Exercise 1: Define a class student with the following specification

Private members of class student

id integer

name string

eng. math, science float

total float

ctotal() a function to calculate eng + math + science with float return type.

Public member function of class student

Take_data() Function to accept values for id, name, eng, science and invoke ctotal() to calculate total.

Show_data() Function to display all the data members on the screen.

Sample Run:

```
Enter Id number: 1439
Enter student name: Mohamed
Enter marks in english, math, science:14
18
19
ID number: 1439
Student name :Mohamed
English:14
Math: 18
Science: 19
Total: 51
```

Answer:

```
#include<iostream>

#include<string>

using namespace std;

class student

{

private:

        int id;

        string name;

        float eng,math,science;
        float total;
        float ctotal()
        {               return eng+math+science;
        }
public:
        void Take_data()
        {
                cout<<"Enter Id number :";
                cin>> id;
                cout<<"Enter student name: " ;
                cin>>name;
                cout<< "Enter marks in english, math, science: ";
                cin>>eng>>math>>science;
                total=ctotal();
        }
        void Show_data()
        {cout<<"ID number: "<<id<<"\nStudent name :"<<name<<"\nEnglish:
<<eng<<"\nMath: "<<math<<"\nScience: "<<science<<"\nTotal: "<<total;
        }
};
int main ()
{       student obj ;
        obj.Take_data();
        obj.Show_data();
return 0;
```

```
}
```

Exercise 2: Define a class **flight** in C++ with following description:

Private Members

A data member Flight number of type integer

A data member Destination of type string

A data member Distance of type integer

A data member Fuel of type integer

A member function CALFUEL() to calculate the value of Fuel as per the following criteria

Distance	Fuel
<=1000	500
more than 1000 and <=2000	1100
more than 2000	2200

Public Members

A function **get_data()** to allow user to enter values for Flight Number, Destination, Distance.

A function **Show_data()** to allow user to view the content of all the data members & call function **Calfuel()** to calculate the quantity of Fuel.

Sample Run:

```
Enter Number of flight: 2019

Enter Destination: NewYork

Enter Distance: 5000
Number of Flight: 2019
Destination: NewYork
Distance: 5000
Cost Fuel: 2200
```

Answer:

```
#include<iostream>

#include<string>

using namespace std;

class flight

{

  private:
        int number_flight;
        string Destination;
        int distance;
        int fuel;
        int calfuel()
        {
                if (distance<1000)
                return 500;
                if((1000<distance)&&(distance<2000))
                return 1100;
                else
                return 2200;
        }
  public:
        void get_data();
        void show_data();
};
void flight::get_data()
{
        cout<<"Enter Number of flight: ";
        cin>> number_flight;
        cout<<"\nEnter Destination: ";
        cin>>Destination;
        cout<< "\nEnter Distance: ";
        cin>>distance;
```

```
}
void flight :: show_data()
{
        cout<<"Number of Flight: "<<number_flight<<"\nDestination:
"<<Destination<<"\nDistance: " <<distance<<"\nCost Fuel: "<<calfuel();
}
int main ()
{
        flight obj;
        obj.get_data();
        obj.show_data();
        return 0;
}
```

Exercise 3: Define a class **BOOK** with the following specifications :

Private members of the class BOOK are

BOOK NO	integer type
BOOKTITLE	string
PRICE	float (price per copy)
TOTAL_COST()	A function to calculate the total cost for N number of copies where N is passed to the function as argument.

Public members of the class BOOK are

INPUT()	function to read BOOK_NO. BOOKTITLE, PRICE
PURCHASE()	function to ask the user to input the number of copies to be purchased. It invokes TOTAL_COST() and prints the total cost to be paid by the user.

Note : You are also required to give detailed function definitions.

Sample Run:

```
Enter Book Number 0123456
Enter Book Title cplusplus
Enter price per copy 2
Enter number of copies to purchase 42
Total cost is 84$
```

Answer:

```
#include<iostream>

#include<string>

using namespace std;

class BOOK

{

        int BOOKNO;

        string BOOKTITLE;

        float PRICE;

        void TOTAL_COST(int N)

        {

                float tcost;

                tcost=PRICE*N;

                cout<<tcost<<"$";

        }

public:

        void INPUT()

        {

                cout<<"Enter Book Number ";

                cin>>BOOKNO;

                cout<<"Enter Book Title ";

                cin>>BOOKTITLE;

                cout<<"Enter price per copy ";

                cin>>PRICE;

        }
        void PURCHASE()
        {
                int n;
                cout<<"Enter number of copies to purchase ";
                cin>>n;
                cout<<"Total cost is ";
                TOTAL_COST(n);
        }
};

int main()
{
        BOOK obj;
        obj.INPUT();
        obj.PURCHASE();
        return 0;
}
```

Exercise 4: Write the definition for a class called **complex** that has floating point data members for storing real and imaginary parts. The class has the following member functions:

void set(float, float) to set the specified value in object

void disp() to display complex number object

complex sum(complex) to sum two complex numbers & return complex number

1. Write the definitions for each of the above member functions.
2. Write main function to create three complex number objects. *Set the value in two objects and call sum() to calculate sum and assign it in third object.* Display all complex numbers.

Sample Run:

```
complex Number 1 = 1.5 + i2.5

complex Number 2 = -0.8 + i3.5

complex Number 3 = 0.7 + i6
```

Answer:

```
#include<iostream>

using namespace std;

class complex

{

  private:

          float x;

          float y;

  public:

          void set(float real, float img)

          {

                  x=real; y=img;

          }

          complex sum(complex);

          void disp();

};

complex complex::sum(complex C)

{

          complex t;

          t.x = x + C.x;

          t.y = y + C.y;

          return t;
}
void complex::disp()
{
        cout<<x<<" + i"<<y<<endl;
}
int main()
{
        complex C1,C2,C3;

        C1.set(1.5,2.5);
        C2.set(-0.8,3.5);
        C3=C1.sum(C2);

        cout<<"\n complex Number 1 = ";C1.disp();
        cout<<"\n complex Number 2 = ";C2.disp();
        cout<<"\n complex Number 3 = ";C3.disp();
        return 0;
}
```

Exercise 5: Write the definition for a class called **timing** that has hours and minutes as integer. The class has the following member functions:

void settime(int, int) to set the specified value in object

void showtime() to display time object

timing sum(timing) to sum two timing object & return time.

1. Write the definitions for each of the above member functions.
2. Write main function to create three time objects. Set the value in two objects and call sum() to calculate sum and assign it in third object. Display all time objects.

Sample Run:

```
Time 1 : 2 hours and 45 minutes

Time 2 : 3 hours and 30 minutes

Time 3 : 6 hours and 15 minutes
```

Answer:

```
#include<iostream>

using namespace std;

class timing

{

  private:

        int hours;

        int minutes;

  public:

        void settime(int h, int m)

        {

                hours=h; minutes=m;

        }

        timing sum(timing);

        void showtime();

};


 timing timing::sum(timing TM)

{

        timing t;

        t.minutes = minutes + TM.minutes;
```

```
    t.hours=t.minutes/60;

    t.minutes=t.minutes%60;

    t.hours += hours + TM.hours;

    return t;

}


void timing::showtime()

{

    cout<<hours<<" hours and "<<minutes<<" minutes"<<endl;

}


int main()

{

    timing T1,T2,T3;

    T1.settime(2,45);

    T2.settime(3,30);

    T3=T1.sum(T2);


    cout<<"\n Time 1 : ";T1.showtime();

    cout<<"\n Time 2 : ";T2.showtime();

    cout<<"\n Time 3 : ";T3.showtime();

    return 0;

}
```