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Home Assignment 2

1)Single inheritance

```
//Single inheritance

#include <bits/stdc++.h>

using namespace std;

class Mathematics{
protected:
    int a;
    int b;

public:
    void accept(){
        cout<<"This is base class"<<endl;
        cout<<"Enter value of a: "<<endl;
        cin>>a;
        cout<<"Enter value of b: "<<endl;
        cin>>b;
    }
};

class Addition:public Mathematics{
    int sum;
public:
    void add(){
        sum=a+b;
    }
    void display(){
        cout<<"This is derived class"<<endl;
        cout<<"Value of a+b = "<<sum<<endl;
    }
};

int main(){
    Addition a;
    a.accept();
    a.add();
    a.display();
    return 0;
}
```

Ouput of Single inheritance program:

This is base class

Enter value of a:

6

Enter value of b:

8

This is derived class

Value of a+b = 14

2)Multilevel inheritance

```
//Multilevel inheritance

#include <bits/stdc++.h>

using namespace std;

class A
{
    char name[100];
    int age;
public:
    void accept()
    {
        cout<<"Name: ";
        cin>>name;
        cout<<"Age: ";
        cin>>age;
    }
    void display()
    {
        cout<<"Name: "<<name<<endl;
        cout<<"Age: "<<age<<endl;
    }
};

class B: public A
{
    float salary;
public:
```

```

        void accept()
        {
            A::accept();
            cout<<"Stipend(in Rs.): ";
            cin>>salary;
        }
        void display()
        {
            A::display();
            cout<<"Stipend is : Rs."<<salary<<endl;
        }
    };

class C: public B
{
    int number;
public:
    void accept()
    {
        B::accept();
        cout<<"Number of programming language known: ";
        cin>>number;
    }
    void display()
    {
        B::display();
        cout<<"Number of programming language known: "<<number;
    }
};

int main()
{
    C p;
    cout<<"-----Enter Student internship data-----"<<endl;
    p.accept();
    cout<<endl<<"-----Displaying Student internship data-----"<<endl;
    p.display();
    // getch();
    return 0;
}

```

Ouput of Multilevel inheritance program:

-----Enter Student internship data-----

Name: mugdha

Age: 19

Stipend(in Rs.): 2500.56

Number of programming language known: 4

-----Displaying Student internship data-----

Name: mugdha

Age: 19

Stipend is : Rs.2500.56

Number of programming language known: 4

3)Multiple inheritance

```
//multiple inheritance

#include <bits/stdc++.h>

using namespace std;

//Base Class is General_Info
class General_Info
{
    protected:
        char name[30];
        char address[100];
    public:
        void getGeneral_Info(void)
        {
            cout << "Enter Name: ";
            cin.getline(name,30);
            cout << "Enter address: ";
            cin.getline(address,100);
        }
};

//Base Class is Academic_Info
class Academic_Info
{
    protected:
        char grade[30];
        int marks;
    public:
        void getAcademic_Info(void)
        {
            cout << "Enter grade: ";
            cin.getline(grade,30);
        }
};
```

```

        cout << "Enter marks(out of 100): ";
        cin >> marks;
    }
};

//Derived Class - Employee
class Employee:private General_Info, private Academic_Info
{
    public:
        void getEmployeeInfo(void){
            cout << "-----Enter Employee's general info: -----" << endl;
            getGeneral_Info();
            cout << "-----Enter Employee's academic info: -----" << endl;
            getAcademic_Info();
        }
        void printEmployeeInfo(void)
        {
            cout << "-----Employee's information display-----"
            << endl;
            cout << "General info: " << endl;
            //accessing protected data - name and address
            cout << "Name: " << name << endl;
            cout << "Address: " << address << endl;

            cout << "Academic info: " << endl;
            //accessing protected data - grade and marks
            cout << "Grade: " << grade << endl;
            cout << "Marks: " << marks << endl;
        }
};

int main()
{
    Employee emp;

    emp.getEmployeeInfo();
    emp.printEmployeeInfo();

    return 0;
}

```

Output of Multiple inheritance program:

-----Enter Employee's general info: -----

Enter Name: mugdha

Enter address:

-----Enter Employee's academic info: -----

Enter grade: A

Enter marks(out of 100): 95

-----Employee's information display-----

General info:

Name: mugdha

Address: _

Academic info:

Grade: A

Marks: 95

4) Hierarchical inheritance

```
// hierarchical inheritance

#include <bits/stdc++.h>

using namespace std;

class Person
{
    char name[100];
    int age;
public:
    void getdata()
    {
        cout<<"Enter name: ";
        gets(name);
        cout<<"Enter age: ";
        cin>>age;
    }
    void display()
    {
        cout<<"Name: "<<name<<endl;
        cout<<"Age: "<<age<<endl;
    }
};

class Student: public Person
{
    int marks;
public:
    void getdata()
```

```

        {
            Person::getdata();
            cout<<"Enter marks: ";
            cin>>marks;
        }
        void display()
        {
            Person::display();
            cout<<"Marks: "<<marks<<endl;
        }
    };

class Employee: public Person
{
    float salary;
public:
    void getdata()
    {
        Person::getdata();
        cout<<"Enter salary(in Rs.): ";
        cin>>salary;
    }
    void display()
    {
        Person::display();
        cout<<"Salary: "<<salary<<endl;
    }
};

int main()
{
    Student s;
    Employee e;
    cout<<"****Student****"<<endl;
    cout<<"-----Enter data-----"<<endl;
    s.getdata();
    cout<<endl<<"-----Displaying data-----"<<endl;
    s.display();
    cout<<endl<<"****Employee****"<<endl;
    cout<<"-----Enter data-----"<<endl;
    e.getdata();
    cout<<endl<<"-----Displaying data-----"<<endl;
    e.display();
    return 0;
}

```

Ouput of hierarchical inheritance program:

****Student****

-----Enter data-----

Enter name: mugdha

Enter age: 19

Enter marks: 95

-----Displaying data-----

Name: mugdha

Age: 19

Marks: 95

****Employee****

-----Enter data-----

Enter name: shreeya

Enter age: 35

Enter salary(in Rs.): 6000.67

-----Displaying data-----

Name: shreeya

Age: 35

Salary: 6000.67