

UNIVERSITY OF ENGINEERING AND TECHNOLOGY (NAROWAL CAMPUS)



Object-Oriented Programming Lab Manual

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Topics: Copy Constructor, Array of pointers to Object,
Dynamic Objects and their Destruction, Static Data Member and
Constant Member Functions

Lab Manual

(Object-Oriented Programming Lab)

- **Task 1:**

Create a class and make copy constructor in its definition in the C++ program

Program:

```
1  #include <iostream>
2  #include <string>
3  using namespace std;
4  class person
5  {
6  private:
7  int age;
8  string name, fname, city;
9  public:
10 person(string = "Abdullah", string = "Zahid", int = 19, string = "lahore");
11 person(person&);
12 ~person(){}
13 void get();
14 void print();
15 };
16 int main()
17 {
18     person Abdullah;
19     Abdullah.get();
20     person abdullah(Abdullah);
21     Abdullah.print();
22     abdullah.print();
23     return 0;
24 }
25 person :: person(string a, string b, int c, string d) {
26     name = a;
27     fname = b;
28     age = c;
29     city = d;
30 }
31 person :: person(person &per){
32     name = per.name;
33     fname = per.fname;
34     age = per.age;
35     city = per.city;
36 }
37 void person :: print(){
38     cout<<"Name: "<<name<<endl;
39     cout<<"Father Name: "<<fname<<endl;
40     cout<<"Age: "<<age<<endl;
41     cout<<"City: "<<city<<endl;
42 }
43 void person :: get(){
44     cout<<"Enter Name: ";
45     getline(cin>>ws,name);
46     cout<<"Enter Father Name: ";
47     getline(cin>>ws,fname);
48     cout<<"Enter City Name: ";
49     getline(cin>>ws,city);
50     cout<<"Enter Age: ";
51     cin>>age;
52 }
```

Output:

```
Enter Name: Abdullah
Enter Father Name: Zahid
Enter City Name: Lahore
Enter Age: 19
Name: Abdullah
Father Name: Zahid
Age: 19
City: Lahore
Name: Abdullah
Father Name: Zahid
Age: 19
City: Lahore

D:\UET Narowal\2nd Semester\Object Oriented Programming\Lab\OOP Lab\x64\Debug\OOP Lab.exe (process 7080) exited with code 0.
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 2:**

Create an array of pointers that points to objects in the C++ program

Program:

```
1  #include <iostream>
2  using namespace std;
3  class client{
4  public:
5      client(int = 00, string = "Ali");
6      ~client();
7      void get(int,string);
8      void print();
9  private:
10     int clientNo;
11     string project;
12 };
13 int main(){
14     client** ptr = new client*[5];
15     for(int i=0 ; i<5;i++){
16         ptr[i] = new client[3];
17     }
18     for(int i = 0; i<5;i++){
19         for(int j =0; j<3;j++){
20             if((i+j)%2==0){
21                 ptr[i][j].get(i+j,"Web Development");
22             }
23             else{
24                 ptr[i][j].get(i+j,"Machine Learning");
25             }
26         }
27     }
28     for(int i = 0; i<5;i++){
29         for(int j =0; j<3;j++){
30             ptr[i][j].print();
31         }
32     }
33     for(int i =0;i<5;i++){
34         delete[] ptr[i];
35     }
36     delete ptr;
37     ptr = NULL;
38     return 0;
39 }
```

Output:

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• Task 3:

Create a dynamic object using a pointer and also perform its destruction in a C++ program

Program:

```
1  #include <iostream>
2  #include <string>
3  using namespace std;
4  class Student{
5  private:
6  int age, id;
7  string name,fname;
8  public:
9  Student(string = "Abdullah", string= "Zahid", int=19, int=525);
10 ~Student();
11 void get();
12 void print();
13 };
14 int main(){
15     Student *ptr = new Student[2];
16     for(int i=0;i<2;i++){
17         ptr[i].get();
18         cout<<endl;
19     }
20     for(int i=0;i<2;i++){
21         ptr[i].print();
22         cout<<endl;
23     }
24     delete[] ptr;
25     ptr = NULL;
26     return 0;
27 }

28 Student :: Student(string a, string b, int c, int d){
29     name = a;
30     fname = b;
31     age = c;
32     id = d;
33 }
34 Student :: Student(string Name, string Fname, int Age, int Id){
35     name = Name;
36     fname = Fname;
37     age = Age;
38     id = Id;
39 }
40 void Student :: get(){
41     cout<<" --: Enter Student Information :--"<<endl;
42     cout<<"Enter Name: ";
43     getline(cin>>ws,name);
44     cout<<"Enter Father Name: ";
45     getline(cin>>ws,fname);
46     cout<<"Enter Age: ";
47     cin>>age;
48     cout<<"Enter Id Number: ";
49     cin>>id;
50 }
51 void Student :: print(){
52     cout<<" --: Student Information :--"<<endl;
53     cout<<"Name: "<<name<<endl;
54     cout<<"Father Name: "<<fname<<endl;
55     cout<<"Age: "<<age<<endl;
56     cout<<"Id Number: "<<id<<endl;
57 }
58 Student :: ~Student(){
59     cout<<"Object Destroyed Successfully";
60 }
```

Output:

```
--: Enter Student Information :--
Enter Name: Muhammad Abdullah
Enter Father Name: Zahid Mehmood
Enter Age: 19
Enter Id Number: 525

--: Enter Student Information :--
Enter Name: Muhammad Abu-Bakar
Enter Father Name: Zahid Mehmood
Enter Age: 14
Enter Id Number: 500

--: Student Information :--
Name: Muhammad Abdullah
Father Name: Zahid Mehmood
Age: 19
Id Number: 525

--: Student Information :--
Name: Muhammad Abu-Bakar
Father Name: Zahid Mehmood
Age: 14
Id Number: 500

Object Destroyed SuccessfullyObject Destroyed Successfully
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Press any key to close this window . . .
```

• Task 4:

Create a class that contains static data members in a C++ program

Program:

```
1  #include <iostream>
2  using namespace std;
3  class resident
4  {
5  private:
6      static int age;
7  public:
8      resident();
9      int display();
10 };
11 int resident :: age = 0;
12 int main()
13 {
14     resident r1;
15     cout<<"Employee Age of Resident 1: "<<r1.display()<<endl;
16     resident r2;
17     cout<<"Employee Age of Resident 2: "<<r2.display()<<endl;
18     resident r3;
19     cout<<"Employee Age of Resident 3: "<<r3.display()<<endl;
20     return 0;
21 }
22 resident :: resident(){
23     age++;
24 }
25 int resident :: display(){
26     return age;
27 }
```

Output:

```
Employee Age of Resident 1: 1
Employee Age of Resident 2: 2
Employee Age of Resident 3: 3
```

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

• Task 5:

Create a class that contains constant member functions and create constant objects in the C++ program

Program:

```
1  #include <iostream>
2  #include <string>
3  using namespace std;
4  class user
5  {
6  private:
7      int age,balance;
8      string name, fname,city;
9  public:
10     user(string = "Abdullah", string = "Zahid", int = 19, int = 1000, string = "Lahore");
11     void getInfo();
12     int getAmount() const;
13     void deposit(int);
14     void debit(int);
15     void print() const;
16 };
17 int main()
18 {
19     user Abdullah;
20     Abdullah.getInfo();
21     Abdullah.print();
22     Abdullah.deposit(500);
23     Abdullah.debit(200);
24     Abdullah.print();
25     const user Ali("Ali","Ahamd", 20);
26     Ali.getAmount();
27     Ali.print();
28     return 0;
29 }
30 user :: user(string a, string b, int c, int d, string e){
31     name = a;
32     fname = b;
33     age = c;
34     balance = d;
35     city = e;
36 }
```

```

37 void user :: getInfo(){
38     cout<<"Enter Name: ";
39     getline(cin>>ws,name);
40     cout<<"Enter Father Name: ";
41     getline(cin>>ws,fname);
42     cout<<"Enter Age: ";
43     cin>>age;
44     cout<<"Enter Balance: ";
45     cin>>balance;
46     cout<<"Enter City Name: ";
47     getline(cin>>ws,city);
48 }
49 int user :: getAmount() const{
50     return balance;
51 }
52 void user :: deposit(int value){
53     balance += value;
54 }
55 void user :: debit(int value){
56     balance -= value;
57 }
58 void user :: print() const{
59     cout<<endl<<" --: User Information :-- "<<endl;
60     cout<<"Name:      "<<name<<endl;
61     cout<<"Father Name: "<<fname<<endl;
62     cout<<"Age:         "<<age<<endl;
63     cout<<"Balance:     "<<balance<<endl;
64     cout<<"City:         "<<city<<endl;
65 }

```

Output:

```

Enter Name: Abdullah
Enter Father Name: Zahid
Enter Age: 19
Enter Balance: 30000
Enter City Name: Lahore

```

```

--: User Information :--
Name:      Abdullah
Father Name: Zahid
Age:       19
Balance:   30000
City:      Lahore

```

```

--: User Information :--
Name:      Abdullah
Father Name: Zahid
Age:       19
Balance:   30300
City:      Lahore

```

```

--: User Information :--
Name:      Ali
Father Name: Ahamd
Age:       20
Balance:   1000
City:      Lahore

```

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