



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;
}

```

```

4
5 struct Student {
6     int roll;
7     string name;
8     float gpa;
9 };
10
11 int main() {
12     cout << "Hunaina Yasir" << endl;
13     cout << "Roll number: 073" << endl << endl;
14
15     Student s[3];
16
17     for (int i = 0; i < 3; i++) {
18         cout << "Enter roll number: ";
19         cin >> s[i].roll;
20
21         cout << "Enter name: ";
22         cin >> s[i].name;
23
24         cout << "Enter GPA: ";
25         cin >> s[i].gpa;
26
27         cout << endl;
28     }
29
30     cout << "Student Data" << endl << endl;
31
32     for (int i = 0; i < 3; i++) {
33         cout << "Roll Number: " << s[i].roll << endl;
34         cout << "Name: " << s[i].name << endl;
35         cout << "GPA: " << s[i].gpa << endl << endl;
36     }
37
38     return 0;
39 }
40

```

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

```
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;
}

```

```

1  #include <iostream>
2  using namespace std;
3
4  struct Employee {
5      string name;
6      float monthlySalary;
7  };
8
9  int main() {
10     cout << "Hunaina Yasir" << endl;
11     cout << "Roll number: 073" << endl << endl;
12
13     Employee e;
14
15     cout << "Enter name: ";
16     cin >> e.name;
17
18     cout << "Enter monthly salary: ";
19     cin >> e.monthlySalary;
20
21     float annualSalary = e.monthlySalary * 12;
22
23     cout << "Annual Salary: " << annualSalary << endl;
24
25     return 0;
26 }
27

```

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;
}
```

```

1  #include <iostream>
2  using namespace std;
3
4  struct Book {
5      string title;
6      float price;
7  };
8
9  int main() {
10     cout << "Hunaina Yasir" << endl;
11     cout << "Roll number: 073" << endl << endl;
12
13     Book b[5];
14
15     for (int i = 0; i < 5; i++) {
16         cout << "Enter book title: ";
17         cin >> b[i].title;
18
19         cout << "Enter price: ";
20         cin >> b[i].price;
21         cout << endl;
22     }
23
24     cout << endl << "Books with price greater than 500:" << endl;
25
26     for (int i = 0; i < 5; i++) {
27         if (b[i].price > 500) {
28             cout << b[i].title << " " << b[i].price << endl;
29         }
30     }
31
32     return 0;
33 }

```

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

```
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;
}

```

```

1  #include <iostream>
2  using namespace std;
3
4  struct Date {
5      string day;
6      string month;
7      int year;
8  };
9
10 struct Student {
11     string name;
12     Date dob;
13 };
14
15 int main() {
16     cout << "Hunaina Yasir" << endl;
17     cout << "Roll number: 073" << endl << endl;
18
19     Student s;
20
21     cout << "Enter name: ";
22     cin >> s.name;
23
24     cout << "Enter day of birth: ";
25     cin >> s.dob.day;
26
27     cout << "Enter month of birth: ";
28     cin >> s.dob.month;
29
30     cout << "Enter year of birth: ";
31     cin >> s.dob.year;
32
33     cout << endl;
34     cout << "Name: " << s.name << endl;
35     cout << "Date of Birth: " << s.dob.day << " " << s.dob.month << " " << s.dob.year << endl;
36
37     return 0;
38 }

```

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;
}
```

```
1  #include <iostream>
2  using namespace std;
3
4  struct Student {
5      int marks[3];
6  };
7
8  void calculate(Student s) {
9      int total = s.marks[0] + s.marks[1] + s.marks[2];
10     float average = total / 3.0;
11
12     cout << "Total Marks: " << total << endl;
13     cout << "Average Marks: " << average << endl;
14 }
15
16 int main() {
17     cout << "Hunaina Yasir" << endl;
18     cout << "Roll number: 073" << endl << endl;
19
20     Student s;
21
22     for (int i = 0; i < 3; i++) {
23         cout << "Enter marks: ";
24         cin >> s.marks[i];
25     }
26
27     calculate(s);
28
29     return 0;
30 }
```

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
```