

**Jaypee University of Engineering  
and Technology, Guna**

**Department of Computer Science  
and Engineering**

Object Oriented Programming Lab  
(18B17CI271)

# **Lab**

# **Exercise-7**

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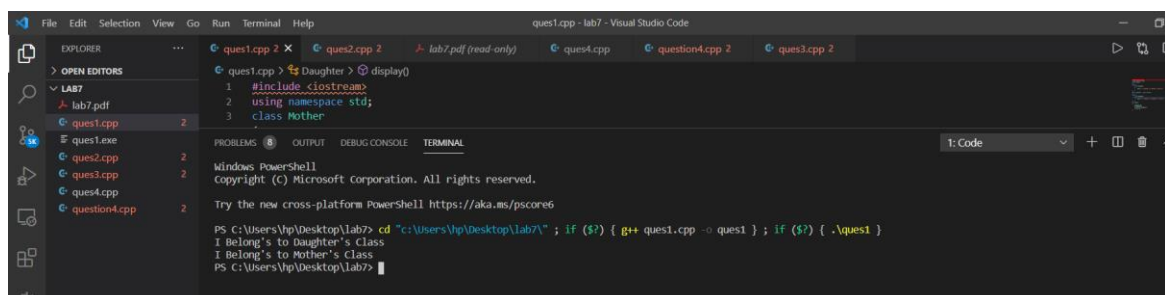
## Question 1.

Write a program with a mother class and a derived daughterclass. Both of them should have a method void display () that prints a message (different for mother and daughter). In the main function declare an object of class daughter and call the display() method on it. Also suitably invoke the display() function of mother class using this object of class daughter.

## Answer :

```
#include <iostream>
using namespace std;
class Mother
{
public:
    void display()
    {
        cout << "I Belong's to Mother's Class\n";
    }
};
class Daughter : public Mother
{
public:
    void display()
    {
        cout << "I Belong's to Daughter's Class\n";
    }
};
int main()
{
    Daughter D;
    D.display();
    D.Mother::display();
    return 0;
}
```

## Output:



```
ques1.cpp - lab7 - Visual Studio Code
EXPLORER
  > OPEN EDITORS
  > LAB7
  > lab7.pdf
  > ques1.cpp
  > ques1.exe
  > ques2.cpp
  > ques3.cpp
  > ques4.cpp
  > question4.cpp
  > ques3.cpp.2

  > ques1.cpp > Daughter > display()
  1 #include <iostream>
  2 using namespace std;
  3 class Mother
  4 {
  5 public:
  6     void display()
  7     {
  8         cout << "I Belong's to Mother's Class\n";
  9     }
  10 };
  11 class Daughter : public Mother
  12 {
  13 public:
  14     void display()
  15     {
  16         cout << "I Belong's to Daughter's Class\n";
  17     }
  18 };
  19 int main()
  20 {
  21     Daughter D;
  22     D.display();
  23     D.Mother::display();
  24     return 0;
  25 }

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
1: Code
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/powershell

PS C:\Users\hp\Desktop\lab7> cd "C:\Users\hp\Desktop\lab7"; if ($?) { g++ ques1.cpp -o ques1 }; if ($?) { .\ques1 }
I Belong's to Daughter's Class
I Belong's to Mother's Class
PS C:\Users\hp\Desktop\lab7>
```

## Question 2.

Consider an example of declaring the examination result. Design three classes: Student, Exam, and Result. The Student class has data members representing roll number, name. Create the class Exam by inheriting Student class. The Exam class adds fields(data members) representing the marks scored in six subjects. Derive the Result from the Exam class, and it has its own fields such as total\_marks. Write an interactive program to model this relationship.

## Answer :

```
#include <iostream>
using namespace std;
class Student
{
    int roll_no;
    char name[20];

public:
    void getdata()
    {
        cout << "Enter Name \n";
        cin >> name;
        cout << "\nEnter Roll Number : \n";
        cin >> roll_no;
    }
    void show()
    {
        cout << "roll_no : " << roll_no << "\t"
              << "Name :" << name << endl;
    }
};
class Exam : public Student
{
public:
    int Eng, phy, chem, bio, math, hindi;
    void input()
    {
        cout << "Enter the marks of students in the six subjects\n";
        cout << "Eng, phy, chem, bio, math, hindi;\n";
        cin >> Eng >> phy >> chem >> bio >> math >> hindi;
    }
};
class Result : public Exam
{
}
```

```

        int total_marks;

public:
    int total()
    {

        total_marks = Eng + phy + chem + bio + math + hindi;
        return total_marks;
    }
    void display()
    {
        cout << "\nThe total of marks : " << total();
    }
};
int main()
{
    Result R;
    R.getdata();
    R.show();
    R.input();
    R.display();
}

```

## Output:

```

ques2.cpp - lab7 - Visual Studio Code
ques1.cpp 2  ques2.cpp 2 x  lab7.pdf (read-only)  ques4.cpp  question4.cpp 2  ques3.cpp 2
ques2.cpp > ...
4  {
5      int roll_no;
6      char name[20];

PROBLEMS 8  OUTPUT  DEBUG CONSOLE  TERMINAL  1: Code
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\hp\Desktop\lab7> cd "c:\Users\hp\Desktop\lab7\" ; if ($?) { g++ ques2.cpp -o ques2 } ; if ($?) { .\ques2 }
Enter Name
Palash

Enter Roll Number :
123
Roll no : 123  Name :Palash
Enter the marks of students in the six subjects
Eng, phy, chem, bio, math, hindi;
54
62
4
89
62
74

The total of marks : 345
PS C:\Users\hp\Desktop\lab7>

```

### Question 3.

There is a class student, that stores name of school or university from which he is enrolled and name of highest degree he has obtained so far. It has the function to get and display the members. Design a class Employee with name and employee number. Derive Manager, Scientist and Laborer classes from Employee class. The manager class has extra attribute title(string type) and dues(float type). The scientist class has extra attributes number of publications. The Laborer class has nothing extra. The classes have necessary functions for set and display the information. The manager and scientist are students of a university also. Use inheritance. Test your program by creating objects of type manager, scientists and laborer.

**Answer :**

```
#include <iostream>
using namespace std;
class student
{
    char n_of_s[40];
    char degree[30];

public:
    void gdata()
    {
        cout << "\nEnter name of school/university : ";
        cin >> n_of_s;
        cout << "\nEnter name of highest degree : ";
        cin >> degree;
    }
    void sdata()
    {
        cout << "University : " << n_of_s << endl;
        cout << "Highest degree: " << degree << endl;
    }
};

class employee
{
    int no;
    char name[20];

public:
    void getdata()
```

```

{
    cout << "Enter Number  : ";
    cin >> no;
    cout << "\nEnter Name : ";
    cin >> name;
    cout << endl;
}
void showData()
{
    cout << "employee no.: " << no << endl;
    cout << "name of employee : " << name << endl;
}
};
class manager : public employee,public student
{
    char title[40];
    float dues;

public:
    void get()
    {
        cout << "\nEnter title : ";
        cin >> title;
        cout << "\nEnter dues : ";
        cin >> dues;
        cout << endl;
    }
    void show()
    {
        cout << "\ntitle : " << title;
        cout << "\ndues : " << dues;
    }
};
class scientist : public employee,public student
{
    int n_of_publ;

public:
    void enter()
    {
        cout << "\nEnter Number of Publications: ";
        cin >> n_of_publ;
    }
    void display()
    {
        cout << "\nNo. of publications : " << n_of_publ;
    }
}

```

```

};
class laborer : public employee
{
};
int main()
{
    manager mn;
    mn.gdata();
    mn.sdata();
    mn.getdata();
    mn.showData();
    mn.get();
    mn.show();
    scientist st;
    st.gdata();
    st.sdata();
    st.getdata();
    st.showData();
    st.enter();
    st.display();
    laborer lb;
    lb.getdata();
    lb.showData();
    return 0;
}

```

## Output:

```

Run Terminal Help ques3.cpp - lab7 - Visual Studio Code
PROBLEMS 8 OUTPUT DEBUG CONSOLE TERMINAL 1: Code
PS C:\Users\hp\Desktop\lab7> cd "c:\Users\hp\Desktop\lab7\" ; if ($?) { g++ ques3.cpp -o ques3 } ; if ($?) { .\ques3 }

Enter name of school/university : Juet
Enter name of highest degree : Mtech
University : Juet
Highest degree: Mtech
Enter Number : 123

Enter Name : Palash
employee no.: 123
name of employee : Palash

Enter title : Student
Enter dues : 3010

title : Student
dues : 3010
Enter name of school/university : MITs

Enter name of highest degree : Btech
University : MITs
Highest degree: Btech
Enter Number : 102

Enter Name : Vijay
employee no.: 102
name of employee : Vijay
Enter Number of Publications:
52
No. of publications :52
Enter Number : 190

Enter Name : Rahul
employee no.: 190
name of employee : Rahul
PS C:\Users\hp\Desktop\lab7>

```

#### Question 4.

An educational institution wishes to maintain a database of its employees. The database is divided into a number of classes whose hierarchical relationships are shown in Fig.1. The figure also shows the minimum information required for each class. Specify all the classes and define methods to create the database and retrieve individual information as and when required.

#### Answer :

```
#include <iostream>
using namespace std;
class staff
{
protected:
    int code;
    string name;

public:
    void sinput()
    {
        cout << "\nEnter code : ";
        cin >> code;
        cout << "\nEnter name : ";
        cin >> name;
    }
    void idisplay()
    {
        cout
            << "\nCode : " << code;
        cout << "\nName : " << name;
    }
};
class teacher : public staff
{
protected:
    string sub;
    string pub;

public:
    void tinput()
    {
        sinput();
        cout << "\nEnter subject : ";
        cin >> sub;
    }
}
```



```

        cout << "\nEnter publication : ";
        cin >> pub;
    }
    void tdisplay()
    {
        idisplay();
        cout << "\nSubject : " << sub;
        cout << "\nPublication : " << pub;
    }
};
class officer : public staff
{
protected:
    string g;

public:
    void oinput()
    {
        sinput();
        cout << "\nEnter grade : ";
        cin >> g;
    }
    void odisplay()
    {
        idisplay();
        cout << "\nGrade : " << g;
    }
};
class typist : public staff
{
protected:
    double s;

public:
    void tpinput()
    {
        sinput();
        cout << "\nEnter speed : ";
        cin >> s;
    }
    void tydisplay()
    {
        idisplay();
        cout << "\nSpeed " << s;
    }
};
class regular : public typist

```

```

{
protected:
    double sal;

public:
    void input()
    {
        tpinput();
        cout << "\nEnter monthly salary : ";
        cin >> sal;
    }
    void display()
    {
        tydisplay();
        cout << "\nSalary : " << sal;
    }
};

class causal : public typist
{
protected:
    double sal;

public:
    void input()
    {
        tpinput();
        cout << "\nEnter daily salary : ";
        cin >> sal;
    }
    void display()
    {
        tydisplay();
        cout << "\nSalary : " << sal;
    }
};

int main()
{
    int ch, ch2;
    cout << "\nEnter 1 for teacher";
    cout << "\nEnter 2 for typist";
    cout << "\nEnter 3 for officer";
    cout << "\nEnter your choice : ";
    cin >> ch;
    if (ch == 1)
    {
        teacher t;
        t.tinput();
        t.tdisplay();
    }
}

```

```

    }
    else if (ch == 3)
    {
        officer o;
        o.oinput();
        o.odisplay();
    }
    else if (ch == 2)

    {
        cout << "\nEnter 1 for regular";
        cout << "\nEnter 2 for causal";
        cout << "\nEnter your choice : ";
        cin >> ch2;
        if (ch2 == 1)
        {
            regular r;
            r.input();
            r.display();
        }
        else if (ch2 == 2)
        {
            causal c;
            c.input();
            c.display();
        }
    }
    return 0;
}

```

## Output:

```

question4.cpp - lab7 - Visual Studio Code
ques1.cpp 2 ques2.cpp 2 lab7.pdf (read-only) ques4.cpp 2 question4.cpp 2 X ques3.cpp 2
question4.cpp > $ causal > input()
102 class causal : public typist
103 {
104     protected:
105     double cal;
PROBLEMS 10 OUTPUT DEBUG CONSOLE TERMINAL 1: Code
Windows PowerShell
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PS C:\Users\hp\Desktop\lab7> cd "c:\Users\hp\Desktop\lab7\" ; if ($?) { g++ question4.cpp -o question4 } ; if ($?) { .\question4 }

Enter 1 for teacher
Enter 2 for typist
Enter 3 for officer
Enter your choice : 1

Enter code : 1022

Enter name : Sachin

Enter subject : Pol_science

Enter publication : 502

Code : 1022
Name : Sachin
Subject : Pol_science
Publication : 502
PS C:\Users\hp\Desktop\lab7>

```

```
Run Terminal Help question4.cpp - lab7 - Visual Studio Code
ques1.cpp 2 ques2.cpp 2 lab7.pdf (read-only) ques4.cpp 2 question4.cpp 2 X ques3.cpp 2
question4.cpp > main()
102 class causal : public typist
103 {
104 protected:
105 double sal;

PROBLEMS 10 OUTPUT DEBUG CONSOLE TERMINAL 1: Code
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PS C:\Users\hp\Desktop\lab7> cd "C:\Users\hp\Desktop\lab7\" ; if ($?) { g++ question4.cpp -o question4 } ; if ($?) { .\question4 }

Enter 1 for teacher
Enter 2 for typist
Enter 3 for officer
Enter your choice : 2

Enter 1 for regular
Enter 2 for causal
Enter your choice : 1

Enter code : 102

Enter name : Mayank

Enter speed : 203

Enter monthly salary : 9000

Code : 102
Name : Mayank
Speed 203
Salary : 9000
PS C:\Users\hp\Desktop\lab7>
```

```
Run Terminal Help question4.cpp - lab7 - Visual Studio Code
ques1.cpp 2 ques2.cpp 2 lab7.pdf (read-only) ques4.cpp 2 question4.cpp 2 X ques3.cpp 2
question4.cpp > main()
102 class causal : public typist
103 {
104 protected:
105 double sal;

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Windows PowerShell
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PS C:\Users\hp\Desktop\lab7> cd "C:\Users\hp\Desktop\lab7\" ; if ($?) { g++ question4.cpp -o question4 } ; if ($?) { .\question4 }

Enter 1 for teacher
Enter 2 for typist
Enter 3 for officer
Enter your choice : 3

Enter code : 1090

Enter name : Raju

Enter grade : A

Code : 1090
Name : Raju
Grade : A
PS C:\Users\hp\Desktop\lab7>
```