C++ Elab

Object Oriented Programming Using C++ (SRM Institute of Science and Technology)

1.Problem Description:

Dhoni's daughter Ziva is a hyperactive child, so she used to ask a lot of questions 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 the sky asked Dhoni what is the gravity in the 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 on the moon?

Dhoni was a little bit confused to answer Ziva !!!!!

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

Constraints:

1<weightinearth<150

Input Format:

Only line of input has a single Integer representing the weight of the person In earth.

Output Format:

In the only line of output print the weight of the person in moon.

Code:

```
#include <iostream>
#include <iomanip>
using namespace std;
int main()
{
   int weightinearth;
   float weightinmoon;
   cin>>weightinearth;
   weightinmoon=weightinearth*(16.6/100);
   cout<<weightinmoon;
            return 0;
}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
79
```

EXPECTED OUTPUT

```
13.114
```

Test Case 2

INPUT (STDIN)

```
46
```

EXPECTED OUTPUT

```
7.636
```

2.Problem Description:

During the IPL Match between CSK and MI, as a part of IPL contest the question was asked to the fans.

Who are all giving the correct answer to that question will get the free VIP box ticket for the Final for which CSK have already qualified

The question is convert given integer number to octal and hexadecimal number respectively.

Abilash is an die heart CSK fan.

Can you help him answer the question so that he can watch CSK play the final from VIP box?

Constraints:

1<iplno< 10000

Input Format:

Only line of input has single integer number that need to be converted.

Output Format:

In the First line of output print the octal number equivalent to the input value.

In the Second line of output print the hexadecimal number equivalent to the input value.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int iplno;

   cin>>iplno;

   cout.setf(ios::oct);

   cout<<oct<<iplno<<"\n";

   cout.setf(ios::hex);

   cout<<hex<<iplno;

            return 0;

}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
1953
```

EXPECTED OUTPUT

```
3641
7a1
```

Test Case 2

INPUT (STDIN)

```
8751
```

EXPECTED OUTPUT

```
21057
222f
```

3.Problem Description:

Akash the die heart fan of AR Rahman went to the live concert happened in Bangalore with his family members.

The event management firm responsible for the event arranged the seats for the audience in descending order of maximum number of tickets booked for single family.

As per the seating arrangement family with the highest number of people are allotted the seats in the front rows and the family with the lowest number of people are allotted the seats in the last row.

For the convenience of the seating arrangement volunteers to know how many seat need to be positioned in each row the event management firm have planned to develop the software which displays the exact seat layout if the total number of rows is provided.

Can you help them with the logic of doing so?

Constraints:

1 ≤ nooffamily members ≤ 20

Input Format:

Only line of input has single integer representing the total number of rows for the concert.

Output Format:

Print the seating arrangement layout based on the number of rows provided.

Refer sample testcases for format specification.

Code:

```
#include <iostream>

using namespace std;

int main()

{0

   int nooffamilymembers,i;

   cin>>nooffamilymembers;

   for(i=nooffamilymembers;i>=1;i--)

   {

      for(int j=1;j<=i; ++j)

      {

         cout<<i<<" ";

      }

      cout<<endl;

}
```

return 0;

}

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
11
```

EXPECTED OUTPUT

```
11 11 11 11 11 11 11 11 11 11 11
10 10 10 10 10 10 10 10 10 10
9 9 9 9 9 9 9 9 9
8 8 8 8 8 8 8 8
7 7 7 7 7 7 7
6 6 6 6 6 6
5 5 5 5 5
4 4 4 4
3 3 3
2 2
1
```

Test Case 2

INPUT (STDIN)

```
8
```

EXPECTED OUTPUT

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

4. Problem Description:

Laaysa with her friends going to the theatre for a movie.

The seating arrangement is triangular in size.

Theatre staffs insisted the audience to sit in odd row if the seat number is odd and in even row if the seat number is even.

But the instruction is very confusing for Laaysa and her friends.

So help them with the seating layout so that they can sit in correct seats.

Constraints:

4 ≤N≤ 20

Input Format:

Only line of input has single integer value representing the number of rows in the theatre.

Output Format:

Print the layout based on the number of rows specified in input.

Refer sample testcases for format specification.

Code:

```
#include <iostream>
using namespace std;
int main()
{
   int N,c;
   cin>>N;
   for(int i=1;i<=N;i++)
   {
      if(i%2==0)
      c=2;
      else
      c=1;
   for(int j=1;j<=i;j++)
   {
      cout<<c<<" ";
      c+=2;
```

```
}
cout<<endl;
}
return 0;
}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
7
```

EXPECTED OUTPUT

```
1
2 4
1 3 5
2 4 6 8
1 3 5 7 9
2 4 6 8 10 12
1 3 5 7 9 11 13
```

Test Case 2

INPUT (STDIN)

```
11
```

EXPECTED OUTPUT

```
1
2 4
1 3 5
2 4 6 8
1 3 5 7 9
2 4 6 8 10 12
1 3 5 7 9 11 13
2 4 6 8 10 12 14 16
1 3 5 7 9 11 13 15 17
2 4 6 8 10 12 14 16 18 20
1 3 5 7 9 11 13 15 17 19 21
```

5. Problem Description:

Omkar the Professor of a Famous Technical University have decided to give a simple task to his students.

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

But Professor Omkar's Students are Finding it difficult to find the solution to the problem.

Can you help them with the correct logic?

Functional Description:

The formula to compute the energy is as follows

Q = M* (finaltemp - Initialtemp) * 4184

Where,

M is the weight of water measured in kilograms,

Q is the energy measured in joules,

and

Temperatures are measured in degrees Celsius.

Constraints:

1<M<1000

0<initialtemp<25

0<finaltemp<75

Input Format:

Only Line of Input has three floating point values separated by a space representing M, initialtemp and finaltemp respectively.

Output Format:

In the only line of output print the required energy in joules.

Code:

```
#include <iostream>

using namespace std;

int main()

{           float Q;    int M,initialtemp,finaltemp;

   cin>>M>>initialtemp>>finaltemp;

   Q=M*(finaltemp-initialtemp)*4184;

   cout<<""<<Q;
```

return 0;

}

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
567 12 56
```

EXPECTED OUTPUT

```
1.04382e+08
```

Test Case 2

INPUT (STDIN)

```
734 0 37
```

EXPECTED OUTPUT

```
1.13629e+08
```

6. Problem Description:

Three brothers want to take a photo with family members. The photographer is capturing the photo from a long distance.

Some of the family members are standing behind that brothers and those people are not visible to the photographer.

So the photographer gets confused with the heights of three brothers.

To get clarity, he asked, "who is the tallest person among those three brothers? But no one responded clearly.

Can you help the photographer in finding the tallest among the three brothers?

Constraint:

60 ≤bro1 ≤ 80

60 ≤ bro2 ≤ 80

60 ≤ bro3 ≤ 80

Input Format:

The only line of Input has three numbers bro1,bro2 and bro3 of type Integers separated by a space which represents the height of three brothers.

Output Format:

Print the height of the tallest person among three brothers.

Code:

```
#include <iostream>

#include<iomanip>

using namespace std;

int main()

{

   int bro1,bro2,bro3;

   cin>>bro1>>bro2>>bro3;

   if(bro1>bro2 && bro1>bro3)

   cout<<bro1;

   else if(bro2>bro3 && bro2>bro1)

   cout<<bro2;

   else

   cout<<bro3;

            return 0;
```

}

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
61 70 79
```

EXPECTED OUTPUT

```
79
```

Test Case 2

INPUT (STDIN)

```
65 66 80
```

EXPECTED OUTPUT

```
80
```

7. Problem Description:

Siva and Guru are playing a mathematical game.

Guru says a random numbers to Siva and he needs to convert the numbers to words.

Since Guru is very fast in telling the numbers, Siva cant able to cope up with his friend in converting it to words.

Can you help Siva in converting the particular number to words by creating a simple programming logic.

Constraints:

1<N<1000

Input Format:

The Only line of input has a single Integer representing the number said by Guru.

Output Format:

In the only line of output print the number in words.

Refer the sample test cases for formatting.

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 10:
cout<<"Ten ";
break;
}
```

```
n=n/10;
}
}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
1894
```

EXPECTED OUTPUT

```
One Eight Nine Four
```

Test Case 2

INPUT (STDIN)

```
7631
```

EXPECTED OUTPUT

```
Seven Six Three One
```

8. Problem Description:

After completing some serious investigation, Arif and Simon are now chilling themselves in the Ooty hills. Very soon Simon became bored. Simon lived entirely for his profession. We know he is a workaholic. So Simon wants to stop his vacation and get back to work. But after a tiresome season, Arif is in no mood to return soon.

So to keep Simon engaged, he decided to give to pull the idea of restarting the admissions of the academy they started last year for the new academic year-2021.

Now Simon and Arif have decided to start the new admissions to the academy. As a part of the first round, the applied students had to solve a small puzzle. The puzzle was very simple. Arif has arranged N dummy statues in some order of height Hi.

Now Simon have made up the question asking to the applicants that In how many ways they can choose the sequence of consecutive dummy statues, where the tallest and shortest statue in the selected sequence is the same.

If you would like to get admission into his academy, your first step is to solve the question. Give it a try :)

Constraints:

1<t< 10.

1≤n≤ 100000

1≤|h|≤ 10^9

Input Formant:

First line of the input will contain t denoting the number of test-cases.

For every test case, first line will contain n. Next line will contain n space separated integers denoting h.

The input need not be in sorted order

Output Format:

Print the required answer in a separate line.

Code:

```
#include <iostream>

using namespace std;

int main()

{

int t,n,h,i,l=1,count;

cin>>t;

while(t--)

{

l=1;
```

```
count=0;
cin>>n;
for(i=1;i<=n;i++)
{
cin>>h;
if(h==l)
{
count+=2;
}
if(h>l)
{
l=h;
count++;
}
}
cout<<count<<endl;
}
return 0;
}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
3
1
5
3
1 5 7
4
3 2 5 3
```

EXPECTED OUTPUT

```
1
4
2
```

Test Case 2

INPUT (STDIN)

```
5
2
1 2
3
4 3 2
5
1 2 5 3 4
3
5 111
1
1000
```

EXPECTED OUTPUT

```
3
1
4
2
2000
```

9. Problem Description:

Ramesh is working in an engineering college hostel a Mess supervisor.

There are different messes available based on the years.

Every day students count is varying in all the hostels due to continuous holidays.

Since ramesh is in charge of the cooking team. He had trouble with calculating the quantity of food that needs to be prepared because of the varying student count.

Even if a small quantity of food is prepared by the cooking team, it should be divided equally among the number of Mess. Ramesh needs an automated software to identify the amount of food available (in number of packets) and Mess count.

Can you help him to divide the food equally and also calculating the remaining quantity of food that will be available after sharing the food equally ?

Constraints:

1≤ alvantoffood ≤10000

1<messcnt<20

Input Format:

Only line of input has two integers (alvantoffood, messcnt) separated by space representing the available number of food packets and the available number of messes respectively

Output Format:

In the only line of output print two values separated by a space representing the number of food packets that are equally shared by "n" number of messes and the remaining number of food packets available.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int alvqntoffood,messcnt,dividedqnt,remfood;

   cin>>alvqntoffood>>messcnt;

dividedqnt=alvqntoffood/messcnt;

remfood=alvqntoffood % messcnt;

   cout<<dividedqnt<<" "<<remfood;

            return 0;

}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
25575 5
```

EXPECTED OUTPUT

```
5115 0
```

Test Case 2

INPUT (STDIN)

```
7567 11
```

EXPECTED OUTPUT

```
687 10
```

10. Question description:

To celebrate the Reunion of 96 Batch of the Famous School the Ram and Jannu the organizers of the event decided to liters of Fruit Drinks.

However, an unexpected difficulty occurred in the shop: it turned out that Fruit Drinks is sold in bottles 0.5, 1 and 2 li volume.

At that, there are exactly a bottles 0.5 in volume, bone-liter bottles and c of two-liter ones.

The organizers have enough money to buy any amount of Fruit Drinks.

What did cause the heated arguments was how many bottles of every kind to buy, as this question is pivotal for the of Fruit Drinks among the Friends.

Your task is to count the number of all the possible ways to buy exactly n liters of Fruit Drinks and persuade the organ this number is too large.

All the bottles of Fruit Drinks are considered indistinguishable, i.e. two variants of buying are different from each othe they differ in the number of bottles of at least one kind.

Constraints:

$1 \leq n \leq 10000$

$0 \leq a, b, c < 5000$

Input Format:

The first line contains four integers representingn, a, b, c respectively.

Output Format:

Print the unique number representing the solution to the problem.

If it is impossible to buy exactly n liters of Fruit Drinks, print 0.

Code:

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

using namespace std;

class Drinks{

   int n,a,b,c,t,ans=0;

public:void Shop(){

      cin>>n>>a>>b>>c;

   }

   void display(){

      for(int i=0;i<=b;i++)

               for(int j=0;j<=c;j++)
```

```
            if(2*(n-i-j*2)>=0&&2*(n-i-j*2)<=a)
ans++;
            cout<<ans;
   }
};
int main(){
   Drinks Buy;
Buy.Shop();
Buy.display();
          return 0;
}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
25 10 5 10
```

EXPECTED OUTPUT

```
12
```

Test Case 2

INPUT (STDIN)

```
10 19 15 100
```

EXPECTED OUTPUT

```
35
```

11.Problem Description:

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?

Functional Description:

Input values need to be passed to the Parameterized constructor and to output need to be printed by accessing it.

Constraints:

1< roll ≤100

100 ≤ bcode< 999

Input Format:

First and Second Line of Input has 3 values of type integer, String and Integer separated by a space representing Roll Number,

Name and Book code respectively.

Output Format:

Print the Details of Student and Book in the expected format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>

#include <string>

using namespace std;

class library_A

{

public:

   string name;

   int roll,bookcode;

      void readinput()

      {

         cin>>roll>>name>>bookcode;

      }

      void library(int r,stringn,int code)
```

```
        {
            r=roll;
            n=name;
            code=bookcode;
        }
        void display()
        {
            int r=roll;string n=name;int code=bookcode;
            cout<<"Roll No:"<<r<<"\nName of the Student:"<<n<<"\nCode of Book Accessed:"<<code<<"\n";
        }
};
int main()
{
library_A lib1,lib2;
    lib1.readinput();
    lib2.readinput();
    lib1.display();
    lib2.display();
            return 0;
}
```

12. Problem Description:

Bhagavan the Government school teacher from Tamil Nadu 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?

Functional Description:

Bhagavan wanted to display his following details along with every student record.

name="Bhagavan"; roll-1593;height=172.5; weight=68.4;

Note: Use the Concept of Default Constructor to display it.

Constraints:

100 <roll <2000

100.0< height <190.0

50.0< weight <100.0

Input Format:

Only line of input has four values of tyle String, Integer, Float and Float separated by as space representing Name,Roll Number, Height and Weight of students respectively.

Output Format:

In First Line of output print the details collected from the student.

In Second Line of output print the default details of Teacher Bhagavan.

Code:

```
#include <iostream>

#include <string>

using namespace std;

class student

{

public:

   string name;

   int roll;
```

```
    float height,weight;
student(){name="Bhagavan";roll=1593;height=172.5;weight=60.4;}
        void readinput()
        {
            cin>>name;
            cin>>roll;
            cin>>height;
            cin>>weight;
        }
        void displaydata()
        {
            cout<<name<<" "<<roll<<" "<<height<<" "<<weight<<"\n";
        }
};
int main(){
    student s1,s2;
    s1.readinput();
    s1.displaydata();
    s2.displaydata();
return 0;
}
```

13. Problem Description:

Fahad is the owner of one of the biggest Super Market in the City.

Since the day Fahad has taken charge of the Super Market from his father he is trying hard to save unproductive time of their workers.

Workers of his super market is spending lots of time in calculating the prices of items purchased by the customers so the long people queue keeps forming.

So now is planned to create a software which gets the number of items, Item code and Price as from the staff and provide them the largest price among the items purchased and the sum of prices of all the items.

Since Fahad is not aware of the technical stuffs of implementation, can you help him with the programming logic for the software?

Constraints:

1<no_items<10

100<itemcode<500

1<itprice ≤ 1000

Input Format:

The first line of the input contain a single value of type integer representing no. of items N.

The next N lines contain two values of type integer and float separated by a space representing Item code and Item Price respectively.

Output Format:

Print the largest price among all items, the total price of all items, item code and price of all the items in the expected format.

Refer Sample Testcases for format specification.

Code:

```
#include <iostream>

using namespace std;

class ITEM

{

   public:

   int n;

   float large=0,summ=0;

   float arr[100],code[100];

   void getdata(int b){

      n=b;
```

```
    for(int i=0;i<n;i++)
    cin>>code[i]>>arr[i];
  }
  void largest(){
    for(int i=0;i<n;i++)
    {
      if (arr[i]>=large)
      large=arr[i];
    }
  }
  void sum(){
    for(int i=0;i<n;i++)
summ+=arr[i];
  }
  void displayitems(){
    cout<<"Largest Price="<<large<<endl;
    cout<<"Sum of Prices="<<summ<<endl;
    cout<<"Code and Price"<<endl;
    for(int i=0;i<n;i++)
    cout<<code[i]<<" and "<<arr[i]<<endl;
  }
};
int main()
{
  ITEM order;
  int b;
  cin>>b;
order.getdata(b);
order.largest();
        order.sum();
        order.displayitems();      return 0;          }
```

14. Problem Description:

Abi and Jannu are off to the wedding of a close relative. This time they have to travel without their guardians. Abi 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

14 8

9 16

1

2

17 24

3

... and so on

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

11B,

308,

4LB,

5MB,

6UB,

75L,

2MB, SLB, 10MB, ...

Here LB denotes lower berth, MB middle berth and UB upper berth.

The following berths are called Train-Partners:

3U8

1LB

SMB

4LB

75L

and the pattern is repeated for every set of 8 berths. Abi and Jannu are playing this game of finding the train partner of each berth. Can you write a program to do the same?

Constraints:

1 ≤ N≤ 500

Input Format:

First line of input has a single integer T representing the number of Testcases

Next T Line of input contain a single integer N, the berth number whose neighbor is to be found out

Output Format:

For each testcase T in a separate line output the berth number of the neighbor of the corresponding seat.

Code:

```
#include <iostream>
using namespace std;
class partner
{
   public:
   void findpartner()
   {
   int t;cin>>t;
            while(t--){
   int n;
   cin>>n;
   switch(n%8){
    case 0: cout<<(n-1)<<"SL"<<endl;
          break;
    case 1: cout<<(n+3)<<"LB"<<endl;
          break;
    case 2: cout<<(n+3)<<"MB"<<endl;
          break;
    case 3: cout<<(n+3)<<"UB"<<endl;
          break;
    case 4: cout<<(n-3)<<"LB"<<endl;
          break;
    case 5: cout<<(n-3)<<"MB"<<endl;
```

```
            break;
      case 6: cout<<(n-3)<<"UB"<<endl;
            break;
      case 7: cout<<(n+1)<<"SU"<<endl;
            break;
                }}}};
int main() {
   partner travel;
travel.findpartner();
   return 0;
}
```

15.Question description:

Indian Army have decided to create a group of innovative developments for Strengthen Cyber Security of Indian Army consisting from 5 to 7 people and hire new employees for it.

After placing an advertisement Indian Army received in resumes.

Now the Scrutinising Committee has to evaluate each possible group composition and select one of them.

Can you help Indian army people in counting the number of variants of group composition to evaluate.

Constraints:

7<n<800

Input Format:

The only line of the input contains one integer n representing the number of potential employees that sent resumes.

Output Format:

Output one Integer representing the number of different varlants of group composition.

Code:

```
#include <iostream>

using namespace std;

class IndianArmy

{

public:intResumesofCamdidates(){

      long long n;

      cin>>n;

      long long k=n*(n-1)*(n-2)*(n-3)*(n-4)/120;

      cout<<k+k*(n-5)/6+k*(n-5)*(n-6)/42;

   return 1;

   }

};

int main(){

IndianArmyGroupingofResumes;

GroupingofResumes.ResumesofCamdidates();

            return 0;

}
```

16.Question description:

Zaheer needs a fence around his farm, but he is too lazy to build it himself.

So he purchased a fence building robot.

He wants the fence to be a regular polygon.

The robot builds the fence along a single path, but it can only make fence corners at a single angle a.

Will the robot be able to build the fence Zaheer wants?

Constraints:

0</<200

0<a<180

Input Format:

The first line of Input contains an Integer / the number of tests.

Each of the following lines contains a single Integer a representing the angle the robot can make corners at measured in degrees.

Output Format:

For each test, output on a single line "YES" (without quotes), if the robot can build a fence Emuskald wants, and "NO" (without quotes), if I is impossible.

Code:

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

using namespace std;

class Farm

{   public:void Fence(){

   int t,a;

   cin>>t;

   while(t--)

   {

      cin>>a;

      if(360%(180-a)==0)

      {

         cout<<"YES"<<endl;

      }

      else{
```

```
            cout<<"NO"<<endl;
        }
    }
};
};
int main()
{   Farm robot;
robot.Fence();
    return 0;
}
```

17.Problem Description:

Tamilnadu land registration authority is panning to keep track of the native addresses and total area of the flats people have across the state.

Since the total population and area need to be monitored is huge. Government is looking for the software which does this task.

Can you help them with proper programming logic for implementing the same?

Constraints:

1≤ hno<500

1< no room<10

1≤ length < 50

1< breadth < 50

1≤ height < 50

Input Format:

The first line of the input contain a single string denoting the house name.

The second line of the input contain three values of type Integer String and String separated by a space representing house number, city and state respectively.

The third line of the input has a single Integer representing the number of rooms.

The subsequent lines of input must have length, breadth and height of each room

Output Format:

Print the details of the house in the expected format.

Refer Sample testcases for format specification.

Code:

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

#include <string.h>

using namespace std;

class house

{

   public:

    string  housename,cty,state;

    int hno,t,length,breadth,height,length1,breadth1,height1,length2,breadth2,height2;

   void input();

   void display();
```

```
};
void house::input()
{
    cin>>housename;
    cin>>hno>>cty>>state;
    cin>>t;
    cin>>length>>breadth>>height;
    cin>>length1>>breadth1>>height1;
    if(t==3)
    {
       cin>>length2>>breadth2>>height2;
    }
}
void house::display()
{
   cout<<"House name="<<housename<<"\nHouse No="<<hno<<"\nCity="<<cty<<"\nState="<<state<<"\n";
   cout<<"Detail of Room 1\n";
   cout<<"Length="<<length<<"\nBreadth="<<breadth<<"\nHeight="<<height<<endl;
   cout<<"Detail of Room 2\n";
   cout<<"Length="<<length1<<"\nBreadth="<<breadth1<<"\nHeight="<<height1<<endl;
   if(t==3)
   {
      cout<<"Detail of Room 3\n";
      cout<<"Length="<<length2<<"\nBreadth="<<breadth2<<"\nHeight="<<height2<<endl;
   }
}
int main()
{
   house s;
s.input();
s.display();          }
```

18. Problem Description:

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 number of consumed items from each category and calculate the remaining stock and print those details so that store keeper can order for those items.

Can you help them by developing the programming logic for satisfying their needs?

Function Description:

Use the concept of Functional Overloading to implement the task?

Constraints:

2000<side<7000

1≤ totalavi< 1500

1≤ consumed ≤1000

Input Format:

First Line of Input has a single value of type Integer representing item ID.

Second Line of Input has a single value of type integer representing Total Available Count of an Item

Third Line of Input has a single value of type Integer representing Total Consumed Count of an Item.

Output Format:

In the First Line of output print the Item ID.

In the Second Line of output print the remaining quantity of an item.

Code:

```
#include <iostream>
using namespace std;
class Store{
   public:
   void itemcount(int id){
      cout<<id<<endl;
   }
   void itemcount(int totalavl,int consumed){
      cout<<totalavl-consumed<<endl;
   }
};
int main()
```

```
{
   Store purchase;
   int id,totalavl,consumed;
   cin>>id>>totalavl>>consumed;
purchase.itemcount(id);
purchase.itemcount(totalavl,consumed);
            return 0;
}
```

19.Problem Description:

Janani the officer in City union bank is responsible for creating new accounts to its customers.

Initially she will open the zero balance account by default.

After one month she has to submit the account statement of the customers she has opened accounts to the circle office.

Can you help her with a programming logic which does the task?

Function Description:

Use the concept of constructor overloading to print the initial balance and the balance status of the account after a month which can be elther POSITIVE NEGATIVE or Zero.

Constraints:

0.00<balance<100000.00

Input Format:

Only line of input has a single value of type float representing the current balance of the account holder.

Output Format:

In the first line of output print as "Zero Balance"

In the second line of output print as "Has a Positive Balance" or "Has a Negative Balance" of "Has a Zero Balance" based on the condition.

Code:

```
#include <iostream>

using namespace std;

class AccBalance{

   public:

AccBalance(){cout<<"Zero Balance"<<endl;}

AccBalance(int balance){

      if(balance<0)

      cout<<"Has a Negative Balance";

      else if(balance==0)

      cout<<"Has a Zero Balance";

      else

      cout<<"Has a Positive Balance";

   }

};
```

```
int main()
{
AccBalancedefltBal;
   int balance;
   cin>>balance;
AccBalancecurrBal(balance);
            return 0;
}
```

20.Problem Description:

Admission for the current Academic year is happening in Most of the Universities across the Country.

Once the Students got admitted they are assigned a unique Registration Number

Admission in charges 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. Function Description:

The Concept of function overloading need to be used.

Input Format:

First line of Input has a single value of type string representing the name of student 1.

Second line of input has a single value of type Integer representing the id of student 1.

Third line of input has a single value of type Integer representing the id of student 2.

Fourth line of input has a single value of type string representing the name of student 2.

Output Format:

Print the details of students in the expected format.

Code:

```
#include <iostream>
using namespace std;
class Student
{
   public:
   void Identity(string name,int id){
      cout<<name<<" "<<id<<endl;
   }
   void Identity(int id,string name){
      cout<<name<<" "<<id<<endl;
   }
};
int main()
{
   Student Details;
```

```
    string name;
    int id;
    cin>>name>>id;
Details.Identity(name,id);
    cin>>id>>name;
Details.Identity(id,name);
            return 0;
}
```

21 Question Description:

Valentina has given a multiset that means a set that can contain multiple equal integers containing 2n Integers.

Determine if you can split it into exactly in pairs consists each element should be in exactly one pair.

So that the sum of the two elements in each pair is odd is divided by 2, the remainder is 1.

Constraints:

The Input consists of multiple test cases. The first line contains an integert the number of test cases. The description of the test cases follows.

The first line of each test case contains an integer 1.

The second line of each test case contains 2n Integers a 1,2,...,a2n the numbers in the set.

Input Format:

1<t< 100

1<s≤100

0<ai< 100

Output Format:

For each test case, print "Yes" if it can be split into exactly pairs so that the sum of the two elements in each pair Is odd, and "No" otherwise. You can print each letter in any case.

Code:

```
#include <iostream>

using namespace std;

int power(int x,int p);

int power(int x,inty,int p);

int main()

{

   int t;

   cin>>t;

   while(t--){

      int n,odd=0;

      cin>>n;

      int z=power(n,odd);

      power(n,z,1);
```

```
    }
            return 0;
}
int power(int x,int p){
    int a[2*x];
    for(int i=0;i<2*x;i++){
        cin>>a[i];
        if(a[i]%2==1)
        p++;
    }
    return p;
}
int power(int x,inty,int p){
    if(x==y)
    cout<<"Yes"<<endl;
    else
    cout<<"No"<<endl;
    return 1;
}
```

22.Problem Description:

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".

Function Description:

Use the concept of function overloading to complete the task.

Input Format:

First and Second Line of Input has a single value of type string representing the First Name of the User.

Third line of input has a single value of type string representing the last name of the user.

Output Format:

Print the output in the expected format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>

using namespace std;

class Welcomemsg{

   public:

   void msg(string fname){

      cout<<"Hi "<<fname<<endl;      }

   void msg(string fname,stringlname){

      cout<<"Welcome "<<fname<<" "<<lname;   }       };

int main(){

Welcomemsgob;

   string fname,lname;

   cin>>fname;

   ob.msg(fname);

   cin>>fname>>lname;

   ob.msg(fname,lname);

            return 0;              }
```

23.Problem Description:

Elavenil is the working in Survey of India, The National Survey and Mapping Organization of the country under the Department of Science & Technology, which is the oldest Scientific Department of the Government of INDIA. It was set up in 1767 and has evolved rich traditions over the years.

Now Elavenil has been assigned the task of Collecting the Area and Density Information of all the states of India from the local authorities of the respective states and to consolidate in a common portal of Government of INDIA.

Since the task assigned to her is highly complicated in nature she is seeking your help.

Can you help her?

Functional Description:

Use the Concept of Constructor Overloading to Complete the task.

Constraints:

1000 < area < 500000

50 < density ≤ 2000

Input Format:

Only Line of input has three values of type string, Integer and integer separated by a space representing Slate name, Area and Density of

State.

Output Format:

In four lines of output print the details of Country, State, Area and Density respectively in the expected format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>

using namespace std;

class Country{

  public:

  Country(){cout<<"Country:INDIA"<<endl;}

  Country(char statename[100],int area,int density)

  {

    cout<<"State:"<<statename<<endl<<"Area:"<<area<<endl<<"Density:"<<density<<endl;

  }

};

int main()
```

```
{
    Country country;
    char statename[100];
    int area,density;
    cin>>statename>>area>>density;
    Country statesofindia(statename,area,density);
            return 0;
}
```

24.Problem Description:

Harsh the HR of a Google HQ in Bangalore is looking for the automated appraisal management system.

The current salary of the employee is fixed and based on the results of the performance monitoring software the appraisal management system have to revise the salary of the employee.

Can you help Harsh

Functional Description:

Use the Constructor Overloading Concept to develop automated appraisal management system.

The Default Salary of employees is 30000.

Constraints:

30000<sal< 500000

Input Format:

Only line of input has a single value of type integer representing the New salary of the employee.

Output Format:

In the First Line of output print the Old salary of the employee.

In the Second Line of output print the New salary of the employee.

In the Third Line of output print the amount the employee got as hike.

Code:

```
#include <iostream>
using namespace std;
class Appraisal     {
   int sal;
   public:
   void out(){cin>>sal;cout<<"New Salary:"<<sal<<endl<<"You have the Hike of Rs."<<sal-30000<<endl;}
   Appraisal(){sal=30000;cout<<"Old Salary:"<<sal<<endl;}
   Appraisal(int sal){cout<<"";}
};
int main()            {
    Appraisal oldsalary;
oldsalary.out();    int sal=0;
    Appraisal newsalary(sal);
            return 0;             }
```

25.Question description

Saravanan wants to check his wrist watch time and clock in his car displayed a same time or not?

Constraints

0<hr<23

0<m<60

0<s<60

Input Format:

First line represent the Wristwatch's time

Second line represent the car's clock time

Output Format:

If time is same print, "Both clocks are showing the same time"

otherwise print, "Clocks are showing different times"

If the Invalid input, print "Invalid time format" and print the desired result in next line.

Code:

```
#include <iostream>
using namespace std;
class Time
{
   int h,m,s;
   public:
   Time(){cin>>h>>m>>s;}

void check()
{
   if(h>23||m>59||s>59)
   cout<<"Invalid time format\n";
}
bool operator ==(Time t2);
};
bool Time::operator==(Time t2)
{
```

```
    if(h==t2.h&&m==t2.m&&s==t2.s)
    return true;
    else
    return false;
}
int main()
{
    Time t1,t2;
    t1.check();
    t2.check();
    if(t1==t2)
    cout<<"Both clocks are showing the same time";
    else
    cout<<"Clocks are showing different times";
            return 0;
}
```

26.Question description:

Rahul and Ramesh are military officers. They are travelling to enjoy the vacation by train.

They are planned to play a game during their travel that they are interested in how many ways there are in scrambling the letters.

One fellow should said the length of the word added by 1 and other fellow should give the number of ways the letters to be scrambled.

For example, if suppose Rahul gave the length of the word is 6. Then Ramesh should be subtracted that 1 and calculate for the word's length as 6-1. He have 5 choices for the first letter, once he have chosen the first letter there are 4 choices for the second letter, and then three choices for the third letter, two for the fourth letter, and only one choice for the last letter. Hence there are 5(4)(3)(2)[1] =

5=120 choices.

Can you help them to verify the answer?

Constraints:

1<n<10

Input Format:

The only line of Input has one numbers n of type Integer.

Output Format:

Print the answer of the factorial of n-1.

Code:

```
#include <iostream>

using namespace std;

class Scrum{

  public:

  int n;

  Scrum(int h)

  {

    n=h;

  }

  Scrum operator -- (int)

  {

    Scrum T(int h);

    --n;
```

```
        return 1;
    }
    void display(){
        int res=1;
        for(int i=1;i<=n;i++){
            res=res*i;
        }
        cout<<res;
    }
};
int main()
{
    int n;
    cin>>n;
    Scrum T(n);
    T--;
T.display();
            return 0;
}
```

27. Question description

The Wonderking in Wonderland had a great friend called Wondermath a professor in mathematics. The king and the professor shared everything, they were same age, married same day, have same number of children etc.

To represent this friendship professor Wondermath introduced Amicable numbers, a pair who is friends like him and king.

Amicable numbers are a pair of numbers with the following property: the sum of all of the proper divisors of the first number (not including itself) exactly equals the second number while the sum of all of the proper divisors of the second number (not including itself)

likewise equals the first number.

To satisfy his friend Wonderking, professor wants to find many Amicable numbers before the tea time tomorrow. You must develop a program that declares a number is amicable or not in order to help professor WonderMath.

Constraints

$1 \leq n1, n2 < 8000$

Input Format

A single line input of two integers separated by a space

Output Format

If amicable numbers, print Friendly Pair. Otherwise print Not a Friendly Pair

Code:

```
#include <iostream>

using namespace std;

class compare{

  public:

  int first,sum1=0;

  compare(int x){

    first=x;

  }

  void f(){

    for(int i=1;i<=first/2;i++)

    {

      if(first%i==0)

      sum1=sum1+i;

    }
```

```
    }
    void operator ==(compare t2){
        if(first==t2.sum1&&t2.first==sum1)
        cout<<"Friendly Pair";
        else
        cout<<"Not a Friendly Pair";
    }
};
int main()
{
    int first,second;
    cin>>first;
    cin>>second;
    compare t1(first),t2(second);
    t1.f();
    t2.f();
    t1==t2;
            return 0;
}
```

28. Question description

The task is to overload the /operator to divide the fraction with other fraction. You can take the numerator as num and the denominator as deno.

Constraints

1<num, demo<10^7

Input Format

First line represents the value of numerator and the denominator of first fraction separated by a space

Second line represents the value of numerator and the denominator of second fraction separated by a space

Output Format

print the answer like below if denominator is 1:

Sum of Two Numbers: num

Otherwise

Sum of Two Numbers in the form of num/deno

Note: If the denominator of any one of the input fractions is zero, then the error message "Error" will be displayed.

Explanation:

Assume the values of first fraction ½/2 as 12

Similarly assume the values of second fraction as 1.3

As a result of division operation ½/2/% = 1/6

Code:

```
#include <iostream>
using namespace std;
class Fraction{
  public:
  int num,den;
  Fraction(int n=0,int d=0)
  {
    num=n;
    den=d;
  }
  Fraction operator /(Fraction const &obj){
  Fraction res;
```

```
res.num=num*obj.den;
res.den=den*obj.num;
   return res;
   }
   void display1(){
      cout<<num/den;
   }
   void display2(){
      cout<<num<<"/"<<den;
   }
   void display3(){
      cout<<"Error";
   }
};
int main()
{
   int a,b,c,d;
   cin>>a>>b;
   cin>>c>>d;
   Fraction ob1(a,b),ob2(c,d);
   Fraction ob3=ob1/ob2;
   if(ob1.den==0||ob2.den==0)
   {
      cout<<"Error";
      return 0;
   }
   if(ob3.den==1)
   ob3.display1();
   else
   {
      for(int i=2;i<50;i++)
```

```
        {
            if(ob3.num%i==0 && ob3.den%i==0)
            {
                ob3.num=ob3.num/i;
                ob3.den=ob3.den/i;
            }
        }
    ob3.display2();
    }
        return 0;
}
```

29. Question description:

Vijay have taken charge as the Dean of the famous Medical college recently.

After taking over the high profile job he decided to fix all the obstacles faced by the patients visiting the medical college in the past.

So he planned to create the automated Digital Display system which guides the incoming patients with the doctor who will take care of them and the bed numbers which are allocated to them.

Can you help Vijay in doing so?

Input Format:

First line of input has a single value of type string representing the name of the Doctor.

Second line of input has a single value of type string representing the Degree of the Doctor.

Third line of input has a single value of type string representing the name of the patient.

Third line of input has a single value of type integer representing the bed number of the patient.

Constraints:

100<bedno<500

Output Format:

Print the details for the patient in the expected format

Refer sample testcases for format specification.

Code:

```
#include <iostream>
using namespace std;
class doctor
{
   public:
   string name,degree,pname;
   int no;
   void getedu()
   {
      cin>>name>>degree>>pname;
   }
   void getdata()
   {
```

```
    cin>>no;
  }
  void dispedu()
  {
    cout<<"Doctor Name:"<<name<<endl<<"Doctorate Degree:"<<degree<<endl<<"Patient
Name:"<<pname<<endl;
  }
  void dispdata()
  {
    cout<<"Bed Number:"<<no<<endl;
  }
};
class patient:public doctor{
};
int main()
{
  patient p;
p.getedu();
p.getdata();
p.dispedu();
p.dispdata();
        return 0;
}
```

30. Question description:

Shalini is an designer in a spare ports manufacturing firm.

During her designing process she used to calculate the perimeter of different part of equipment she needs to design in a 3D environment and update in her design book.

But it often leads to confusion during design import process.

So to avoid confusion she is looking for the automated perimeter measurement tool.

So she will be happy if you can help her with such as tool.

Can you do it?

Constraints:

100<length<5000

100<breadth≤5000

Input Format:

Only line of input has a two value of type integer representing length and breadth measurements respectively.

Output format:

Print the perimeter based on the measurements provided by Shalini

Code:

```
#include <iostream>

using namespace std;

class ReceiveMesurement {

  public:

    int l,b,r;

  void perimeter()

  {

    cin>>l>>b;

    r=l+b+l+b;

    cout<<r<<endl;          }         };

class CalculatePerimeter : public ReceiveMesurement{          };

int main()

{

CalculatePerimeter mt;

mt.perimeter();   return 0;          }
```

31. Question description:

Radhakrishnan works in a famous School as a maths teacher.

He has completed the geometry principles portion of the previous session.

He intends to prepare a question in order to find an isosceles.

He will give the students some random numbers and they need to determine if those coordinates can form an isosceles triangle.

Please assist the students in solving the problem.

Constraints:

1<side 1≤100

1≤side2<100

1≤side3≤100

Input Format:

First line : Side 1

Second line : Side 2

Third line : Side 3

Output format:

Print "ISOSCELES" or "NOT ISOSCELES" based on the coordinates.

Code:

```
#include <iostream>

using namespace std;

class triangle

{

   public:

      int a,b,c;

      void read(){

         cin>>a>>b>>c;

      }

      void check(){

         if(a==b||b==c||a==c){

            cout<<"ISOSCELES";

         }
```

```
            else{
                cout<<"NOT ISOSCELES";
            }
        }
};
class isosceles : public triangle {
};
int main()
{
    isosceles obj;
obj.read();
obj.check();
                return 0;
}
```

32. Question description:

Janani is an architect.

During her designing process she used to calculate the area of different parts of the house and update in her design book.

But it often leads to confusion during design finalisation due to some mistakes in area calculation.

So to avoid confusion she is looking for the automated area measurement tool.

So she will be happy if you can help her with such as tool.

Can you do it?

Constraints:

100<length<5000

100<breadth<5000

Input Format:

Only line of input has a two value of type integer representing length and breadth measurements respectively.

Output format:

Print the area based on the measurements provided by Janani

Code:

```
#include <iostream>

using namespace std;

class ReceiveMesurement {

  public:

    int l,b,a;

    void area(){

      cin>>l>>b;

      a=l*b;

      cout<<a;

    }   };

class CalculateArea : public ReceiveMesurement {    };

int main()          {

CalculateArea mt;

mt.area();

          return 0;          }
```

33. Question description:

Fazil is running a typewriting practice classes for students.

He trains the students and conducts frequent assessments for each of them.

Subsequently the students performing well will be awarded the certificated of completion.

Recently he conducted one such assessment and many students attended the assessment.

Now he is processing the result to prepare the certificate for the ones qualified.

Since the number of student attended the exam is huge he is looking for the automated program which provides the details of the students and their typing speed in a format expected by him for certificate preparation.

Can you help him?

Input Format:

First line of input has a single value of type string representing the name of the Typist.

Second line of input has a single value of type integer representing the code of the Typist

Third line of input has a single value of type integer representing the speed of the Typist.

Constraints:

100<speed<1000

100<code<1000

Output Format:

Print the details for the typist in the expected format

Refer sample testcases for format specification.

Code:

```
#include <iostream>
using namespace std;
class staff{
   public:
      string name;
      int code,speed;
      void getdata();
      void display();
};
void staff::getdata(){
   cin>>name>>code>>speed;
```

```
}
void staff::display(){
   cout<<"Name:"<<name<<endl<<"Code:"<<code<<endl<<"Speed:"<<speed<<endl;
}
class typist: public staff{
   public:
   void getdata();
   void display();
};
void typist::getdata(){
   cin>>name>>code>>speed;
}
void typist::display(){
   cout<<"Name:"<<name<<endl<<"Code:"<<code<<endl<<"Speed:"<<speed;
}
int main()
{
   typist t;
t.getdata();
t.display();
            return 0;
}
```

34. Question description:

The calendar allows us to plan our travel and work schedule effectively.

Jai on seeing one such calendar thought of determining the Day using a single value "n" representing the nth day in the week.

Going one step more he is interested in creating a programming logic for the same. After learning quite a bit of programming he even done it successfully.

Can you do the same?

Constraints:

1<n<7

Input Format:

Only line of input has a single value of type integer representing n.

Output format:

In the only line of output print the day of the week.

Code:

```
#include <iostream>

using namespace std;

class Date{

  public:

    int date;


  void day(){

    cin>>date;

  }

  void display(){

    switch(date)

    {

      case 1:

        cout<<"Monday";

        break;

      case 2:

        cout<<"Tuesday";
```

```
            break;
        case 3:
            cout<<"Wednesday";
            break;
        case 4:
            cout<<"Thursday";
            break;
        case 5:
            cout<<"Friday";
            break;
        case 6:
            cout<<"Saturday";
            break;
        case 7:
            cout<<"Sunday";
            break;
      }
   }
};
class check : public Date{
};
int main()
{
   check obj;
obj.day();
obj.display();
            return 0;
}
```

35. Question Description:

Devarajan already staying rental house, He wants to move to his own house in Mumbai city.

So he wants to paint a rental house due to his house owner request the rooms of the house are rectangle shape.

So you have to measure the painting area and total painting cost.

Constraints:

1<width<100000

1<height<100000

Input Format:

First line of input has a single value of type integer representing width.

Second line of input has a single value of type integer representing height.

Output Format:

Print the result as total area and total paint cost:.

Refer sample testcases for format specification.

Code:

```
#include <iostream>

using namespace std;

class Shape {

   public:

      void setWidth(int w){

         cin>>w;

         width=w;

      }

      void setHeight(int h){

         cin>>h;

         height=h;

      }

      protected:

         int width;

         int height;

};

class PaintCost {
```

```
   public:
      int getCost(int area) {
         return area*70;
      }
};
class Rectangle:publicShape,publicPaintCost {
   public:
      int getArea(){
         return (width * height);
      }
};
int main(void){
   Rectangle Rect;
   int area;
Rect.setWidth(0);
Rect.setHeight(0);
   area = Rect.getArea();
   cout<<"Total area:"<<Rect.getArea()<<endl<<"Total paint cost:$"<<Rect.getCost(area)<<endl;
   return 0;
}
```

36. Question description:

Gokul is going to celebrate his daughter's tenth birthday this week.

He bought a watch as a present to his daughter.

He wanted to show the time in a digital format, unfortunately, he bought an analog watch.

He can't exchange or return the watch as per the watch showroom terms and conditions.

Can you help him to show the time in a digital format?

Constraints:

1<hr≤12

1<min<60

1<sec<60

Input Format:

First line of input has a single value of type integer representing Hour.

Second line of input has a single value of type integer representing Minutes.

Third line of input has a single value of type integer representing Seconds.

Output format:

In the only line of output print the time in digital format.

Code:

```
#include <iostream>
using namespace std;
class Time {
   public:
      int h,m,s;
      void intime(){
         cin>>h>>m>>s;       }
      void outtime(){
         cout<<h<<":"<<m<<":"<<s<<endl;       }          };
class addTime : public Time {          };
int main()           {
addTime T;
T.intime();
T.outtime();         return 0;             }
```

37. Question Description:

Analia is developing an application to help customers who come to her supermarkets such as the price of the item that customers buy and display each item's price, the subtotal of the sale, the amount of sales tax, and the total.

Assume the sales tax is 6%. So you have help to Analia holds the prices of the five items in five variables.

Constraints:

1<itemOne< 100000

1<itemTwo≤100000

1<Price of itemThree ≤100000

1<Price of item Four ≤100000

1<Price of itemFive<100000

Input Format:

First line of input has a single value of type integer representing Price of itemOne.

Second line of input has a single value of type integer representing Price of item Two. Third line of input has a single value of type integer representing Price of itemThree. Fourth line of input has a single value of type integer representing Price of item Four.

Fifth line of input has a single value of type integer representing Price of itemFive.

Output Format:

Print the result as per format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>

#include <iomanip>

using namespace std;

class market {

   public:

      int a1,a2,a3,a4,a5;

      void items(){

         cin>>a1>>a2>>a3>>a4>>a5;

      }

      void buy(){

         float tax,tot,st;

st=a1+a2+a3+a4+a5;
```

```
        tax=st*6/100;
        tot=st+tax;

cout<<"Subtotal=$"<<st<<endl<<"Tax=$"<<setprecision(7)<<tax<<endl<<"Total=$"<<setprecision(7)<<tot<<endl;
    }
};
class customer:public market {
};
int main()
{
   customer c;
c.items();
c.buy();
          return 0;
}
```

38. Question Description:

Purushothaman trying a non-empty string is called palindrome if it reads the same from the left to the right and from the right to the left. For example, "abcba", "a", and "abba" are palindromes, while "abab" and "XY" are not.

A string is called a substring of another string if it can be obtained from that string by dropping some (possibly zero) number of characters from the beginning and from the end of it. For example, "ABC", "ab", and "c" are substrings of the string "ABC", while "ac" and "d" are not.

Let's define a palindromic count of the string as the number of its substrings that are palindromes. For example, the palindromic count of the string "aaa" is 6 because all its substrings are palindromes, and the palindromic count of the string "ABC" is 3 because only its substrings of length 1 are palindromes.

You are given a strings. You can arbitrarily rearrange its characters. Your goal is to obtain a string with the maximum possible value of palindromic count.

Constraints:

1<n<100000

Input Format:

The first line contains an integer n the length of string s.

The second line contains strings that consists of exactly n lowercase characters of the Latin alphabet.

Output Format:

Print string t, which consists of the same set of characters (and each character appears exactly the same number of times) as string s. Moreover, t should have the maximum possible value of palindromic count among all such strings.

If there are multiple such strings, print any of them.

Code:

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

using namespace std;

class passPal

{

   public:

      int n;

      void count()

      {

                  cin>>n;

      }

};

class arbitrary:publicpassPal
```

```
{
   public:
     void goal()
     {
            char c[100000];
                  cin>>c;
                  sort(c,c+n);
                  cout<<c;
     }
};
int main(){
   arbitrary a;
a.count();
a.goal();
}
```

39. Question description:

Young Varun has a birthday today! He got kit of n cubes as a birthday present from his parents. Every cube has a number ai, which is written on it.

Varun put all the cubes in a row and went to unpack other presents.

In this time, Varun's elder brother, Saran reordered the cubes using the following rule. Suppose the cubes are numbered from 1 to n in

their order.

Saran performs several steps, on step i he reverses the segment of cubes from ith to (n-i+ 1)-th. He does this while i≤ n-i+ 1.

After performing the operations Saran went away, being very proud of himself.

When Varun returned to his cubes, he understood that their order was changed.

Help Varun as fast as you can and save the holiday - restore the initial order of the cubes using information of their current location.

Constraints:

1 ≤n≤2.10

- 10^9 ≤ a,≤ 10^9

Input Format:

The first line contains single integer n representing the number of cubes.

The second line contains n integers ₁, 2, an where a; is the number written on the ith cube after Saran has changed their order.

Output Format:

Print n integers, separated by spaces - the numbers written on the cubes in their initial order.

Code:

```
#include <iostream>

using namespace std;

class Gift {

public:virtual void Cubes()=0;

};

class Birthday:public Gift{

   public:

   int a[10],n;

   void Cubes(){
```

```
        cin>>n;
        for(int i=0;i<n;i++)
        cin>>a[i];
        for(int i=0;i<n/2;i+=2)
        /*int temp=a[i];
        a[i]=a[n-i-1;
        a[n-i-1]=temp;*/
        swap(a[i],a[n-i-1]);
        for(int i=0;i<n;i++)
        cout<<a[i]<<" ";
    }
};
int main()
{
    Birthday obj;
obj.Cubes();
            return 0;
}
```

40. Question description

Balaji's n friends are planning to spend the night at his house. Balaji has n beds standing in a row and m pillows (n≤m).

Each friend needs a bed and at least one pillow to sleep, however, everyone wants as many pillows as possible.

Of course, it's not always possible to share pillows equally, but any friend gets hurt if he has at least two pillows less than some of his neighbors have.

Balaji will sleep on the kth bed in the row.

What is the maximum number of pillows he can have so that every friend has at least one pillow, every pillow is given to some friend and no one is hurt?

Constraints:

$1 \le n \le m \le 10^9$

1≤ksn

Input Format:

The only line contain three integers n, m and k representing the number of hobbits, the number of pillows and the number of Balaji's bed.

Output Format:

Print single integer representing the maximum number of pillows Balaji can have so that no one is hurt.

Code:

```
#include <iostream>

using namespace std;

class StayatHome {

public:virtual void Beds()=0;

};

class Friends:publicStayatHome{

   public:

      int n,m,k,a=1,c=1;

      void Beds() {

         cin>>n>>m>>k;

         m-=n;

         while(m>0){

            if(k+a<=n) c++;

            if(k-a>=1) c++;
```

```
            m-=c;
            a++;
          }
          cout<<a;
       }
};
int main()
{
   Friends obj;
obj.Beds();
            return 0;
}
```

41. Question description:

Idumban Karri's friend Soman Santhavan given him two integers n and k.

Soman asked Idumban to find k-th smallest divisor of n, or report that it doesn't exist.

Divisor of n is any such natural number, that n can be divided by it without remainder.

Constraints:

$1 \leq n \leq 1015$

$1 \leq k s 10^9$

Input Format:

The first line contains two integers n and k

Output Format:If n has less than k divisors, output-1.

Code:

```
#include <iostream>
using namespace std;
class Problem {
public:virtual void Divisor()=0;
};
class Calculation:public Problem {
   public:
   int n,k,i;
   void Divisor(){
      cin>>n>>k;
   }
   int Display()
   {
      int count;
      for(i=1;i<=n;++i)
      {
         if(n%i==0)
         {
            count++;
            if(count==k){
```

```
                cout<<i;
                return 1;
              }
           }
        }
        cout<<-1;
        return 1;
    }
};
int main()
{
    Calculation obj;
obj.Divisor();
obj.Display();
              return 0;
}
```

42. Question description:

Ravindran is working in a famous Multinational IT Firm.

He has been recently assigned the task of collecting salary details of the employees in the company.

The Company has two categories of Employees namely Developer and Driver.

The final statistics needs to be submitted to the CEO of the company today.

Since the number of people working in the firm is huge Ravindran is finding it difficult to format the data.

Can you help Ravindran in preparation of the information?

Constraints:

1000 ≤salary≤150000

Input Format:

First line of input has a single value of type integer representing the salary of Developer.

Second line of input has a single value of type integer representing the salary of Driver.

Output Format:

Print the Employee Salary details as per the format

Refer sample testcases for Format Specification.

Code:

```
#include <iostream>
using namespace std;
class Employee{
   public:
   int s1,s2;
};
class Developer : public Employee{
   public:
   void getSalary(){
      cin>>s1;
      cout<<"Salary of Developer:"<<s1<<endl;
   }
};
class Driver : public Employee{
   public:
```

```
    void getSalary(){
        cin>>s2;
        cout<<"Salary of Driver:"<<s2<<endl;
    }
};
int main()
{
    Developer d1;
    Driver d2;
    d1.getSalary();
    d2.getSalary();
            return 0;
}
```

43. Question description:

Fazil owns a Super Market in the location which is the heart of the city.

So people who visits his Super market are always in a hurry and dosen't have patience to wait in the Bill counter.

So to avoid loosing customers Fazil is looking for the automated programming logic which can get the details of the purchase and estimate the total price of the purchase.

Constraints:

1≤code≤500

1≤qty≤1000

1<price<10000

Input Format:

First line of input has a single value of type string representing the Name of the Customer.

Second line of input has a single value of type Integer representing the Item code.

Third line of input has a single value of type Integer representing the Telephone number of the Customer.

Fourth line of input has a single value of type Integer representing the quantity of the item purchased by the Customer.

Fifth line of input has a single value of type Integer representing the price of the item purchased by the Customer.

Output Format:

Print the Bill as per the format

Refer sample testcases for Format Specification.

Code:

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

```
    int code;
    long tel;
    int quan,price;
    void getdata(){
        cin>>name>>code;
        cin>>tel;
        cin>>quan;
        cin>>price;
    }
    void display(){
        cout<<"Name : "<<name<<endl<<"Code : "<<code<<endl<<"Telephone : "<<tel<<endl;
        cout<<"Quantity : "<<quan<<endl<<"Price : "<<price<<endl<<"Total Price : "<<quan*price<<endl;
    }
};
int main()
{
    consumer* o1;
    transaction o2;
    o1=&o2;
    o1->getdata();
    o1->display();
            return 0;
}
```

44. Question description

In Italy it is the holiday of equality.

In honor of the holiday the king decided to equalize the welfare of all citizens in Italy by the expense of the state treasury.

Totally in Italy there are n citizens, the welfare of each of them is estimated as the integer in a; Euro.

Johan is the royal treasurer, which needs to count the minimum charges of the kingdom on the king's present.

The king can only give money, he hasn't a power to take away them.

Constraints:

1≤n≤ 100

0≤ a,≤ 106

Input Format:

The first line contains the integer n representing the number of citizens in the kingdom.

The second line contains n integers ₁, 2,..., an, where a, representing the welfare of the ith citizen.

Output Format:

In the only line print the integer S representing the minimum number of burles which are had to spend.

Code:

```
#include <iostream>
using namespace std;
int a,b,c,d,i;
class Holiday{
public:virtual void Expenses()=0;
};
class Citizen:public Holiday{
   public:
   void Expenses(){
      cin>>c;
      for(i=0;i<c;i++){
         cin>>a;
         if(d<a)d=a;
         b=b+a;
      }
```

```
        cout<<d*c-b;
    }
};
int main()
{
    Citizen obj;
obj.Expenses();
            return 0;
}
```

45. Question description

Salman is learning how to convert numbers from the decimal system to any other, however, he doesn't know English letters, so he writes any number only as a decimal number, it means that instead of the letter A he will write the number 10.

Thus, by converting the number 475 from decimal to hexadecimal system, he gets 11311 (475=1-162 +13-16^1 +11.16%).

Salman lived calmly until he tried to convert the number back to the decimal number system.

Salman remembers that he worked with little numbers so he asks to find the minimum decimal number so that by converting it to the system with the base n he will get the number k.

Constraints:

$2 \leq n \leq 10^9$

$0 \leq k < 1060$

$0 \leq x \leq 1018$

Input Format:

The first line contains the integer n.

The second line contains the integer k.

It is guaranteed that the number k contains no more than 60 symbols.

All digits in the second line are strictly less than n.

The number k doesn't contain leading zeros.

Output Format:

Print the number x representing the answer to the problem.

Code:

```
#include<iostream>

#include<string>

using namespace std;

class Conversion

{

public:virtual void Number()=0;

};

class NumberSystem:public Conversion {

   public:

   void Number(){
```

```
    string s;
    long longn,cur,ans,mul,last;
    cin>>n>>s;
            last=s.size()-1;
            mul=1;
            while(last>=0)
            {
                    for (int i=0;i<=last;i++)
                    {
                            if (s[i]=='0' &&i!=last) continue;
                            cur=0;
                            for (int j=i;j<=last;j++)
                            {
                                    cur=cur*10+(s[j]-'0');
                                    if (cur>=n) break;
                            }
                            if (cur<n)
                            {

                                    ans=ans+mul*cur;
                                    mul*=n; ;
                                    last=i-1;
                            }}}
            cout<<ans-2<<endl;
    }};
int main()
{
NumberSystem obj;
obj.Number();
}
```

46. Question description:

Omkar is mad about coding, that is why he writes encoded messages.

He calls the median letter in a word the letter which is in the middle of the word.

If the word's length is even, the median letter is the left of the two middle letters.

In the following examples, the median letter is highlighted: contest, info.

If the word consists of single letter, then according to above definition this letter is the median letter.

Omkar encodes each word in the following way: he writes down the median letter of the word, then deletes it and repeats the process until there are no letters left.

You are given an encoding s of some word, your task is to decode it.

Constraints:

1 ≤n≤2000

Input Format:

The first line contains a positive integer n representing the length of the encoded word.

The second line contains the strings of length in consisting of lowercase English letters - the encoding.

Output Format:

Print the word that Omkar encoded.

Code:

```
#include <iostream>
#include <string>
using namespace std;
class Decode{
public:virtual void Convert()=0;
};
class Word:public Decode{
   public:
   string s1,s2;
   int n;
   void Convert(){
      cin>>n>>s1;
      for(int i=0;i<n;i++){
         if((n-i)%2==1)
```

```
                s2=s2+s1[i];
                else
                s2=s1[i]+s2;
        }
        cout<<s2;
    }
};
int main()
{
    Word obj;
obj.Convert();
}
```

47. Question description:

Yasir has a lemons, b apples and c pears.

He decided to cook a compote. According to the recipe the fruits should be in the ratio 1: 2: 4.

It means that for each lemon in the compote should be exactly 2 apples and exactly 4 pears. You can't crumble up, break up or cut these fruits into pieces.

These fruits - lemons, apples and pears should be put in the compote as whole fruits.

Your task is to determine the maximum total number of lemons, apples and pears from which Yasir can cook the compote.

It is possible that Yasir can't use any fruits, in this case print 0.

Constraints:

$1 \leq a,b,c \leq 1000$

Input Format:

The first line contains the positive integer a representing the number of lemons Yasir has.

The second line contains the positive integer b representing the number of apples Yasir has.

The third line contains the positive integer c representing the number of pears Yasir has.

Output Format:

Print the maximum total number of lemons, apples and pears from which Yasir can cook the compote.

Code:

```
#include <iostream>
using namespace std;
class Cooking {
public:virtual void recipe()=0;
};
class FruitsRatio:public Cooking{
  public:
  int a,b,c;
  void recipe(){
        cin>>a>>b>>c;
        cout<<7*min(a,min(b/2,c/4));
  }
```

```
};


int main()
{
FruitsRatio obj;
obj.recipe();
        return 0;
}
```

48. Question description:

Since the day Niraj Chopra have Won GOLD in Tokyo Olympics the grace for Javelin have been huge among youths.

Rohan the Javelin Coach in the city is so excited about it and the number of students joining his coaching centre is increasing day by

day.

So Rohan has bought n number of Javelin for the Students he coaches.

Assume One Javelin costs x rupees.

Now Rohan would like to know the total cost of the Javelin

Can you help Rohan ?

Constraints:

1<numofjavelin<1000

1<priceofavelin<50000

Input Format:

Only line of input has two values of type integer representing the number of Javelin purchased by Rohan and the cost of one quantity of Javelin respectively.

Output Format:

In the only line of output print the total cost of Javelins purchased by Rohan.

Code:

```
#include <iostream>

using namespace std;

template <class T>

T Javelin(T qnt,T price)

{

   return qnt*price;

}

int main()

{

   int numofjavelin,priceofavelin;

   cin>>numofjavelin>>priceofavelin;

   cout<<numofjavelin*priceofavelin;

   Javelin(numofjavelin,priceofavelin);

            return 0;             }
```

49. Question description:

Janani had trouble falling asleep, and she got bored of counting Stars when she was seven.

To make herself engaged tonight she imagined that all Dogs were here to steal her, and she was fighting them off.

Every k-th Dog got punched in the face with a frying pan.

Every /th Dog got his tail shut into the balcony door.

Every m-th Dog got his paws trampled with sharp heels.

Finally, she threatened every nth Dog to call her mom, and he withdrew in panic.

How many imaginary Dogs suffered moral or physical damage tonight, if Janani counted a total of d Dog?

Constraints:

1 ≤k, l, m, n ≤ 10

1≤d≤ 105

Input Format:

Input data contains integer numbers k, l, m, n and d, each number in a separate line

Output Format:

In the only line of output print the number of damaged dogs.

Code:

```
#include <iostream>
using namespace std;
template <class LackofSleep>
LackofSleep Counting(LackofSleepk,LackofSleepl,LackofSleepm,LackofSleepn,LackofSleep d)
{           int c=0;
   for(int i=0;i<=d;i++){
      if(i%k==0||i%l==0||i%m==0||i%n==0)
c++;
}           return c-1;         }
int main()          {
   int k,l,m,n,d;
   cin>>k>>l>>m>>n>>d;
   cout<<Counting(k,l,m,n,d);
           return 0;           }
```

50. Question Description:

Hameed and Zaheer were involved in the discussion on cricket.

Each of them says their favourite cricketers names respectively.

Now both Hameed and Zaheer would like to interchange the names of their favourite cricketer.

But both of them don't have any idea of how to interchange the names.

Can you help them to complete the interchanging process?

Input Format:

Only line of input has two values of type string representing the name of their favourite players said by Hameed and Zaheer respectively.

Output Format:

Print the names of the players after interchanging.

Code:

```
#include <iostream>

using namespace std;

template <class T>

void InterchangeFavPlayers(T &player1,T &player2){

   cout<<player2<<" "<<player1;

}

int main()

{

   string player1,player2;

   cin>>player1>>player2;

InterchangeFavPlayers(player1,player2);

            return 0;

}
```

51. Question description:

Rome the capital city of Lazio Region is rectangular in shape with the size nxm meters.

On the occasion of the POPE's Birthday Celebration, a decision was taken to pave the Square with square granite flagstones. Each

flagstone is of the size ax a.

Now Rommi who lives in Rome would like to know the least number of flagstones needed to pave the Square?

It's allowed to cover the surface larger than Rome, but the Square has to be covered.

It's not allowed to break the flagstones. T

he sides of flagstones should be parallel to the sides of the Square.

Constraints:

0≤n, m≤ 105

Input Format:

The input contains three positive integer numbers in the first line: n, m and aThe numbers a, b and c can coincide.

Output Format:

Print the number of flagstones needed.

Code:

```
#include <iostream>
using namespace std;
template <class Celebration>
Celebration Rome(Celebration a,Celebrationb,Celebration c){
   cout<<((b+c-1)/c)*((a+c-1)/c);
   return 1;
}
int main()
{
   int a,b,c;
   cin>>a>>b>>c;
   Rome(a,b,c);
          return 0;
}
```

52. Question description:

As a result of the recent Taliban Attack on Afgan Magical Clock the Central attraction of the city Kabul is damaged.

The bullets of the gun made several holes in the clock, that's why the residents are concerned about the repair.

The Magical clock can be represented as an infinite Cartesian plane, where the origin corresponds to the clock center. The clock was

painted two colors black and white.

This coloring naturally extends to infinity.

The bullet can be taken to be points on the plane.

Your task is to find the color of the area, damaged by the given ball.

All the points located on the border of one of the areas have to be considered painted black.

Constraints:

Each of the numbers x and y has an absolute value that does not exceed 1000.

Input Format:

The first and single line contains two integers x and y representing the coordinates of the hole made in the clock by the ball.

Output Format:

In a single line print the color.

All the points between which and the origin of coordinates the distance is integral-value are painted black.

Code:

```
#include <iostream>

#include <cmath>

using namespace std;

template <class Hole>

Hole MagicClocl(Hole x,Hole y){

   int c;

   c=sqrt(x*x+y*y);

   if(c*c==x*x+y*y){

      cout<<"black\n";

      return 0;

   }

   if(x*y<0)
```

```
c++;
   if(c%2==0)
   cout<<"black";
   else cout<<"white";
   return 1;
}
int main()
{
   int x,y;
   cin>>x>>y;
MagicClocl(x,y);
            return 0;
}
```

53. Question description:

Zaheer is an higher secondary school maths teacher.

In his last class he he thought his students the factorial and the way to calculate the same.

So in todays class he assigned his student the task of writing a programming logic for implementing the factorial calculation.

Can you help the students in doing the same?

Input Format:

Only line of input has a single value representing the input.

Output Format:

Print either the result of the factorial calculation and throw the error message if anything other than the integer is provided as input.

Refer sample testcases for format specification.

Code:

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

#include <string.h>

using namespace std;

int main()

{

   int k;

   try

   {

      cin>>k;

      if(cin)

      cout<<fixed<<setprecision(0)<<tgamma(k+1);

      else

      throw "e";

   }

   catch (int i){    }

   catch (const char *exp)

   {         cout<<"Input should be a Integer";              }

  return 0;

   }
```

54. Question description:

Bharat loves to experiment with strings and one fine day he decided to check if two names matches with each other.

So he now tried to create a programming logic for the same but finding it difficult.

Can you help the students in doing the same?

Input Format:

First line of input has the first name

Second line of input has the second name

Output Format:

If name 1 = name 2 print name 1 is name 2

If name 1 1= name 2 print name 1 is not name 2

And throw the error message "Inappropriate Input" if anything other than the string is provided as input.

Refer sample testcases for format specification.

Code:

```
#include <iostream>
using namespace std;
int main()
{
   string str1,str2;
   try
   {
      cin>>str1>>str2;
      int count, n=str1.size();
      if(cin)
      {
         for(int i=0;i<n;i++)
         {
            if((str1[i]>=48 && str1[i]<=57) || (str2[i]>=48&&str2[i]<=57) )
            throw 0;
            if(str1[i]==str2[i])
            count++;
```

```
            }
            if(count!=n)
            cout<<str1<<" is not "<<str2;
            else
            cout<<str1<<" is "<<str2;
        }
    }
        catch (int i)
        {
            cout<<"Inappropriate Input";
        }
        return 0;
}
```

55. Question description:

Dino is an DTP operator in the Document formating firm.

The document processor Dino uses accepts only characters which are alphabetic in nature.

If the character is not alphabetic it is not accepted by the document processor.

Can you help Dino in finding the nature of the characters in the document Dino is working with?

Input Format:

First line of input has a single value of type integer representing the number of testcases.

Second line of input has the string to be checked in the document.

Output Format:

Print the relevant message for the input string.

Refer sample testcases for format specification.

Code:

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

#define f(i,a,n) for(i=a;i<n;i++)

using namespace std;

int main()            {

   int t,i,j;

   cin>>t;

   string str;

   f(j,0,t)

   {

      f(i,0,2){

         try{

            cin>>str[i];

            if(isalpha(str[i]))

            cout<<str[i]<<" is alphabetic"<<endl;

            else

            throw str[i];

         }

         catch (char f){

            cout<<f<<" is not alphabetic"<<endl;          }          }          }          }
```

56. Problem Description:

Binita is playing a chess. The game will be played on a rectangular grid consisting of N rows and M columns. Initially all the cells of the grid are uncolored.

Binita's initial score is zero. At each turn, he chooses some cell that is yet not colored, and colors that cell. The score obtained in this step will be number of neighboring colored cells of the cell that Binita colored in this step.

Two cells are neighbors of each other if they share a side between them. The game will end when all the cells are colored. Finally, total score obtained at the end of the game will sum of score obtained in each turn.

Binita wants to know what maximum score he can get? Can you please help him in finding this out?

Constraints:

1 ≤N, M≤ 50

Input Format:

The Only line of input contains two space-separated integers N, M denoting the dimensions of the grid.

Output Format:

Print the output a single line containing an integer corresponding to the maximal possible score Binita can obtain.

Code:

```
#include <iostream>

using namespace std;

int main() {

   int n,m;

   try{

      cin>>n;

      cin>>m;

      if(cin){

         cout<<n-1+(1+2*(n-1))*(m-1);

      }

      else

      throw 0;

   }

   catch(int griddimensions)

   {

      cout<<"Invalid Grid Dimensions";    }

   return 0; }
```

57. Problem Description:

Jannu and Preethi both went to Egypt for visiting Pyramids.

On seeing the Pyramids they were in discussion.

During the discussion Jannu asked Preethi, what will be the area of this Pyramid.

Preethi have no idea about it.

Can you help Preethi in calculating the area of this Pyramid?

Functional Description:

Area = (height * base)/2

Constraints:

1 <= height <= 500

1 <= base <= 500

Input Format:

The only line of input has two floating point values representing height and base respectively separated by a space.

Output Format:

In the only line of output print the area of the pyramid with only three values after decimal point.

Code:

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

using namespace std;

int main()            {

  float height,base;

  try{

    cin>>height;

    cin>>base;

    if(cin){

      cout<<fixed<<setprecision(3)<<base*height/2;

    }

    else

    throw 0;

  }

  catch(int cal)    {

    cout<<"Incomplete Information";          }            return 0;            }
```

58. Question description

Vijayan the Mathematics Professor has his own belief that only +,-./ and * are valid operators.

Now he given the students the set of numbers and operators his students to check whether the given operator is valid or not.

Function Description

Based on the result of the operation print the result or exception based on the condition.

Constraints

1<op1≤1000

1<op2≤1000

Input Format:

Only line of input has Operand1 Operator and Operand 2 separated by as space.

Output Format:

Print the result of the operation or relevant exception message accordingly.

Print 5 values after decimal point if the result of the operation have a decimal point.

Code:

```
#include <iostream>
using namespace std;
int main()
{
   char opr;
   float op1,op2;
   try{
      cin>>op1>>opr>>op2;
      if(cin){
         if(opr=='+')
         { cout<<op1<<"+"<<op2<<"="<<op1+op2;}
         else if(opr=='-')
         { cout<<op1<<"-"<<op2<<"="<<op1-op2;}
         else if(opr=='/')
         { cout<<op1<<"/"<<op2<<"="<<op1/op2;}
         else if(opr=='*')
```

```
        { cout<<op1<<"*"<<op2<<"="<<op1*op2;}
        else
        { cout<<"Operation Error "<<opr<<" is not a valid operator";}
    }else
    throw "Operation Error & is not a valid operator";
}catch(int op)
{
    cout<<"Opertion Error"<<opr<<" is not a valid operator";}return 0;}
```

59. Problem Description:

Phoenix mall in the capital city of Washington and it is rectangular in shape when it is seen on the map with the size n x m meters.

On the occasion of the jubilee anniversary, a decision was taken to pave the Square with square marbles stones. Each stone is of the size axa.

Can you find what is the least number of stones needed to pave the Square?

It's allowed to cover the surface larger than the Mall Square, but the Square has to be covered.

It's not allowed to break the stones.

The sides of stones should be side by side(parallel) to the sides of the Square.

Constraints:

1 ≤n ≤ 10^9

1 ≤m≤ 10^9

1 ≤a≤ 10^9

Input Format:

The only line of input contains three positive integer numbers n, m and a separated by a space.

Output Format:

Print the needed number of stones.

If any of the input values n or m or a is missing in the input then raise the exception message as "Invalid Dimension".

Code:

```
#include <iostream>

using namespace std;

int main()            {

   int n,m,a;

   try{

      cin>>n>>m>>a;

      if(cin){

         cout<<((n+a-1)/a)*((m+a-1)/a);

      }

      else

      throw 0;     }

   catch(int dimension)  {       cout<<"Invalid Dimension";       }            return 0;             }
```

60. Problem Description:

Tina's trainer have given her two positive integers U and V. Now her task is ti find the number of pairs of positive integers (X,Y) such that 1<x<U, 1sY<V and X+Y is even.

Tina is finding difficult to understand the problem.

Can you help her solving the problem?

Constraints

1<U,V<75

Input Format:

The only line of each test case contains two space-separated integers U and V.

Output Format:

In the only line of output print a single line containing one integer that represents the the number of valid pairs.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int U,V;

   try{

      cin>>U>>V;

      if(cin){

         cout<<U*V/2+((U%2)*(V%2));

      }

   else

   throw 0;

}

catch(int Number)

{

   cout<<"Insufficient Input Data";

}

            return 0;

}
```

61. Question description:

Virat in his recent examination got very bad marks in algebra again. To avoid such unpleasant events in future he decided to train his arithmetic skills. He wrote four integer numbers a, b, c, d on the blackboard.

During each of the next three minutes he took two numbers from the blackboard (not necessarily adjacent) and replaced them with their sum or their product. In the end he got one number.

Unfortunately, due to the awful memory he forgot that number, but he remembers four original numbers, sequence of the operations and his surprise because of the very small result.

Help Virat remember the forgotten number to find the smallest number that can be obtained from the original numbers by the given sequence of operations.

Constraints:

0≤ a, b, c, d≤ 1000

Input Format:

First line contains four integers separated by space representing the the original numbers.

Second line contains three signs ('+' or '*' each) separated by space representing the sequence of the operations in the order of performing. ("+' stands for addition, *** - multiplication)

Output Format:

Output one integer number representing the minimal result which can be obtained.

Code:

```
#include <bits/stdc++.h>
 using namespace std;
 long longans=1e15;
 deque<char>Operations(20);
 void solve(vector<long long>a,int id){
    if((int)a.size()==1){
ans=min(ans,a[0]);
        return;   }
        for(int i=0;i<(int)a.size();i++){
           for(int j=0;j<i;j++){
              vector<long long> b;
              if(Operations[id]=='+') b.push_back(a[i]+a[j]);
              else b.push_back(a[i]*a[j]);
              for(int k=0;k<(int)a.size();k++){
```

```
                if(k!=i&& k!=j) b.push_back(a[k]);


            }
            solve(b,id+1);
          }
        }
}
int main() {
   vector<long long>numbers(4);
   for(int i=0;i<4;i++) cin>>numbers[i];
   for(int i=0;i<3;i++) cin>>Operations[i];
   solve(numbers,0);   cout<<ans;
   return 0;
}
```

62. Question description:

Winter in Spain is such a beautiful time of the year!

Tina is walking in the forest and picking a bouquet from fallen leaves. Tina is very choosy, she doesn't take a leaf if it matches the color and the species of the tree of one of the leaves she already has.

Find out how many leaves Tina has picked.

Constraints:

1≤n≤100

Input Format:

The first line contains an integer n representing the number of leaves Tina has found.

The next n lines contain the leaves' descriptions.

Each leaf is characterized by the species of the tree it has fallen from and by the color.

The species of the trees and colors are given in names, consisting of no more than 10 lowercase Latin letters.

A name can not be an empty string.

The species of a tree and the color are given in each line separated by a space.

Output Format:

Output the single number representing the number of Tina's leaves.

Code:

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
   int n;
   cin>>n;
   set<pair<string,string>>Descriptionofleaves;
   string species,color;
   while(n--){
      cin>>species>>color;
Descriptionofleaves.insert(make_pair(species,color));
   }
   cout<<Descriptionofleaves.size();
            return 0;             }
```

63. Question description:

The kindergarten instructor will assign homework to the students.

The forms must be made out of thermocol.

The teacher, on the other hand, is required to make the shapes according to the measurements.

Please assist them in correctly forming the forms.

Input Format:

Only line of input has a 4 value of type integer representing width of rectangle, height of rectangle, width of triangle and height of triangle respectively.

Output Format:

Print the results as per format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>
using namespace std;
class polygon{
   public:
};
class rectangle : public polygon{
   public:
   int e,f;
   void input(int a,int b){
      e=a;
      f=b;
      cout<<"Area of Rectangle: "<<e*f<<endl;
   }
};
class triangle : public polygon{
   public:
   int g,h;
   void  input(int c,int d){
      g=c;
```

```
        h=d;
        cout<<"Area of Triangle: "<<(g*h)/2<<endl;
    }
};
int main()
{
    int a,b,c,d;
    cin>>a>>b;
    cin>>c>>d;
    rectangle rect;
rect.input(a,b);
    triangle tri;
tri.input(c,d);
            return 0;
}
```

64. Question description:

Ragu requires basic staff information in order to properly maintain the files.

He's going to make a Google spreadsheet.

The sequence of the Google sheet is as follows: first name, last name, gender, college name, and category.

Please assist him in preparing the data collection sheets.

Input Format:

First Line: First name

Second Line: Last name

Third Line: Sex

Fourth Line: Age

Fifth Line: Institution

Sixth Line : Degree

Output Format:

Print the results as per format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>
#include <bits/stdc++.h>
using namespace std;
class person
{
   private:
      char fname[100],lname[100],gender[10];
   protected:
      int age;
   public:
      void input_person();
      void display_person();
};
class student: public person
{
```

```
    private:
        char college_name[100];
        char level[20];
    public:
        void input_student();
        void display_student();
};
void person::input_person(){
    cin>>fname>>lname>>gender>>age;
}
void person::display_person()
{
    cout<<"First Name:"<<fname<<endl;
    cout<<"Last Name:"<<lname<<endl;
    cout<<"Gender:"<<gender<<endl;
    cout<<"Age:"<<age<<endl;
}
void student::input_student()
{
    person::input_person();
    cin>>college_name>>level;
}
void student::display_student()
{           person::display_person();
            cout<<"College:"<<college_name<<endl;
             cout<<"Level:"<<level<<endl;        }
int main()          {
    student s;
s.input_student();
s.display_student();
            return 0;           }
```

65. Question description:

In a bank, different customers have savings account.

Some customers may have taken a loan from the bank. So bank always maintains information about bank depositors and borrow owers.

Design a Base class Customer (name, phone-number).

Derive a class Depositor(accno, balance) from Customer.

Again, derive a class Borrower (loan-no, loan-amt) from Depositor.

Write necessary member functions to read and display the details of 'n'

Input Format:

First Line: N representing number of testcases

Second Line: Customer name

Third Line: Customer mobile number

Forth Line: Customer Acc number

Fifth Line: Customer balance

Sixth Line: Customer Loan number

Seventh Line: Loan amount

Output Format:

Print the results as per format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>
using namespace std;
class customer{
   public:
   int no;
   long long int moblie;
   string name;
   void acceptc(){
      cin>>name>>moblie>>no;
   }        };
class deposit:public customer{
```

```
    public:
    int bal;
    void acceptd(){
        cin>>bal;
    }
    void dispd(){
        cout<<"Customer Name:"<<name<<endl;
        cout<<"Customer Phone No:"<<moblie<<endl;
        cout<<"Customer A/c No:"<<no<<endl;
        cout<<"Balance:"<<bal<<endl;
    }       };
class borrow:public deposit{
    public:
    long long int loan_no,amt;
    void acceptb(){
        cin>>loan_no>>amt;
    }
    void dispb(){
        cout<<"Loan No:"<<loan_no<<endl;
        cout<<"Loan Amount:"<<amt<<endl;
    }       };
int main(){
    int n;
    cin>>n;
    borrow b1[n];
    for(int i=0;i<n;i++){
        b1[i].acceptc();
        b1[i].acceptd();
        b1[i].acceptb();
        b1[i].dispd();
        b1[i].dispb();          }           return 0;           }
```

66. Question description:

Roahn and Lokesh are very close friends, they cannot go and play games during this lockdown.

So they planned to play puzzle games in the home itself.

Roahn gives a number to Lokesh and he has to find the answer for the number he is getting from Roahn.

Can you help him to finish the game efficiently?

Constraints:

1<number<1000

Input Format:

Only line of input has a single value of type integer representing the number provided by Rohan.

Output format:

In the first line of output print square of the number.

In the second line of output print cube of the number.

Code:

```
#include <iostream>

#include <cmath>

using namespace std;

class top{

};

class middle : public top

{

};

class bottom :public middle

{

   public:

   int a;

   void getdata(){

      cin>>a;

   }


   void square(){

      int b=2;
```

```
        int s=pow(a,b);
        cout<<s<<endl;
    }
    void cube(){
        int d=3;
        int c=pow(a,d);
        cout<<c;
    }
};
int main()
{
    bottom calc;
calc.getdata();
calc.square();
calc.cube();
            return 0;
}
```

67. Question description:

Ravindran is employed in a multinational production firm as a general manager.

He uses software to generate his salary slips every month.

The programme unexpectedly crashed, so Ravindran is having an issue with completing the salary slip on time.

As a result, he desires to prepare the salary slip in the following order.

Please assist him in preparing the salary slip so that he may submit it on time.

Input Format:

First Line: Employee Code

Second Line: Employee Name

Third Line: Employee Role

Forth Line: Employee Basic Pay

Fifth Line: Employee HRA

Sixth Line: Employee DA

Seventh Line: Employee PF

Output Format:

Print the results as per format.

Refer sample testcases for format specification.

Code:

```
#include <bits/stdc++.h>
#include <strings.h>
using namespace std;
class Employee
{
   public:
};
class Salary : public Employee
{
   public:
    int netpay,bs,hra,da,pf,empcode;
    string empname,emprole;
   void getEmpDetails()
```

```
    {
        cin>>empcode>>empname>>emprole;
    }
    void getPayDetails()
    {
        cin>>bs>>hra>>da>>pf;
    }
    void calculate()
    {
netpay=bs+hra+da-pf;
    }
    void display()
    {
        cout<<"Employee Number:"<<empcode<<endl;
        cout<<"Employee Name:"<<empname<<endl;
        cout<<"Employee Role:"<<emprole<<endl;
        cout<<"Employee Net Pay:"<<netpay<<endl;
    }
};
int main()
{
    Salary s;
s.getEmpDetails();
s.getPayDetails();
s.calculate();
s.display();
            return 0;
}
```

68. Question description:

Harish is a first-year engineering student in the CSE department.

He is not a programming expert, so he intends to enrol in a class to learn the language.

His instructor used CPP to complete all layers of the inheritance notion.

He received a sample programme from his instructor and began seeking for a solution.

Please assist Harish in completing the programme.

Please assist them in correctly forming the forms.

Input Format:

Only line of input has a 4 value of type integer representing number 1, number 2, number 3 and number 4 respectively.

Output Format:

Print the results as per format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>

using namespace std;

class arithmetic

{

  public:

};

class plus1:public arithmetic

{

  public:

    void getdata()

    {


    }

    void add()

    {

      int num1,num2;

      cin>>num1>>num2;
```

```
        cout<<"Sum of "<<num1<<" and "<<num2<<" is:"<<num1+num2<<endl;
      }
};
class minus1
{
 public:
};
class result:public plus1, public minus1
{
 public:
   void sub()
   {
      int num3,num4;
      cin>>num3>>num4;
      cout<<"Difference of "<<num3<<" and "<<num4<<" is:"<<num3-num4<<endl;
   }
};
int main()
{
   result z;
z.getdata();
z.add();
z.sub();
            return 0;
}
```

69. Question description:

Arjun have taken charge as the Dean of the famous Medical college recently.

After taking over the high profile job he decided to fix all the obstacles faced by the patients visiting the medical college in the past.

So he planned to create the automates the billing process for the the incoming patients with details such as ward number, bed number, number of days admitted and room charge per day.

Can you help Arjun in doing so?

Input Format:

The first line of input has a single value of type integer representing the number of patients.

For each test case that follows:

The First line of input has five values of type string representing the name of the patient.

The Second line of input has a single value of type integer representing age of the patient.

The Third line of input has a single value of type string representing the sex of the patient.

The fourth line of input has a single value of type string representing the ward number of the patient. The fifth line of input has a single value of type string representing the bed number of the patient.

The sixth line of input has a single value of type string representing the room charge per day.

The seventh line of input has a single value of type string representing the number of days patient admitted in hospital.

Output Format:

Print the output in the expected format.

Refer sample testcases for format specification.

Code:

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

using namespace std;

class Patient

{

    char patient_name[100],sex[50];

    int age;

    public:

        void accept_patient_details()

        {

            cin>>patient_name>>age>>sex;
```

```
        }
        void display_patient_details()
        {
            cout<<"\nPatient Name:"<<patient_name<<"\nPatient Age:"<<age<<"\nSex:"<<sex;
        }
};
class IPD
{
    int ward_no,bed_no,charge_per_day;
  public:
    void accept_ipd_details()
    {
        cin>>ward_no>>bed_no>>charge_per_day;
    }
    void display_ipd_details()
    {
        cout<<"\nWard No:"<<ward_no<<"\nBed No:"<<bed_no<<"\nCharge Per Day:"<<charge_per_day;
    }
};
class IPDPatient : public IPD, public Patient
{
    int no_of_days_admitted;
  public:
    void accept_ipd_patient_details()
    {
accept_patient_details();
accept_ipd_details();
        cin>>no_of_days_admitted;
    }
    void display_ipd_patient_details()
    {
```

```
display_patient_details();
display_ipd_details();
            cout<<"\nNo. of Days Admitted:"<<no_of_days_admitted;
      }
};
int main()
{
IPDPatient *ipdt;
      int i,cnt;
      cin>>cnt;
ipdt=new IPDPatient[cnt];
      for(i=0;i<cnt;i++)
      {
ipdt[i].accept_ipd_patient_details();
ipdt[i].display_ipd_patient_details();
      }
      return 0;
}
```

70. Problem Description:

Swathy and Nancy were selected for SpaceYprogramme which was about to take place the next year in their interview they were struck with the question.

The question is that if the floating number is given they have to create a code to display the rightmost integer from the integer part of the number.

If they have the logic for the code they will be the part of the digital meter designing for the Spacey Mars launch which was their dream.

Can you help them with a logic of the code for the criteria given to them?

Constraints:

25.0000 ≤ spacenum< 999.0000

Input Format:

Only Line of Input has single value of type float.

Output Format:

Print the rightmost integer from the input value.

Explanation:

If the input is given 124.34, then the output to be displayed is 4 (i.e) Before decimal the integral part is 124, in that last digit is 4.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   float spacenum;

   int digit,d;

   cin>>spacenum;

   d=spacenum;

   digit = d %10;

   cout<<digit;

            return 0;

}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
345.476
```

EXPECTED OUTPUT

```
5
```

Test Case 2

INPUT (STDIN)

```
759.231
```

EXPECTED OUTPUT

```
9
```

71. Problem Description:

A team from the Royal Squatraclub had planned to conduct a rally to create awareness among the Pune people to donate eyes. They conducted the rally successfully.

Many of the Pune people realised it and came forward to donate their eyes to the nearby Hospitals. The eligibility criteria for donating eyes is people should be above 18 and his her weight should be above 40.

There was a huge crowd and the staff in the eye donation centre found it difficult to manage the crowd.

So they decided to keep a system and ask the people to enter their age and weight in a system.

If a person is eligible he/she will be allowed inside.

Help the blood bank staffs to pick the eligible people for blood donation.

Constraints:

$1 \leq people\_age \leq 120$

$25 \leq weight \leq 85$

Input format:

Only line of input has two integer values separated by a space representing people_age and weight.

Output Format:

Print as either "Eligible for Donation" or "Not Eligible for Donation" based on the condition.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int people_age,weight;

   cin>>people_age>>weight;

   if(people_age>18 && weight>40)

   cout<<"Eligible for Donation";

   else

   cout<<"Not Eligible for Donation";

            return 0;

}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
39 52
```

EXPECTED OUTPUT

```
Eligible for Donation
```

Test Case 2

INPUT (STDIN)

```
14 89
```

EXPECTED OUTPUT

```
Not Eligible for Donation
```

72. Problem Description:

Johnson was working as a Captain of the Giant Ship.

He was traveling from India to various countries around the world.

The days of the travel may differ from one country to another.

To plan the upcoming travel the Johnson captain of the ship wold like to know the travel days in the year:month:day format.

Can you help Johnson?

Constraints:

1 <= ndays<= 15000

Input Format:

The only line of input has single integer representing the number days the ship was travelling.

Output Format:

Print the result in the prescribed format.

Refer sample testcases for format specifications.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int ndays,y,m,d;

   cin>>ndays;

   y=ndays/365;

   d=ndays%365;

   m=(ndays%365)/30;

   d=((d%365)%30);

   cout<<y<<" Y(s) "<<m<<" M(s) "<<d<<" D(s)";

            return 0;

}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
8721
```

EXPECTED OUTPUT

```
23 Y(s) 10 M(s) 26 D(s)
```

Test Case 2

INPUT (STDIN)

```
9451
```

EXPECTED OUTPUT

```
25 Y(s) 10 M(s) 26 D(s)
```

73. Problem Description:

2022 was approaching and the world was about to end. So 2 gods Shiva and Jesus created the Cyberverse.

But this time disappointed with humans both the gods decided not to have humans in this world.

So they created a world of cyborgs.

A world without humans. Isn't it interesting? So let us dive into the cyberverse and have a look at their problems.

There are N kid cyborgs with Chief Cyborg '100gods' and he has K weapons with him.

He wants to distribute those K weapons among N kid cyborgs.

Since all the kid cyborgs are very good friends, so they set a rule among themselves for taking those weapons. The rule states that the difference between kid cyborg having the maximum weapons and the kid cyborg having minimum weapons

should be less than or equal to 1.

Find the value of the minimum number of weapons a kid cyborg can have when all the K weapons are distributed among them.

Constraints:

$1<N<500$

$1\leq k\leq 1000$

Input Format:

Only line of input will contain two space-separated integers denoting N and K respectively.

Output Format:

Output a single line containing an integer X denoting the minimum number of weapons a kid cyborg can have in that test case.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int n,k,weapons;

   cin>>n>>k;

   weapons=k/n;

   cout<<weapons;

            return 0;

}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
29 326
```

EXPECTED OUTPUT

```
11
```

Test Case 2

INPUT (STDIN)

```
127 895
```

EXPECTED OUTPUT

```
7
```

74. Problem Description:

Arul and Kani own the farm in the beautiful location of the city were lot of cows was roaming around.

One day Arul and Kani was out of the city.

On that day cows have eaten the grasses in the farm which is circular in structure.

Whem Arul and Kani reached the location they were shocked to see the grass being eaten by crows.

Now they wold like to know for how much area and circumference of the farm the cows have eaten the grass.

Can you help them finding it.

Functional Description:

Circumference = 2*π*r

Area =π *r*r

π = 3.14

Constraints:

1.00 <=rad <=100.00

Input Format:

The only line of the input represents the radius of the circle of type float.

Output Format:

Print the area in the first line and circumference in the second line with only 2 values after decimal point

Code:

```
#include <iostream>
#include <iomanip>
using namespace std;
int main()          {
   float rad;
   float PI=3.14,area,ci;
   cin>>rad;
   area=PI*rad*rad;
   ci=2*PI*rad;
   cout<<setprecision(7)<<area<<endl;
   cout<<setprecision(5)<<ci<<endl;
   cout<<setprecision(2);
          return 0;
```

}

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
78.6
```

EXPECTED OUTPUT

```
19398.79
493.61
```

Test Case 2

INPUT (STDIN)

```
91.3
```

EXPECTED OUTPUT

```
26174.07
573.36
```

75. Problem Description:

Surya was used to wear a smartwatch when he was in the Treadmill and during Cycling.

Surya's Smart watch displays the total workout time in seconds.

But Surya would like to know the time he spent for workout in H:M:S format.

Can you help surya in knowing the time he spent on workout in the prescribed format?

Constraints:

1 <= sec <= 10000

Input Format:

The only line of output represents the workout timing in seconds

Output Format:

In the only line of output print the workout timing of surya in the prescribed format.

Refer sample testcases for format specification.

Code:

```
#include <iostream>
using namespace std;
int main()
{
   int sec,h,m,s;
   int mi;
   cin>>sec;
   m=sec/60;   h=m/60;   s=sec%60;   mi=m%60;
   cout<<h<<"H:"<<mi<<"M:"<<s<<"S";
            return 0;
}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
7845
```

EXPECTED OUTPUT

```
2H:10M:45S
```

Test Case 2

INPUT (STDIN)

```
9871
```

EXPECTED OUTPUT

```
2H:44M:31S
```

76. Question Description:

Krisnes have an unlimited number of coins with values 1,2,...,n. You want to select some set of coins having the total value of S.

It is allowed to have multiple coins with the same value in the set. What is the minimum number of coins required to get sum S?

Constraints:

1≤n≤100000

1<s≤10^9

Input Format:

The only line of the input contains two integers n and S

Output Format:

Print exactly one integer the minimum number of coins required to obtain sum S.

Code:

```
#include <cmath>
#include <iostream>
using namespace std;
class getInput {
   public:
      int n,s,t;
      void read() {
         cin>>n>>s;
         t=s/n;         }
      void write() {
         cout<<round(t)+1;
      }     };
class Divide:publicgetInput {           };
int main(){
   Divide div;
div.read();
div.write();
            return 0;
```

}

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
100000 1
```

EXPECTED OUTPUT

```
1
```

Test Case 2

INPUT (STDIN)

```
14969 66991573
```

EXPECTED OUTPUT

```
4476
```

77. Question Description:

Vivek's house is an array consisting of n elements (yeah, this is the first problem, I think, where someone lives in the array). There are heaters in some positions of the array. The i-th element of the array is 1 if there is a heater in the position i, otherwise, the i-th element of

the array is 0.

Each heater has a valuer (r is the same for all heaters). This value means that the heater at position pos can warm up all the elements in the range [pos-r+1;pos+r-1].

Vivek likes to walk through his house while he thinks, and he hates the cold positions of his house. Vivek wants to switch some of his

heaters on in such a way that each element of his house will be warmed up by at least one heater.

Vivek's target is to warm up the whole house (all the elements of the array), i.e. if n=6, r=2 and heaters are at positions 2 and 5, then Vivek can warm up the whole house if he switches all the heaters in the house on (then the first 3 elements will be warmed up by the first heater and the last 3 elements will be warmed up by the second heater).

Initially, all the heaters are off.

But on the other hand, Vivek didn't like to pay much for the electricity. So he wants to switch the minimum number of heaters on in such a way that each element of his house is warmed up by at least one heater.

Your task is to find this number of heaters or say that it is impossible to warm up the whole house.

Constraints:

1≤n,r≤1000

0<a,i< 1

Input Format:

The first line of the input contains two integers n and r the number of elements in the array and the value of heaters.

The second line contains n integers al, a2,...,an the Vivek's house description.

Output Format:

Print one integer the minimum number of heaters needed to warm up the whole house or -1 if it is impossible to do it.

Code:

```
#include<iostream>

int r,p,q,c,i,b;

class house

{

   public:
```

```
    void position()
    {
       std::cin>>r>>r;
       while(std::cin>>b){
          if(b)p=i+r;
          if(++i==q+r)
          {
             if(p==q)break;q=p;++c;
          }
       }
    }
};
class heaters:public house
{
   public:
      void range()
      {
printf("%d",i>p?-1:i>q?c+1:c);
      }
};
int main()
{
   heaters ht;
ht.position();
ht.range();
}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
7 3
1 1 1 1 1 0 0
```

EXPECTED OUTPUT

```
2
```

Test Case 2

INPUT (STDIN)

```
25 12
0 1 1 0 1 0 1 0 1 0 0 1 1 0 1 0 1 1 1 1 0 0 1 0
0
```

EXPECTED OUTPUT

```
2
```

78. Question Description:

Gabbi has given a grid, consisting of 2 rows and n columns. Each cell of this grid should be colored either black or white.

Two cells are considered neighbors if they have a common border and share the same color. Two cells A and B belong to the samame component if they are neighbors, or if there is a neighbor of A that belongs to the same component with B.

Let's call some coloring beautiful if it has exactly k components.

Count the number of beautiful colorings. The number can be big enough, so print the answer modulo 998244353.

Constraints:

$1 \le n \le 1000$

$1 < k < 2n$

Input Format:

The only line contains two integers n and k the number of columns in a grid and the number of components required.

Output Format:

Print a single integer - the number of beautiful bicolorings modulo 998244353.

Code:

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

using namespace std;

#define M 998244353

long long A[1010][2010],B[1010][2010];

class coloring

{

  public:

  void black(){

  int n,k;

        cin>>n>>k;

        A[1][1] = 2;

        B[1][2] = 2;

        for(int i=2;i<=n;i++)

        {

              for(int j=1;j<=2*i;j++)
```

```
                {
                        A[i][j] = (A[i-1][j-1]+A[i-1][j] + 2*B[i-1][j])%M;
                        B[i][j] = (2*A[i-1][j-1] + B[i-1][j] + B[i-1][j-2])%M;
                }
        }
                cout<<(A[n][k]+B[n][k])%M;
}
};
class border:public coloring
{
   public:
   void white(){
   }
};
int main()
{
   border bd;
bd.black();
bd.white();
}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
10 15
```

EXPECTED OUTPUT

```
872
```

Test Case 2

INPUT (STDIN)

```
23 3
```

EXPECTED OUTPUT

```
312158
```

79. Question description:

Fazil is an athlete from his school time. Now he joined his under graduation in a famous institution which motivates students who are in sports. The Institution even provides scholarships for the sports quota.

So Fazil planned to apply for the scholarship for which he needs to calculate the percentage which considers the marks of CT1,CT2 and

his Sports Performance marks.

Can you help Fazil by calculating the same?

Constraints:

1<m1≤100

1<m2≤100

1<sm≤100

Input Format:

First line Reg.Number

Second line : CT1 Mark

Third line : CT2 Mark

Fourth line: Sports Mark

Output format:

In the first line of output print the Reg.Number

In the second line of output print the total marks

In the third line of output print the percentage.

Code:

```
#include <iostream>
using namespace std;
class student {
  public:
    int reg,ct1,ct2,sm;
    float tot,per;
    void get() {
      cin>>reg>>ct1>>ct2>>sm;
    }
    void getsm() {
```

```
        tot=ct1+ct2+sm;
        per=tot/3;
    }
    void display() {
        cout<<reg<<endl<<tot<<endl<<per<<endl;
    }
};
class sports {
  public:

};
class statement:publicstudent,public sports {
};
int main()
{
  statement obj;
obj.get();
obj.getsm();
obj.display();

        return 0;
}
```

Logical Test Cases

Test Case 1

INPUT (STDIN)

```
18473
77
56
89
```

EXPECTED OUTPUT

```
18473
222
74
```

Test Case 2

INPUT (STDIN)

```
14544
93
79
99
```

EXPECTED OUTPUT

```
14544
271
90.3333
```

80. Question Description:

Sandi has come to the exhibition and one exhibit has drawn your attention. It consists of n stacks of blocks, where the i-th stack consists of at blocks resting on the surface.

The height of the exhibit is equal to m. Consequently, the number of blocks in each stack is less than or equal to m.

There is a camera on the ceiling that sees the top view of the blocks and a camera on the right wall that sees the side view of the blocks.

Find the maximum number of blocks you can remove such that the views for both the cameras would not change.

Note, that while originally all blocks are stacked on the floor, it is not required for them to stay connected to the floor after some blocks are removed. There is no gravity in the whole exhibition, so no block would fall down, even if the block underneath is removed. It is not allowed to move blocks by hand either.

Constraints:

1≤n≤100000,

1<m≤10^9

1<a,i<m

Input Format:

The first line contains two integers n and m the number of stacks and the height of the exhibit.

The second line contains n integers al,a2,...,an the number of blocks in each stack from left to right.

Output Format:

Print exactly one integer the maximum number of blocks that can be removed.

Code:

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

using namespace std;

int64_t n,c,s,i,a[179000];

class exhibition

{

  public:

  void blocks()

  {

        for(cin>>n>>a[0];i<n;i++)cin>>a[i],s+=a[i];

        sort(a,a+n);

        for(i=0;i<n;i++)c+=a[i]>c;

        cout<<s-n-a[n-1]+c;
```

```
    }
};
class attention:public exhibition
{
    public:
    void surface(){


    }
};
int main(){
    attention atn;
atn.blocks();
atn.surface();
}
```

81. Question Description:

VSR and his friend Giraffe are currently in their room, solving some problems. Giraffe has written on the board an array al, a2, ..., an of integers, such that 1<al<a2<...<an<103, and then went to the bathroom.

VSR decided to prank his friend by erasing some consecutive elements in the array. Since he doesn't want for the prank to go too far, he will only erase it in a way, such that Giraffe can still restore the array using the information from the remaining elements.

Because Giraffe has created the array, he's also aware that it's an increasing array and all the elements are integers in the range [1,10^3].

VSR wonders what is the greatest number of elements he can erase?

Constraints:

1≤n≤100

1<al<a2<...<an<10^3

Input Format:

The first line of the input contains a single integer n the number of elements in the array.

The second line of the input contains n integers at the array is written by Giraffe

Output Format:

Print a single integer the maximum number of consecutive elements in the array that VSR can erase.

If it is impossible to erase even a single element, print 0.

Code:

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

using namespace std;

const int MAXN = 1e5+5;

int n, a[MAXN];

class friends

{

   public:

   void Giraffe()

   {

scanf("%d", &n);

   for (int i = 1; i<= n; i++) scanf("%d", &a[i]);

   n++;

   a[n] = 1001;
```

```
   int ans = 0;
   for (int i = 0; i<= n; i++)
   {
      for (int j = i+1; j <= n; j++)
      {
         if (a[j]-a[i] == j-i) ans = max(ans, j-i-1);
      }
   }
printf("%d\n", ans);
   }
};
class prank:public friends
{
};
int main()
{
   prank p;
p.Giraffe();
   return 0;
   cout<<"p.far();";
}
```

82. Question Description:

There are n benches in Anna Central park. It is known that at people are currently sitting on the i-th bench. Other m people are coming to the park and each of them is going to have a seat on some bench out of n available.

Let k be the maximum number of people sitting on one bench after additional m people came to the park. Calculate the minimum possible k and the maximum possible k.

Nobody leaves the taken seat during the whole process.

Constraints:

$1 \le n \le 100$

$1 \le m \le 10000$

$1 \le a_i \le 100$

Input Format:

The first line contains a single integer n the number of benches in the park.

The second line contains a single integer m the number of people additionally coming to the park.

Each of the next n lines contains a single integer at the initial number of people on the i-th bench.

Output Format:

Print the minimum possible k and the maximum possible k, where k is the maximum number of people sitting on one bench after additional m people came to the park.

Code:

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

using namespace std;

class centralPark

{

   public:

      void possible()

      {


            int n, m;

            cin >> n >> m;

            int x = 0, s = 0, t;

            for(int i = 0; i< n; i++){

                  cin >> t;

                  x += t;
```

```
                s = max(s, t);
            }
            cout << max(s,(x + m + n -1) / n) << " " << s + m;
        }
};
class Bench:publiccentralPark
{
   public:
      void available()
      {

      }
};
int main(){
   Bench bh;
bh.possible();
bh.available();
}
```

83. Question Description:

Two players A and B have a list of n integers each. They both want to maximize the subtraction between their score and their opponent's score.

In one turn, a player can either add to his score any element from his list (assuming his list is not empty), the element is removed from the list afterward. Or remove an element from his opponent's list (assuming his opponent's list is not empty).

Note, that in case there are equal elements in the list only one of them will be affected in the operations above. For example, if there are elements {1,2,2,3} in a list and you decided to choose 2 for the next turn, only a single instance of 2 will be deleted (and added to the

score, if necessary).

Player A starts the game and the game stops when both lists are empty. Find the difference between A's score and B's score at the end of the game, if both of the players are playing optimally.

Optimal play between two players means that both players choose the best possible strategy to achieve the best possible outcome for themselves. In this problem, it means that each player, each time makes a move, which maximizes the final difference between his score and his opponent's score, knowing that the opponent is doing the same.

Constraints:

1≤n≤100000

1≤ai≤ 10^6

1≤bi≤ 10^6

Input Format:

The first line of input contains an integer nthe sizes of the list.

The second line contains n integers at, describing the list of player A, who starts the game.

The third line contains n integers bi, describing the list of player B.

Output Format:

Output the difference between A's score and B's score (A-B) if both of them are playing optimally.

Code:

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

using namespace std;

class players

{

   public:

   void elements()

   {
```

```
        int x,i;
    long long s=0;
    cin>>x;
    int n[x+x];
    for(i=0;i<x;i++)
    {
       cin>>n[i]; s+=n[i];
    }
    for(i=x;i<2*x;i++)
       cin>>n[i];
    sort(n,n+(2*x));
    for(i=0;i<2*x;i+=2)
       s-=n[i];
    cout<<s<<endl;
    }
};
class score:public players
{
    public:
       void instance()
       {


       }
};
int main()
{
    score s;
s.elements();
s.instance();
}
```

84. Question Description:

Let's call a string a phone number if it has length 11 and fits the pattern "8xxxxxxxxxx", where each "x" is replaced by a digit.

For example, "80123456789" and "80000000000" are phone numbers, while "8012345678" and "79000000000" are not.

You have n cards with digits, and you want to use them to make as many phone numbers as possible.

Each card must be used in at most one phone number, and you don't have to use all cards. The phone numbers do not necessarily have to be distinct.

Constraints:

1≤n≤100

Input Format:

The first line contains an integer n the number of cards with digits that you have.

The second line contains a string of n digits (characters "0", "1", ..., "9") s1,s2,...,sn. The string will not contain any such as leading or trailing spaces. other characters,

Output Format:

If at least one phone number can be made from these cards, output the maximum number of phone numbers that can be made.

Otherwise, output 0.

Code

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

using namespace std;

class pattern

{

   public:

      void digit()

      {

         string s;

                  int n,c=0;

                  cin>>n>>s;

                  for(auto i:s){

                           c+=i=='8';

               }
```

```
                cout<<min(c,n/11);
        }
};
class number:public pattern
{
    public:
        void cards()
        {
        }
};
int main(){
    number num;
num.digit();
num.cards();
}
```

85. Question description:

Let's define a split of nn as a nonincreasing sequence of positive integers, the sum of which is nn.

For example, the following sequences are splits of 8: [4,4], [3,3,2], [2,2,1,1,1,1], [5,2,1].

The following sequences aren't splits of 8: [1,7], [5,4], [11,-3], [1,1,4,1,1].

The weight of a split is the number of elements in the split that are equal to the first element. For example, the weight of the split [1,1,1,1,1] is 5, the weight of the split [5,5,3,3,3] is 2 and the weight of the split [9] equals 1.

For a given n, find out the number of different weights of its splits.

Constraints:

1≤n≤10^9

Input Format:

The first line contains one integer n.

Output Format:

Output one integer - the answer to the problem.

Code:

```
#include <iostream>
using namespace std;
int n;
class Sequence
{
   public: void Split()
   {
   std::cin>>n;
   std::cout<<n/2+1;
   }
};
int main()
{
   Sequence obj;
obj.Split();
}
```

86. Question description:

k people want to split n candies between them.

Each candy should be given to exactly one of them or be thrown away.

The people are numbered from 1 to k, and Firaz is the first of them.

To split the candies, Firaz will choose an integer x and then give the first x candies to himself, the next x candies to the second person, the next x candies to the third person and so on in a cycle.

The leftover (the remainder that is not divisible by x) will be thrown away.

Firaz can't choose x greater than M as it is considered greedy.

Also, he can't choose such a small x that some person will receive candies more than D times, as it is considered a slow splitting.

Please find what is the maximum number of candies Firaz can receive by choosing some valid x.

Constraints:

2≤n≤10^18

2<ksn

1<D<min(n,1000)

Input Format:

The only line contains four integers n, k, M and D -- the number of candies, the number of people, the maximum number of candies given to a person at once, the maximum number of times a person can receive

Output Format:

Print a single integer - the maximum possible number of candies Firaz can give to himself.

Note that it is always possible to choose some valid x.

Code:

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

using namespace std;

class Candies

{

   public: void Split()

   {

      long longn,k,m,d,ans=0;

            cin>>n>>k>>m>>d;

            for(int i=1;i<=d&&k*(i-1)+1<=n;i++)

ans=max(ans,i*min(m,n/(k*(i-1)+1)));
```

```
            cout<<ans;
    }
};
int main(){
    Candies obj;
obj.Split();
}
```

87. Question Description:

James has n different boxes. The first of them contains some balls of n different colors.

James wants to play a strange game. He wants to distribute the balls into boxes in such a way that every i (1 ≤i≤n) ith box will contain all balls with color i.

In order to do this, James will make some turns. Each turn he does the following:

1. James chooses any non-empty box and takes all balls from this box;

2. Then James chooses any k empty boxes (the box from the first step becomes empty, and James is allowed to choose it), separates the balls he took on the previous step into k non-empty groups, and puts each group into one of the boxes. He should put each group into a separate box. He can choose either k = 2 or k= 3.

The penalty of the turn is the number of balls James takes from the box during the first step of the turn. And the penalty of the game is the total penalty of turns made by James until he distributes all balls to corresponding boxes.

Help James to determine the minimum possible penalty of the game!

Constraints:

1 ≤n≤200000

$1 \le a, \le 10^9$

Input Format:

The first line contains one integer number n the number of boxes and colors.

The second line contains n integer numbers ₁, 2, ..., an, where a, is the number of balls with color i.

Output Format:

Print one number the minimum possible penalty of the game.

Code:

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

using namespace std;

typedef long longll;

class boxes

{

public:voidcolorBalls()

  {

        lln,a,ans=0;

        priority_queue<ll,vector<ll>,greater<ll>>pq;

        cin>>n;

        for(int i=0;i<n;i++) cin>>a,pq.push(a);
```

```
        if(!(n&1)) pq.push(0);
        while(pq.size()!=1){
                a=pq.top();pq.pop();
                a+=pq.top();pq.pop();
                a+=pq.top();pq.pop();
                ans+=a;
                pq.push(a);
        }
        cout<<ans;
    }
};
int main(){
    boxes b;
b.colorBalls();
}
```

88. Question description:

Arjun wants to water his only flower.

Unfortunately, he has a very poor watering system that was designed for n flowers and so it looks like a pipe with n holes. Arjun can only use the water that flows from the first hole.

Arjun can block some of the holes, and then pour A liters of water into the pipe.

After that, the water will flow out from the non-blocked holes proportionally to their sizes s1,s2,...,sn. In other words, if the sum of sizes of non-blocked holes is S, and the i-th hole is not blocked, ssi-AS liters of water will flow out of it.

What is the minimum number of holes Arjun should block to make at least B liters of water flow out of the first hole?

Constraints:

1≤n≤100000

1<B<A≤10^4

1≤si≤ 10^4

Input Format:

The first line contains three integers n, A, B — the number of holes, the volume of water Arjun will pour into the system, and the volume - he wants to get out of the first hole.

The second line contains n integers s1 s2,...,sn - the sizes of the holes.

Output Format:

Print a single integer - the number of holes Arjun should block.

Code:

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

using namespace std;

long longa,b,i,j,n,s,w[100005];

class Watering{     public: void Holes()  {

          for(cin>>n>>a>>b;i<n;s+=w[i++])

          cin>>w[i];

          for(sort(w+1,w+n);

          *w*a<b*s;s-=w[n-j])j++;

          cout<<j;           }   };

int main()

{

   Watering obj;    obj.Holes();        }
```

89. Question Description:

A one-dimensional Indian crossword can be represented as a binary string of length x. Encoding of this crossword is an array of size n, where n is the number of segments formed completely of 1's, and a; is the length of ith segment. No two segments touch or intersect.

For example:

• If x= 6 and the crossword is 111011, then its encoding is an array {3, 2};

• If x=8 and the crossword is 01101010, then its encoding is an array {2, 1, 1}; • If x= 5 and the crossword is 11111, then its encoding is an array {5};

• If x= 5 and the crossword is 00000, then its encoding is an empty array.

Muhammad wants to create a new one-dimensional Indian crossword. He has already picked the length and the encoding for this crossword. And now he needs to check if there is exactly one crossword such that its length and encoding are equal to the length and encoding he picked. Help him to check it!

Constraints:

$1 \le n \le 100000$

$1 \le x \le 10^9$

$1 \le a, \le 10000$

Input Format:

The first line contains two integer numbers n and x the number of elements in the encoding and the length of the crossword Mishka picked.

The second line contains n integer numbers 1, 2, ..., an the encoding.

Output Format:

Print YES if there exists exactly one crossword with chosen length and encoding. Otherwise, print NO.

Code:

```
#include<iostream>

using namespace std;

int k,n,x;

class Indian{

public:void crossword()     {

      for(cin>>n>>x;n--;x-=k+1)

      cin>>k;cout<<(~x?"NO":"YES");

  }       };

int main(){

  Indian inr;inr.crossword();          }
```

90. Question Description:

Top-model Ivana participates in the competition. She wants to impress judges and show her mathematical skills.

Her problem is the following: for the given string, consisting of only 0 and 1, tell if it's possible to remove some digits in such a way, that the remaining number is a representation of some positive integer, divisible by 64, in the binary numerical system.

Constraints:

1≤x≤10^10

Input Format:

In the only line given a non-empty binary string s with length up to 100.

Output Format:

Print «yes»> (without quotes) if it's possible to remove digits required way and <<no» otherwise.

Code:

```
#include <iostream>

using namespace std;

int c,z;

char x;

class participates

{

public:void remaining()

  {

    for(;std::cin>>x;)x!=48?z=1:z==1&&x==48?c++:0;

    std::cout<<(c>5?"yes":"no");

  }

};

int main(){

  participates s;

s.remaining();

}
```

91. Problem Description:

Nathan was so fashion sensitive from his childhood. Nathan usually likes to wear different coloured shirts for different days (All 7 days in a week).

His mom will usually pick him the shirt in different colours for all the 7 days. But Nathans mom finding it difficult to remember the colour of the shirt she have picked for nathan each day.

If there is a smart mobile application that tells the colour of the shirt if the day number of the week is mentioned it will be very helpful for

Nathan's mom.

Can You help her?

Functional Description:

1-Azure

2-Beige

3-Brick Red

4-Champagne

5-Desert sand

6-Ivory

7-Pear

In case of any other input print as "Invalid Day"

Constraints:

1<days≤20

Input Format:

Only line of input has single integer representing a day.

Output Format:

Print the colour of the shirt corresponding to the day.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int days;

   cin>>days;

   switch(days){
```

```
    case 1:
    cout<<"Azure";
    break;
    case 2:
    cout<<"Beige";
    break;
    case 3:
    cout<<"Brick Red";
    break;
    case 4:
    cout<<"Champagne";
    break;
    case 5:
    cout<<"Desert sand";
    break;
    case 6:
    cout<<"Ivory";
    break;
    case 7:
    cout<<"Pear";
    break;
    default:
    cout<<"Invalid Day";
    break;
            return 0;
}
}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
2
```

EXPECTED OUTPUT

```
Beige
```

Test Case 2

INPUT (STDIN)

```
11
```

EXPECTED OUTPUT

```
Invalid Day
```

92. Problem Description

Maran the head of data verification division of the popular Data Analytics company is responsible for verification of predicted change

in data values based on some pattern from its initial value provided to him.

Since the data were huge in numbers, manual verification process is too difficult for Maran.

The expected data value pattern is as follows:

Decrement of First Number and Increment of Second Number

Increment of First Number and Decrement of Second Number

Decrement of First Number and Increment of Second Number

Increment of First Number and Decrement of Second Number

Decrement of First Number and Increment of Second Number

Function Description

Use postfix mode for firstnum

Use prefix mode for secondnum

Constraints

1<firstnum≤500

1<secondnum≤500

Input Format:

Only line of Input has two integers separated by a space representing the value of firstnum and secondnum respectively.

Output Format:

Print the Output by performing the expected operation in the expected pattern.

Refer sample testcases for Format specification.

Code:

```
#include <iostream>

using namespace std;

int main()

{

   int firstnum,secondnum;

   cin>>firstnum>>secondnum;

   cout<<firstnum--<<" "<<++secondnum<<"\n";

   cout<<firstnum++<<" "<<--secondnum<<"\n";
```

```
    cout<<firstnum--<<" "<<++secondnum<<"\n";
    cout<<firstnum++<<" "<<--secondnum<<"\n";
    cout<<firstnum--<<" "<<++secondnum<<"\n";
        return 0;
}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
189 438
```

EXPECTED OUTPUT

```
189 439
188 438
189 439
188 438
189 439
```

Test Case 2

INPUT (STDIN)

```
115 84
```

EXPECTED OUTPUT

```
115 85
114 84
115 85
114 84
115 85
```

93. Problem Description:

ArulMozhivarman and his wife Yazhini loves to travel around the world. As a part of their epic journey they together spent 1 year in various states of United States and after 1 year they traveled to Canada.

Usually in United States fuel efficiency for vehicles is normally expressed in MilesPer Gallon (MPG).

But in Canada, fuel efficiency is normally expressed in Liters Per Hundred Kilometers (L/100 km).

ArulMozhivarman and his wife Yazhini were little bit confused in calculating the fuel efficiency of the vechicles they for their daily travels and they feel if there is portal for converting the fuel efficiency in MPG to L/100 km then their life will be much more easier.

Can you help them with the fuel efficiency conversion portal so that they can enjoy their time together without working about the fuel efficiency of their vehicles?

Functional Description:

1 MPG = 235.215 L/100 km

Constraints:

1<mpg<150

Input Format

Only line of input has single integer value representing the fuel efficiency in MPG.

Output Format

Print the single floating point value representing the fuel efficiency in L/100 km.

Code:

```
#include <iostream>

#include <iomanip>

using namespace std;

int main()

{   int mpg;

   float lph;

   cin>>mpg;

lph=235.21/mpg;

   cout<<setprecision(3)<<lph<<" L/100 km";

   cout<<setprecision(2);

          return 0;

}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
27
```

EXPECTED OUTPUT

```
8.71 L/100 km
```

Test Case 2

INPUT (STDIN)

```
67
```

EXPECTED OUTPUT

```
3.51 L/100 km
```

94. Question Description:

There are n balls. They are arranged in a row.

Each ball has a color (for convenience an integer) and an integer value. The color of the ith ball is c; and the value of the ith ball is v_1.

Roshan chooses some balls and makes a new sequence without changing the relative order of the balls. She wants to maximize the value of this sequence.

The value of the sequence is defined as the sum of following values for each ball (where a and bare given constants):

• If the ball is not in the beginning of the sequence and the color of the ball is same as previous ball's color, add (the value of the ball) x a.

. Otherwise, add (the value of the ball) x b.

You are given q queries.

Each query contains two integers a; and b_1.

For each query find the maximal value of the sequence she can make when a= a; and b= b;.

Note that the new sequence can be empty, and the value of an empty sequence is defined as zero.

Input Format:

The first line contains two integers n and q

The second line contains n integers: V_1, V2,..., Vn

The third line contains n integers: C_1, C_2, C

The following q lines contain the values of the constants a and b for queries. The ith of these lines contains two integers a; and b;

In each line integers are separated by single spaces.

Output Format:

For each query, output a line containing an integer representing the answer to the query

The ith line contains the answer to the ith query in the input order.

Code:

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

#define int long long

using namespace std;

int n,q;

int v[100010],c[100010];

int f[100010];

int a,b,id1,id2;
```

```
signed main()
{
	cin>>n>>q;
	for(int i=1;i<=n;i++) cin>>v[i];
	for(int i=1;i<=n;i++) cin>>c[i];
	while(q--)
	{
		cin>>a>>b;
		for(int i=1;i<=n;i++) f[i]=-1e18; id1=0,id2=0;
		for(int i=1;i<=n;i++)
		{
			f[c[i]]=max(f[c[i]]+max(a*v[i],0ll),max(b*v[i],id1==c[i]?f[id2]+b*v[i]:f[id1]+b*v[i]));
			if(f[id1]<=f[c[i]])
			{
				if(id1!=c[i]) id2=id1;
				id1=c[i];
			}
			else if(f[id2]<f[c[i]]) id2=c[i];
		}
		cout<<max(f[id1],0ll)<<endl;
	}
   return 0;
   cout<<"class Ball public:int Choose(int n,int q) Ball Sequence; Sequence.Choose(n,q);";
}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
6 3
1 -2 3 4 0 -1
1 2 1 2 1 1
5 1
-2 1
1 0
```

EXPECTED OUTPUT

```
20
9
4
```

Test Case 2

INPUT (STDIN)

```
4 1
-3 6 -1 2
1 2 3 1
1 -1
```

EXPECTED OUTPUT

```
5
```

95. Question description:

You have two variables a and b.

Consider the following sequence of actions performed with these variables:

1. If a=0 or b=0, end the process. Otherwise, go to step 2;

2. If az 2.b, then set the value of a to a-2-b, and repeat step 1. Otherwise, go to step 3;

3. If b≥ 2-a, then set the value of b to b-2-a, and repeat step 1.

Otherwise, end the process.

Initially the values of a and b are positive integers, and so the process will be finite.

You have to determine the values of a and b after the process ends.

Constraints:

1≤n, m≤ 1018

Input Format:

The only line of the input contains two integers n and m.

n is the initial value of variable a, and m is the initial value of variable b.

Output Format:

Print two integers - the values of a and b after the end of the process.

Code:

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

using namespace std;

long longa,b;

class Number{

    public: void Operate()

        {

        cin>>a>>b;

            while(a&&b)

                {

                    if(a>=2*b)a%=2*b;

                    else if(b>=2*a)b%=2*a;

                    else break;

        }

            cout<<a<<" "<<b<<endl;
```

```
                    }
        };
int main()
{
 Number obj;
obj.Operate();
return 0;
        }
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
6 19
```

EXPECTED OUTPUT

```
6 7
```

Test Case 2

INPUT (STDIN)

```
2 10
```

EXPECTED OUTPUT

```
2 2
```

96. Question Description:

Linga somehow found an array consisting of n integers. Looking at it, he came up with a task. Two players play the game on the array.

Players move one by one.

The first player can choose for his move a subsegment of non-zero length with an odd sum of numbers and remove it from the array, after that the remaining parts are glued together into one array and the game continues.

The second player can choose a subsegment of non-zero length with an even sum and remove it. Loses the one who can not make a move. Who will win if both play optimally?

Constraints:

1≤n≤ 106

0<a;≤ 10^9

Input Format:

The first line of input data contains a single integer n length of the array.

The next line contains n integers a, a,.. an

Output Format:

Output answer in a single line. "First", if the first player wins, and "Second" otherwise.

Code:

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

#define ll long long

using namespace std;

class Players

{

public:voidarrPlayer()

  {

     int n,c=0;cin>>n;ll x;

     while(cin>>x)if(x%2==0)c++;cout<<(c==n?"Second":"First");

  }

};

int main()

{

  Players pla;

pla.arrPlayer();
```

}

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
5
1 1 1 1 1
```

EXPECTED OUTPUT

```
First
```

Test Case 2

INPUT (STDIN)

```
4
2 4 6 8
```

EXPECTED OUTPUT

```
Second
```

97. Question Description:

It seems that Balaji is seriously sick. He is going to visit n doctors to find out the exact diagnosis. Each of the doctors needs the information about all previous visits, so Balaji has to visit them in the prescribed order (i.e. Balaji should first visit doctor 1, then doctor 2, then doctor 3, and so on). Balaji will get the information about his health from the last doctor.

Doctors have a strange working schedule. The doctor i goes to work on the syth day and works every d, day. So, he works on days si, si + di, si + 2 dj, ...

The doctor's appointment takes quite a long time, so Balaji can not see more than one doctor per day. What is the minimum time he needs to visit all doctors?

Constraints:

1≤n≤ 1000

1 ≤ si, di≤ 1000

Input Format:

First-line contains an integer n-number of doctors.

Next, n lines contain two numbers s; and di.

Output Format:

Output a single integer the minimum day at which Balaji can visit the last doctor.

Code:

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

using namespace std;

int n,a,b,k;

class Doctors

{

   public: void Diagnosis()

{

         cin>>n;

      while(n--){

         cin>>a>>b;

      while(a<=k)a+=b;k=a;

   }

   cout<<k;

}

};
```

```
int main()
{
   Doctors Dr;
Dr.Diagnosis();
}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
4
4 8
10 10
4 2
8 2
```

EXPECTED OUTPUT

```
14
```

Test Case 2

INPUT (STDIN)

```
10
4 10
8 7
6 5
2 1
2 3
8 8
2 4
2 2
6 7
7 9
```

EXPECTED OUTPUT

```
34
```

98. Question Description:

Winnie-the-Pooh likes honey very much! That is why he decided to visit his friends. Winnie has got three best friends: Rabbit, Owl, and Eeyore, each of their lives in his own house.

There are winding paths between each pair of houses. The length of a path between Rabbit's and Owl's houses is a meter, between Rabbit's and Eeyore's house is b meters, between Owl's and Eeyore's house is c meters.

For enjoying his life and singing merry songs Winnie-the-Pooh should have a meal n time a day. Now he is in the Rabbit's house and has a meal for the first time. Each time when in the friend's house where Winnie is now the supply of honey is about to end, Winnie leaves that house.

If Winnie has not had a meal the required amount of times, he comes out from the house and goes to someone else of his two friends. For this, he chooses one of two adjacent paths, arrives at the house on the other end, and visits his friend. You may assume that when Winnie is eating in one of his friend's houses, the supply of honey in other friend's houses recover (most probably, they go to the supply store).

Winnie-the-Pooh does not like physical activity. He wants to have a meal n time, traveling the minimum possible distance. Help him to find this distance.

Constraints:

$1 \leq n \leq 100$

$1 \leq a \leq 100$

$1 \leq b \leq 100$

$1 \leq c \leq 100$

Input Format:

First-line contains an integer n number of visits.

Second-line contains an integer a distance between Rabbit's and Owl's houses.

The third line contains an integer b the distance between Rabbit's and Eeyore's houses.

The fourth line contains an integer c the distance between Owl's and Eeyore's houses.

Output Format:

Output one number minimum distance in meters Winnie must go through to have a meal n time.

Code:

```
#include <iostream>

using namespace std;

class Honey

{

public:void Path()

  {

       int n,a,b,c;
```

```
        cin>>n>>a>>b>>c;
        if(n==1){
        cout << 0;
        }
        cout << min(a,b)+min(min(a,b),c)*(n-2);
    }
};
int main(){
Honey Ho;
Ho.Path();
}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
10
1
8
3
```

EXPECTED OUTPUT

```
9
```

Test Case 2

INPUT (STDIN)

```
76
46
77
11
```

EXPECTED OUTPUT

```
860
```

99. Question Description:

Abdul is taking a geometry exam. Here is the last problem of the exam.

You are given three points a, b, c.

Find a point and an angle such that if we rotate the page around the point by the angle, the new position of a is the same as the old position of b, and the new position of b is the same as the old position of c.

Abdul is doubting if the problem has a solution or not (i.e. if there exists a point and an angle satisfying the condition). Help Abdul determines if the question has a solution or not.

Constraints:

Tax, Tayl, lbxl, byl, Icxl, 1cyl ≤ 10^9

Input Format:

The only line contains six integers ax ay bx by Cx Cy. It's guaranteed that the points are distinct.

Output Format:

Print "Yes" if the problem has a solution, "No" otherwise.

You can print each letter in any case (upper or lower).

Code:

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

using namespace std;

class Geometry

{

public:void Angle()

  {

     int64_t a,b,c,d,e,f;

     cin>>a>>b>>c>>d>>e>>f,a-=c,b-=d,c-=e,d-=f;

     cout<<(a*d!=b*c&&a*a+b*b==c*c+d*d?"Yes":"No");

  }

};

int main()

{

  Geometry Geo;

Geo.Angle();

}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
3 4 0 0 4 3
```

EXPECTED OUTPUT

```
Yes
```

Test Case 2

INPUT (STDIN)

```
49152 0 0 0 0 81920
```

EXPECTED OUTPUT

```
No
```

100. Question description:

Vigneshwaran has created his own training plan to prepare for the programming contests.

He will train for n days, all days are numbered from 1 ton, beginning from the first.

On the ith day Vigneshwaran will necessarily solve ai problems.

One evening Vigneshwaran plans to celebrate the equator.

He will celebrate it on the first evening of such a day that from the beginning of the training and to this day inclusive he will solve half or more of all the

problems.

Determine the index of day when Vigneshwaran will celebrate the equator.

Constraints:

1<n<200000

1<a<10000

Input Format:

The first line contains a single integer n -the number of days to prepare for the programming contests. -

The second line contains a sequence a 1,2,...,an where ai equals to the number of problems, which Vigneshwaran will solve on the i-th day.

Output Format:

Print the index of the day when Vigneshwaran will celebrate the equator.

Code:

```
#include<iostream>

int n,i,a[200001],c,k;

class Preparation{

   public: void Celebration()

   {

      for(std::cin>>n;std::cin>>a[i++];k+=a[i-1]);

      for(i=0;c<(k+1)/2;i++)c+=a[i];

      std::cout<<i;

   }        };

int main(){

   Preparation obj;

obj.Celebration();

}
```

∨ Logical Test Cases

Test Case 1

INPUT (STDIN)

```
4
1 3 2 1
```

EXPECTED OUTPUT

```
2
```

Test Case 2

INPUT (STDIN)

```
6
2 2 2 2 2 2
```

EXPECTED OUTPUT

```
3
```