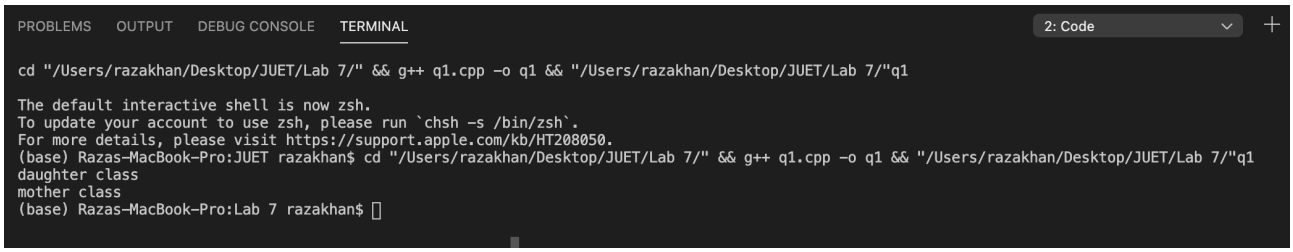
Jaypee University of Engineering an Technology, Guna
Department of Computer Science and Engineering
Object Oriented Programming Lab(18B17CI271) - 7
Submitted by :- Mohammed Raza Khan
Enrolment no. :- 201B156
Batch :- BX2(B5)

Q1. Write a program with a mother class and a derived daughter class. 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.

Code:

```
#include<iostream>
using namespace std;
class mother{
public:
void display()
{
cout<<"mother class"<<"\n";
}
};
class daughter:public mother
{
public:
void display()
{cout<<"daughter class"<<"\n";
mother::display();
}};
int main()
{
daughter obj;
obj.display();
return 0;
}
```

Output:



Q2. 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.

Code:

```
#include<iostream>
#include<stdio.h>

using namespace std;
class student
{
	int roll;
	char name[25];
	public:
	void getdata()
	{
		cout<<"\n enter the student roll no.  ";
		cin>>roll;
		cout<<"\n enter the student name  ";
		cin>>name;
	}
	void putdata()
	{
		cout<<"\n the student roll no: "<<roll;
		cout<<"\n the student name: "<<name;
	}
};
class exam: public student
{	float per;
	protected:
	int sub1;
	int sub2;
	int sub3;
	int sub4;
	int sub5;
	int sub6;

	public:

   void input()
	{
		getdata();
		cout<<"\n enter the marks1: ";
		cin>>sub1;
		cout<<"\n enter the marks2: ";
		cin>>sub2;
		cout<<"\n enter the marks3: ";
		cin>>sub3;
	    cout<<"enter marks4:";
		cin>>sub4;
		cout<<"\n enter the marks5: ";
		cin>>sub5;
		cout<<"\n enter the marks6: ";
		cin>>sub6;
		    }
	void output()
	{
		putdata();
		cout<<"\n marks1: "<<sub1;
		cout<<"\n marks2: "<<sub2;
		cout<<"\n marks3: "<<sub3;
```

```
            cout<<"\n marks4: "<<sub4;
            cout<<"\n marks5: "<<sub5;
            cout<<"\n marks6: "<<sub6;
      }
      void calculate ()
      {
            per= (sub1+sub2+sub3+sub4+sub5+sub6)/6;
            cout<<"\n total percentage  "<<per<<"%"<<"\n";
      }
};
class result: public exam
{
public:
int total_marks;
void showresult()
  {
      input();
      output();
      total_marks=sub1+sub2+sub3+sub4+sub5+sub6;
      cout<<"\n total marks obtained out of 600:"<<total_marks;
      calculate();

   }
};

int main()
{
     result m1;
   m1.showresult();
   return 0;


}
```

```
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Razas-MacBook-Pro:JUET razakhan$ cd "/Users/razakhan/Desktop/JUET/Lab 7/" && g++ q2.cpp -o q2 && "/Users/razakhan/Desktop
/JUET/Lab 7/"q2

 enter the student roll no.  201b156

 enter the student name
 enter the marks1: 10

 enter the marks2: 10

 enter the marks3: 10
enter marks4:10

 enter the marks5: 10

 enter the marks6: 10

 the student roll no: 201
 the student name: b156
 marks1: 10
 marks2: 10
 marks3: 10
 marks4: 10
 marks5: 10
 marks6: 10
 total marks obtained out of 600:60
 total percentage  10%
(base) Razas-MacBook-Pro:Lab 7 razakhan$
```

Q3. 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.

Code:

```
#include<iostream>
using namespace std;
class Student {
protected:
string school_name,university_name,highest_degree;
public:
void std_details()
{
cout<<"Enter the name of School : "<<endl;
getline(cin,school_name);
cout<<"Enter the name of University : "<<endl; getline(cin,university_name);
cout<<"Enter the name of Highest degree obtained : "<<endl; getline(cin,highest_degree); }
void display_Student()
{ cout<<"The name of School is : "<<school_name<<endl;
cout<<"The name of University is : "<<university_name<<endl;
cout<<"The name of Highest degree obtained is : "<<highest_degree<<endl; } };
class employee {
protected:
string emp_name;
int emp_id;
public:
void emp_details()
{ cout<<"Enter the Employee name : "<<endl; getline(cin,emp_name);
cout<<"Enter the Employee id : "<<endl; cin>>emp_id; cin.ignore(); }
void display_employee()
{
cout<<"The Employee name is : "<<emp_name<<endl; cout<<"The Employee ID is :
"<<emp_id<<endl; } };
class manager :public employee, public Student {
 protected:
string designation;
float dues;
public:
void manager_details()
{ cout<<"Enter the designation of the Manager : "<<endl; getline(cin,designation);
cout<<"Enter the dues of Manager : "<<endl; cin>>dues;
cin.ignore();
}
void display_manager()
 {
cout<<"The designation of the Manager is : "<<designation<<endl; cout<<"The dues of the
Manager is : "<<dues<<endl; }
};
class scientist : public employee , public Student {
protected: int publication_num;
public:
void set_member_scientist()
```

```
{
cout<<"Enter the number of publications of Scientist : "<<endl; cin>>publication_num;
cin.ignore(); }
void display_scientist()
{ cout<<"The number of publications of Scientis are : "<<publication_num<<endl;
}
};
class laborer : public employee {};
int main() {
int man,sci,lab;
cout<<"Enter the details of the Manager : "<<endl<<endl; cout<<"Enter the number of employee
working as Manager : "; cin>>man;
cin.ignore();
 manager manager1[10];
for(int i=0;i<man;i++)
{
manager1[i].emp_details();
manager1[i].std_details();
manager1[i].manager_details(); }
cout<<endl<<"Enter the details of the Scientist : "<<endl; cout<<"Enter the number of employee
working as Scientist : "; cin>>sci;
cin.ignore();

scientist scientist1[10];
for(int i=0;i<sci;i++)
{
scientist1[i].emp_details(); scientist1[i].std_details(); scientist1[i].set_member_scientist(); }
cout<<endl<<"Enter the details of the Labourer : "<<endl; cout<<"Enter the number of employee
working as Labourer : "; cin>>lab;
cin.ignore();
laborer laborer1[10];
for(int i=0;i<lab;i++)
{ laborer1[i].emp_details(); }
cout<<endl<<endl<<"The details of the managers are : "<<endl<<endl; for(int i=0;i<man;i++)
{ manager1[i].display_Student();
manager1[i].display_employee();
manager1[i].display_manager();
cout<<endl; }
cout<<endl<<"The details of the scientists are : "<<endl<<endl; for(int i=0;i<sci;i++)
{ scientist1[i].display_Student(); scientist1[i].display_employee(); scientist1[i].display_scientist();
cout<<endl; }
cout<<endl<<"The details of the labourers are : "<<endl<<endl; for(int i=0;i<lab;i++)
{ laborer1[i].display_employee();
}
return 0;
}
```

```
cd "/Users/razakhan/Desktop/JUET/Lab 7/" && g++ q3.cpp -o q3 && "/Users/razakhan/Desktop/JUET/Lab 7/"q3

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Razas-MacBook-Pro:JUET razakhan$ cd "/Users/razakhan/Desktop/JUET/Lab 7/" && g++ q3.cpp -o q3 && "/Users/razakhan/Desktop/JUET/Lab 7/"q3
Enter the details of the Manager :

Enter the number of employee working as Manager : 1
Enter the Employee name :
Raza
Enter the Employee id :
340
Enter the name of School :
JUET
Enter the name of University :
JAYPEE
Enter the name of Highest degree obtained :
Btech
Enter the designation of the Manager :
Manager
Enter the dues of Manager :
2000

Enter the details of the Scientist :
Enter the number of employee working as Scientist : 1
Enter the Employee name :
Khan
Enter the Employee id :
677
Enter the name of School :
JUET
Enter the name of University :
Jaypee
Enter the name of Highest degree obtained :
Btech
Enter the number of publications of Scientist :
678

Enter the details of the Labourer :
Enter the number of employee working as Labourer : 1
Enter the Employee name :
Sufiyan
Enter the Employee id :
777


The details of the managers are :

The name of School is : JUET
The name of University is : JAYPEE
The name of Highest degree obtained is : Btech
The Employee name is : Raza
The Employee ID is : 340
The designation of the Manager is : Manager
The dues of the Manager is : 2000


The details of the scientists are :

The name of School is : JUET
The name of University is : Jaypee
The name of Highest degree obtained is : Btech
The Employee name is : Khan
The Employee ID is : 677
The number of publications of Scientis are : 678


The details of the labourers are :

The Employee name is : Sufiyan
The Employee ID is : 777
(base) Razas-MacBook-Pro:Lab 7 razakhan$
```

Q4. 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.

Code:

```
#include<iostream>
#include<stdio.h>
using namespace std;
class staff
{
   int code;
  string name;
```

```
    public:

    void get()
    {
     cout<<"\n enter employee code:";
        cin>>code;
    cout<<"\n enter name of employee:";
    cin>>name;

}
void put()
    {   cout<<"\n employee code:"<<code;
        cout<<"\n employee  name :"<<name;
    }

  };
class teacher : public staff
{
string s_publication;
public:
void getdata()
{
  get();
cout<<"\n enter subject publication";
cin>>s_publication;
}
 void putdata(){
        put();
        cout<<"\n subject publication:"<<s_publication;


}
};
class typist:public staff
{
int speed;
public:
void getdata()
    {
        get();
cout<<"\n enter typing speed:";
    cin>>speed; }
void putdata()
{
   put();
cout<<"\nspeed=word"<<speed<<"/min";;
        }
    };
class officer: public staff
{
char grade;
    public:
    void getdata()
    {
    get();
    cout<<"\nenter grade of the officer";
    cin>>grade;

}
    void putdata()
```

```
    {
  put();
    cout<<"\n officer's grade:"<<grade;
    }
} ;
class regular: public typist
{
public:
void show()
{
getdata();
putdata();
}
};
class casual : public typist
{
   int d_wages;
   public:
    void getvalues()
    {
       getdata();
    cout<<"\n enter compensation of employee :";
    cin>>d_wages;

}
   void showvalues()
    {
      putdata();
    cout<<"\n compensation received as casual basis"<<d_wages;
}
};
int main ()
{
cout<<"--- Database of employees ---";
int b;
teacher A;
regular B;
casual C;
officer D;
    cout<<"\n 1.teacher";
    cout<<"\n 2.typist";
    cout<<"\n 3.officer";
    cout<<"\n enter your choice:";
    cin>>b;
switch(b)
    { case 1: cout<<"\n  teacher's details ";
            A.getdata();
            A.putdata();
            break;
        case 2: cout<<"\n typist's details ";
              int a;
             cout<<"\n 1. regular typist";
             cout<<"\n 2.casual typist ";
             cout<<"\n enter your choice:";
             cin>>a;
             switch(a)
        {
        case 1:

             B.show();
```

```
            break;
        case 2:
          C.getvalues();
           C.showvalues();
            break; }
        break;
        case 3:
        cout<<"\n officer's details  ";
       D.getdata();
      D.putdata();
     break;

        }
    return 0;
}
```

```
cd "/Users/razakhan/Desktop/JUET/Lab 7/" && g++ q4.cpp -o q4 && "/Users/razakhan/Desktop/JUET/Lab 7/"q4

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) Razas-MacBook-Pro:JUET razakhan$ cd "/Users/razakhan/Desktop/JUET/Lab 7/" && g++ q4.cpp -o q4 && "/Users/razakhan/Desktop
/JUET/Lab 7/"q4
--- Database of employees ---
 1.teacher
 2.typist
 3.officer
 enter your choice:1

  teacher's details
 enter employee code:101010

 enter name of employee:YoYoYoYo

 enter subject publicationiOS Dev

 employee code:101010
 employee  name :YoYoYoYo
 subject publication:iOS(base) Razas-MacBook-Pro:Lab 7 razakhan$
```