

Q. Waiting or Not Waiting

Raju's maths teacher gave him a task of identifying the number name.

If the number is greater than 0 then he should utter to the teacher as "I am waiting".

If the number is less than 0 then he should utter the word as "I am not waiting".

If the number is "0" the he should utter the word as "Sorry" Help him by completing his task.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main() {
    int a;
    cin>>a;
    if(a>0)
        cout<<"I am waiting";
    else
        if(a<0)
            cout<<"I am not waiting";
        else
            cout<<"Sorry";

    return 0;
}
```

Sample Input

15

Sample Output

I am waiting

Result

Thus, Program " Waiting or Not Waiting " has been successfully executed

Q. Dhoni and Ziva in Chennai

Dhoni's daughter Ziva is hyper active child, so she used to ask lot of question to Dhoni while playing with him.

One fine evening Dhoni and Ziva were playing in Chepak Stadium in Chennai, at that time ziva looking at the Moon in sky asked Dhoni what is the gravity in moon? Dhoni said it's 16.6 percentage that of earth.

Ziva didn't get satisfied with that then she asked what will be my weight in moon?

Dhoni was little bit confused to answer ziva !!!!

Can you help Dhoni to answer the question by creating a logic which calculates the weight of the person in moon so that Ziva will be happy knowing her weight.

Input Format:

Get the actual weight of the person

Output Format:

Print the weight in moon.

Refer Sample Testcases.

Programming Language need to be use:C++

Source Code

```
#include <iostream>
using namespace std;
int main() {
    float a;
    int b;
    cin>>b;
    a=(16.6*b)/100;
    cout<<"Your weight on moon is :"<<a;
    return 0;
}
```

Sample Input

17

Sample Output

Your weight on moon is : 2.822

Result

Thus, Program " Dhoni and Ziva in Chennai " has been successfully executed

Course: OOPS **Session:** I/O Operations **Timestamp:** 2021-4-1 12:23:29

Register Number: RA2031241010065

Q. Digits in Words

Siva and guru are playing a game in Maths.

Guru says random numbers to siva and he need to convert the numbers to words.

So please help siva to find the words for particular numbers. Refer the following sample test cases,

Refer Sample Testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main() {
    long int n,sum=0,r;
    cin>>n;
    while(n>0)
    {
        r=n%10;
        sum=sum*10+r;
        n=n/10;
    }
    n=sum;
    while(n>0)
    {
        r=n%10;
        switch(r)
        {
            case 1:
                cout<<"One ";
                break;
            case 2:
                cout<<"Two ";
                break;
            case 3:
                cout<<"Three ";
                break;
            case 4:
                cout<<"Four ";
                break;
            case 5:
                cout<<"Five ";
                break;
            case 6:
                cout<<"Six ";
                break;
            case 7:
                cout<<"Seven ";
                break;
            case 8:
                cout<<"Eight ";
                break;
            case 9:
                cout<<"Nine ";
                break;
            case 0:
                cout<<"Zero ";
                break;
            default:
                cout<<"ttt ";
                break;
        }
        n=n/10;
    }
}
return 0;
}
```

Sample Input

63412

Sample Output

Six Three Four One Two

Result

Thus, Program " Digits In Words " has been successfully executed

Q. Scientist Game

Armstrong was one of the great scientist.

The Indian council decided that we need to assign some number as a gift to the great scientist.

There was a suggestion given by the Indian Council. If the sum of cube of each number is again equal to the number then they decided that they can assign the number to the great scientist.

Kindly help the Indian Council to complete the task by writing a simple logic.

Refer sample Inputs and Outputs.

Input 1: 153

Output: Give to Scientist Armstrong

Reason($(1^3 + 5^3 + 3^3 = 153)$ which is equal to the number)

Input 2: 134

Output: Don't Give to Scientist Armstrong

Reason($(1^3 + 3^3 + 4^3 \neq 134)$ which is not equal to the number)

NOTE:

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int origNum, num, rem, sum = 0;
    cin >> origNum;
    num = origNum;
    while(num != 0)
    {
        rem = num % 10;
        sum += rem * rem * rem;
        num /= 10;
    }
    if(sum == origNum)
        cout<<"Give to Scientist Armstrong";
    else
        cout<<"Dont Give to Scientist Armstrong";
    return 0;
}
```

Sample Input

371

Sample Output

Give to Scientist Armstrong

Result

Thus, Program " **Scientist Game** " has been successfully executed

Q. Country

In a country named Differenzia, the minors and senior citizens are not eligible to vote.

Only people aged between 18 to 60 (both inclusive) are eligible to vote.

So create a logic to determine a person in Differenzia is eligible to vote or not.

Refer the sample test cases.

NOTE:

The Programming Language need to be used : C++

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int a;
    cin>>a;
    if(a>17 && a<60)
        cout<<"Eligible";
    else
        cout<<"Not Eligible";
    return 0;
}
```

Sample Input

18

Sample Output

Eligible

Result

Thus, Program " Country " has been successfully executed

Q. Swim

Gowtham is planning to go for swimming classes. He would prefer to enroll in the center which has the swimming pool of a greater area.

In the first centre that he visit, the swimming pool is a circular shape(radius-r).

In the next centre that he visit, the swimming pool is of a square shape (side-S).

Create a logic that will help him to make the choice of the swimming pool.

Input :

Input consists of 2 integers.

The first integer correspond to the radius (r) of the circular swimming pool.

The second integer corresponds to the side (S) of the square swimming pool.

NOTE:

The Programming Language need to be used is : C++

Refer sample test cases.

Source Code

```
#include <iostream>
using namespace std;
int main() {
    int a,b,c,s;
    cin>>a>>b;
    c=3.14*a*a;
    s=b*b;
    if(c>s)
        cout<<"I prefer centre 1";
    else
        cout<<"I prefer centre 2";
    return 0;
}
```

Sample Input

6
4

Sample Output

I prefer centre 1

Result

Thus, Program " **Swim** " has been successfully executed

Q. SRM Calculator

SRM Students decides to create a software to extend our help to Petty shops and Shops. In this regard the "STUDENT" team has selected a few students to complete the task. The task was monitored by a group of experts and the software was tested by a expert team from corporate.

The task is as follows when there are two items and if the shop keeper says 1 then it needs to add the two items. If the shop keeper says 2 then the two items should be subtracted. And when the shop keeper tells 3 then the product of the items needs to be outputted. When shop keeper tells as 4 then the items should fight with one another.

Refer sample input and output:

Input should be between 1 to 4

Only Integer numbers as input.

If input is less than or greater than 1 to 4 print "Invalid Input"

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int op,b,c;
    cin>>op;
    cin>>b>>c;
    switch(op)
    {
        case 1:
        cout<<b+c;
        break;
        case 2:
        cout<<b-c;
        break;
        case 3:
        cout<<b*c;
        break;
        case 4:
        cout<<b/c;break;
        break;
        default:
        cout<<"Invalid Input";
        break;
    }
    return 0;
}
```

Sample Input

```
1
35 36
```

Sample Output

```
71
```

Result

Thus, Program " **SRM Calculator** " has been successfully executed

Q. You and Me

In Argentina the COUPLE GAMESHOW named You and Me is going to happen.

In order to complete the application process for the game show the participants need to find their average age.

Can you help them to find their average age?

NOTE:

The Programming Language need to be used is : C++

Refer sample input and output in the test cases.

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int a,b,c;
    cin>>a>>b;
    cout<<"I am "<<a<<endl;
    cout<<"You are "<<b<<endl;
    c=(a+b)/2;
    cout<<"We are around "<<c;
    return 0;
}
```

Sample Input

28
24

Sample Output

I am 28
You are 24
We are around 26

Result

Thus, Program " You and Me " has been successfully executed

Q. Professor Omkar

Omkar is the Professor in SRM he has decided to give a simple task to his students.

He asked his students to create a logic for automatically calculating the amount of energy needed to heat X amount of water from Y initial temperature to Z final temperature.

The formula to compute the energy is as follows

$$Q = M * (\text{finalTemperature} - \text{initialTemperature}) * 4184$$

Where,

M is the weight of water in kilograms,

Q is the energy measured in joules,

and

Temperatures are in degree Celsius.

Input Format:

Get the input of amount of water in kilograms , initial temperature of water and final temperature of the water.

Output Format:

Print the energy needed to heat the water.

Refer Sample Testcases

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int a,b,c;
    float d;
    cin>>a>>b>>c;
    d=(a*(c-b))*4184;
    cout<<"The energy needed is "<<d;
    return 0;
}
```

Sample Input

567 12 56

Sample Output

The energy needed is 1.04382e+08

Result

Thus, Program " Professor Omkar " has been successfully executed

Q. Print Floyd's

Create a logic to print Floyd's triangle upto the given n rows.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int n,k,i,j;
    cin>>n;
    k=1;
    for(i=1;i<=n;i++)
    {
        for(j=1;j<=i;j++,k++)
        {
            cout<<k;
        }
        cout<<endl;
    }
    return 0;
}
```

Sample Input

5

Sample Output

1
23
456
78910
1112131415

Result

Thus, Program " Print Floyd's " has been successfully executed

Q. Bhagavan the Inspirational Teacher

Bhagavan the Government school teacher from Karur district is so involved with his students development which in turn even forced the Tamilnadu Educational department to cancel his transfer from his old school on the request of his students.

He is such an inspirational teacher. Now he has been assigned the new set of students from other schools to train them. So before starting the training he wants to collect the personal details from the new student for maintaining the record in his school.

Can you help him to automate his task of collecting student details?

Mandatory:

- 1.Create a class "student"
- 2.Create the following datamembers:
roll,
name,
height, and
weight.
- 3.Create a DEFAULT CONSTRUCTOR to assign the values to the above data members as follows:
name= "Bhagavan" ; roll=1593 ; height=172.5 ; weight=60.4;
- 4.Create a member function readinput() to get the values from the above members
- 5.Create a member function displaydata() to print the information collected from the students.
- 6.Create two objects s1 and s2. Call the member function readinput() only with s1 and displaydata() with s1 and s2.

Refer sample testcases

Note:

Programming Language need to be used:C++.

Source Code

```
#include <iostream>
using namespace std;
#include<string>
class student
{
private:
    int roll;
    string name;
    float height;
    float weight;
public:
    student()
    {
        roll=1593;
        name="Bhagavan";
        height=172.5;
        weight=60.4;
    }
    void readinput()
    {
        cin>>name>>roll>>height>>weight;
    }
    void displaydata()
    {
        cout<<name<<" "<<roll<<" "<<height<<" "<<weight<<endl;
    }
};

int main()
{
    student s1,s2;
    s1.readinput();
    s1.displaydata();
    s2.displaydata();
    return 0;
}
```

Sample Input

Manikandan 156 168.5 65.3

Sample Output

Manikandan 156 168.5 65.3
Bhagavan 1593 172.5 60.4

Result

Thus, Program " Bhagavan the Inspirational Teacher " has been successfully executed

Q. Athithya Karthalan and his Hobby

Athithya Karthalan the Chola King has a hobby of learning about building architectures and its construction methodologies throughout India. Imagine he has given you the task of analysing the building parameters and the stability of the building. Can you complete the prestigious task assigned to you ??

Do the following things in order to satisfy Athithya Karthalan's need..

Mandatory:

1. Create a class called Building with object name "objname"
2. Declare the following private data members or member variables length, width and ratePerSqFoot (all of type int)
3. Create the public member functions or methods as follows:

4. Create the public member functions or methods as follows:

- a. Method name = getLength()
b. Type = int
c. Access Specifier = Public
d. Argument Type = 3 arguments of type int

This method is used to set the values for length, width and ratePerSqFoot. The arguments are passed to this function in the same order.

5. Create the public member functions or methods as follows:

- a. Method name = getWidth()
b. Type = int
c. Access Specifier = Public
d. Argument Type = no arguments

This method is used to return the length of the building

6. Create the public member functions or methods as follows:

- a. Method name = getRatePerSqFoot()
b. Type = float
c. Access Specifier = Public
d. Argument Type = no arguments

This method is used to return the ratePerSqft of the building

7. Create the public member functions or methods as follows:

- a. Method name = calculateCost()
b. Type = void
c. Access Specifier = Public
d. Argument Type = no arguments

This method is used to return the width of the building

8. Create the public member functions or methods as follows:

- a. Method name = determineSuitability()
b. Type = void
c. Access Specifier = Public
d. Argument Type = no arguments

This method is used to calculate and print cost of the building.

9. Call all the methods from main class using the object name "objname"

Note:

Athithya Karthalan is interested in buildings that are almost in the shape of a square. If the length and width of the building differ by at most 10, then the building is suitable. If the difference between the length and width of the building is more than 10, then it is not suitable.

Source Code

```
#include <iostream>
#include <math.h>
using namespace std;
class Building
{
private:
    int length,width,ratePerSqFoot;
public:
    void initializeData(int l,int w,int r)
    {
        length=l;
        width=w;
        ratePerSqFoot=r;
    }
    void getLength(int length,int width,int ratePerSqFoot)
    {
        cout<<"Length : "<<length<<endl;
    }
    void getWidth()
    {
        cout<<"Width : "<<width<<endl;
    }
    void getRatePerSqFoot()
    {
        cout<<"Rate Per SqFt : "<<ratePerSqFoot<<endl;
    }
    void calculateCost()
    {
        int z;
        z=length*width*ratePerSqFoot;
        cout<<"Cost of the Building : "<<z<<endl;
    }
    void determineSuitability()
    {
        if(length==60)
        {
            if(abs(length-width)>10)
                cout<<"Suitability : Not Suitable";
            else if(length-width)<=10
                cout<<"Suitability : Suitable";
            else
                cout<<"Suitability : Not Suitable"<<endl;
        }
    }
};

objname;
int main()
{
    int l,w,r;
    cin>>l>>w>>r;
    objname.initializeData(l,w,r);
    objname.getLength(l,w);
    objname.getWidth();
    objname.getRatePerSqFoot();
    objname.calculateCost();
    objname.determineSuitability();
    return 0;
}
```

Sample Input

```
34
56
54
```

Sample Output

```
Length : 34
Width : 56
Rate Per SqFt : 54
Cost of the Building : 102816
Suitability : Not Suitable
```

Result

Thus, Program " Athithya Karthalan and his Hobby " has been successfully executed

Q. Arulmozhivarman and his pets

Arulmozhivarman is a cholla price and a pet lover. He has a lot of his favorite pets cats and dogs in the barn. He knows that there are C cats and D dogs in the barn. Also, one day went to field and found that there were legs of the animals touching the ground. Arulmozhivarman knows that cats love to ride on the dogs. So, they might touch the ground and their legs won't touch the dogs, and their legs won't touch the back. It was a cold foggy morning. When Arulmozhivarman did this counting. So he is now wondering whether he counted the legs properly or not. Specifically, he is wondering if there is some possibility of his counting being correct. Please Help Arulmozhivarman in finding it.

Input Format:

First line of the input contains an integer T denoting number of test cases. T test cases follow.

Output Format:

For each test case, output a single line containing a string "yes" or "no" (both without quotes) according to the situation.

Constraints:

```
1 <= T <= 10 power 5  
0 <= C,D,L <= 10 power 9
```

Explanation

Example 1. There is one cat and one dog. The number of legs of these animals on the ground are 8, it can be possible when both cat and dog are standing on the ground.

Example 2. There is one cat and one dog. The number of legs of these animals on the ground are 4, it can be possible if the cat will ride on the dog, so its legs won't be counted by Arulmozhivarman, only the dog's legs will be counted.

Example 3. There is one cat and one dog. The number of legs of these animals are 2, it can not be true at all, Arulmozhivarman might have made some mistake. Hence answer is "no".

Mandatory:

1. Create a new class named "catanddog" and the object name for the new class should be "obj".

2. Create a methods as follows:

a. Method name = count()
b. Type = void
c. Access Specifier = public
d. Argument type = no arguments

3. Access the method count() using the object name "obj" from the main method.

Source Code

```
#include <iostream>  
using namespace std;  
class catanddog  
{  
public:  
    int C,D,L,T;  
    void count()  
    {  
        cin>>C>>D>>L;  
        long int u=L*4*D;  
        if(C<0||(u%4!=0)||u>4*C)  
            cout<<"no";  
        else  
            cout<<"yes";  
        cout<<endl;  
    }  
};  
obj;  
int main()  
{  
    obj.count();  
    return 0;  
}
```

Sample Input

```
3  
1 1 8  
1 1 4  
1 1 2  
1 1 2
```

Sample Output

```
yes  
yes  
no
```

Result

Thus, Program " Arulmozhivarman and his pets " has been successfully executed

Q. lomda

Rahul and Rashi are off to the wedding of a close relative.

This time they have to travel without their guardians.

Rahul got very interested in the arrangement of seats inside the train coach.

The entire coach could be viewed as an arrangement of consecutive blocks of size 8.

Berth Number Compartment

1 - 8 - 1

17 - 16 - 2

... and so on

Each of these size-8 blocks are further arranged as:

1LB, 2MB, 3UB, 4LB, 5MB, 6UB, 7SL, 8SU 9LB, 10MB, ...

Here

L denotes lower berth

M denotes middle berth and

S denotes upper berth.

The following berths are called Train-Partners:

3UB | 6UB

2MB | 5MB

7SL | 8SU

and the pattern is repeated for every set of 8 berths.

Rahul and Rashi are playing this game of finding the train partner of each berth. Can you write a program to do the same?

Input

The first line of input contains a single integer T, denoting the number of test cases to follow.

Each of the next T lines contain a single integer N, the berth number whose neighbor is to be found out.

Output

The output should contain exactly T lines each containing the berth of the neighbor of the corresponding seat.

Constraints

1 ≤ N ≤ 8

Mandatory:

1. Create a new class "partner" other than the main class (TestClass)

2. Create the methods as follows:

a. Method name = findpartner() to find the possible partner in train

b. Access Specifier = public

c. Argument type = no arguments

3. Access the method findpartner() using the object name "objname" from the main method.

Refer: Sample Testcases

Source Code

```
#include <iostream>
using namespace std;
class partner
{
public:
    void findpartner()
    {
        int n,x,t;
        string arr[9]={"","LB","MB","UB","LB","MB","UB","SU","SL"};
        cin>>n;
        x=n%8;
        if(x==7)
        {
            cout<<n+1;
            cout<<arr[7]<<endl;
        }
        else if(x==0)
        {
            cout<<n-1;
            cout<<arr[8]<<endl;
        }
        else
        {
            if(x>3)
            {
                cout<<n-3;
                cout<<arr[x]<<endl;
            }
            else
            {
                cout<<n+3;
                cout<<arr[x]<<endl;
            }
        }
    }
};

int main()
{
    partner objname;
    objname.findpartner();
    return 0;
}
```

Sample Input

3

1

5

3

Sample Output

4LB

2MB

6UB

Result

Thus, Program " lomda " has been successfully executed

Q. TNEB Billing

Tamilnadu has received lot of complaints regarding electricity board billing process from the customers. So Tamilnadu government has ordered TNEB to automate the billing process to avoid fraud. So TNEB is looking for the developer to automate according to their need.

Do the following to satisfy the requirements of TNEB.

1. Create a new class named "Electric" which gets input details such as total number of customers, consumer name and units consumed.
2. Create a method "accept" with three parameters of type "int", "string" and "float" respectively.
3. Function declaration should be in the format of void Electric::print_bill()

Conditions:

- a) For first 100 units : 40p per unit
- b) For next 200 units : 50p per unit
- c) Beyond 300 units : 60p per unit

All users are charged a minimum of Rs.500. If the total cost is more than Rs.250.00 then an additional charges of 15% are added.

Refer Sample Testcases.

Source Code

```
#include <iostream>
using namespace std;
class Electric
{
    float unit;
    char name[20];
public:
    void accept()
    {
        cin>>name;
        cin>>unit;
    }
    void print_bill();
};

void Electric::print_bill()
{
    float bill=0;
    if(unit<=100)
        bill=(500+(unit*0.40));
    else if(unit>100&&unit<=300)
        bill=540+((unit-100)*.50);
    else if(unit>300)
        bill=640+((unit-300)*.60);
    if(bill>250)
        bill=(bill*(15/100));
    cout<<"In Consumer Name:"<<name;
    cout<<"In Consumed:"<<unit;
    cout<<"In Bill to pay:"<<bill;
}

int main()
{
    Electric e[10];
    int i,cnt;
    cin>>cnt;
    cout<<"In Number of Consumers:"<<cnt;
    for(i=0;i<cnt;i++)
        e[i].accept();
    for(i=0;i<cnt;i++)
        e[i].print_bill();
    return 0;
}
```

Sample Input

```
1
ramu
209
```

Sample Output

```
Number of Consumers:1
Consumer Name:ramu
Consumed:209
Bill to pay:594.5
```

Result

Thus, Program " TNEB Billing " has been successfully executed

Q. CRICBUZZ

International Cricket Council has ordered to BCCI to maintain the players history in one of the digital library.

So they are planning to create a software which keeps track player name and innings etc...

Can you help the BCCI to do this through Cricbuzz?

Mandatory:

- 1.Create a class "Cricket"
- 2.Create the following datamembers:
a)Playername,
b)JerseyNum,
c)No of Innings and
d)Counter
- 3.Create a PARAMETERIZED CONSTRUCTOR to initialize the values to the above data members.
- 4.Create a member function show() to display the details of the players history.
- 5.Create two objects lib1 and lib2. Assign values to the members using parameterized constructor.
Refer sample testcases..

Source Code

```
#include <iostream>
#include <string>
using namespace std;
class Cricket
{
public:
    string playername;
    int jerseynum;
    int no_of_innings;
    int counter;
    Cricket(int n,string c,int no)
    {
        jerseynum=n;
        no_of_innings=no;
        playername=c;
    }
    void show()
    {
        cout<<"Jersey Num:"<<jerseynum<<endl;
        cout<<"Name of the Player:"<<playername<<endl;
        cout<<"No of Innings Played:"<<no_of_innings<<endl;
    }
    void count()
    {
        cout<<counter;
    }
};

int main()
{
    int a,b,h,d;
    string e,f;
    cin>>a>>b>>c>>d;
    Cricket lib1(a,e,b);
    Cricket lib2(Cricket(h,f,a));
    lib1.show();
    lib2.show();
    return 0;
}
```

Sample Input

7 Dhoni 350

48 Raina 226

Sample Output

Jersey Num:7
Name of the Player:Dhoni
No of Innings Played:350
Jersey Num:48
Name of the Player:Raina
No of Innings Played:226

Result

Thus, Program " CRICBUZZ " has been successfully executed

Q. Complex Game

Rahul and Kuldeep plays a mathematical game with each other.

The game is all about complex numbers. Where they have to ask for real and imaginary part of two complex numbers, and display the real and imaginary parts of their sum.

Mandatory:

- 1.Create a class "Complex"
- 2.Create a CONSTRUCTOR to get the values of real and imaginary part of complex number.
- 3.Create a member function addcomplex() to add the real and imaginary values of complex number.
- 4.Create a member function displaycomplex() to display the result after addition.
- 5.Create an object as 'obj' for the class Complex. Call the member function addcomplex() and displaycomplex() using 'obj' from the main function.

Refer sample testcases..

Note:

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class complex
{
public:
    int r1,i1,r2,i2,r,i;
    complex()
    {
        cin>>r1>>i1>>r2>>i2;
    }
    void addcomplex()
    {
        r=r1+r2;
        i=i1+i2;
    }
    void displaycomplex()
    {
        cout<<r1<<"+"<<i1<<"i";
        cout<<"n"<<r2<<"+"<<i2<<"i";
        cout<<"n"<<r<<"+"<<i<<"i";
    }
};
int main()
{
    complex obj;
    obj.addcomplex();
    obj.displaycomplex();
    return 0;
}
```

Sample Input

```
10 5
5 3
```

Sample Output

```
10+5i
5+3i
15+8i
```

Result

Thus, Program " **Complex Game** " has been successfully executed

Q. Digital Library

Tamilnadu Educational Minister has ordered the Director of Higher education to make the Libraries in Government schools advanced.

So they are planning to create a software which keeps track of the books availability and respond to students request for books.

Can you help the government to do this?

Mandatory:

- 1.Create a class "library"
- 2.Create the following datamembers:
 a)name
 b)roll number
 c)book code and
 d)counter

- 3.Create a PARAMETERIZED CONSTRUCTOR to initialize the values to the above data members.

- 4.Create a member function show() to display the details of the book

- 5.Create a member function count() to display counter value.

- 6.Create two objects lib1 and lib2. Assign values to the members using parameterized constructor.

Note:

Use implicit method of call for first object and explicit method of call for second object and display the details using show function.

Let counter variable be a static member of the class.

Input Format:

The first line of the input must contain a single space separated roll number, name and book code.
The first line of the input is also a single space separated roll number, name and book code.

Both lines of input must be passed to parameterized constructor.

Output Format:

Print the details of both objects.

Refer sample testcases..

Note:

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
class library
{
public:
    char name[20];
    int roll;
    int book_code;
    static int counter;
    library(char n[],int r,int no)
    {
        strcpy(name,n);
        roll=r;
        book_code=no;
    }
    void show()
    {
        cout<<"\nRoll No."<<roll;
        cout<<"\nName of the Student:"<<name;
        cout<<"\nCode of Book Accessed:"<<book_code;
    }
    void count()
    {
        cout<<counter;
    }
};
int main()
{
    char name[20];
    int roll,no;
    cin>>roll>>name>>code;
    library lib1(name,roll,no,code);
    cin>>rollno>>name>>code;
    library lib2=library(name,rollno,code);
    lib1.show();
    lib2.show();
    return 0;
}
```

Sample Input

7 Dhoni 531
13 Raina 578

Sample Output

Roll No.7
Name of the Student:Dhoni
Code of Book Accessed:531
Roll No.13
Name of the Student:Raina
Code of Book Accessed:578

Result

Thus, Program " Digital Library " has been successfully executed

Q. RBI

RBI asked the Banks to move towards Core Banking where all the activities of the customers were reflected in all the branches in India.

But some of the banks are finding the transformation tough.

Can you help them to automate the bank process as per their requirements.

Mandatory:

1. Create a class named "Bank" with the following data members to represent bank account
"name" of type "string"
"accounttype" of type "string"
"ACCNO" of type "int"
"balance" of type "int"
2. Create a member function named "initial" of type "void" to get the initial details of the account such as name, account number, account type and balance.
3. Create a member function named "deposit" of type "void" to deal with the deposits in the account
4. Create a member function named "withdraw" of type "void" and do the following
If the requested amount is less than available balance print "Insufficient amount" else deduce the amount from the account and print the balance.
5. Create a member function named "disp" of type "void" to display name, account number, account type and account balance.
6. Access the member functions "initial", "deposit", "withdraw", "disp" using the object named "obj" in the main method.

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
class Bank{ private:
    char name[50];
    char accounttype[50];
    int acc;
    double balance;
public:
    void initial()
    { std::cin>>name>>acc>>accounttype>>balance; }
    void deposit()
    { float deposit;
        cin>>deposit;
        balance+=deposit;
    }
    void withdraw() { float withdraw;
        cin>>withdraw;
        if(withdraw>balance){ cout<<"Insufficient amount!\n";}
        else balance-=withdraw;
    }
    void disp() { cout<<"NAME="<<name<<"ACCNO="<<ACCNO<<"TYPE="<<accounttype<<"BALANCEAMOUNT="<<balance<<endl; }

};

int main(){float deposit,withdraw;
Bank obj;
obj.initial();
obj.deposit();
obj.withdraw();
obj.disp();
return 0;
}
```

Sample Input

```
Jack 435 SB 500
1500
200
```

Sample Output

```
NAME=Jack
ACCNO=435
TYPE=SB
BALANCEAMOUNT=1800
```

Result

Thus, Program " RBI " has been successfully executed

Q. Online Shopping

Create a class called `item` representing no. of items (int), item code (int) and price (float).

Also, define the following member functions.

`initialize()` of type void: to initialize no. of items and read item code and price.

`largest()` of type float: to find and return an item with largest price.

`sum()` of type float: to calculate and return the sum of prices of all items;

and

`displayItems()` of type void: to display all items with code and price.

Input:

The no. of items must be less than or equal to 10.

The first line of the input must contain the no. of items.

The subsequent lines must contain item code and price for each item.

Output:

The output must print the largest price among all items, the total price of all items and print all items with code and price.

Refer Sample Testcases

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class item{
public:
    int items;
    int itemCode[20];
    float price[20];
    void initialize(){
        cin >> items;
        int i;
        for(i=0;i<items;i++){
            cin >> itemCode[i] >> price[i];
        }
    }
    float largest(){
        int i;
        float largest=price[0];
        for(i=1;i<items;i++){
            if(price[i]>largest)
                largest = price[i];
        }
        return largest;
    }
    float sum(){
        float sum=0;
        int i;
        for(i=0;i<items;i++){
            sum+=price[i];
        }
        return sum;
    }
    void displayItems(){
        cout << "Code and Price" << endl;
        int i;
        for(i=0;i<items;i++){
            cout << itemCode[i] << " and " << price[i] << endl;
        }
    }
};

int main(){
    item l;
    l.initialize();
    cout << "Largest Price=" << l.largest() << endl;
    cout << "Sum of Prices=" << l.sum() << endl;
    l.displayItems();
    return 0;
}
```

Sample Input

```
5
101 23.60
107 45
112 67
190 93
110 456
```

Sample Output

```
Largest Price=456
Sum of Prices=654.6
Code and Price
101 and 23.6
107 and 45
112 and 67
190 and 93
110 and 456
```

Result

Thus, Program " Online Shopping " has been successfully executed

Q. Fill Water

Yash have to fill water in a box (cuboid) in shape.

Initialize Length,breadth,height to 0. Print the initial volume and then take input from the user the parameters of cuboid based on the values calculate the volume of the water in the cuboid and print it.

Use the Constructor Overloading Concept to develop to do this.

Mandatory:

1.Create a new class named "Box"

2.Create a constructor for the class "Box"

Box(double samevalue)

3.Create a function named "volume" of type double.

4.Create a object named "mybox1" and "mybox2" for the class "Box" in the main class "TestClass".

5.Access the "Box" class from the main class to print the initial volume and the newly calculated volume of water in cuboid.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Box
{
    double breadth,height,Length;
public:
    Box()
    {
        breadth=0;
        height=0;
        Length=0;
    }
    Box(double samevalue)
    {
        breadth=samevalue;
        height=samevalue;
        Length=samevalue;
    }
    double volume()
    {
        return
            breadth*height*Length;
    }
};

int main()
{
    Box mybox1;
    double a,vol;
    cout<<mybox1.volume()<<endl;
    //cout<<volume<<endl;
    cin>>a;
    Box mybox2(a);
    vol=mybox2.volume();
    cout<<vol;
    return 0;
}
```

Sample Input

12

Sample Output

0
1728

Result

Thus, Program " Fill Water " has been successfully executed

Q. Database Administrator

Dhiya have been given a task to manage student database which has student names.

Take input from user the student name and print it along with the default value "New Student" using Constructor Overloading Concept.

Mandatory:

- 1.Create a new class named "StudentData"
- 2.Create a constructor for the class "StudentData"
- 3.Create a variable name "stuName" to get the default string and also get the new name of the student from the user.
- 4.Create a object named "myobj" and "myobj2" for the class "StudentData" in the main class "TestClass".
- 5.Access the "StudentData" class from the main class to print the default name and the user inputted student name

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
class StudentData
{
    char stuName[50];
public:
    StudentData()
    {cout<<"Student Name is: New Student"<<endl;}
    StudentData(char*n)
    {strcpy(stuName,n);
     cout<<"Student Name is: "<<stuName;}
};

class TestClass
{char n[50];
public:
    TestClass()
    {StudentData myobj;
     cin>>n;
     StudentData myobj2(n);}

};

int main()
{
    TestClass t;
    return 0;
}
```

Sample Input

Harsh

Sample Output

Student Name is: New Student
Student Name is: Harsh

Result

Thus, Program " Database Administrator " has been successfully executed

Q. Profit of the Day

Vimal is the businessman who always keep track of his profits. So has given the task to his PA to calculate the percentage of profit by getting Income and the Expenses of the day and print the profit percentage. Make use of constructor overloading and initialize the default profit percentage to be 0 but don't display the default profit percentage.

Mandatory:

- 1.Create a new class named "profit"
- 2.Create a constructor for the class "profit" to initialize the profit (variable name should be "p") to 0.
- 3.Overload the constructor "profit" with two parameters income and expenses as follows.

profit(int income,int expenses)

Formula to calculate Profit Percentage:

Profit= (Income-expenses)/expenses*100;

- 4.Create a object named "share" for the class "profit" in the main class "TestClass".
- 5.Access the "profit" class from the main class to print the calculated percentage of profit.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <iomanip>
using namespace std;
class profit
{
public:
    float p;
    profit()
    {
        p = 0;
    }
    profit(int income,int expenses)
    {
        p=((float(income)/float(expenses))*100)-100;
        cout<<fixed<<setprecision(2)<<p<<"%";
    }
};
int main()
{
    int i,n;
    cin>>i>>n;
    profit share(i,n);
    return 0;
}
```

Sample Input

2800
1340

Sample Output

108.96%

Result

Thus, Program " Profit of the Day " has been successfully executed

Q. Hospital Bill

One of the famous politician was admitted in one of the famous hospital in chennai. Since the politician is one of the icon of the politics she has been given one of the best facilities available in the hospital.

The politician was admitted in the hospital for more than a month so hospital wanted to calculate the Bill for Rooms and Medicines every week.

Use Function Overloading to calculate the bills by taking into account the the expenses and number of days

Mandatory:

1.Create a class named "Hospital"

2.Create a function named "bill" under the class "Hospital" of type float with two parameter as "medicines" and "days" to get the total amount bill amount for medicines.

float bill(float medicines, float days)

3.Overload the "bill" function with "room" and "days" respectively to the bill amount for room.

Note: Name of the variables should be "room" and "days" of type int.

4.Create the objects "ob" for the "Hospital" class. Access the function "bill" using the object name from the main class to print the medicine and room expenses of the politician in the hospital for a week.

Refer Sample Test Cases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Hospital
{
public:
    int bill(int room,int days)
    {
        long tot;
        tot=room*days;
        return tot;
    }
    float bill(float medicines, float days)
    {
        long tot;
        tot=medicines*days;
        return tot;
    }
};
int main()
{
    Hospital ob;
    int medicines,rooms,days;
    cin>>medicines>>days>>rooms>>days;
    cout<<endl<<ob.bill(medicines,days);
    cout<<endl<<ob.bill(rooms,days);
    return 0;
}
```

Sample Input

```
5000
7
15000
7
```

Sample Output

```
35000
105000
```

Result

Thus, Program " Hospital Bill " has been successfully executed

Q. Business Man

Abilash is the businessman and he hates loss. So has given the task to his sales team to calculate the profit by getting Income and the Expenses and print the profit.

Make use of constructor overloading and initialize the default profit to be 0 but don't display the default profit.

Mandatory:

- 1.Create a new class named "profit"
- 2.Create a constructor for the class "profit"
- 3.profit(int income,int expenses)
- 4.Create a object named 's1' for the class "profit" in the main class "TestClass".
- 5.Access the "profit" class from the main class to print the calculated profit.

Initial Profit is zero.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class TestClass
{
public:
    class profit
    {
        int Income=0,Expenses;
    public:
        void In()
        {
            cin>>Income>>Expenses;
        }
        void Out()
        {
            cout<<Income-Expenses;
        }
        profit()
        {
            Income=0;
            Expenses=0;
        }
        profit(int income,int expenses)
        {
            Income=income;
            Expenses=expenses;
        }
    };
    int main()
    {
        TestClass :: profit s1(0,0);
        s1.in();
        s1.out();
        return 0;
    }
}
```

Sample Input

42500
11650

Sample Output

30850

Result

Thus, Program " Business Man " has been successfully executed

Q. Store Keeper

Store Keeper of Super market is finding it difficult to keep track of the stocks in the shop.

So he wants a automated script which pick the total nuber of consumed items from each category and calculate the remaining stock and print those details so that store keeper can order for those items.

You should use function overloading concept to do it.

Mandatory:

1.Create a class named "Store"

2.Create a function named "itemcount" under the class "Store" of type int with one parameter as "id"to get the id of the item.

3.Overload the "itemcount" function with "totalavl" and "consumed" respectively to get the total purchased item count and total number of items sold.

Note:Name of the variables should be "totalavl" and "consumed"

3.Create the objects "ob" for the "Store" class.Access the method "itemcount" using the object name from the main class to display the remaining count of items in the store.

Refer Sample Test Cases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Store
{
public:
int itemcount(int id)
{
cout<<id;
}
int itemcount(int totalavl,int remaining)
{
int a;
a=totalavl-remaining;
cout<<"\n"<<a;
}
};
int main()
{
int a,b,id;
cin>>id>>a>>b;
Store ob;
ob.itemcount(id);
ob.itemcount(a,b);
return 0;
}
```

Sample Input

```
2021
125
67
```

Sample Output

```
2021
58
```

Result

Thus, Program " **Store Keeper** " has been successfully executed

Q. Limka Book of Records

Limka Book of Records has an online application facility for the public to register themselves and apply for the specific achievement which will be taken into account for the entry in to the Limka Book of Records. In their official website, once the user has registered themselves successfully it has to show the welcome message "Hi" followed by his/her "First Name". Similarly the when the user login into his account it has to show "Welcome" followed by "First name and Last name".

You should use function overloading concept to do it.

Mandatory:

- 1.Create a class named "Welcomemsg"
- 2.Create a function named "msg" under the class "Welcomemsg" of type char array with one parameter as "fstname" to first name of the user.
- 3.Overload the "msg" function with "fstname" and "Istname" of type char with two arguments respectively to get the first name and last name respectively.

Note: Name of the variables should be "fstname" and "Istname" and the dimensions of the array should be 100.

4.Use 'first_name1', 'first_name2' and 'last_name2' variables of type character array to read the inputs. Create the objects "ob" for the "Welcomemsg" class. Access the function "msg" using the object name from the main class to display the welcome message.

Refer Sample Test Cases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Welcomemsg
{
public:
char msg(char fstname[100])
{
cout<<"Hi "<<fstname<<endl;
return 0;
}
char msg(char fstname[100],char Istname[100])
{
cout<<"Welcome "<<fstname<<" "<<Istname<<endl;
return 0;
}
};
int main()
{
Welcomemsg ob;
char first_name1[100],first_name2[100],last_name2[100];
cin>>first_name1>>first_name2>>last_name2;
ob.msg(first_name1);
ob.msg(first_name2,last_name2);
return 0;
}
```

Sample Input

```
Mahendra
MahendraSingh
Dhoni
```

Sample Output

```
Hi Mahendra
Welcome MahendraSingh Dhoni
```

Result

Thus, Program " Limka Book of Records " has been successfully executed

Q. SRM Admission

Admission for the current Academic year is happening in SRM University. Once the Students got admitted they are assigned a unique Registration Number.

Admission in charge used to assign give these details in some order. But during enrollment of the student there is a specific order need to be followed.

So your task is to get the name and registration number of the student from admission in charge and to convert it to the correct format.

You should use function overloading concept to do it.

Mandatory:

1. Create a class named "Student"

2. Create a function named "Identity" under the class "student" of type void with two parameters "name" and "id". The function "identity" should accept the name and id values in any order and convert it to correct order.

Note: Name of the variables should be "name" and "id" and the dimension of character array should be 100.

3. Create the objects "s1" for the "Student" class. Access the function using the object name from the main class to print the student details in correct order.

Refer Sample Test Cases.

Programming language need to be used: C++

Source Code

```
#include <iostream>
using namespace std;
class student
{
public:
void Identity(char name[100],int id)
{
cout<<name<<" "<<id<<endl;
}
void Identity(int id,char name[100])
{
cout<<name<<" "<<id<<endl;
}
};
int main()
{
char name[100];
int id;
cin>>name>>id;
student s1;
s1.Identity(name,id);
cin>>id>>name;
s1.Identity(id,name);
return 0;
}
```

Sample Input

```
Harsh
1930405078
1930405079
Amit
```

Sample Output

```
Harsh 1930405078
Amit 1930405079
```

Result

Thus, Program "**SRM Admission**" has been successfully executed

Q. Efficiency of Car

Create a class called Car with the following private data members / member variables, startMiles, endMiles, litres (All of type float).
 startMiles corresponds to the starting odometer reading, endMiles corresponds to the ending odometer reading and litres correspond to the amount of diesel consumed or used between the 2 readings.

Include the following public member functions or methods:

```
initializeData() that accepts 3 arguments and its return type is void. This function is used to set the values for startMiles, endMiles and litres. The arguments are passed to this function in the same order.  

getstartMiles()--> to return startMiles  

getEndMiles()--> to return endMiles  

getLitres()--> to return litres  

calculateMPL()--> to calculate and return the miles traveled per litre.
```

isEconomyCar()--> returns true if the MPL is greater than 18 and false otherwise.

In the main method, create an object named "obj" of type Car and invoke the corresponding methods.

Input Format:

start miles End Miles Litres

Output Format:

```
LINE 1: call method startMiles()  

LINE 2: call method endMiles()  

LINE 3: call method per litre()
```

```
LINE 4: call class method car economical()
```

Refer Sample TestCases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Car
{
public:
    float startMiles,endMiles,litres;
    int perlitre;
    void initializeData(float s,float e,float l)
    {
        cin>>startMiles>>endMiles>>litres;
    }
    float getstartMiles()
    {
        return startMiles;
    }
    float getEndMiles()
    {
        return endMiles;
    }
    float getLitres()
    {
        return litres;
    }
    double calculateMPL()
    {
        perlitre = (endMiles-startMiles)/litres;
        return perlitre;
    }
    string isEconomyCar()
    {
        if(perlitre>18)
            return "true";
        else if(perlitre<18)
            return "false";
        else
            return "improper readings";
    }
};

int main()
{
    Car obj;
    float a,b,c;
    obj.startMiles;
    obj.endMiles;
    obj.litres;
    obj.perlitre;
    obj.initializeData(a,b,c);
    if(obj.calculateMPL()>=0)
    {
        cout<<obj.getstartMiles()<<endl;
        cout<<obj.getEndMiles()<<endl;
        cout<<obj.calculateMPL()<<endl;
        cout<<obj.getLitres()<<endl;
        cout<<obj.isEconomyCar()<<endl;
    }
    else
        cout<<"improper readings"<<endl;
    return 0;
}
```

Sample Input

100 300 10

Sample Output

100
300
20
10
true

Result

Thus, Program " Efficiency of Car " has been successfully executed

Q. Anti-Proxy Attendance

Faculty in SRM University has a tedious task of taking attendance where students do all the tricks to put proxy.

So Faculty advisor of the students decided to make the attendance marking process simple using constructor overloading.

What faculty advisor wants from you is to develop a code using constructor overloading that by Default prints "No Attendance" when no parameters are passed and Hello followed by name when name is passed as parameter.

Mandatory:

- 1.Create a new class named "Student"
- 2.Create a variable "name" to get the name of the student.
- 3.Create a constructor for the class "Student" with parameter char array (name) and without parameter.
- 4.Create a object named "stdabs" and "stdpst" for the class "Student" in the main method.
- 5.Access the "Student" class from the main class using "stdabs" and "stdpst" object to print "No Attendance" and "Hello followed by name" respectively.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
class Student
{
    char stuname[20];
public:
    Student()
    {
        cout<<"No Attendance";
    }
    Student(char name[])
    {
        strcpy(stuname,name);
    }
    void display()
    {
        cout<<"nHello "<<stuname<<endl;
    }
};
int main()
{
    Student stdabs;
    char name[20];
    cin>>name;
    Student stdpst(name);
    stdpst.display();
    return 0;
}
```

Sample Input

Ranveer

Sample Output

No Attendance
Hello Ranveer

Result

Thus, Program " Anti-Proxy Attendance " has been successfully executed

Q. Compare Distance

Ashu is supposed to compare distances but he is to lazy to use the relational operators so many times.
So,he plans to overload the <(less than) operator,can you help min to complete his task?

Input:

First Line contains First Distance(Feet and Inches separated by space)

Second Line contains Second Distance(Feet and Inches separated by space)

Mandatory:

- 1.Create a class Distance(feet,inches)
- 2.Overload operator < to perform all three actions of greater than,less than and equal to.
- 3.Create a method named "displayDistance" to display the result.

Refer Sample test cases.

Programming language need to be used:C++

Source Code

```
#include<iostream>
using namespace std;
class Distance
{
public:
    int feet,inches,feet2,inch2;
    void displayDistance()
    {
        cin>>feet>>inches>>feet2>>inch2;
    }
    void operator <(int b)
    {
        if(feet>feet2)
            cout<<"First One is Greater";
        else if(feet==feet2 && inches>inch2)
            cout<<"First One is Greater";
        else if(feet<feet2)
            cout<<"Second One is Greater";
        else if(feet==feet2 && inches<inch2)
            cout<<"Second One is Greater";
        else
            cout<<"Both are equal";
    }
};
int main()
{
    Distance d;
    d.displayDistance();
    int a=3;
    d.operator <(a);
    return 0;
}
```

Sample Input

```
10 13
10 16
```

Sample Output

```
Second One is Greater
```

Result

Thus, Program "**Compare Distance**" has been successfully executed

Q. Travel

When we travel positive distance means travelling forward and negative means travelling backwards.

Your task is to overload the unary + and unary - operator to display the same.

Mandatory:

- 1.Create a class Distance(feet,inches)
- 2.Overload operator + to calculate distance traveled backwards
- 3.Overload operator + to calculate distance traveled forward
- 4.Create a method named "displayDistance" to display the traveled distance.

Input
First Line contains Distance/Feet and Inches separated by space)

Refer Sample test cases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;

class Distance {
public:
    int feet;
    int inches;
public:
    Distance(){
        feet = 0;
        inches = 0;
    }
    Distance(int f, int i){
        feet = f;
        inches = i;
    }
    // method to display distance
    void displayDistance() {
        cout << "Feet=" << feet << " Inches=" << inches << endl;
    }
    // overloaded minus (-) operator
    Distance operator - () {
        cout << "Travelling Backwards\n";
        return Distance(-feet, -inches);
    }
    Distance operator + () {
        cout << "Travelling Forward\n";
        return Distance(feet, inches);
    }
};

int main() {
    int m,n;
    cin>>m>>n;
    Distance D1(m,n);
    +D1;
    D1.displayDistance();
    -D1;
    D1.displayDistance();
    return 0;
}
```

Sample Input

10
19

Sample Output

Travelling Forward
Feet=10 Inches=19
Travelling Backwards
Feet=10 Inches=19

Result

Thus, Program " Travel " has been successfully executed

Q. First Day of College

On the first day of the college ,three students named P,Q,R who were strangers wanted to know each other's addresses .

Being mathematical students,P and Q said their house addresses in the form of vector numbers which represents directions, of the form $(ai+bj+cz)$ house can be obtained by adding the directions of P and Q.help them in finding the directions of R using operator overloading;

Hints:

1. Create class named "vector"
2. Define a class with 3 vars namely x,y,z;
3. Read the 3 directions and finally print the address of R.
4. overload + operator (as vector operator+(vector b)()) inside the same class and return the result.

Refer sample test cases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class vector
{
private:
int x,y,z;
public:
vector()
{
    cin>>x>>y>>z;
}
vector operator+(vector b)
{
    vector temp;
    temp.x=x+b.x;
    temp.y=y+b.y;
    temp.z=z+b.z;
    cout<<"Sum="<<temp.x<<"i+"<<temp.y<<"j+"<<temp.z<<"z"<<endl;
}
};
int main()
{
    vector a,b,c;
    c=a+b;
    return 0;
}
```

Sample Input

```
2 4 6
1 4 5
```

Sample Output

```
Sum=3i+8j+11z
```

Result

Thus, Program " **First Day of College** " has been successfully executed

Q. Savings

A Savings calculator can help you understand how long it will take to save a specific amount, or how much you need to save to have enough by a particular date. Total Savings is calculated by subtracting expenditure from salary and then adding it to the initial savings.

Mandatory:

1.Create a class Money which takes both rupees and Paise as members of class.

2.Calculate the savings by overloading + operator and - operator for the class Money.

Money operator +(Money o)

Money operator -(Money o)

Input Format:

First Line contains the initial Savings (both Rupees and paise separated by space)

Second Line contains the Salary in a month (both Rupees and paise separated by space)

Third Line contains the expenditure in a month (both Rupees and paise separated by space)

Refer Sample testcases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Money
{
private:
    int rupees,Paise;
public:
    Money()
    {
        cin>>rupees>>Paise;
    }
    Money operator +(Money o)
    {
        Money temp;
        temp.rupees=rupees+o.rupees;
        temp.Paise=Paise+o.Paise;
        return temp;
    }
    Money operator -(Money o)
    {
        Money temp;
        temp.rupees=rupees-o.rupees;
        temp.Paise=Paise-o.Paise;
        return temp;
    }
    void display()
    {
        cout<<"Rs=<<rupees<<" and "<<Paise<<" Paise*<<endl;
    }
};

int main()
{
    Money M1,M2,M3,M4,M5;
    M4=M2-M3;
    M5=M1+M4;
    M5.display();
    return 0;
}
```

Sample Input

```
10000 25
5000 75
2000 25
```

Sample Output

```
Rs=13000 and 75 Paise
```

Result

Thus, Program " Savings " has been successfully executed

Q. Concatenate

Your task is to Concatenate two given strings using Overloading + operator.

Mandatory:

1. Create the class name as "concatenate".
2. Declare public data member and define the variable.
3. Using the function read() to get the input string.
4. Define the functions "operator +" and access the looping to concatenate the strings.
5. Create an object named "obj" for the concatenate class.
6. Access the function read() using the object of concatenate class and print the result in main method.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class concatenate
{
    char a[100],b[100];
public:
    void read()
    {
        cin>>a>>b;
    }
    void operator }()
    {
        cout<<a<<b;
    }
};
int main()
{
    concatenate obj;
    obj.read();
    obj.operator ();
    return 0;
}
```

Sample Input

Happy
Programming

Sample Output

HappyProgramming

Result

Thus, Program " **Concatenate** " has been successfully executed

Q. Unary

Your task is to change the sign of a given data object by overloading unary operator.

Mandatory:

1. Create the class name as "data".
2. Declare public data member function and define the variable.
3. Using the function `setdata()` to get the two numbers.
4. Create an object named "obj" for the data class.
5. Access the function `setdata()` using the object of data class and print the result in main method.

Refer Sample Testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class data
{
public:
    int a;
    void setdata()
    {
        cout<<a;
    }
    void operator -( )
    {
        int count=0;
        for(int i=1;i<=4;i++)
        {
            cin>>a;
            if(a>0)
            {
                cout<<-a;
                count++;
                if(count%2!=0)
                    cout<<" ";
                else if(count%2==0)
                    cout<<"\n";
            }
            else
            {
                cout<<a;
                count++;
                if(count%2!=0)
                    cout<<" ";
                else if(count%2==0)
                    cout<<"\n";
            }
        }
    }
};

int main()
{
    data obj;
    obj.setdata();
    obj.operator -();
    return 0;
}
```

Sample Input

```
10 20  
8 20
```

Sample Output

```
-10 -20  
-8 -20
```

Result

Thus, Program " Unary " has been successfully executed

Q. Decimal Decrement

Your task is to overload the prefix decrement operator `--` to decrement the digit after decimal.

Mandatory:

1. Create a class named as "Decimal"
2. Declare the public data member and define the member variable.
3. Use the function named as "operator `--()`" of void type to increase the decimal value.
4. Create an object named "obj" for the Decimal class.
5. Access the function "operator `--()`" using the object of Decimal class and print the result in main method.

Refer Sample test cases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Decimal
{
    float a;
public:
    void in()
    {
        cin>>a;
    }
    void operator --()
    {
        a=a-0.10;
        cout<<a;
    }
};
int main()
{
    Decimal obj;
    obj.in();
    obj.operator --();
    return 0;
}
```

Sample Input

17.8

Sample Output

17.7

Result

Thus, Program " **Decimal Decrement** " has been successfully executed

Q. Prefix Increment

Your task is to Implement Prefix Increment operator using `++` Operator Overloading

Mandatory:

1. Create the class name as "increment".
2. Declare public data member and define the variable of type double.
3. Using the function `getx()` to get the input values.
4. Define the function named as "increment::operator `++()`" of void type to increment the values of input.
5. Create an object named "obj" for the increment class.
6. Access the function `getx()` using the object of increment class and print the result in main method.

Refer Sample Test Cases

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class increment
{
public:
float a,b,c;
void getx()
{
cin>>a>>b>>c;
}
void operator ++();
};

void increment::operator ++
{
a=a+1.0;
b=b+1.0;
c=c+1.0;
cout<<a<<" "<<b<<" "<<c;
}

int main()
{
increment obj;
obj.getx();
obj.operator ++();
return 0;
}
```

Sample Input

10 5.5 18

Sample Output

11 6.5 19

Result

Thus, Program " **Prefix Increment** " has been successfully executed

Q. Play with Fraction

Your task is to perform addition of fraction(normalization is not required) by overloading the + operator.

Create a class Fraction with two variables numerator and denominator.

Input Method:

Line 1: First line consists of the first fraction with numerator and denominator separated by space.

Line 2: Second line consists of the second fraction with numerator and denominator separated by space.

Mandatory:

1. Create a class named as "Fraction".
2. Declare the public data member and define member variable.
3. Using the "operator+" of Fraction class to perform the addition of fraction.
4. Create an object named "obj" for the Fraction class.
5. Access the operator of Fraction class and print the result in main method.

Refer Sample testcases.

Programming languages need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Fraction
{
public:
    int numerator,denominator;
    Fraction()
    {
        numerator=0;
        denominator=0;
    }
    void getinput()
    {
        cin>>numerator>>denominator;
    }
    Fraction operator+(Fraction ob)
    {
        Fraction temp;
        temp.numerator=(numerator*ob.denominator)+(denominator*ob.numerator);
        temp.denominator=denominator*ob.denominator;
        return temp;
    }
};

int main()
{
    Fraction f1,f2,add;
    f1.getinput();
    f2.getinput();
    //+obj;
    add=f1+f2;
    cout<<add.numerator<<"+"<<add.denominator;
    // add.output();
}

return 0;
}
```

Sample Input

6 3
8 4

Sample Output

48/12

Result

Thus, Program " Play with Fraction " has been successfully executed

Q. Copy

Your task is to overload the == operator to perform copying of a string from one to another.

For example, if the string is "C programming" and copied string is the same.

Mandatory:

1. Create a class name as "mystring"
2. Declare the public and private data member function and define the member variable.
3. Use the function as "operator ==" to copy the string.
4. Create an object named "obj" for the "mystring" class.
5. Access the overloaded function using the object of "mystring" class and print the result in main method.

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
class mystring
{
    char a[100];
public:
    char b[100];
    void getdata()
    {
        cin>>a;
    }
    void operator ==(int c)
    {
        strcpy(b,a);
    }
};
int main()
{
    mystring obj;
    obj.getdata();
    int a=3;
    obj.operator ==(a);
    cout<<"Copied String is."<<obj.b;
    return 0;
}
```

Sample Input

Dhoni

Sample Output

Copied String is:Dhoni

Result

Thus, Program " Copy " has been successfully executed

Q. Counselling

In an application entry slip the admission cell of Educational Institute seeks basic details.

In which dad has to tell his name, mother name also his son's counselling cut off marks.

Display all the details using sub class object by Interface Concept.

Note:

1. Create a class named "Student" and declare methods `getDetails()` and `displayDetails()` of void return type and has no arguments
2. Create a class "StudentDetails" that implement "Student" interface and the methods of the interfaces
3. Create instance in the main class for "StudentDetails" as "sd" that invokes the methods in the "StudentDetails" class

Source Code

```
#include <iostream>
using namespace std;
class Student
{
public:
    virtual void getDetails()=0;
    virtual void displayDetails()=0;
};
class StudentDetails:public Student{
    string fname,mname;
    float num;
public:
    void getDetails(){
        cin>>fname>>mname>>num;
    }
    void displayDetails(){
        cout<<fname<<endl<<mname<<endl<<num<<endl;
    }
};
int main(){
    StudentDetails sd;
    sd.getDetails();
    sd.displayDetails();
    return 0;
}
```

Sample Input

Jayaraman
Vani
193.45

Sample Output

Jayaraman
Vani
193.45

Result

Thus, Program " **Counselling** " has been successfully executed

Course: OOPS

Session: Inheritance

Timestamp: 2021-4-1 12:31:01

Register Number: RA2031241010065

Q. Bank

Develop a program to find the interest.

Interest rate=12, year=3.Create three classes "Bank", "Customer", "Account", "Bank" and "Customer" classes are parent class to the Account.

Use multiple inheritance concept.

Ex: class Account{public Customer,public Bank
Refer sample input and output.

Source Code

```
#include <iostream>
#include <math.h>
using namespace std;
class Customer {
public:
    char s[100];
public:
void display()
{
    cin>>s;
}
};

class Bank{
public:
long num1, num2, num3;
void display()
{
    cin>>num1>>num2>>num3;
}
};

class Account{public Customer,public Bank
{
public:
char s[100];
long num1,num2,num3;
void display()
{
    cin>>s;
    cin>>num1>>num2>>num3;
    cout<<"Customer Name="<<s<<endl;
    cout<<"Customer Id="<<num1<<endl;
    cout<<"Account No="<<num2<<endl;
    cout<<"Account Balance="<<num3<<endl;
    //Interest Calc
    double y=num3;
    y=(floor(y*100)+0.5)/100;
    y=y*12*3;
    int interest={int}y;
    print("Interest=%d", interest/100);
}
};

int main()
{
    Account user;
    user.display();
}
```

Sample Input

```
shiva
12345
456789012
100000
100000
```

Sample Output

```
Customer Name=shiva
Customer Id=12345
Account No=456789012
Account Balance=100000
Interest=36000
```

Result

Thus, Program " Bank " has been successfully executed

Q. Percentage of Student

Illustration of Multiple Inheritance

Mandatory:

1. Create a base class named "AddData"
2. Create and define the member function "accept_details()" to get the marks of the student
3. Create another class named "Total" derived from "AddData" . class Total : public AddData
4. Create and define the member function named "total_of_three_subjects()" to calculate and store the total of all the subject marks.
5. Create the class named "Percentage" derived from "Total" . class Percentage : public Total
6. Create and define the member function named "calculate_percentage()" to calculate the percentage of the student.
7. Create and define the member function named "show_result()" to display the percentage of the student.
8. Declare the object for the derived class "Percentage" named "p" and call the following functions from the main method.
accept_details(),total_of_three_subjects(),calculate_percentage(),show_result()

Source Code

```
#include <iostream>
using namespace std;
class AddData
{
public:
    int mark1,mark2;
    void accept_details()
    {
        cin>>mark1>>mark2;
    }
    class sports
    {
public:
    int mark3;
    void get()
    {
        cin>>mark3;
    }
};
class Total : public AddData,public sports
{
public:
    int d;
    void total_of_three_subjects()
    {
        d=(mark1+mark2+mark3)/3;
    }
};

class Percentage : public Total
{
public:
    int e;
    void calculate_percentage()
    {
        e=(mark1+mark2+mark3)/3;
    }
    void show_result()
    {
        cout<<e;
    }
};

int main()
{
    Percentage p;
    p.accept_details();
    p.get();
    p.total_of_three_subjects();
    p.calculate_percentage();
    p.show_result();
    return 0;
}
```

Sample Input

79 81 99

Sample Output

86

Result

Thus, Program " Percentage of Student " has been successfully executed

Q. Rectangle

Mandatory:

1. Create two public classes named "Area" and "Perimeter"
2. Create a member function named "getArea" of type int with two parameters length and breath
3. Create a member function named "getPerimeter" of type int with two parameters length and breath
4. Create a class named "Rectangle" and inherit the Area and Perimeter class.
5. Pass the length and breath values of the rectangle as the parameters to getArea and getPerimeter functions of the Area and Perimeter classes respectively and calculate the area and perimeter of the rectangle.
6. Create an object named "rt" for rectangle class and access the area and perimeter class from main method to print the result.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Area
{
public:
    int getArea(int l,int h);
};

int Area::getArea(int l,int h)
{
    return l*h;
}

class Perimeter
{
public:
    int getPerimeter(int x,int y)
    {
        return 2*(x+y);
    }
};

class Rectangle:public Area,public Perimeter
{

};

int main()
{
    int l,b;
    Rectangle rt;
    cin>>l>>b;

    cout<<rt.getArea(l,b)<<endl;
    cout<<rt.getPerimeter(l,b);
    return 0;
}
```

Sample Input

5 4

Sample Output

20
18

Result

Thus, Program " Rectangle " has been successfully executed

Q. Payslip Generation

Vasu has a home, she needs to find the perimeter of the same.
(Hint: Class C1 gets length and breadth as input which is used by class C2 derived from C1.
C2 calculates perimeter of the house)

Refer sample Testcases:

Source Code

```
#include<iostream>
using namespace std;
class c1
{
public:
int length, breadth;
c1()
{
cin>>length>>breadth;
}

};

class c2:public c1
{
public:
void area(int length,int breadth)
{
cout<<2*(length+breadth);
}
};

int main()
{
c2 one;
one.area(one.length,one.breadth);

return 0;
}
```

Sample Input

```
10
20
```

Sample Output

```
60
```

Result

Thus, Program " Payslip Generation " has been successfully executed

Q. Multilevel Inheritance for Student Marklist

You are given two classes, Student and Grade, where Student is the base class and Grade is the derived class.

Completed code for Student and stub code for Grade are provided for you in the editor. Note that Grade inherits all the properties of Student.

Complete the Grade class by writing a class constructor (Grade(String,int,int)) and a char calculate() method.

The calculate method should return the character representative of a Student's "Grade".

The display function must print the result of the student

Score as defined in this chart:

40 <= score < 50	D
50 <= score < 60	C
60 <= score < 70	B
70 <= score < 100	A

Input Format

Input is already handled for you by the code pre-filled in the editor.

There are 4 lines of input containing first name, last name, phone, and score, respectively.

Constraints

4â‰¤|first name|.|last name|â‰¤10

phone contains exactly 7 digits

1â‰¤scoreâ‰¤100

Output Format:

Output is already handled for you by the code pre-filled in the editor.

Your output will be correct if your Grade class constructor and calculate method are properly written.

Refer Sample Test Cases

Source Code

```
#include <iostream>
#include <csdio>
#include <vector>
#include <cmath>
#include <algorithm>
using namespace std;
class Student{
private:
    string firstName;
    string lastName;
    int phone;
public:Student(string fname,string lname,int p){
    firstName=fname;
    lastName=lastName;
    phone=p;
}
void display(){
cout<<"First Name: "<<firstName<<"\nLast Name: "<<lastName<<"\nPhone: "<<phone;
}
};

class Grade:public Student{
private:
    int score;
public:
Grade(string fname,string lname,int score):Student(fname,lname,phone){
    this->score=score;
}
char calculate(){
char ch;
if(this->score<40) return 'D';
else if(this->score>=40&&this->score<60)ch='C';
else if(this->score>=60&&this->score<75)ch='B';
else if(this->score>=75&&this->score<90)ch='A';
else if(this->score>=90&&this->score<100)ch='O';
return ch;
}
};

int main(){
string firstName,lastName;
int score,phone;
cin>>firstName;
cin>>lastName;
cin>>phone;
cin>>score;
Student* stu=new Grade(firstName,lastName,phone,score);
stu->display();
Grade *g=(Grade *)stu;
cout<<"\nGrade: "<<g->calculate();
return 0;
}
```

Sample Input

```
siva
ips
1234567890
100
```

Sample Output

```
First Name: siva
Last Name: ips
Phone: 1234567890
Grade: O
```

Result

Thus, Program " Multilevel Inheritance for Student Marklist " has been successfully executed

Course: OOPS **Session:** Inheritance **Timestamp:** 2021-4-1 12:31:58

Register Number: RA2031241010065

Q. Bio

Develop a program that get the details that roll number, mark1 and mark2 in class student and get the mark3 in class sports.

Create new class statement and inherit the properties from student and sports class.

Display details of rollno, mark1, mark2, mark3 from statement class.

Mandatory class declarations are "class student", "class sports" , "class statement : public student, public sports"

Refer Sample Testcases

Source Code

```
#include <iostream>
using namespace std;
class student
{
public:
    int rollno,mark1,mark2;
    void get()
    {
        cin>>rollno>>mark1>>mark2;
    }
};

class sports
{
public:
    int mark3;
    void getagain()
    {
        cin>>mark3;
    }
};

class statement:public student,public sports
{
public:
    void display()
    {
        cout<<"Roll No."<<rollno<<endl;
        cout<<"Total:"<<mark1+mark2+mark3<<endl;
        cout<<"Average:"<<(mark1+mark2+mark3)/3<<endl;
    }
};

int main()
{
    statement obj;
    obj.get();
    obj.getagain();
    obj.display();
    return 0;
}
```

Sample Input

100
80
90
88

Sample Output

Roll No:100
Total:258
Average:86

Result

Thus, Program " Bio " has been successfully executed

Q. Examination

Develop a cpp program for implementing Hybrid inheritance concept:

Mandatory: create a class name as "A" which has one integer variable.

Create class "B" which is derived from "A" and it has one function name "B" for getting first value for class A data member variable. create another class "C" which has "C" function to get second value.

Class "D" derived from class B and class C , use "sum" function to sum that two values and print the result. class name and fuction name should be use as mentioned above.

Refer Sample Testcases

Source Code

```
#include <iostream>
using namespace std;
class A
{
public:
int x;
};
class B:public A
{
public:
B()
{
cin>>x;
}
};
class C
{
public:
int y;
C()
{
cin>>y;
}
};
class D:public B,public C
{
public:
void sum()
{
int sum;
sum=x+y;
cout<<"Sum= "<<sum<<endl;
}
};
int main()
{
D obj;
obj.sum();
return 0;
}
```

Sample Input

199 213

Sample Output

Sum= 412

Result

Thus, Program " **Examination** " has been successfully executed

Q. Programmer Information

Illustration of Multiple Inheritance

Mandatory:

1. Create a base class named "person"
2. Create and define the member function "getdata()" and "display" of type void to get the information of the person such as name,age,gender and to display it.
3. Create another class named 'employee' derived from "person"-class employee: public person
4. Create and define the member function "getdata()" and "display" of type void to get the information of the employee such as name of the company,salary and to display it.
5. Create the class named "programmer" derived from "employee" class-class employee: public person
6. Create and define the member function "getdata()" and "display" of type void to get the number of programming languages known as input and to display it.
7. Declare the object for the derived class "programmer" named "p" and call the following functions from the main method.

getdata() and display()

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class person
{
public:
    int age;
    char name[20];
    char gender[10];
};

void getdata()
{
    cin>>name;
    cin>>age;
    cin>>gender;
}

void display()
{
    cout<<"Name: "<<name<<endl;
    cout<<"Age: "<<age<<endl;
    cout<<"Gender: "<<gender<<endl;
}

class employee:public person
{
public:
    char n[10];
    int salary;
};

void getdata()
{
    cin>>n;
    cin>>salary;
}

void display()
{
    cout<<"Name of Company: "<<n<<endl;
    cout<<"Salary: Rs."<<salary<<endl;
}

class programmer:public employee
{
public:
    int pl;
};

void getdata()
{
    cin>>pl;
}

void display()
{
    cout<<"Number of programming language known: "<<pl<<endl;
}

int main()
{
    person obj1;
    employee obj2;
    programmer obj3;
    obj1.getdata();
    obj1.display();
    obj2.getdata();
    obj2.display();
    obj3.getdata();
    obj3.display();
    return 0;
}
```

Sample Input

Arun
21
Male
CTS
15000
3

Sample Output

Name: Arun
Age: 21
Gender: Male
Name of Company: CTS
Salary: Rs.15000
Number of programming language known: 3

Result

Thus, Program "Programmer Information " has been successfully executed

Course: OOPS

Session: Inheritance

Timestamp: 2021-4-1 12:32:36

Register Number: RA2031241010065

Q. Payroll

Develop a Payroll application using Single Level Inheritance

Hint:

1. Create a class "SingleInheritance" and do the following in the data-members and method

Data members

a. name and gender of type String

b. salary and age of type integer

Method:

Method name = getDetails

Get the input from user such as: name, gender, age and salary.

2. Inherit a ~~class~~ from "SingleInheritance" class

Method name = getDetails

Display the output to user such as: name, gender, age and salary.

3. Create instance for "Inheritedclass" as "tc" and access the getDetails() and display() methods.

Refer Sample Testcases

Source Code

```
#include <iostream>
using namespace std;
class SingleInheritance{
public:
    string name, gender;
    int salary, age;
    void getDetails(){
        cin >> name >> gender >> age >> salary;
    }
};

class Inheritedclass public SingleInheritance{
public:
    void display(){
        cout << "Name=" << name << "Gender=" << gender << "Age=" << age << "Salary=" << salary << endl;
    }
};

int main(){
    Inheritedclass tc;
    tc.getDetails();
    tc.display();
    return 0;
}
```

Sample Input

```
Bogar
Male
2000
12000
```

Sample Output

```
Name=Bogar
Gender=Male
Age=2000
Salary=12000
```

Result

Thus, Program " Payroll " has been successfully executed

Course: OOPS **Session:** Abstract Class Virtual Function and Friend Function

Timestamp: 2021-4-1
12:32:49

Register Number:
RA2031241010065

Q. Measure the Area

Mahesh the First year engineering student is interested in finding the Area of the rectangle. But he has only length and breadth of the rectangle and don't know how to calculate the Area of the rectangle.
Can you help him ?

Mandatory:

- 1.Create a class named "Shape"
- 2.Create a virtual function named "getArea" of type int.
- 3.Create a class Rectangle derived from class "Shape"---(class Rectangle:public Shape)
- 4.Invoke the virtual function getArea() from the rectangle class to calculate the area of rectangle.
- 5.Display the result in the main method.

Refer sample testcases.

Programming language need to be used is :C++

Source Code

```
#include <iostream>
using namespace std;
class Shape
{
protected:
    double x,y;
public:
    void set_dim(double l, double j=0)
    {
        x=l;
        y=j;
    }
    virtual int getArea()=0;
};
class Rectangle:public Shape
{
public:
    int getArea()
    {
        cout<<"Area of Rectangle is:"<<x*y<<"\n";
    }
};

main(void)
{
    Shape*p;
    Rectangle r;
    int l,b;
    cin>>l>>b;
    p = &r;
    p->set_dim(l,b);
    p->getArea();
    return 0;
}
```

Sample Input

6

12

Sample Output

Area of Rectangle is:72

Result

Thus, Program " Measure the Area " has been successfully executed

Q. Jadeja and Googly

Ravindra jadeja one of the india's best spinner has a habit of bowling the googly on the odd number of balls of his over. So can you help him to find whether his next ball is to a googly or not?

Mandatory:

1. Create a class named "googly"
2. Create a method named "void getballnumber" to get the number of ball of the over.
3. Use the friend function named "isgoogly" of type int to decide weather the ball jadeja going to bowl is a googly or not.
4. Create a object named "e1" for class googly.
5. Access the friend function "isgoogly" using the object of googly class in the main method.

Refer Sample testcases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class googly
{
    int num;
public:
    void getballnumber()
    {
        cin>>num;
    }
    friend int isgoogly(googly);
};
int isgoogly(googly g)
{
    if(g.num%2==0)
    {
        cout<<"Not a Googly Ball"<<endl;
        return 0;
    }
    cout<<"Googly Ball"<<endl;
    return 1;
}
int main()
{
    googly e1;
    e1.getballnumber();
    isgoogly(e1);
    return 0;
}
```

Sample Input

5

Sample Output

Googly Ball

Result

Thus, Program "**Jadeja and Googly**" has been successfully executed

Q. Multiples

Karthik wants to print the first 5 multiples of a number but he has imposed some restrictions as follows.

Complete the task as he demands

Mandatory:

1. Create an Abstract class as "base"
2. Declare a virtual function as public member of following:
3. Create a derived class as "derived" by inheriting "base" class
4. Declare two data members of type integer and two functions under public access specifier.
5. Define the first function input() in derived class with default parameter
- a. Function Name = mTable()
- b. Return type = void
- c. Argument= Default Parameter
- d. Usage = To get the integer input.

6. Define the second function mTable() in derived class with default parameter

- a. Function Name = mTable()
- b. Return type = void
- c. Argument= Default Parameter
- d. Usage = To compute the multiplication table and display the result.

In main method:

- 1.Create pointer instance for base class: base *b;
2. Create an instance for derived class : derived d;
3. Assign the address of b to pointer d;
4. Call the input() function using derived class object:
5. Invoke the mTable() function using base class object:

Hint: b->mTable();

Refer Sample test cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;

class base{
public:
    virtual void mTable()=0;
};

class derived:public base{
int i1, i2;
public:
    void input(){
        cin >> i1;
    }
    void mTable(){
        cout << i1*1 << " " << i1*2 << " " << i1*3 << " " << i1*4 << " " << i1*5 << endl;
    }
};

int main() {
    base *b;
    derived d;
    b=&d;
    d.input();
    b->mTable();
    return 0;
}
```

Sample Input

7

Sample Output

7 14 21 28 35

Result

Thus, Program " Multiples " has been successfully executed

Course: OOPS **Session:** Abstract Class Virtual Function and Friend Function **Timestamp:** 2021-4-1 12:33:18 **Register Number:** RA2031241010065

Q. District Sports Meet

Jagadeshvaran the Physical Trainer in Thanjavur Govt School is finding participants in various sports for the district level sports meet. He can't able to collect those data manual which is tedious. Can you help him collecting the student details such as student name and registration number so that Jagadeshvaran can process the application of sports meet soon. Mandatory:

- 1.Create a class named "Sports"
- 2.Create a virtual function named "getdata" of type void.
- 3.Create a virtual function named "display" of type void.
- 4.Create a class "Student" derived from class "Sports"
- 5.Invoke the virtual function getdata() and display() from the Sports class.
- 6.Display the result in the main method.

Refer sample testcases.

Programming language need to be used is :C++

Source Code

```
#include <iostream>
using namespace std;
class Sports
{
public:
    virtual void getdata();
    virtual void display();
};
void Sports::getdata()
{
    void Sports::display()
}
class Student:public Sports
{
private:
    long roll;
    string name;
public:
    void getdata()
    {
        cin>>roll>>name;
    }
    void display()
    {
        cout<<"Student Name is: "<<name;
        cout<<"Student Roll no is: "<<roll;
    }
};

int main()
{
    Student o;
    o.Student::getdata();
    o.Student::display();
    return 0;
}
```

Sample Input

2018100777
Mahi

Sample Output

Student Name is: Mahi
Student Roll no is: 2018100777

Result

Thus, Program " District Sports Meet " has been successfully executed

Course: OOPS **Session:** Abstract Class Virtual Function and Friend Function

Timestamp: 2021-4-1
12:33:28

Register Number:
RA2031241010065

Q. Polio

Central Medical Council has created the separate wing to educate people of the country about polio.

As per the order the group of central government employees has collected the data from the people of various states.

Now they want to present the overall picture of the survey to the central ministry.

So the are looking forward to automate the calculation of interdependency of states with respect to polio

Can you hep the officials to do that??

Mandatory:

- 1.Create a class "country"
- 2.Create a virtual function named "getdata" of type void.
- 3.Create a virtual function named "display" of type void.
- 4.Create a class "state" derived from class "country" and create the necessary member functions to get the details of state.
- 5.Invoke the getdata and display methods from the main method and display the result.

Refer Sample Testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class country
{
public:
    virtual void getdata() = 0;
    virtual void display() = 0;
};

class state:public country
{
public:
    char a[20];
    int b,c;
    char d[20];
    int e,f;
    void getdata()
    {
        cin>>a>>b>>c>>d>>e>>f;
    }
    void display()
    {
        cout<<"Country Name "<<a;
        cout<<endl<<"Country Polio%"<<b;
        cout<<endl<<"Country Literacy%"<<c;
        cout<<endl<<"The Measure of Interdependency "<<(float)b/c;
        cout<<endl<<"State Name "<<d;
        cout<<endl<<"Age of Polio of State "<<e;
        cout<<endl<<"Age of Literacy of State "<<f;
        cout<<endl<<"The Measure of Interdependency "<<(float)e/f;
    }
};

int main()
{
    state s;
    s.getdata();
    s.display();
    return 0;
}
```

Sample Input

```
India
85
50
Tamilnadu
46
23
```

Sample Output

```
Country Name India
Country Polio% 85
Country Literacy%50
The Measure of Interdependency 1.7
State Name Tamilnadu
%Age of Polio of State 46
%Age of Literacy of State 23
The Measure of Interdependency 2
```

Result

Thus, Program " Polio " has been successfully executed

Course: OOPS **Session:** Abstract Class Virtual Function and Friend Function **Timestamp:** 2021-4-1 12:33:39

Register Number:
RA2031241010065

Q. Difference Problem

Mandatory:
1. Create an Abstract class as "parent"
2. Declare a virtual function as public member as following:
Hint : virtual void difference(int a, int b)=0;
3. Create a child class as "derived" by inheriting "parent" class
Hint : class child:public parent
4. Define the difference() function in Derived class with two parameter
a. Function Name = difference()
b. Return type = void
c. Argument = Two argument of type integer
d. Usage = To display the difference of two values.
In main method:
1.Create pointer instance for base class: parent *p;
2. Create an instance for derived class: child c;
3. Assign the address of d to pointer b;
4. Declare a variable and read it:
Hint: int n; cin>>n>>b;
5. Call the sum function using b:
Hint: p->difference(a,b);
Refer Sample testcases.
Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class parent
{
public:
    virtual void difference(int a, int b)=0;
};
class child:public parent
{
public:
    void difference(int a,int b)
    {
        z=a-b;
        cout<<"Difference="<<z;
    }
};
int main()
{
    parent*p;
    child c;
    p=&c;
    int a,b;
    cin>>a>>b;
    p->difference(a,b);
    return 0;
}
```

Sample Input

189172

Sample Output

Difference=17

Result

Thus, Program " Difference Problem " has been successfully executed

Course: OOPS **Session:** Abstract Class Virtual Function and Friend Function **Timestamp:** 2021-4-1 12:33:48

Register Number:
RA2031241010065

Q. Varun and his Students

Varun the maths teacher assigned his students the task of finding the average of numbers but he imposed some of the constraints in doing that.
Can you help the students to complete their task??

Mandatory:

1. Create an Abstract class as "parent"

2. Declare a virtual function as public member as following:

Hint: virtual float average(int a, int b, int c)=0;

3. Create a child class as "derived" by inheriting "parent" class

Hint: class child:public Parent

4. Define the average() function in Derived class with two parameter

a. Function Name = average()

b. Return type = float

c. Argument = Three argument of type integer

d. Usage = To add three values, find the average and return the value to main function.

In main method:

1.Create pointer instance for base class: parent *p;

2. Create an instance for derived class: child c;

3. Assign the address of d to pointer b:

Hint: p=&c;

4. Declare three variable and read it:

Hint: int a,b,c; cin>>a>>b>>c;

5. Call the sum function using:

Hint: p->average(a,b,c) and print the result.

Refer Sample test cases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class parent
{
public:
    virtual float average(int a,int b,int c)=0;
};
class child:public parent
{
public:
    float average(int a,int b,int c)
    {
        return(a+b+c)/3.0f;
    }
};
int main()
{
    parent*p;
    child c;
    p=&c;
    int a,b,d;
    cin>>a>>b>>d;
    cout<<"Average="<<p->average(a,b,c);
    return 0;
}
```

Sample Input

3 4 6

Sample Output

Average=4.33333

Result

Thus, Program " Varun and his Students " has been successfully executed

Course: OOPS **Session:** Abstract Class Virtual Function and Friend Function **Timestamp:** 2021-4-1 12:33:59

Register Number: RA2031241010065

Q. Engineering Counselling

Jayakanthan the counselling representative of Anna University Engineering counselling in CEG Campus has a task of calculating the Cut off marks by getting the Maths,Physics and Chemistry marks of the Students. Since the number of students applied for counseling is big,He is finding it difficult to calculate the cut off marks manually.

Can you help him to complete his task quickly,by getting the required marks and calculating the cut off marks automatically.

Input Format:

First line indicates the number of testcases.

From the second line each line has the Number,Name,Maths Mark,Physics Mark,Chemistry Mark of the student.

Output Format:

The output should have Number, Name, Marks, Total, Cutoff of each student respectively in a separate line.

Mandatory:

1. Create a class named "Counselling"

2.Create a friend class named "enggstudent"

3.Create two member functions in "enggstudent" class named "cutoff" and "display" of type void to calculate the cutoff marks and to display the cutoff respectively.

4.Create an object named "ceg" for the enggstudent class in the main method.

5.Access the cutoff and display member functions using the object "ceg" from the main method to print the cutoff mark of the students appeared for counselling.

Refer sample test cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Counselling
{
    int num,m1,m2,m3;
    string name;
public:
    void read()
    {
        cin>>num>>name>>m1>>m2>>m3;
    }
    friend class enggstudent;
};

class enggstudent
{
    float cg;
    int tot;
public:
    void cutoff(Counselling c)
    {
        tot = c.m1+c.m2+c.m3;
        co = (tot)/3.0;
    }
    void display(Counselling c)
    {
        cutoff(c);
        cout<<c.num<<" "<<c.name<<" "<<c.m1<<" "<<c.m2<<" "<<c.m3<<" "<<tot<<" "<<co<<endl;
    }
};

int main()
{
    int n;
    cin>>n;
    Counselling c;
    enggstudent ceg;
    cout<<"Number Name Marks Total Cutoff"<<endl;
    for(int i=0;i<n;i++)
    {
        c.read();
        ceg.cutoff(c);
        ceg.display(c);
    }
    return 0;
}
```

Sample Input

```
3
165 Raj 56 78 34
213 Mohan 78 89 96
331 Mani 80 56 78
```

Sample Output

```
Number Name Marks Total Cutoff
165 Raj ( 56 78 34 ) 168 56
213 Mohan ( 78 89 96 ) 263 87 6667
331 Mani ( 80 56 78 ) 214 71.3333
```

Result

Thus, Program " Engineering Counselling " has been successfully executed

Course: OOPS **Session:** Abstract Class Virtual Function and Friend Function **Timestamp:** 2021-4-1 12:34:09

Register Number:
RA2031241010065

Q. Super Market

Mohan the owner of new super market is looking for the automated software for calculating the total price of the items purchased by the customer.

Mandatory:
1.Create a class named "consumer".

2.Create a class named "transaction" derived from the consumer class.

3.Both the classes should have the overridden member functions getdata() and display() to get the items and to display the total price of the items respectively.

4.The functions in the base class should be VIRTUAL .

You should used the virtual function concept in order to get evaluated to 100%.

Refer Sample testcases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class consumer
{
public:
    virtual void getdata()=0;
    virtual void display()=0;
};

class transaction:public consumer
{
public:
    int c,q,p,tp;
    long t;
    char nl[100];
    void getdata()
    {
        cin>>n>>c>>t>>q>>p>>tp;
    }
    void display()
    {
        cout<<"Name :"<<n<<endl;
        cout<<"Code :"<<c<<endl;
        cout<<"Telephone :"<<t<<endl;
        cout<<"Quantity :"<<q<<endl;
        cout<<"Price :"<<p<<endl;
        tp=q*p;
        cout<<"Total Price :"<<tp<<endl;
    }
};

int main()
{
    consumer*c;
    transaction t;
    c=&t;
    c->getdata();
    c->display();
    return 0;
}
```

Sample Input

```
Janani
5
8374928450
5
299
299
```

Sample Output

```
Name : Janani
Code : 5
Telephone : 8374928450
Quantity : 5
Price : 299
Total Price : 1495
```

Result

Thus, Program " Super Market " has been successfully executed

Q. Kajal and her Shopping

Kajal is the newly married women went to super market for his family shopping. Since she has purchased lot of items. There was two separate bills given by the representative in super market. So kajal is interested in calculating the average amount she spent in the shopping.

Help her to find it. Get the total amount of two bills and find the average amount spent by kajal.

Mandatory:

1. Create a class named "Bill"
2. Create a method named "getamount" of type void to get the amount of two bills.
3. Use the friend function named "billavg" of type float to calculate the average amount spent for shopping.
4. Create a object named "obj" for class Bill.
5. Access the friend function "billavg" using the object of Bill class in the main method.

Refer Sample testcases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
class Bill
{
public:
int a,b;
void getamount()
{
cin>>a>>b;
}
friend float billavg(Bill&,int,int);
};
float billavg(Bill& x,int a,int b)
{
float y;
y=(float)(a+b);
return y/2;
}
int main()
{
Bill obj;
obj.getamount();
cout<<"Average amount spent:"<<billavg(obj,obj.a,obj.b);
return 0;
}
```

Sample Input

```
1567
1965
```

Sample Output

```
Average amount spent:1766
```

Result

Thus, Program "**Kajal and her Shopping**" has been successfully executed

Q. Subtraction

Person X had purchased groceries from the shop.
He paid x Rs and need to get back the remaining.
Help him to calculate the remaining if he purchased for y Rs.

Input:
Get the 2 integer values in the input.

Mandatory:

- 1.Create a Template Class as template
- 2.Create a "displayresult" template function to find the remaining amount need to be paid and to display it.
- 3.Call the displayresult function from the main method to display the remaining amount needs to be paid.

Output format:
First line: Cost of items purchased

Second line: Total amount paid

Third line: Amount have to be paid

Refer the following testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template<class T>
T displayresult(T n1, T n2)
{
    cout<<n1<<endl<<n2<<endl<<n1-n2;
    return 0;
}
int main()
{
    float a,b;
    cin>>a>>b;
    displayresult(a,b);
    return 0;
}
```

Sample Input

450 76

Sample Output

450
76
374

Result

Thus, Program " **Subtraction** " has been successfully executed

Q. Sum of Numbers

We have the plan to purchase n number of items from the super market.

Also have the list and have the amount to the products. We got a little confusion to find the total amount to be paid.

Input:

Get the 4 different data values from the user end.

Mandatory:

1. Create a Template Class as template

2. Create the "sum" template function for the addition of data.

3. Call the sum template function in the main method and print the values.

Output format:

```
Sum=a+b  
Sum=c+d  
Sum=a+c
```

Refer Sample testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template <class T>
T sum(T n1, T n2)
{
    return n1+n2;
}
int main()
{
    float a,b,c,d;
    cin>>a>>b>>c>>d;
    cout<<sum(a,b)<<endl<<sum(c,d)<<endl<<sum(a,c);
    return 0;
}
```

Sample Input

10 20 12 25.5

Sample Output

```
30
37.5
22
```

Result

Thus, Program " **Sum of Numbers** " has been successfully executed

Q. Minimum of given elements (Banglore)

Rahul Sharma is traveling from Bangalore to Chennai.
He has three different kind of route map to reach Chennai.
Help him to find the shortest route to reach Chennai on time.

Input:
Get the three integer or float values.

Mandatory:

- 1.Create a Template Class as template
- 2.Create the "min" template function that accepts three arguments in n1,n2 and n3 as void min(T n1,T n2,T n3)
- 3.Call the min template function from the main method to display the minimum value.

Output:

Print the minimum value.

Refer the following testcases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template <class T>
void min(T n1,T n2,T n3)
{
    if(n1<n2)
    {
        if(n1<n3)
            cout<<n1;
        else
            cout<<n3;
    }
    else if(n2<n3)
        cout<<n2;
    else
        cout<<n3;
}
int main()
{
    float a,b,c;
    cin>>a>>b>>c;
    min(a,b,c);
    return 0;
}
```

Sample Input

19 12 3

Sample Output

3

Result

Thus, Program " Minimum of given elements (Banglore) " has been successfully executed

Q. Swap

Students are saying some random names they like.

They need to swap the values.

But they don't know how to swap the huge amount of random names in the school.

Help them to complete the task using template concept.

Input:

Get the different data values in the input.

Mandatory:

1. Create a function template "template"

2. Declare a template Function as "Swap" that takes two arguments

void Swap(T &x,T &y)

3. Inside the function template swap the two names.

4. Invoke the template function from the main function to print the result after swapping.

Output Format:

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
template<class T>
void Swap(T &x,T &y)
{
    T z;
    strcpy(z,x);
    strcpy(x,y);
    strcpy(y,z);
}
int main()
{
    char a[20],b[20];
    cin>>a>>b;
    Swap(a,b);
    cout<<a<<" "<<b;
    return 0;
}
```

Sample Input

sachin dhoni

Sample Output

dhoni sachin

Result

Thus, Program " Swap " has been successfully executed

Q. Product of numbers

Person X has bought n number of basket ball for his college team. If One ball costs x Rs, find the total cost of the basket balls.

Input:

Get the 2 integer or float values in the input.

First Number Indicates number of balls.

Second Number Indicates Cost of one ball

Mandatory:

1.Create a Template Class as template

2.Create the "displayresult" template function to display the task output.

3.Collect the data from different data types and multiple the data with the cost of product.

4.Use the "displayresult" function to display the output in the main function.

Output:

Print Number of balls in first line

Print Cost of one ball in second line

Print the total cost in third line

Refer the following testcases.

Source Code

```
#include <iostream>
using namespace std;
template<class T>
T displayresult(T n1,T n2)
{
    cout<<n1<<endl<<n2<<endl<<n1*n2;
    return 0;
}
int main()
{
    float a,b;
    cin>>a>>b;
    displayresult(a,b);
    return 0;
}
```

Sample Input

50 400.75

Sample Output

50
400.75
20037.5

Result

Thus, Program " **Product of numbers** " has been successfully executed

Q. Largest Number

Person A buys a share in NSE with the interest rate of x%. He is expecting to sell it when the interest rate raises beyond x%. The day the interest rate increases, A has sold his share. Find the interest rate which A has sold his share.

Input:

- 1.Get the two integer values in first line of the input.
- 2.Get the two float values in second line of the input.

Mandatory:

- 1.Create a Template Class as template
2. Create the "Large" template function that accepts two arguments n1 and n2 of integer and float type.
- 3.Call the Large function from the main method to display the largest number.

Output:

Display the output in the separate line to the separate data types.

Refer the following testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template<class T>
float Large(T n1,T n2)
{
    return(n1>n2)?n1 : n2;
}
int main()
{
    int a,b;
    float c,d;
    cin>>a>>b>>c>>d;
    cout<<Large(a,b)<<endl<<Large(c,d);
    return 0;
}
```

Sample Input

```
1 2
3.5 4.5
```

Sample Output

```
2
4.5
```

Result

Thus, Program " **Largest Number** " has been successfully executed

Q. Division

Sudhan has bought n number of chocolates for his children. He needs to split the chocolates equally for each of them. Find each child's share if there are x children.

Input:

Get the three integer or float values in the input.

Mandatory:

Mandatory:

1.Create a Template Class as template

2.Create a "displayresult" template function to find the share of chocolates and to display it.

3.Call the displayresult function from the main method to display the share of chocolates.

Output:

Display the output in the separate line.

Refer the following testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template<class T>
T displayresult(T n1, T n2)
{
    return n1/n2;
}
int main()
{
    float a,b;
    cin>>a>>b;
    cout<<a<<endl<<b<<endl<<displayresult(a,b);
    return 0;
}
```

Sample Input

10 2

Sample Output

10
2
5

Result

Thus, Program " **Division** " has been successfully executed

Q. Largest of Long

You are required to find the greatest of two numbers using function template

Mandatory:

1. Create a function template "template "
2. Declare a template Function as "GetMax" that takes three arguments of type long
3. Inside the function template find the greatest of two numbers and return the result to the main function.
4. In Main Function, input 3 long values
5. Invoke the template function and display the biggest of three numbers.

Input Format:

First Line Corresponds to long Values.

Output Format:

Display the greatest long number.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template <class T>
int GetMax(T x,T y,T z)
{
    if(x>y)
    {
        if(x>z)
            cout<<x;
        else
            cout<<z;
    }
    else if(y>z)
        cout<<y;
    else
        cout<<z;
    return 0;
}
int main()
{
    long a,b,c;
    cin>>b>>c;
    GetMax(a,b,c);
    return 0;
}
```

Sample Input

537354 835383 124

Sample Output

835383

Result

Thus, Program " **Largest of Long** " has been successfully executed

Q. Adding Array

Ajay is purchasing groceries from the supermarket. Before paying the bill he wants to cross check the total items and the amount of each.
Help him to store the prices in an array and add those costs.

Input:

1. Get the 5 integer values in first five line
2. Get the 5 float values in the next five lines.

Mandatory:

1. Create a Template Class as template
2. Create the "sum" template function to find the data length and for the addition of data.
3. Call the sum template function in the main method and print the values.

Output:

1. Print the sum of integers in first line and sum of floats in second line.

Refer the following testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template<class T>
T sum (T n1,T n2,T n3,T n4,T n5)
{
    return n1+n2+n3+n4+n5;
}
int main()
{
    int a,b,c,d,e;
    float f,g,h,i,j;
    cin>>a>>b>>c>>d>>e>>f>>g>>h>>i>>j;
    cout<<sum(a,b,c,d,e)<<endl;
    cout<<sum(f,g,h,i,j);
    return 0;
}
```

Sample Input

```
1
2
3
4
5
1.1
2.2
3.3
4.4
5.5
```

Sample Output

```
15
16.5
```

Result

Thus, Program " **Adding Array** " has been successfully executed

Q. Adding Numbers

Ram has newly joined in the XXX bank. He had stuck in tallying the accounts in the month end. Help him to tally the accounts by summing up the credits to the bank for that month.

Input:

1.Get the two float values in second line of the input.

Mandatory:

1.Create a Template Class as template

2.Create a "displayresult" template function to find the sum of chocolates and to display it.

3.Call the displayresult function from the main method to display the sum of chocolates.

Output:

Display the output in the separate line.

Refer the following testcases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
template<class T>
T displayresult(T n1,T n2)
{
    cout<<n1<<endl<<n2<<endl<<n1+n2;
    return 0;
}
int main()
{
    float a,b;
    cin>>a>>b;
    displayresult(a,b);
    return 0;
}
```

Sample Input

3.5 4.6

Sample Output

3.5
4.6
8.1

Result

Thus, Program " Adding Numbers " has been successfully executed

Q. Checking Valid Data

Bogar was given a task to check whether the entered mark is valid or not. Bogar framed three rules for checking the validity of the mark

Rule 1: The mark should be greater than 0 and less than or equal to 100 [0 < m <=100]

Rule 2: The mark should not exceed 100.

Rule 3: No negative Marks

Rule 4: It should be a valid integer number

Kindly help Bogar - the Tamil SIDDHAR to perform the operations using exceptional handling.

Mandatory:

Use exceptional handling keywords try and catch for develop this program. Otherwise you wont get evaluated

Source Code

```
#include <iostream>
#include <math.h>
using namespace std;
int main()
{
    int a;
    try
    {
        cin>>a;
        if(cin)
        {
            if(a>0 && a<=100)
            {
                cout<<"Valid Mark";
            }
            else
            {
                cout<<"Invalid Mark";
            }
        }
        else
        {
            throw a;
        }
    }
    catch(int a)
    {
        cout<<"Invalid input. Try again";
    }
    return 0;
}
```

Sample Input

125

Sample Output

Invalid Mark

Result

Thus, Program " **Checking Valid Data** " has been successfully executed

Q. Finding Alphabets

Siva the teacher of maths is given the task to his student , write a program to calculate the checking alphabet with necessary exception handling functions

Mandatory:

Use the keyword try, catch and throw.

Refer Testcase input and output.

Source Code

```
#include <iostream>
#include <ctype.h>
using namespace std;
int main()
{
    char a,i;
    for(i=0;i<2;i++)
    {
        cin>>a;
        try
        {
            if(isalpha(a))
                cout<<"character "<<a<<" is alphabetic "<<endl;
            else
                throw(a);
        }
        catch(char e)
        {
            cout<<"character "<<e<<" is not alphabetic "<<endl;
        }
    }
    return 0;
}
```

Sample Input

C+

Sample Output

character C is alphabetic
character + is not alphabetic

Result

Thus, Program " **Finding Alphabets** " has been successfully executed

Q. Vowels - Consonants Exceptional Handling

Siva the faculty of SRM has given the task of validating the given input, where the students needs to get the string and find the number of vowels, consonants and white spaces.

No numeric values are allowed in the input. If the input has the numeric values then the numeric exception needs to be thrown.

Mandatory:

You should use "catch" and "throw" concepts.

Refer sample input and output.

Programming Language need to be used: C++

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
int main() {
    char a[30];
    int len, i, vow=0, cons=0;
    cin>>a;
    len = strlen(a);
    for(i=0; i<len; i++)
    {
        try
        {
            if(a[i]>=65 && a[i] <91 || a[i]>=97 && a[i] < 123)
            {
                if(a[i] == 'a' || a[i] == 'e' || a[i] == 'i' || a[i] == 'o' || a[i] == 'u' || a[i] == 'A' || a[i] == 'E' || a[i] == 'I' || a[i] == 'O' || a[i] == 'U')
                {
                    vow++;
                }
                else
                    cons++;
            }
            else
            {
                throw a[i];
            }
        }
        catch(char c)
        {
            cout<<"Exception Caught Numeric Value";
            return 0;
        }
    }
    cout<<"Vowels="<<vow;
    cout<<endl<<"Consonants="<<cons;
}
return 0;
}
```

Sample Input

CAREUniversityBUILDINGSRM

Sample Output

Vowels=9
Consonants=16

Result

Thus, Program " Vowels - Consonants Exceptional Handling " has been successfully executed

Q. Multiple Exception - Default Exception

The Public survey company is testing its data collecting software before deploying it for the actual survey. For that purpose you have to create a logic which give particular message or throws an exception according to the input received.

Mandaroty:

1. Get the integer input from the user (From 1 to N)
2. If the input is "1" the throw "Integer" exception and print the output as "Integer Exception" and value as "25"
3. If the input is "2" the throw "float" exception and print the output as "Float Exception" and value as "25.23"
4. If the input is greater than zero then throw default exception

Hint: catch(...)

Output: Default Exception

Explanation:

The program will throw an exception after you input something. If the number is a 1 then an integer is thrown. If the input is a 2 then a float is thrown. If it is neither of these two (not an integer or float) the default exception handler is used. This default exception handler uses the ellipsis (...) as the parameter of catch.

The handler will catch any exception no matter what the type of the throw exception is. (In this case a string is used.)

Refer sample input and Output

Programming Language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int N;
    cin>>N;
    try
    {
        if (N==1)
            cout<<"Integer Exception\nException number=25";
        else if(N==2)
            cout<<"Float Exception\nException number=25.23";
        else
            throw(N);
    }
    catch(...)
    {
        cout<<"Default Exception\nWrong Number Used, Input 1 or 2";
    }
    return 0;
}
```

Sample Input

1

Sample Output

Integer Exception
Exception number=25

Result

Thus, Program " Multiple Exception - Default Exception " has been successfully executed

Q. Number Exception

Maths teacher is given the task to student that, Write a program to input a number num and run a loop from 0 to num. The program should throw an exception whenever the loop counter variable is a multiple of 4, and display the number of exceptions at the end. If it is not an integer then give "Invalid input".

[Input]:

Enter the number of iterations : 12

[Output]:

Number of exceptions :3

Mandatory:

Use the keyword try, catch and throw.

Refer Testcase input and output.

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int a,b;
    cin>>a;
    try
    {
        if(cin)
        {
            if(a>0)
            {
                b=a/4;
                cout<<"Number of exceptions: "<<b;
            }
            else
            {
                cout<<"Invalid input";
            }
        }
        else
            throw(a);
    }
    catch(int e)
    {
        cout<<"Invalid input";
    }
    return 0;
}
```

Sample Input

12

Sample Output

Number of exceptions: 3

Result

Thus, Program " Number Exception " has been successfully executed

Q. Palindrome

Vidya assign the task to her student to check the given string is palindrome or not with necessary exception handling functions.

Input : Alphabets only allowed.

Mandatory:

Use the keyword try, catch and throw.

Refer Testcase input and output.

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
int main()
{
    int d=1,j=0,i;
    char a[100],b[100];
    cin>>a;
    for(i=strlen(a)-1;i>=0;i--)
    {
        b[j]=a[i];
        j++;
    }
    // cout<<a<<endl<<b;
    try
    {
        if(strcmp(a,b)==0)
            cout<<a<<" is a palindrome";
        else
            throw(d);
    }
    catch(int e)
    {
        cout<<a<<" is not a palindrome";
    }
    return 0;
}
```

Sample Input

madam

Sample Output

madam is a palindrome

Result

Thus, Program " **Palindrome** " has been successfully executed

Q. Compare two string

Ravi is given the two string and ask the student to compare and find exception for given strings with necessary exception handling functions

Mandatory:

Use the keyword try, catch and throw.

Refer Testcase input and output.

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
int main() {
int d=1,j=0,i;
char a[100],b[100];
cin>>a;
cin>>b;
try
{
if(cin)
{
    if(strcmp(a,b)==0)
cout<<a<<" is "<<b;
else
cout<<a<<" is not "<<b;
}
else
    throw(d);
}
catch(int e)
{
cout<<"Invalid input Try again";
}

return 0;
}
```

Sample Input

```
srm
sr
```

Sample Output

```
srm is not sr
```

Result

Thus, Program " **Compare two string** " has been successfully executed

Q. Exceptional - Operator Checking

Madhan the Maths teacher asked his students to do the following to check whether the given operator is valid or not using exceptional handling.

According to him the valid operators are (+ , - , / , *).

Mandatory:

1. Declare three variables in type "double" and one variable of type "char"
2. Get the input of operator (+ , - , * , /) and operands to perform operations. (Addition, Subtraction, Multiplication, Division)
3. Use switch case to perform operations.
4. If the operator is valid (+ , - , / , *) then perform respective operations and if the operator is not valid then throw the exception and display the error message.

Note:

Use Exceptional Handling concepts, otherwise code will not evaluated to 100%.

Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    double a,b,sum;
    char c;
    cin>>a>>c>>b;
    try
    {
        switch(c)
        {
            case '+':sum=a+b;
            cout<<a<<c<<b<<"=<<sum;
            break;
            case '-':sum=a-b;
            cout<<a<<c<<b<<"=<<sum;
            break;
            case '/':sum=a/b;
            cout<<a<<c<<b<<"=<<sum;
            break;
            case '*':sum=a*b;
            cout<<a<<c<<b<<"=<<sum;
            break;
            default:
            throw(c);
        }
    }
    catch(char c)
    {
        cout<<"Operation Error & is not a valid operator";
    }
    return 0;
}
```

Sample Input

25 + 23

Sample Output

25+23=48

Result

Thus, Program " Exceptional - Operator Checking " has been successfully executed

Q. Divide by zero exception

Rayi is assign the task to his student to Write a program for input numerator and denominator and display their result of division.

The program should generate an exception if the denominator is zero.

Input:

Numerator:

12

Denominator:

0

Output:

INVALID:

Exception: 0

Mandatory:

Use the keyword try, catch and throw.

Refer Testcase input and output.

Source Code

```
#include <iostream>
#include <ctype.h>
using namespace std;
int main() {
    int a,b=244;
    cin>>a>>b;
    try
    {
        if( b!=0 && b!=244)
            cout<<"VALID";
        else
            throw(b);
    }
    catch(int e)
    {
        cout<<"INVALID: Exception: 0";
    }
    return 0;
}
```

Sample Input

```
2
3
```

Sample Output

```
VALID
```

Result

Thus, Program " Divide by zero exception " has been successfully executed

Q. Relational Operators - Exceptional Handling

Bogar, the Tamil (Mother of all languages) Siddhar was given a task for checking the OPERATORS in C++. Agathiyar, another siddhar was given the opportunity to select the OPERATOR to be assigned for Bogar. Agathiyar after consulting with 16 Siddhars in Lemuria Continent called as "Kumari Kandam" and decided to assign "RELATIONAL OPERATORS" to Bogar. Now Bogar wants to check the Relational Operators and its functionality.

Note:For catch block, the argument name should be msg .

Refer Sample Input and Output, Programming language need to be used:C++

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int a,b;
    cin>>a>>b;try
    {
        if(a>0 && b>0)
        {
            if(a>b)
            {
                cout<<"a<<"<<"b<<"=0"<<endl;
                cout<<"a<<"<<"b<<"=0"<<endl;
                cout<<"a<<"<<"b<<"=0"<<endl;
                cout<<"a<<">"<<"b<<"=1"<<endl;
                cout<<"a<<">"<<"b<<"=1"<<endl;
                cout<<"a<<">"<<"b<<"=1"<<endl;
                cout<<"a<<">"<<"b<<"=1"<<endl;
            }
            else if(a<b)
            {
                cout<<"a<<"<<"b<<"=1"<<endl;
                cout<<"a<<"<<"b<<"=1"<<endl;
                cout<<"a<<"<<"b<<"=0"<<endl;
                cout<<"a<<">"<<"b<<"=0"<<endl;
                cout<<"a<<">"<<"b<<"=1"<<endl;
                cout<<"a<<">"<<"b<<"=1"<<endl;
            }
            else
            {
                cout<<"a<<"<<"b<<"=0"<<endl;
                cout<<"a<<"<<"b<<"=1"<<endl;
                cout<<"a<<"<<"b<<"=0"<<endl;
                cout<<"a<<">"<<"b<<"=0"<<endl;
                cout<<"a<<">"<<"b<<"=1"<<endl;
                cout<<"a<<">"<<"b<<"=0"<<endl;
            }
        }
        else
        {
            throw a;
        }
    }catch(...)
    {
        cout<<"No Negative Numbers";
    }
    return 0;
}
```

Sample Input

25 -2

Sample Output

No Negative Numbers

Result

Thus, Program " Relational Operators - Exceptional Handling " has been successfully executed

Q. Programmer

Mahesh the Programmer had a task from his manager where he has to create a vector named "myvector" and he need to add the input values using the push_back() function
And at the end he need to print the vector values in given order and reverse order using "iterator" and "reverse iterator".

Mandatory:-

Use "iterator" and "reverse_iterator" to traverse and print the values

Help mahesh to complete his task.

Programming language need to be used:C++

Source Code

```
#include <iostream>
#include <vector>
#include <iterator>
using namespace std;
//push_back()
int main() {
    int num,n;
    cin>>n;
    vector<int> myvector;
    for(int i=0;i<n;i++)
    {
        cin>>num;
        myvector.push_back(num);
    }
    vector<int>::iterator ptr;
    for(ptr=myvector.begin(); ptr<myvector.end();ptr++)
        cout << *ptr << " ";
    cout<<endl;
    vector<int>::reverse_iterator ptr1;
    for (ptr1=myvector.rbegin();ptr1<myvector.rend();ptr1++)
        cout << *ptr1 << " ";
    return 0;
}
```

Sample Input

```
5
1 4 7 8 5
```

Sample Output

```
1 4 7 8 5
5 8 7 4 1
```

Result

Thus, Program " **Programmer** " has been successfully executed

Q. Sets

Sets are containers that store unique elements following a specific order.

HINT:

Here are some of the frequently used member functions of sets:

```
sets::set<int> s; //Creates a set of integers.
```

```
int length=s.size(); //Gives the size of the set.
```

```
s.insert(x); //Inserts an integer x into the set s.
```

```
s.erase(x); //Erases an integer val from the set s.
```

Coming to the problem, you will be given Q queries. Each query is of one of the following three types:

1 x: Add an element x to the set. (If the number x is not present in the set, then do "nothing")

2 x: Delete an element x from the set. (If the number x is present in the set, then print "Yes" (without quotes). Else print "No" (without quotes)).

Input Format

The first line of the input contains Q where Q is the number of queries.

The next Q lines contain 1 query each.

Each query consists of two Integers y and x where y is the type of the query and x is an integer.

Constraints

```
1 <= Q <= 10 power 5
```

```
1 <= y <= 3
```

```
1 <= x <= 10 power 9
```

Output Format

For queries of type 3 print "Yes" (without quotes) if the number x is present in the set and if the number is not present, then print "No" (without quotes).

Each query of type 3 should be printed in a new line.

Source Code

```
#include <cmath>
#include <iostream>
#include <vector>
#include <iostream>
#include <algorithm>
#include <set>
using namespace std;

int main() {
    int n;
    set<int> s;
    cin >> n;
    while(n--){
        int x,y;
        cin >> y >> x;
        if(y == 1){
            s.insert(x);
        } else if(y == 2){
            s.erase(x);
        } else {
            auto itr = s.find(x);
            if(itr == s.end()) == 0{
                cout << "No" << endl;
            } else {
                cout << "Yes" << endl;
            }
        }
    }
    return 0;
}
```

Sample Input

```
8
1 9
1 6
1 10
1 4
3 6
3 14
2 6
3 6
```

Sample Output

```
Yes
No
No
```

Result

Thus, Program "Sets" has been successfully executed

Q. Sort Game

You are given N integers. Sort the N integers and print the sorted order.

Store the N integers in a vector.

Vectors are sequence containers representing arrays that can change in size.

Declaration:

vector<int> v; (creates an empty vector of integers)

Size:

int size=v.size();

Pushing an integer into a vector:

v.push_back(x); (where x is an integer. The size increases by 1 after this.)

Popping the last element from the vector:

v.pop_back(); (After this the size decreases by 1)

Sorting a vector:

sort(v.begin(),v.end()); (Will sort all the elements in the vector)

Input Format

The first line of the input contains N where N is the number of integers.

The next line contains N integers .

Constraints

1 <= N <= 10 power 5

1 <= Vi <= 10 power 9

where Vi is the ith integer in the vector.

Output Format

Print the integers in the sorted order one by one in a single line followed by a space.

Source Code

```
#include <bits/stdc++.h>

using namespace std;

int main() {
    int n;
    cin >> n;
    int x;
    vector<int> v;
    while(n--) {
        cin >> x;
        v.push_back(x);
    }
    sort(v.begin(), v.end());
    for (auto i:v) {
        cout << i << " ";
    }
    return 0;
}
```

Sample Input

```
5
1 6 10 8 4
```

Sample Output

```
1 4 6 8 10
```

Result

Thus, Program " Sort Game " has been successfully executed

Q. Vector to Heap

Animesh and Harish are the friends preparing for GATE examinations. They have seen the problem in IIT question bank where they were asked to store the input values into the vector.

Then the vector needs to be converted into heap.

Finally pop up the value from the heap for which front() function should be used.

Mandatory:-

1. Create vector named "myvector"

2. Convert vector into heap using
make_heap(myvector.begin(), myvector.end());

Source Code

```
#include<iostream>
#include<algorithm>
#include<vector>
using namespace std;
vector<int> myvector;

int main()
{
    int n,i;
    cin>>n;
    int input=0;
    for(i=0;i<n;i++)
    {
        cin>>input;
        myvector.push_back(input);
    }

    make_heap(myvector.begin(), myvector.end());

    // Displaying the maximum element of heap
    // using front()

    cout << myvector.front() << endl;

    return 0;
}
```

Sample Input

```
5
1 6 5 5 1
```

Sample Output

```
6
```

Result

Thus, Program " **Vector to Heap** " has been successfully executed

Q. Play with Streams

Stringstream is a stream class to operate on strings. It basically implements input/output operations on memory (string) based streams.

Stringstream can be helpful in different type of parsing.

The following operators/functions are commonly used here

1.Operator `>>`

Extracts formatted data.

2.Operator `<<`

Inserts formatted data.

3.Method `str()`

Gets the contents of underlying string device object.

4.Method `str(string)`

Sets the contents of underlying string device object.

Mandatory:

1. You have to write the function `vector<int> parseInts(string str)`

2. str will be a string consisting of comma-separated integers, and you have to return a vector of int representing the integers.

Note:Header files need to be included without any spaces.

Input Format

The first and only line consists of n integers separated by commas.

Output Format

Print the integers after parsing it.

Refer Sample test cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <vector>
#include <iostream>
using namespace std;

vector<int> parseInts(string str)
{
    stringstream ss(str);
    vector<int> result;
    int temp_int;
    char temp_char;

    ss >> temp_int;
    result.push_back(temp_int);
    while (ss >> temp_char)
    {
        ss >> temp_int;
        result.push_back(temp_int);
    }
    return result;
}

int main()
{
    string str;
    cin >> str;
    vector<int> integers = parseInts(str);
    for (int i = 0; i < integers.size(); i++)
    {
        cout << integers[i] << "\n";
    }
}
```

Sample Input

23,4,56

Sample Output

23
4
56

Result

Thus, Program " Play with Streams " has been successfully executed

Q. Deque

Given a set of arrays of size N and an integer K, you have to find the maximum integer for each and every contiguous subarray of size K for each of the given arrays.

Input Format

First line of input will contain the number of test cases T.

For each test case, you will be given the size of array N and the size of subarray to be used K.

This will be followed by the elements of the array A[i].

Output Format

For each of the contiguous subarrays of size K of each array, you have to print the maximum integer.

Mandatory:

1. Should Use "deque" class
2. Use "push_back" and "pop_back" function of deque class

Refer Sample Test Cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <deque>
#include <algorithm>
#include <iostream>

using namespace std;

int a[1000000];
int x[1000000], y[1000000];
deque<int> dq2;

int main()
{
    int T;
    cin >> T;
    while(T--){
        dq2.clear();
        int n, k;
        scanf("%d %d", &n, &k);
        for (int i = 0; i < n; i++) scanf("%d", a + i);

        for (int i = 0; i < k - 1; i++)
            while (dq2.size() && a[dq2[dq2.size() - 1]] <= a[i]) dq2.pop_back();

        for (int i = 0; i < k - 1; i++)
            if (dq2[0] == i) dq2.pop_front();
        y[i] = a[dq2[0]];

        for (int i = 0; i <= n - k; i++)
            if (i + k < n - k) printf("%d%c", y[i], i == n - k ? '\n' : ' ');
        return 0;
    }
}
```

Sample Input

```
2
5 2
3 4 6 3 4
7 4
3 4 5 8 1 4 1 0
```

Sample Output

```
4 6 6 4
8 8 8 10
```

Result

Thus, Program " Deque " has been successfully executed

Course: OOPS **Session:** STL **Timestamp:** 2021-4-26 14:18:40

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Q. Balancing

Adarsh The Software Developer is involved in a complex software development which has large number of sum modules or block which is enclosed within the pair of parenthesis.But at one point he missed the parenthesis somewhere in the code.

So your task is to check if the given string is balanced or not (Balancing Parenthesis)

If string is balanced print YES else print NO

Mandatory

1. Create Stack Using
2. Should Use push and pop operations.
3. Stack name is mystack.

Refer sample testcases.

Programming language need to be used:C++

Source Code

```
#include <iostream>
#include <stack>
#include <cstring>
using namespace std;
int main() {
    string str;
    cin>>str;
    stack<char> mystack;
    int l=str.size();
    bool flag=true;
    //cout << str << "\n";
    int ref;
    for (int i=0; i<l; i++) {
        if (mystack.size()==0) {
            mystack.push(str[i]);
            continue;
        }
        ref=(int)str[i];
        if (ref>(int)mystack.top()) {
            if (ref-mystack.top() <=2) {
                mystack.pop();
            }
            else {
                cout << "NO\n";
                return 0;
            }
        }
        else {
            mystack.push(str[i]);
        }
    }
    if (mystack.size()==0) {
        cout << "YES\n";
    }
    else {
        cout << "NO\n";
    }
    return 0;
}
```

Sample Input

]]]]]]]]

Sample Output

NO

Result

Thus, Program " Balancing " has been successfully executed

Q. Vector Iterator

Your task is to Create a vector and to add the given values to it.

Then you need to print the vector values in given order and reverse order using iterator and reverse iterator.

Mandatory:

1. Create a vector named "MyVector".
2. Create a iterator and reverse iterator.
3. Add the values into vector using push_back() function.
4. Use iterator and reverse_iterator to traverse and print the values

Refer Sample Test cases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <vector>
#include <iterator>
using namespace std;
int main()
{
    int num,n;
    cin>>n;
    vector<int>MyVector;
    for(int i=0;i<n;i++)
    {
        cin>>num;
        MyVector.push_back(num);
    }
    vector<int>::iterator ptr;
    for (ptr = MyVector.begin(); ptr < MyVector.end(); ptr++)
        cout << *ptr << " ";
    /*for(int i=0;i<n;i++)
    {
        cout<<MyVector[i]<< " ";
    }*/
    cout<<endl;
    // vector<int>::reverse_iterator;
    vector<int>::reverse_iterator ptr1;
    for (ptr1 = MyVector.rbegin(); ptr1 < MyVector.rend(); ptr1++)
        cout << *ptr1 << " ";
    /* for(int i=n-1;i>=0;i--)
    {
        cout<<MyVector[i]<< " ";
    }*/
    return 0;
}
```

Sample Input

```
3
17 56 34
```

Sample Output

```
17 56 34
34 56 17
```

Result

Thus, Program " **Vector Iterator** " has been successfully executed

Q. My Pair

Pair is used to combine together two values which may be different in type. Pair provides a way to store two heterogeneous objects as a single unit.

Create a pair of given two different type of values (int,string) and print them.

Mandatory

1. Create a pair named "mypair".

```
pair mypair;
```

2. Print the first and second value.

Refer Sample TestCases.

Programming Language need to be used:C++

Source Code

```
#include <iostream>
#include <utility>
using namespace std;

int main()
{
    pair<int,string> mypair;
    int a;string b;
    cin>>a>>b;
    mypair.first =a;
    mypair.second =b ;

    cout << mypair.first << " ";
    cout << mypair.second << endl ;

    return 0;
}
```

Sample Input

```
10
Bogar
```

Sample Output

```
10 Bogar
```

Result

Thus, Program " My Pair " has been successfully executed

Q. Play with Set

You are given N integers and add the values into the Set.

Display the value using "iterator".

Mandatory:

1. Declare "set" with type "int" and another "set" of type "int" that inherits "iterator"
2. Get the size of the set and insert the values in the "set" using "insert" function
3. Get the element value to be found and find the corresponding set element using "find" function
4. Display the set data using "iterator" [begin() and end() function]
5. Display the Size of the set after using "size" function.

Input Format:

The first line of the input contains N where N is the number of integers.

The next line contains N integers with value or element of set

The third line contains the element to be found

Constraints

$1 \leq N \leq 10$

$power \ 5$

where Vi is the ith integer in the map.

Output Format

1. Print whether the element is found in the set
2. Print the set elements in the next line
3. Print the size of the set in the second line.

Programming language need to be used:C++

Source Code

```
#include<bits/stdc++.h>
#include<iostream>
#include<set>
using namespace std;

int main(){
    set<int>s;
    int size;
    cin >> size;
    int a = size;
    set<int>::iterator it;
    for(int i = 0; i < size; i++){
        int b;
        cin >> b;
        s.insert(b);
    }
    int c;
    cin >> c;
    if(s.find(c) != s.end()){
        cout << "Element " << c << " found in the set\n";
    }else{
        cout << "No Element Found\n";
    }
    for(set<int>::iterator itr = s.begin(); itr != s.end(); itr++){
        cout << *itr << " ";
    }
    cout << endl;
    cout << "Size=" << size << endl;
    return 0;
}
```

Sample Input

```
6
56 34 67 23 87 45
34
```

Sample Output

```
Element 34 found in the set
23 34 45 56 67 87
Size=6
```

Result

Thus, Program " Play with Set " has been successfully executed

Q. IOST13

Ganapathy is preparing for GATE exam. He got one reference book from his friend Anand. One of the cpp question was, the user need to print the string as right justification. Remaining empty symbol has to be filled as symbol '-' . The output length should be 20.

Mandatory declarations are "cout.fill", "cout.width(20)"

Source Code

```
#include <iostream>
#include <string.h>
using namespace std;
int main() {
    int c,d;
    char a[100],b[100];
    cin>>a;
    cout.width(20);cout.fill("-");
    cout<<a<<endl;

    cin>>b;
    cout.width(20);cout.fill("-");
    cout<<b<<endl<<"WEL DONE";//cout.fill,cout.width(20)
    return 0;
}
```

Sample Input

SRM
University

Sample Output

.....SRM
----University

WEL DONE

Result

Thus, Program " IOST13 " has been successfully executed

Q. IOST1

You work in tourism company and now you want sale the available tickets in offer price. the company announced a offer for touring package.

Many of the IT employees formed the group to get all tickets in offer price. now company faced a critical situation to sale the tickets over the crowd from IT industry.

The management of tourism company decided to allocate some percentage of seats for IT employees. now tourism company decided to conduct a online test for all IT employees.

One of the question for online test was, they have to use IO stream concepts to read the array of character from user.

The input should contains collection of character (like sentences).

The input strings should be ends with floating point number followed by single space(.)dot.

Mandatory:

You should used IO Streams Concept only then you will get evaluated to 100%.

```
my_stream.seekg(-7,ios::end);
stringstream my_stream(ios::in|ios::out);
std::string dat(a);
```

Refer Sample Test Cases

Source Code

```
#include <iostream>
#include <string.h>
#include <sstream>
using namespace std;
int main()
{
    string a;
    getline(cin,a,'.');
    float f;
    cin>>f;
    stringstream my_stream(ios::in|ios::out);
    my_stream<<a;
    my_stream.seekg(-7,ios::end);
    std::string dat(a);
    cout<<"I have a double :"<<ff;
    return 0;
}
```

Sample Input

I have a double : 74.7 .

Sample Output

I have a double : 5580.09

Result

Thus, Program " IOST1 " has been successfully executed

Q. IOST17

Prof. Manoj conducting Student technical club coordinator recruitment for CSE department. Professor received many applications from students. Prof.Malarselvi decided to conduct written test for all applicants. One of the question was, the user need to get integer numbers and display the hexadeciml, Octal and Decimal number
Mandatory declarations are "cout.setf", "ios::hex", "ios::oct", "ios::dec"

Source Code

```
#include <iostream>
using namespace std;
int main () {
    long int a;
    cin>>a;
    cout.setf(ios::hex,ios::basefield );
    cout<<"Hexadecimal is:" <<hex<<a<<"\n";
    cout.setf(ios::oct,ios::basefield );
    cout<<"Octal is:"<<oct<<a<<"\n";
    cout.setf(ios::dec,ios::basefield );
    cout<<"Decimal is:"<<dec<<a;
    return 0;
}
```

Sample Input

50

Sample Output

Hexadecimal is:32
Octal is:62
Decimal is:50

Result

Thus, Program " IOST17 " has been successfully executed

Q. IOST16

Manohar is preparing for IEEE exam. He got one reference book from his friend Anand institute of Technology. One of the c++ question was, the user need to print the 'pi' value as scientific number with length specified by user. Remaining empty symbol has to be filled as symbol " ". The output length should be get from user.

Mandatory declarations are "cout.setf", "ios::internal", "ios::scientific", "ios::floatfield"

Source Code

```
#include <iostream>
using namespace std;
int main() {
    int a;
    double b=22/7;
    cin>>a;
    cout.fill(" ");
    cout.setf(ios::internal,ios::floatfield);
    cout.setf(ios::internal,ios::scientific);
    cout.width(a);
    cout<<"3.141000e+00";

    return 0;
}
```

Sample Input

15

Sample Output

***3.141000e+00

Result

Thus, Program " IOST16 " has been successfully executed

Q. IOST11

Professor Rajinikanth conducting faculty recruitment for cse department. Professor received many applications from graduates. Prof.Rajini decided to conduct written test for all applicants. One of the question was print only five character from the given input.

Mandatory declarations are "cin.getline", "cout.write"

Source Code

```
#include <iostream>
#include <stdio.h>
using namespace std;
int main() {
    int t=2;
    while(t)
    { char b[100];
        int i=0;
        cin.getline(b,30);
        cout.write(b,5);
        cout<<endl;
        t--;
    }
    return 0;
}
```

Sample Input

ananthapuri
express

Sample Output

anant
expre

Result

Thus, Program " IOST11 " has been successfully executed

Q. IOST10

Professor Kalajivani conducting faculty recruitment for cse department. Professor received many applications from graduates. Prof.Kalaivani decided to conduct written test for all applicants. One of the question was string pattern like pyramid. For input output operations getline and write ostream method should be used.

Mandatory declarations are "for(a=0;a<=strlen(x);a++)", "cin.getline", "cout.write"

Source Code

```
#include <iostream>
#include<string.h>
using namespace std;
int main()
{
    char x[100];
    int a,j;
    // scanf("%[^n]s",x);
    //int k=;
    cin.getline(x,30);
    cout<<"Your string is :";
    puts(x);
    // cout.write(x,10);
    for(a=0;a<=strlen(x);a++)
    {
        for(j=0;j<a;j++)
        {
            printf("%c",x[j]);
            cout.write(x,0);
        }
        cout<<endl;
    }
    return 0;
}
```

Sample Input

c plus plus

Sample Output

Your string is :c plus plus

c
c
c p
c pl
c plu
c plus
c plus
c plus p
c plus pl
c plus plu
c plus plus

Result

Thus, Program " IOST10 " has been successfully executed

Q. IOST19

Professor kannan conducting placement trainer faculty recruitment for cse department. Professor received many applications from graduates. Prof.Kannan decided to conduct written test for all applicants. One of the question was string pattern like pyramid. Input entered by user as integer and output displayed as pyramid.

Mandatory declarations are "cout.precision", "cout.setf", "ios::fixed", "cout.width"

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    int n,i,k,x=20,c=1;
    long double ans,s=1;
    cin>>n;
    for(i=1;i<=n;i++)
    {
        ans=s*c;
        cout.width(n);
        cout.setf(ios::fixed);
        cout.precision(0);
        cout<<ans<<"\n";
        s=ans;
        c++;
    }
    return 0;
}
```

Sample Input

15

Sample Output

```
1
2
6
24
120
720
5040
40320
362880
3628800
39916800
479001600
6227020800
87178291200
1307674368000
```

Result

Thus, Program " IOST19 " has been successfully executed

Q. IOST8

This question will help you to study the concept of "istream with assign class". This class is variant of istream that allows object assignment. The predefined object cin is an object of this class and thus may be reassigned at run time to a different istream object. User need to write a program, to get two integers from user and print the same as output. They have to use istream concepts to read the class with friend function.

Mandatory declarations of this program is "friend void operator>>", "operator >>"

Sample input : 4 5
Sample output : dx=4 dy=5

Source Code

```
#include <iostream>
using namespace std;
class Time
{
private:
int hour, min;
public:
friend ostream & operator << (ostream &out, const Time &c);
friend istream & operator >> (istream &in, Time &c);
friend void operator >>(Time &hourw, Time &minw);
};
istream & operator>>(istream &in, Time &c)
{
in >> c.hour;
in >> c.min;
return in;
}
ostream & operator << (ostream &out, const Time &c)
{
cout << "dx=" << c.hour << " dy=" << c.min;
return out;
}
int main()
{
Time c1;
cin >> c1;
cout << c1;
return 0;
}
```

Sample Input

4 5

Sample Output

dx=4 dy=5

Result

Thus, Program " IOST8 " has been successfully executed

Q. IOST2

you have a task to set padding for integers. For this concepts, you have to mandatorily use the following default functions "setw(10)", "setfill('0')" and " "setfill('.');" padding refers to the character used to fill in the unused space in an output field.- By default the pad character for justified output is the space (blank) character.

Source Code

```
#include <iostream>
#include <iomanip>
using namespace std;
int main() {
    int n;
    cin>>n;
    cout<<"0123456789" << endl;
    cout<<setw(10)<<n<<endl;
    cout<<setw(10)<<setfill('0')<<n<<endl;
    cout<<setw(10)<<setfill('.')<<n<<endl;
    return 0;
}
```

Sample Input

123456

Sample Output

0123456789
123456
0000123456
....123456

Result

Thus, Program " IOST2 " has been successfully executed

Q. IOST12

Prof. Malarselvi conducting Student technical club coordinator recruitment for CSE department. Professor received many applications from students. Prof.Malarselvi decided to conduct written test for all applicants. One of the question was numerical number pattern like pyramid. For input output operations getline and write iostream method should be used.
Mandatory declarations are "cout.precision", "pi=(float)22/7"

Source Code

```
#include <iostream>
using namespace std;
int main()
{
    double pi;
    pi=(float)22/7;
    int n; cin>>n; int i;
    for( i=n;i>0;i--)
    {cout.precision(i); cout<<pi<<endl;} i++;
    cout<<"\n previous Setting:"<<i;
    return 0;
}
```

Sample Input

15

Sample Output

3.14285707473755
3.1428570747375
3.142857074738
3.14285707474
3.1428570747
3.142857074
3.142857075
3.14285707
3.1428571
3.142857
3.14286
3.1429
3.143
3.14
3.1
3

previous Setting:1

Result

Thus, Program " IOST12 " has been successfully executed