INTRA HSTU PROGRAMMING CONTEST JULY-2019

Hosted by Programmers Arena

A. Tree!

Time limit: 1 second

The Earth is in crisis. Global warming is threatening the Earth. To reduce global warming we need to plant billions of trees. Before planting a tree, you have to know what is a tree!

A tree is a connected graph with no cycle. Are you shocked by this kind of definition? Of course not because you're a programmer.

You're given the number of vertices V and edges E of a connected graph. You've to tell whether the graph could possibly be a tree or not.

Input

The first line of the input contains an integer **T ($T \leq 100$)** indicating the number of cases to be analyzed.

Each of the next T lines contain two integers V and E **($1 \leq V \leq 2*10^9$, $0 \leq E \leq 2*10^9$)**, the number of vertices and edges respectively.

Output

For each line of input, print "Plant it!" if the graph is possibly a tree, otherwise print "Skip it!".

Sample

Input	Output
2 3 3 3 2	Skip it! Plant it!

B. Friendship in Friendland: Part II

Time limit: 1 second

A country, known as Friendland, has **n** citizens numbered from **0** to **n-1**. Friendship in Friendland has transitive relation property, i.e. if **a** and **b** are friends, and **b** and **c** are friends, then **a** and **c** are also friends. Justfriend, the prime minister of Friendland, has **m** records of friendships. Each record of friendship contains two integer **a** and **b (0 ≤ a,b ≤ n-1),** which indicates that **a** and **b** are friends.

For n = 6, m = 3 and these 3 records of friendships are-
1 4
2 0
5 4
Then, total possible new friendships are (0,1), (0, 3), (0, 4), (0,5), (1, 2), (1, 3), (2, 3), (2, 4), (2, 5), (3, 4), (3, 5).

As Justfriend is aged so much, he is not good with math anymore. So, he has freelanced you to help him finding the total number of possible **new friendships**. If you succeed to do that job, you will get "Accepted"- the billion worth currency of Friendland!

Input

The first line contains two space-separated integers **n ($1 \le n \le 10^5$)** - the number of citizens in Friendland; **m ($1 \le m \le 10^4$)** - the number of friendship records. Each of next **m** lines contains two space-separated integers **a** and **b (0 ≤ a,b ≤ n-1)** which indicates that **a** and **b** are friends.

Output

A single integer representing the total number of possible new friendships.

Sample

Input	Output
6 3 1 4 2 0 5 4	11

C. Back To High School Math

Time limit: 1 second

Multiples are what we get after multiplying the number by an integer.
For example :

0 x 3 = 0 , so 0 is a multiple of 3
1 x 3 = 3 , so 3 is a multiple of 3
2 x 3 = 6 , so 6 is a multiple of 3
And so on

You are given two distinct positive integers a and b. You have to find out the total number of multiples (divisible by a **or** b) from **1** to **m**.

Input

Input starts with an integer **T** (**1≤ T ≤ 10^5**), denoting the number of test cases. Each case starts with a line containing three integers: **a , b , m (1 ≤ a, b , m ≤ 2^{31}).**

Output

Print T lines of output. In each line there should be an integer.

Sample

Input	Output
2 2 3 10 7 10 10	7 2

D. Reverse Bit

Time limit: 1 second

Do you know about Binary number ? We can express any Decimal number to its corresponding Binary number. See this example $(13)_{10}$ is equivalent to $(1101)_2$. Have you noticed, how many one are present in it's Binary form ? Obviously 3 and we will say it's **SRS** value is 3.

Now you are given a number **N** which **SRS** value is **k** (**k** is a positive integer) , you have to find the first number after **N** which **SRS** value is **k+1**.

Input

Input starts with an integer **T** ($\mathbf{1 \leq T \leq 10^5}$), denoting the number of test cases. Each case starts with a line containing one integer: **n** ($\mathbf{0 \leq n \leq 10^9}$).

Output

Print T lines of output. Each line contains the required number.

Sample

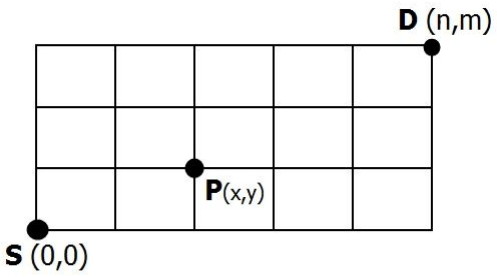
Input	Output
2 10 16	11 17

E. The Ant & The Grasshopper

Time limit: 1 second

The Grasshopper was very hungry. As the winter began, The Grasshopper had no food to eat. He went to The Ant and asked for food. The Ant agreed to help him. But the Grasshopper have to fulfill a condition. What is the condition? Not so tough at all. The Grasshopper have to solve a problem.

The Ant is staying at a point **S(0,0)** in a two dimensional cartesian plane. He wants to go to the position **D(n,m)**. He can move only to right or to up. He wants to know the number of ways he can arrive to that position from **S**. In each travel from **S** to **D** Grasshopper is not allowed to go through the "***UNSAFE***" place. An "***UNSAFE***" place is a point denoted by **P(x,y)**. Take a look at the right side image for clear conception.



Remember that the lines are the paths and it is guaranteed that point **S** and point **D** will always safe. Help Grasshopper to solve this problem.

Input

Input starts with an integer **T** ($1 \leq T \leq 10^5$), denoting the number of test cases. Each case starts with a line containing four integers: **n, m, x, y** ($1 \leq x \leq n \leq 100$, $1 \leq y \leq m \leq 100$) **X** coordinate of **D**, **Y** coordinate of **D**, **X** coordinate of **P**, **Y** coordinate of **P** respectively.

Output

Print **T** lines of output. In each line there should be one integer the answer of the corresponding test case. As the answer can be very large print it **modulo 10^9+7**.

Sample

Input	Output
2 3 3 1 2 5 3 2 1	11 26

F. Rupomoni - The Interplanetary Ninja

Time Limit : 1 second

History

Can you remember Oviman and Ovimani, the cute couple and their only daughter Rupmoni. Rupomoni is in deep sleep and in her dream she is a treasure hunter! she is the great and powerful interplanetary ninja and you are her minion. You must hurry to save this planet from the evil, "Sumo Villain". You must travel across the land so that you may prevent "Sumo Villain"
from their evil plans.

Also just so you(minion) know, Rupomoni is unable to triumph over a great many trials. Some of these include being looked at, handshakes, and even stairs.

The Problem

Given a map of locations, routes between locations, and the trials which exist along routes, help Rupomoni reach their target. You must avoid any of the trials that the Rupomoni is unable to triumph over. Then tell Rupomoni if you are able to reach their target and save the world.

Input

The first input line contains a positive integer, m, indicating the number of maps to check. Each map will start with an integer on a new line, **t** ($0 \leq t \leq 50$), that describes the number of trials that Rupomoni is unable to accomplish. On the next t lines these trials are listed, one per line. The following line will contain two integers, **n** ($2 \leq n \leq 30$) and **e** ($0 \leq e \leq 500$). **n** indicates the number of locations on the map (numbered **0** through **n-1**) and **e** indicates the total number of routes between locations on the map. Assume Rupomoni's starting location number is 0 and Rupomoni's target location is n-1. The following e lines each describe a route between a pair of locations, and the trial on that route. These lines will consist of two integers La and Lb and a string Q. The Rupomoni can travel between location La and location Lb, or between Lb and La, as long as he does not have the trial (Q) on that route. For example, if Rupomoni has the trial "xyz" and the route also has the trial "xyz", then Rupomoni cannot travel on that route. Assume that there is at most one route between any two locations and exactly one trial for a route. All locations are numbered from 0 to n-1, inclusive. All trials are named using only lowercase letters, 1 to 20 in length. If a trial is not on the "unable to accomplish" list of Rupomoni, then Rupomoni will be able to accomplish it. Successive values on a line are separated by exactly one space. There are no leading or trailing spaces on any line.

Output

For each map, output a line that contains only a 1 if Rupomoni can reach her target and a 0 if Rupomoni is unable to reach her target. Each answer must be on a separate line.

Sample

Input	Output
2 3 stairs talking staring 4 5 0 3 talking 0 1 abc 0 2 xyz 1 3 stairs 2 3 staring 3 fire water people 4 5 0 1 abc 0 2 water 1 2 fire 1 3 xyz 2 3 abc	0 1

G. New string

Time limit: 1 second

Halum has N strings s_1, s_2, …, s_N. He wants to make another string of length N whose 1st character is from the 1st character of s_1, 2nd character is from the 2nd character of s_2, and so on. More formally the *i*th character of the string is taken from the *i*th character of string s_i, where $1 \leq i \leq N$. Since Halum is busy for fishing, he wants your help.

Input

The first line of the input contains an integer **N ($N \leq 10$)** number of strings Halum have. Next N lines contain the string s_i consist of lowercase english letters. The length of each string $|s_i| \leq 100$. It is guaranteed that length of string s_i is at least i.

Output

Print the new string in a line.

Sample

Input	Output
3 programmers arena hstu	prt

H. Square Sum

Time Limit : 1s

Morshed is new to programming. He only knows how to sum in the C programming language. From his number theory text book, he learned that every natural number can be represented as the sum of four integer squares.

$$\mathbf{X = a^2 + b^2 + c^2 + d^2, \text{ where } a, b, c, d >= 0}$$

Now he wants to know that, if this is true or not. You are the training instructor of the Programmer Arena and Morshed wants you to solve this problem for 2 taka.
As you are too much greedy, you promised Morshed to solve this problem.

Input

There will be several test cases. First line contains the number of test cases **T (**T < 10001**)**. Each line will contain a single number integer **X (**X < 1000000001**)**.

Output

For each test case, if there are no solution print "no", otherwise print a, b, c, d where a>=b>=c>=d and if there are multiple solution print the with the maximum a, b, c and d.

Sample

Input	Output
5 3 10 159 48 9	1 1 1 0 3 1 0 0 11 6 1 1 6 2 2 2 3 0 0 0

I. Alien Road Trip

Time Limit : 1s

Alien Road is an alternative short road from the HSTU second gate towards Dr. M.A. Wazed building. From recent research, administrators have found that students are using this Alien Road more often even if it's very muddy on rainy days than the Actual Road from the second gate towards Wazed building! Administrators want to demotivate students from using this road, so they have set an entrance passing system in the endpoints of Alien Road. To pass through the system, one has to answer a query, which is, "if you're given the length of Alien Road and the angle between Alien Road and the Actual Road, can you find the length of actual road?" Can you pass through the entrance passing system and walk through Alien Road? Notice the figure given below for further clarification.

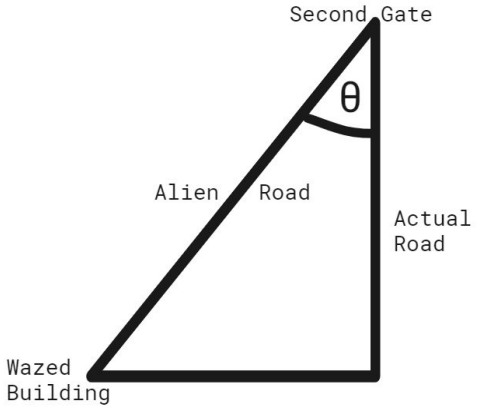


Figure: Road map from second gate towards Dr. M.A. Wazed Building

Input

Single line of input contains two real numbers **x (1 ≤ x ≤ 100)** and **θ (0 ≤ θ ≤ 90)** - the length of Alien Road and the angle between Alien Road and Actual Road, respectively.

Output

Print a real number that denotes the Actual Road length with six places after the decimal point. (as in the example below)

Sample

Input	Output
13 60	6.500000