```cpp
/*swapping private data of two classes*/

#include<iostream>
using namespace std;

class one;
class two
{
    private:
        int data;
    public:
        void getdata()
        {
            cout<<"\nEnter 2nd Number:";
            cin>>data;
        }
        friend void display(one,two);
        friend void swp(one &,two &);
};
class one
{
    private:
        int data;
    public:
        void getdata()
        {
            cout<<"\nEnter 1st Number:";
            cin>>data;
        }
        friend void display(one,two);
        friend void swp(one &,two &);
};

void display(one x,two y)
{
    cout<<"\n1st="<<x.data<<" and 2nd="<<y.data;
}

void swp(one & x,two & y)
{
   int temp;
   temp=x.data;
   x.data=y.data;
   y.data=temp;
}

int main()
{
    one x;
    two y;
    x.getdata();
    y.getdata();
    cout<<"\nValues before swapping";
```

```cpp
    display(x,y);
    cout<<"\nValues after swapping";
    swp(x,y);
    display(x,y);
}
```


```cpp
/*Calculator using Menu Base Program*/

#include<iostream>
using namespace std;

class calculator
{
    private:
        float a,b,c;
    public:
        void getdata()
        {
            cout<<"Enter the numbers:";
            cin>>a>>b;
        }
        void add();
        void sub();
        void mul();
        void div();
};

void calculator::add()
{
    float c=a+b;
    cout<<"The Value is "<<c<<endl<<endl;
}
void calculator::sub()
{
    float c=a-b;
    cout<<"The Value is "<<c<<endl<<endl;
}
void calculator::mul()
{
    float c=a*b;
    cout<<"The Value is "<<c<<endl<<endl;
}
void calculator::div()
{
    float c=a/b;
    cout<<"The Value is "<<c<<endl<<endl;
}
```

```cpp
void menu()
{
    calculator ob;
    char c='Y';
    int ch;
    do
    {
        cout<<"\n\nCalculator Operations:";
        cout<<"\n    1.Addition";
        cout<<"\n    2.Subtraction";
        cout<<"\n    3.Multiplcation";
        cout<<"\n    4.Division\n";
        cin>>ch;
        switch(ch)
        {
            case 1:
                ob.getdata();
                ob.add();
                break;
            case 2:
                ob.getdata();
                ob.sub();
                break;
            case 3:
                ob.getdata();
                ob.mul();
                break;
            case 4:
                ob.getdata();
                ob.div();
                break;
            default:
                cout<<"Wrong Choise!!";
                menu();
        }
        cout<<"\nDo you want More ?(y/n): ";
        cin>>c;
        c=toupper(c);
        }while(c!='N');
}

int main()
{
    menu();
}
```


```cpp
/*Complex Number Calculator using Menu Base Program*/

#include<iostream>
using namespace std;

class comp
{
    private:
        int x,y;
    public:
        void getdata()
        {
            cout<<"\nEnter Real & Imaginary Part:";
            cin>>x>>y;
        }
        void display()
        {
            if(y<0)
                cout<<x<<"-i"<<y*(-1);
            else
                cout<<x<<"+i"<<y;
        }
        comp addition(comp);
        comp subtraction(comp,comp);
        comp multiplication(comp);
};

comp comp::addition(comp b)
{
    comp temp;
    temp.x=x+b.x;
    temp.y=y+b.y;
    return temp;
}

comp comp::subtraction(comp a,comp b)
{
    x=a.x-b.x;
    y=a.y-b.y;
}

comp comp::multiplication(comp b)
{
    comp temp;
    temp.x=(x*b.x)-(y*b.y);
    temp.y=(x*b.y)+(y*b.x);
    return temp;
}

class calculator
{
    private:
        comp a,b,c;
```

```cpp
    public:
        void add()
        {
            c=a.addition(b);
            cout<<"\nThe result is ";
            c.display();
        }
        void sub()
        {
            c=c.subtraction(a,b);
            cout<<"\nThe result is ";
            c.display();
        }
        void mul()
        {
            c=a.multiplication(b);
            cout<<"\nThe result is ";
            c.display();
        }
        void getdata()
        {
            cout<<"\nEnter the 1st Number:";
            a.getdata();
            cout<<"\nEnter the 2nd Number:";
            b.getdata();
        }
};

void menu()
{
    calculator ob;
    char c='Y';
    int ch;
    do
    {
        cout<<"\n\nCalculator Operations:";
        cout<<"\n    1.Addition";
        cout<<"\n    2.Subtraction";
        cout<<"\n    3.Multiplcation";
        cout<<"\n    4.Division\n";
        cin>>ch;
        switch(ch)
        {
            case 1:
                ob.getdata();
                ob.add();
                break;
            case 2:
                ob.getdata();
                ob.sub();
                break;
            case 3:
                ob.getdata();
```

```cpp
                ob.mul();
                break;
            default:
                cout<<"Wrong Choise!!";
                menu();
        }
        cout<<"\nDo you want More ?(y/n): ";
        cin>>c;
        c=toupper(c);
        }while(c!='N');
}

int main()
{
    menu();
}
```


[P.T.O]

```cpp
/* Store Tempurature Record of 12 months using 2D array */

#include<iostream>
using namespace std;

class temp
{
    private:
        int t[2][12];
        char
month[12][4]={"Jan","Feb","Mar","Apr","May","Jun","Jul","Aug","Sep","Oct","Nov","
Dec"};
    public:
        void getdata()
        {
            for(int i=0;i<12;i++)
            {
                cout<<"\nEnter Data for "<<i+1<<"th month : ";
                for(int j=0;j<2;j++)
                {
                    if(j==0)
                        cout<<"\nHigh: ";
                    else
                        cout<<"\nLow: ";
                    cin>>t[j][i];
                }
            }
        }
        void display()
        {
            cout<<"\nMonth:";
            for(int i=0;i<12;i++)
                cout<<"   "<<month[i];
            for(int i=0;i<2;i++)
            {
                if(i==0)
                    cout<<"\nHigh :";
                else
                    cout<<"\nLow  :";
                for(int j=0;j<12;j++)
                    cout<<"    "<<t[i][j];
                cout<<endl;
            }
        }
        void AvgHigh();
        void AvgLow();
        void InHigh();
        void InLow();
};
```

```cpp
void temp::AvgHigh()
{
    int sum=0;
    for(int i=0;i<12;i++)
        sum=sum+t[0][i];
    int avg=sum/12;
    cout<<"The Average High Temperature is "<<avg;
}

void temp::AvgLow()
{
    int sum=0;
    for(int i=0;i<12;i++)
        sum=sum+t[1][i];
    int avg=sum/12;
    cout<<"The Average Low Temperature is "<<avg;
}

void temp::InHigh()
{
    int loc,high=t[0][0];
    for(int i=0;i<12;i++)
    {
        if(t[0][i]>high)
        {
            high=t[0][i];
            loc=i;
        }
    }
    cout<<"The Highest Temperature is "<<high<<" in "<<month[loc];
}

void temp::InLow()
{
    int loc,low=t[1][0];
    for(int i=0;i<12;i++)
    {
        if(t[1][i]<low)
        {
            low=t[1][i];
            loc=i;
        }
    }
    cout<<"The Lowest Temperature is "<< low<<"in "<<month[loc];
}

void menu()
{
    int ch;
    char c;
    temp ob;
    do
    {
```

```cpp
        cout<<"\n\n ENTER YOUR CHOISE  ";
        cout<<"\n 1. Input Data";
        cout<<"\n 2. Display";
        cout<<"\n 3. Find the Average High";
        cout<<"\n 4. Find the Average Low";
        cout<<"\n 5. Index High";
        cout<<"\n 6. Index Low";
        cout<<"\n 7. Quit....\n";
        cin>>ch;
        switch(ch)
        {
            case 1:
                cout<<"Enter the Data:\n";
                ob.getdata();
                break;
            case 2:
                ob.display();
                break;
            case 3:
                ob.AvgHigh();
                break;
            case 4:
                ob.AvgLow();
                break;
            case 5:
                ob.InHigh();
                break;
            case 6:
                ob.InLow();
                break;
            case 7:
                break;
            default:
                cout<<"Wrong Choise!!";
                menu();
        }
        cout<<"\nDo you want to Continue ?(y/n): ";
        cin>>c;
        c=toupper(c);
        }while(c!='N');

}
int main()
{
    menu();
}
```


```cpp
/* Pascle Triangle */

#include<iostream>
using namespace std;

class triangle
{
    int n;
    public:
        void getdata()
        {
            cout<<"\n\t\t\tTHE COEFFICIANT OF(a+b)^n\n";
            cout<<"\nHERE n = ";
            cin>>n;
        }
        void display()
        {
            for(int i=0;i<=n;i++)
            {
                int p=1;
                for(int j=0;j<=n-i;j++)
                    cout<<"    ";
                for(int k=0;k<i+1;k++)
                {
                    if(k==0||k==i)
                        cout<<"       "<<1;
                    else
                        {
                        p=p*(i-k+1)/k;
                            cout<<"       "<<p;
                    }
                }
                cout<<endl;
            }
        }
};

int main()
{
    triangle ob;
    ob.getdata();
    ob.display();
    return 0;
}
```