



DIU Take-Off Programming Contest

Fall 2021

[Mock Round]

Organized By



Problem Analysis

Platform Support



The Toph logo, consisting of a stylized blue and black 'T' icon followed by the word "Toph" in a bold, black, sans-serif font.

Judging Panel

Judges

Rahat Islam Srijon

Judging Director

9th Semester

Md. Galib Hossain

9th Semester

Albin Hossain

9th Semester

Mohammad Dipo Sultan

8th Semester

Md. Rana Hossain

7th Semester



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Mohammad Dipo Sultan

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A. Batman V Joker

Time Limit: 1s

Memory Limit: 512 MB

Description:

The Joker, you know who he is? He lives in a city called Athecaster. Everyone in the city is curious why his name is Joker. People also wonder why he puts makeup on his face. The people of Athecaster think he's a freak, there are many questions around him. The Joker is a psychopathic anarchist mastermind, who portrayed himself as an agent of chaos, rose to power in the criminal underworld, thrusting Athecaster city into turmoil.

Batman is the superhero of Athecaster city. Unlike other superheroes, he lacks abilities; instead, he fights crime using his intelligence, investigative skills, science and technology, fortune, physical strength, and intimidation.

Suddenly, Batman arrives to save the city from Joker. But Batman is not getting along with the Joker in any way. Batman can't stop Joker from psychopathic, mass murdering. He is getting desperate and frustrated. You're a programmer and Batman's friend, you keep him motivated all the time by saying Pera Ase But Chill.

Batman asks you a favor for the sake of your and his friendship. You just have to write a program in C that prints the line **"Pera Ase But Chill!"** (without quotes).

Let me help you with the c program to print "Why so serious?"

```
#include <stdio.h>
int main() {
    printf("Why so serious?\n");
    return 0;
}
```

Input: There is no input for this problem.

Output: Output the line mentioned in the statement to print.

Notes: Please read the statement carefully.

Problem Setter & Dataset: Mohammad Dipo Sultan

Alternate Writer: aro talented kodar

Problem Category: Giveaway



B. Worried at No-Worry

Time Limit: 1s

Memory Limit: 512 MB

Description:

There is a worried programmer who is arrogant and too successful. He is successful because he is arrogant. But this arrogance affects his daily life in a negative manner. His idea of success is that he will either be in 0(failure) or in 1(successful). There will be no in-between. As he follows this philosophy being arrogant. He uses it everywhere in his life.

One day he went to the No-Worry shop run by someone who is too carefree and literally careless. **Our programmer bought some goods worth K taka.** He must follow his 0-1 philosophy even in the payment. He will do this in this case **by using the minimum and maximum banknote of taka only. The minimum banknote he has is of 1 taka and the maximum banknote he has is of X taka.** He told the owner of the shop to calculate the number of banknotes he had to pay. The shop owner, being careless, told him to pay whatever he wanted.

He wants to know the total number of banknotes he will have to give, following the 0-1 principle and with **maximum efficiency, meaning the use of the least number of banknotes to pay the whole amount.** But the carelessness of the owner of the No-Worry shop made him worried. Now he is struggling to count even though he has an infinite amount of banknotes of both types.

Given K and X, you have to find the least number of banknotes he can use to pay the due amount.

Input: The only line contains two integers **K** and **X**, denoting the amount of money to be paid to No-Worry shop and the maximum unit of money the successful programmer has. ($1 \leq X, K < 2^{31}$).

Output: You have to output the least number of banknotes(maximum and minimum) he will have to pay to buy his goods. Check out the samples for clarification.

Sample Input	Sample Output
9 4	3
135 17	23



Notes: In the first case, the programmer has to pay 9 taka. Maximum he has is 4 taka banknotes. He can pay in 3 different ways. Which are,

4 4 1

4 1 1 1 1 1

1 1 1 1 1 1 1 1 1

But, here the most efficient way to pay is using 3 banknotes, two of 4 and one of 1. So, the total number of banknotes will be 3.

Be careful about the newline('\n') at the end.

Problem Setter & Dataset: Rahat Islam Srijon

Alternate Writer: Mohammad Dipo Sultan

Problem Category: Basic math.



C. Tanjiro's Floating Numbers

Time Limit: 1s

Memory Limit: 512 MB

Description:

Tanjiro is new at programming. Every day he tried to improve his problem-solving skills and knowledge. Today Tanjiro studied integer numbers and floating numbers.

At that moment Tanjiro notices an interesting thing that if he tries to print a floating number that has no value in decimal place then it takes some Zero in decimal place and prints it. Tanjiro does not like that type of behavior of floating numbers.

So, Tanjiro decided to write a program that will take a decimal number, and if it has any value in the decimal place then it will print it otherwise it will print only the integer part.

Though he is new at programming, he needs your help to write that program.

Input

Input will contain only a decimal number **n** and there can be at most 2 digits after the decimal point.

$0 \leq n \leq 10^9$

Output

If **n** has any value in the decimal place then print the value of **n** up-to 2 decimal points otherwise print only the integer part of **n**.

Note: you can use "%.2f" or "%.2lf" depending on your variable data type to print up-to 2 decimal places.

Sample Input	Sample Output
12.34	12.34
11.00	11
120.01	120.01

Notes: Be careful about the newline("\n") at the end.

Problem Setter & Dataset: Md Galib Hossain

Alternate Writer: Mohammad Dipo Sultan



D. Three Sided Polygon

Time Limit: 1s

Memory Limit: 512 MB

Description:

A simple closed curve or a polygon formed by three sides is called a triangle. However, any three sides will not always make a triangle. The three sides must come together to form a closed region.

To make a valid triangle the sum of the lengths of any two sides of a triangle has to be greater than the length of the third side.

Triangles are categorized into three categories based on the side values of a valid triangle: Equilateral triangles, Isosceles triangles, and Scalene triangles. **But for this problem we will consider only two types of valid triangle - Equilateral and Isosceles.**

Equilateral - All three sides of a valid triangle are equal.

Isosceles - Exactly two of the sides of a valid triangle are equal.

You will be given a rod of length N . You have to cut this rod into 3 integer pieces such that the sum of these 3 pieces is equal to N and the size of every piece must be greater than 0. You can use these 3 pieces as 3 individual sides. Using these 3 sides you have to make an Equilateral triangle. If it's not possible to make an Equilateral triangle then try to make an Isosceles triangle. If none of them are possible then declare that .

Input

The input line contains a single integer N ($3 \leq N \leq 1000000$) - the length of the rod.

Output

On the output line print "**Equilateral**", If an Equilateral triangle can be formed. If it's impossible to make an Equilateral triangle but it's possible to make an Isosceles triangle then Print "**Isosceles**". Otherwise print "**Invalid**".



Sample Input	Sample Output
3	Equilateral
10	Isosceles

Notes: Be careful about the newline('\n') at the end.

Problem setter: Abu Saleh

Alternate writer: Rana Hossen

Special Thanks: Mohammad Dipo Sultan



E. Average Mark

Time Limit: 1s

Memory Limit: 512 MB

Description:

Ragnar is a class teacher of class 10 in ABC International School And college. There are a total of N students in his class. Recently the result of the pre-test exam of the S.S.C candidates was published.

The headmaster called Ragnar in his room and wanted to know the average mark of students in his class. But there is a problem that the headmaster did not ask for the whole student's average mark of his section. He frequently gave a range of students roll numbers (**l and r**) and asked the average mark of the student between roll **l and r (Inclusive)**.

As Ragnar is very busy with his other work and is not able to answer all the questions of the headmaster in a short time.

He knows you are good in programming and as a best friend of Ragnar ,he is seeking your help and asking you to write a program which can calculate the average mark of the students in the range from roll **l to r (Inclusively)**.

Input

The first line contains two integers N and Q ($1 \leq N, Q \leq 100000$) the number of total students in the class and total query that Ragnar has to answer.

The second line contains N space separated integer a_1, a_2, \dots, a_n ($0 \leq a_i \leq 100$) where a_i is the mark of the i -th roll student.

The third line of the input contains a **Q pair** of integers **l and r** ($1 \leq l \leq r \leq N$) the range of the roll number of the student.



Output

For every query output the average mark of the students between the range of roll number l to r (Inclusively)

Sample Input	Sample Output
10 5	5.50
1 2 3 4 5 6 7 8 9 10	3.00
1 10	1.00
1 5	9.00
1 1	4.50
8 10	
3 6	

Notes: The answer might not be an integer. So print the answer after two decimal places. Be careful about the newline('\n') at the end.

Problem Category: If-else

Problem Setter: MD. Alif Babu

Reviewer: Galib Hossain



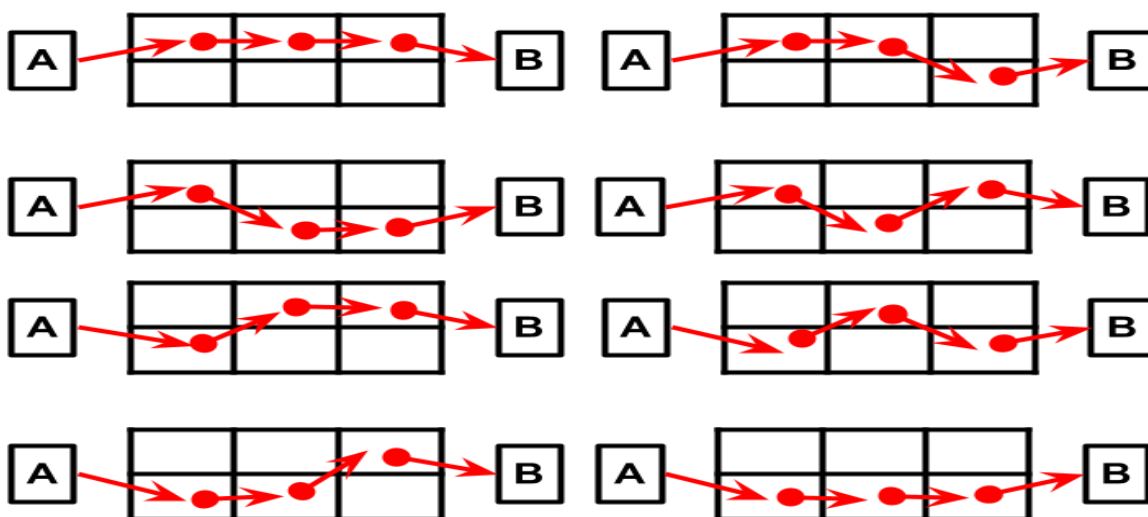
A. Easy Squid

Time Limit: 1s

Memory Limit: 512 MB

Description:

Gi-hun is playing a game named "The Glass Stepping Stones". In this game, players have to cross a bridge which is made of $2 \times n$ glass tiles. The bridge can be considered as $2 \times n$ grid, which has n columns and each column has 2 tiles. The player starts from A and has to reach B. At each step, players can choose exactly 1 tile from each column. e.g For $n=3$ there can be total 8 combinations as below:



How many different combinations of tiles a player can choose to cross the bridge for any given n ?

Input

The only line of the input contains a single integer n ($0 < n < 63$) - the number of columns of the bridge.

Output

On the single line of the output print the total number of different combinations of tiles.



Sample Input	Sample Output
3	8
23	8388608
29	536870912

Notes: Be careful about the newline('\n') at the end.

Problem Category: Number Theory

Problem Setter: Md. Albin Hossain

Reviewer: Rahat Islam Srijon