cin >> s[i].gpa;

      cout << endl;
   }
```

```
    cout << "Student Data" << endl << endl;

    for (int i = 0; i < 3; i++) {
        cout << "Roll Number: " << s[i].roll << endl;
        cout << "Name: " << s[i].name << endl;
        cout << "GPA: " << s[i].gpa << endl << endl;
    }

    return 0;
}
```

```cpp

struct Student {
    int roll;
    string name;
    float gpa;
};

int main() {
    cout << "Hunaina Yasir" << endl;
    cout << "Roll number: 073" << endl << endl;

    Student s[3];

    for (int i = 0; i < 3; i++) {
        cout << "Enter roll number: ";
        cin >> s[i].roll;

        cout << "Enter name: ";
        cin >> s[i].name;

        cout << "Enter GPA: ";
        cin >> s[i].gpa;

        cout << endl;
    }

    cout << "Student Data" << endl << endl;

    for (int i = 0; i < 3; i++) {
        cout << "Roll Number: " << s[i].roll << endl;
        cout << "Name: " << s[i].name << endl;
        cout << "GPA: " << s[i].gpa << endl << endl;
    }

    return 0;
}
```

OUTPUT:

Hunaina Yasir
Roll number: 073

Enter roll number: 8
Enter name: sia
Enter GPA: 3.4

Enter roll number: 56
Enter name: jia
Enter GPA: 2.3

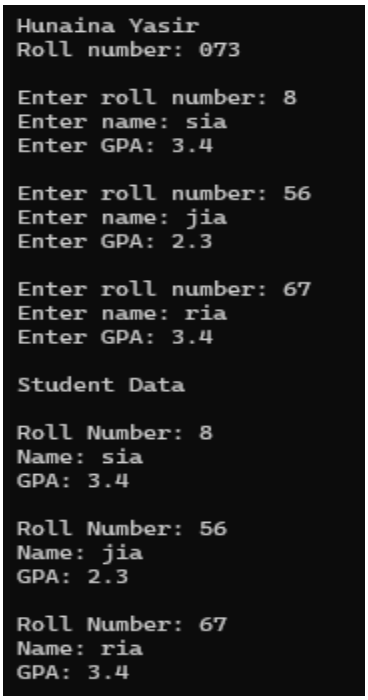
Enter roll number: 67
Enter name: ria
Enter GPA: 3.4

Student Data

Roll Number: 8
Name: sia
GPA: 3.4

Roll Number: 56
Name: jia
GPA: 2.3

Roll Number: 67
Name: ria
GPA: 3.4

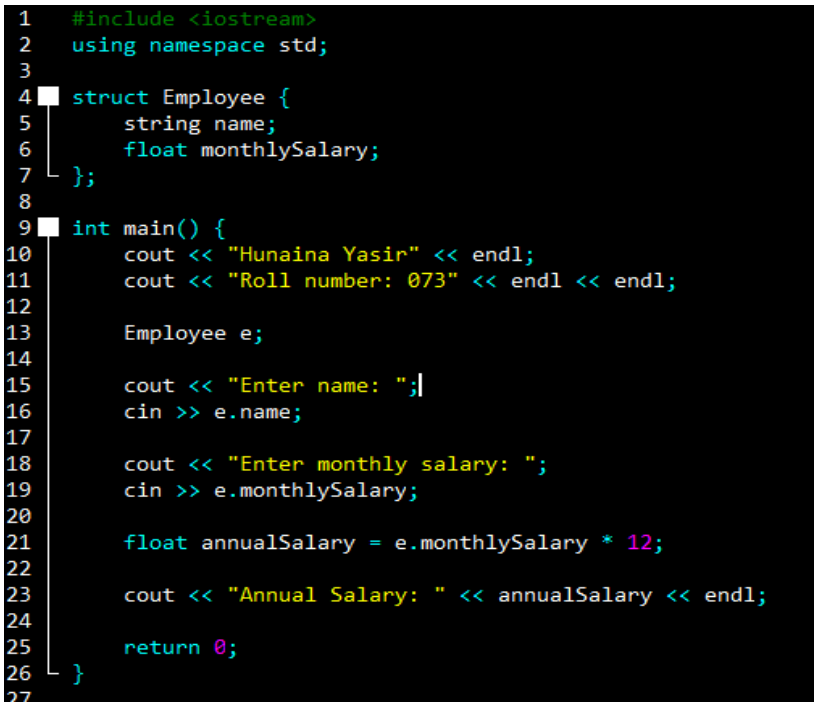


Exercise 2:
Write a program using a structure **Employee** to calculate and display the annual salary of an employee.

SOURCE CODE:

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

struct Employee {
```

```
    string name;
    float monthlySalary;
};

int main() {
    cout << "Hunaina Yasir" << endl;
    cout << "Roll number: 073" << endl << endl;

    Employee e;

    cout << "Enter name: ";
    cin >> e.name;

    cout << "Enter monthly salary: ";
    cin >> e.monthlySalary;

    float annualSalary = e.monthlySalary * 12;

    cout << "Annual Salary: " << annualSalary << endl;

    return 0;
}
```



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

struct Employee {
    string name;
    float monthlySalary;
};

int main() {
    cout << "Hunaina Yasir" << endl;
    cout << "Roll number: 073" << endl << endl;

    Employee e;

    cout << "Enter name: ";
    cin >> e.name;

    cout << "Enter monthly salary: ";
    cin >> e.monthlySalary;

    float annualSalary = e.monthlySalary * 12;

    cout << "Annual Salary: " << annualSalary << endl;

    return 0;
}
```

OUTPUT:

```
Hunaina Yasir
Roll number: 073

Enter name: hia
Enter monthly salary: 34000
```

Annual Salary: 408000

```
Hunaina Yasir
Roll number: 073

Enter name: hia
Enter monthly salary: 34000
Annual Salary: 408000
```

Exercise 3:

Create a structure **Book** and store information for 5 books. Display only those books whose price is greater than 500.

SOURCE CODE:

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

struct Book {
   string title;
   float price;
};

int main() {
   cout << "Hunaina Yasir" << endl;
   cout << "Roll number: 073" << endl << endl;

   Book b[5];

   for (int i = 0; i < 5; i++) {
      cout << "Enter book title: ";
      cin >> b[i].title;

      cout << "Enter price: ";
      cin >> b[i].price;
      cout << endl;
   }

   cout << endl << "Books with price greater than 500:" << endl;

   for (int i = 0; i < 5; i++) {
      if (b[i].price > 500) {
         cout << b[i].title << " " << b[i].price << endl;
      }
   }

   return 0;
}
```

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

struct Book {
    string title;
    float price;
};

int main() {
    cout << "Hunaina Yasir" << endl;
    cout << "Roll number: 073" << endl << endl;

    Book b[5];

    for (int i = 0; i < 5; i++) {
        cout << "Enter book title: ";
        cin >> b[i].title;

        cout << "Enter price: ";
        cin >> b[i].price;
        cout << endl;
    }

    cout << endl << "Books with price greater than 500:" << endl;

    for (int i = 0; i < 5; i++) {
        if (b[i].price > 500) {
            cout << b[i].title << " " << b[i].price << endl;
        }
    }

    return 0;
}
```

OUTPUT:

Hunaina Yasir
Roll number: 073

Enter book title: the
Enter price: 576

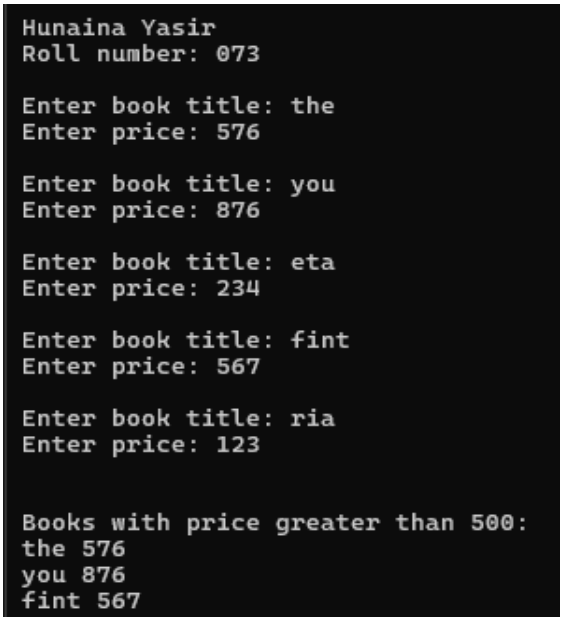
Enter book title: you
Enter price: 876

Enter book title: eta
Enter price: 234

Enter book title: fint
Enter price: 567

Enter book title: ria
Enter price: 123

Books with price greater than 500:
the 576
you 876
fint 567



Exercise 4:

Write a program using nested structures to store and display information of a student including date of birth.

SOURCE CODE:

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

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

struct Student {
   string name;
   Date dob;
};

int main() {
   cout << "Hunaina Yasir" << endl;
   cout << "Roll number: 073" << endl << endl;

   Student s;

   cout << "Enter name: ";
   cin >> s.name;

   cout << "Enter day of birth: ";
   cin >> s.dob.day;
```

```
    cout << "Enter month of birth: ";
    cin >> s.dob.month;

    cout << "Enter year of birth: ";
    cin >> s.dob.year;

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

    return 0;
}
```

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

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

struct Student {
    string name;
    Date dob;
};

int main() {
    cout << "Hunaina Yasir" << endl;
    cout << "Roll number: 073" << endl << endl;

    Student s;

    cout << "Enter name: ";
    cin >> s.name;

    cout << "Enter day of birth: ";
    cin >> s.dob.day;

    cout << "Enter month of birth: ";
    cin >> s.dob.month;

    cout << "Enter year of birth: ";
    cin >> s.dob.year;

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

    return 0;
}
```

OUTPUT:

Hunaina Yasir
Roll number: 073

Enter name: hian
Enter day of birth: monday
Enter month of birth: may
Enter year of birth: 2004

Name: hian
Date of Birth: monday may 2004

```
Hunaina Yasir
Roll number: 073

Enter name: hian
Enter day of birth: monday
Enter month of birth: may
Enter year of birth: 2004

Name: hian
Date of Birth: monday may 2004
```

Exercise 5:
Pass a structure to a function to calculate the total and average marks of a student.
SOURCE CODE:

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

struct Student {
   int marks[3];
};

void calculate(Student s) {
   int total = s.marks[0] + s.marks[1] + s.marks[2];
   float average = total / 3.0;

   cout << "Total Marks: " << total << endl;
   cout << "Average Marks: " << average << endl;
}

int main() {
   cout << "Hunaina Yasir" << endl;
   cout << "Roll number: 073" << endl << endl;

   Student s;

   for (int i = 0; i < 3; i++) {
      cout << "Enter marks: ";
      cin >> s.marks[i];
   }

   calculate(s);
```

```
    return 0;
}
```

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

struct Student {
    int marks[3];
};

void calculate(Student s) {
    int total = s.marks[0] + s.marks[1] + s.marks[2];
    float average = total / 3.0;

    cout << "Total Marks: " << total << endl;
    cout << "Average Marks: " << average << endl;
}

int main() {
    cout << "Hunaina Yasir" << endl;
    cout << "Roll number: 073" << endl << endl;

    Student s;

    for (int i = 0; i < 3; i++) {
        cout << "Enter marks: ";
        cin >> s.marks[i];
    }

    calculate(s);

    return 0;
}
```

OUTPUT:

Hunaina Yasir
Roll number: 073

Enter marks: 45
Enter marks: 34
Enter marks: 234
Total Marks: 313
Average Marks: 104.333

```
Hunaina Yasir
Roll number: 073

Enter marks: 45
Enter marks: 34
Enter marks: 234
Total Marks: 313
Average Marks: 104.333
```