

UNIVERSITY OF ENGINEERING AND TECHNOLOGY (NAROWAL CAMPUS)



Object-Oriented Programming Lab Manual

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Topics: Passing Structure as a parameter to function
by value and by reference, Create an array of Structure,
nested Structure, Pointer of Structure, and Vector Container Functions

Lab Manual

(Object-Oriented Programming Lab)

- **Task 1-A:**

Pass s structure to a function as a parameter by value in a C++ program

Program:

```
1  #include <iostream>
2  #include <string>
3  using namespace std;
4  struct student{
5      string name;
6      string fname;
7      int age;
8      int rollno;
9  };
10 void print(student);
11 int main(){
12     student student;
13     cout<<"Enter Your Name: ";
14     getline(cin, student.name);
15     cout<<"Enter Your Father Name: ";
16     getline(cin, student.fname);
17     cout<<"Enter Your Age: ";
18     cin>>student.age;
19     cout<<"Enter Your Roll Number: ";
20     cin>>student.rollno;
21     print(student);
22     return 0;
23 }
24 void print(student candidate){
25     cout<<"Student Name: "<<candidate.name<<endl;
26     cout<<"Student Father Name: "<<candidate.fname<<endl;
27     cout<<"Student Age: "<<candidate.age<<endl;
28     cout<<"Student Roll Number: "<<candidate.rollno<<endl;
29 }
```

Output:

```
Enter Your Name: Muhammad Abdullah
Enter Your Father Name: Zahid Mehmood
Enter Your Age: 19
Enter Your Roll Number: 525
Student Name: Muhammad Abdullah
Student Father Name: Zahid Mehmood
Student Age: 19
Student Roll Number: 525

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To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

- **Task 1-B:**

Pass s structure to a function as a parameter by reference in a C++ program

Program:

```
1  #include <iostream>
2  #include <string>
3  using namespace std;
4  struct student{
5      string name;
6      string fname;
7      int age;
8      int rollno;
9  };
10 void print(student);
11 void change(student &);
12 int main(){
13     student student = {"Abdullah", "Zahid" , 00, 00};
14     print(student);
15     change(student);
16     print(student);
17     return 0;
18 }
19 void change(student &candidate){
20     cout<<" --: Change Information :--"<<endl;
21     cout<<"Enter New Name: ";
22     getline(cin,candidate.name);
23     cout<<"Enter New Father Name: ";
24     getline(cin, candidate.fname);
25     cout<<"Enter New Age: ";
26     cin>>candidate.age;
27     cout<<"Enter New Roll Number: ";
28     cin>>candidate.rollno;
29 }
30 void print(student candidate){
31     cout<<"Student Name: "<<candidate.name<<endl;
32     cout<<"Student Father Name: "<<candidate.fname<<endl;
33     cout<<"Student Age: "<<candidate.age<<endl;
34     cout<<"Student Roll Number: "<<candidate.rollno<<endl;
35 }
```

Output:

```
Student Name: Abdullah
Student Father Name: Zahid
Student Age: 0
Student Roll Number: 0
--: Change Information :--
Enter New Name: Muhammad Abdullah
Enter New Father Name: Zahid Mehmood
Enter New Age: 19
Enter New Roll Number: 525
Student Name: Muhammad Abdullah
Student Father Name: Zahid Mehmood
Student Age: 19
Student Roll Number: 525

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Press any key to close this window . . .
```

- **Task 2:**

Create an array of structures in a C++ program

Program:

```
1  #include <iostream>
2  #include <iomanip>
3  using namespace std;
4  struct soilder
5  {
6      string name;
7      string rank;
8      string country;
9  };
10 void print(soilder[], int);
11 int main()
12 {
13     int n = 5;
14     soilder team[5] = {
15         {"Muhammad Abdullah", "Lt. Col.", "Pakistan"},
16         {"Tahir Masood Bhutta", "Maj. Gen.", "Pakistan"},
17         {"Tariq Mehmmud", "Brig. Gen.", "Pakistan"},
18         {"Napolean Boneparte", "Gen.", "France"},
19         {"Ali Sarwar", "Maj.", "Pakistan"}};
20     print(team, n);
21     return 0;
22 }
23 void print(soilder array[], int n)
24 {
25     for (int i = 0; i < n; i++)
26     {
27         cout<<"---The Details of Number "<<i+1<<" Team Member:--"<<endl;
28         cout<<"Name: "<<array[i].name<<endl;
29         cout<<"Rank: "<<array[i].rank<<endl;
30         cout<<"Country "<<array[i].country<<endl<<endl;
31     }
32 }
33
```

Output:

```
---The Details of Number 1 Team Member:--
Name: Muhammad Abdullah
Rank: Lt. Col.
Country Pakistan

---The Details of Number 2 Team Member:--
Name: Tahir Masood Bhutta
Rank: Maj. Gen.
Country Pakistan

---The Details of Number 3 Team Member:--
Name: Tariq Mehmmud
Rank: Brig. Gen.
Country Pakistan

---The Details of Number 4 Team Member:--
Name: Napolean Boneparte
Rank: Gen.
Country France

---The Details of Number 5 Team Member:--
Name: Ali Sarwar
Rank: Maj.
Country Pakistan

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Press any key to close this window . . .
```

• Task 3:

Create a structure that contains another structure variable as its member in the C++ program

Program:

```
1  #include <iostream>
2  using namespace std;
3  struct basicinfo{
4      string name;
5      string fname;
6      string gender;
7      int age;
8  };
9  struct academicinfo{
10     string dept;
11     int rollno;
12     int session;
13     double cgpa;
14 };
15 struct information{
16     basicinfo basic;
17     academicinfo academic;
18 };
19 void print(information);
20 int main(){
21     information Abdullah = {{ "Muhmmad Abdullah" , "Zahid Mehmood", "Male", 18},{ "Computer Science",525,2022,3.29}};
22     information AbuBakar = {{ "Muhammad Abu Bakar", "Zahid Mehmood", "Male", 14},{ "Software Engineering", 00, 2026, 00.0}};
23     print(Abdullah);
24     print(AbuBakar);
25     return 0;
26 }
27 void print(information info){
28     cout<<"Name: "<<info.basic.name<<endl;
29     cout<<"Father Name: "<<info.basic.fname<<endl;
30     cout<<"Gender: "<<info.basic.gender<<endl;
31     cout<<"Age: "<<info.basic.age<<endl;
32     cout<<"Department: "<<info.academic.dept<<endl;
33     cout<<"Roll No.: "<<info.academic.rollno<<endl;
34     cout<<"Session: "<<info.academic.session<<endl;
35     cout<<"CGPA: "<<info.academic.cgpa<<endl;
36 }
```

Output:

```
Name: Muhmmad Abdullah
Father Name: Zahid Mehmood
Gender: Male
Age: 18
Department: Computer Science
Roll No.: 525
Session: 2022
CGPA: 3.29
Name: Muhammad Abu Bakar
Father Name: Zahid Mehmood
Gender: Male
Age: 14
Department: Software Engineering
Roll No.: 0
Session: 2026
CGPA: 0

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Press any key to close this window . . .
```

• Task 4:

Create a pointer variable that points to a structure variable in a C++ program

Program:

```
1  #include <iostream>
2  #include <string>
3  using namespace std;
4  struct car{
5      string brand;
6      string model;
7      int hp;
8      int torque;
9      string price;
10 };
11 void print(car*);
12 void change(car*);
13 int main(){
14     car Mycar = {"Ford", "Mustang", 315, 350, "$100 000"};
15     print(&Mycar);
16     change(&Mycar);
17     print(&Mycar);
18     return 0;
19 }
20 void print(car *cars){
21     cout<<"Brand: "<<(cars->brand)<<endl;
22     cout<<"Model: "<<(cars->model)<<endl;
23     cout<<"Horse Power: "<<(cars->hp)<<endl;
24     cout<<"Torque: "<<(cars->torque)<<endl;
25     cout<<"Price: "<<(cars->price)<<endl;
26 }
27 void change(car *car){
28     cout<<"Enter New Car Brand Name: ";
29     getline(cin, car->brand);
30     cout<<"Enter New Car Model Name: ";
31     getline(cin, car->model);
32     cout<<"Enter New Car Price: ";
33     getline(cin, car->price);
34     cout<<"Enter New Horse Power: ";
35     cin>>car->hp;
36     cout<<"Enter New Torque: ";
37     cin>>car->torque;
38 }
```

Output:

```
Brand: Ford
Model: Mustang
Horse Power: 315
Torque: 350
Price: $100 000
Enter New Car Brand Name: Audi
Enter New Car Model Name: S8
Enter New Car Price: 2000000
Enter New Horse Power: 511
Enter New Torque: 525
Brand: Audi
Model: S8
Horse Power: 511
Torque: 525
Price: 2000000

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Press any key to close this window . . .
```

• Task 5:

Create a vector container and apply some pre-defined functions of the vector header file on it in a C++ program

Program:

```
1  #include <iostream>
2  #include <string>
3  using namespace std;
4  struct car{
5      string brand;
6      string model;
7      int hp;
8      int torque;
9      string price;
10 };
11 void print(car*);
12 void change(car*);
13 int main(){
14     car Mycar = {"Ford", "Mustang", 315, 350, "$100 000"};
15     print(&Mycar);
16     change(&Mycar);
17     print(&Mycar);
18     return 0;
19 }
20 void print(car *cars){
21     cout<<"Brand: "<<(cars->brand)<<endl;
22     cout<<"Model: "<<(cars->model)<<endl;
23     cout<<"Horse Power: "<<(cars->hp)<<endl;
24     cout<<"Torque: "<<(cars->torque)<<endl;
25     cout<<"Price: "<<(cars->price)<<endl;
26 }
27 void change(car *car){
28     cout<<"Enter New Car Brand Name: ";
29     getline(cin, car->brand);
30     cout<<"Enter New Car Model Name: ";
31     getline(cin, car->model);
32     cout<<"Enter New Car Price: ";
33     getline(cin, car->price);
34     cout<<"Enter New Horse Power: ";
35     cin>>car->hp;
36     cout<<"Enter New Torque: ";
37     cin>>car->torque;
38 }
```

Output:

```
--: The Vector Before Operations :--
130 425 463 901 947
The first value of vector before operations is: 130
The last value of vector before operations is: 947
The size of vector before operations is: 5
--: The Vector After Operations :--
130 425 463 100 200 300 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
The first value of vector after operations is: 130
The last value of vector after operations is: 0
The size of vector after operations is: 25

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Press any key to close this window . . .
```