SYSUCPC 2022 Online

October 7, 2022

Problem A. NekoPass and KFC Crazy Thursday

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

"For THREE years, I have been regarded as a total LOSER because I have had a matrilocal marriage. My wife walked all over me and insulted me all day and all night. From washing their feet to kissing their asses, I kneeled before my parents-in-law to live a dog's life in the family. Later until my child was born, my eyes were filled with tears as the dawn of my life was right ahead. However, I received a divorce agreement. It turned out that the child's father was my wife's EX-BOYFRIEND! I was swept out of the family with nothing and wandering soullessly in the street. All of a sudden, I was hit by a dumping truck and passed out.

"When I was about to die, the memory of my previous life flashed back to me! I lived in a land where some people can use a special ability called 'aura', and I was so genius in aura that I created my own sect when I was quite young. But I was framed by those evil, treacherous VILLAINS. My family abandoned me! The sect also betrayed me! They even deprived me of the ability of using aura! Now I'm in a new life and in this life, I'll get all I had BACK! But now I have lost all my aura, hungry and thirsty, having just been swept out of my wife's house.

"I have heard that KFC Crazy Thursday which will happen every Thursday in the year 2022 can help rebuild my aura and get my incredibly strong skills back. Young man, please tell me whether I can eat KFC Crazy Thursday this year, if I can, then on which date can I eat KFC Crazy Thursday at the very first moment. After I regain my aura, I will reward you with UNCOUNTABLE treasures."

NekoPass has just seen this page on the website, and he really desires to get uncountable treasures. Since the uncertainty of the information, his teammate, HitassSY, summarizes T possible dates when the article was posted. Considering that HitassSY may play a trick on NekoPass, the date may be ILLEGAL. So you need to write a program to help NekoPass find the answers.

Input

Several tasks in one data.

Each task contains two integers m and d in one line, meaning the month and date of one day in 2022.

"0 0" read means the end of input.

$1 \le m \le 12, 1 \le d \le 32$

T is not more than 365.

Output

For each task:

If the given day is invalid or the next Crazy Thursday is in the next year. Then output one single integer "-1".

Otherwise, output one integer x meaning x days after the given date is the earliest Crazy Thursday.

Example

standard input	standard output
12 31	-1
11 25	6
8 27	5
6 6	3
1 9	4
0 0	

Note

In the example, the next Thursday of date 12 31 is in the next year so the answer should be -1.

Problem B. NekoPass and Food List

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

As a big fan of KFC Crazy Thursday, NekoPass is quite sad because there are no KFC near his campus. He couldn't eat KFC Crazy Thursday anymore. Nevertheless, he still needs to eat something for his dinner, so he takes out a list which has n distinct kinds of food numbered from 1 to n on it. Sincerely, he will choose several kinds of food on the list to set them as an eating plan. He doesn't care how much he will cost or whether he can finish all of the food in the eating plan, but he doesn't like continuous things at all. So once he chooses a kind of food with number i, he will NOT choose the food with number $i - 1$ or $i + 1$. Now NekoPass asks you how many different eating plans he can choose. Two eating plans are considered different if and only if the number sets of the food he choose are not the same. The answer should module $10^9 + 7$.

Input

The first line of input contains an integer T, denoting the number of test cases.

Each test case contains one integer N, denoting the number of kind of food on the list.

Range:

$1 \leq T \leq 10^3$

$1 \leq N \leq 10^5$

Output

For each test print one integer S, denoting the answer mod $10^9 + 7$.

Example

standard input	standard output
3	1
1	2
2	4
3	

Note

In the example:

when n=1, the only legal plan is {1};

when n=2, all the legal plans are {1}, {2};

when n=3, all the legal plans are {1}, {2}, {3}, {1, 3}.

Problem C. NekoPass and Magic Car

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

NekoPass finally selected an eating plan and later the delivery man tells him that his dinner is left right out of the gate. When NekoPass thinks that he will enjoy an easy dinner and have nothing to worry about, he gets to the gate finding out that his dinner is not placed exactly out of the door but somewhere out of the campus. Let's assume that the gate is on the origin of a number axis and the negative axis represents the inside of the campus while the positive axis represents the outside of the campus. As an expert in reasoning, HitassSY provides T possible coordinates X ($0 < X \le 10^{11}$) where the dinner may appear. To get the dinner back as quickly as possible, NekoPass decides to drive his magic car. The magic car can move k^2 (k is a positive integer) unit(s) on the axis in 1 minute and CANNOT stop halfway. To avoid his classmates knowing that he owns a magic car, he can't drive to the negative axis at any time, Without dinner, NekoPass is so hungry that he can't calculate how he can get his dinner from the gate the most quickly for each coordinate HitassSY provides, so he begs you for technical help.

Input

The first line of input contains an integer T .

Each test case contains one integer X .

$T \le 100$

$0 < X \le 10^{11}$

Output

For each X, print one integer n and then n integers a_i.

For $a_i > 0$, it means go forwards a_i^2 and for $a_i < 0$ it means go backwards a_i^2 .

You should guarantee that for each a_i you output, $|a_i| \le 10^{12}$.

Example

standard input	standard output
3	2 3 5
34	2 2 -1
3	2 1 5
26	

Note

$34 = 3^2 + 5^2$

$3 = 2^2 - 1^2$

$26 = 1^2 + 5^2$

If there are multiple answers, you can output any of them.

Problem D. NekoPass and Math

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

After finishing his dinner, NekoPass finally has time doing some mathematical learnings. As a maintainer of involution balance, HitassSY keeps trying to figure out what NekoPass is learning. But NekoPass doesn't like being interrupted so he gives HitassSY a problem to think. First, he provides numbers F_i($i \geq 1$) which satisfy $F_1 = 1$, $F_2 = 2$, $F_i = F_{i-1} + F_{i-2}$ ($i > 2$). Then he provides two integers K , n and asks you how many different sequences a_1, a_2 ... a_n satisfy $1 \leq a_i \leq a_{i+1}$, $\sum_{i=1}^{n} F_{a_i} = K$.($1 \leq i \leq n$).Two sequences a_1 , a_2 ... a_n and b_1 , b_2 ... b_n are considered different if and only if there exists an i satisfying $a_i \neq b_i$. HitassSY fails to solve this problem, so it is now your responsibility to resist involution.

Input

First line of the input contains an integer Q denoting number of questions.

In the next Q lines follow the questions, i-th of the line will denote the i-th question represented by two space separated integer K, n respectively.

$0 < Q \leq 100$

$0 < K \leq 10^9, \ 0 < n \leq 10$

Output

For each question, output a separate line containing the answer of the question.

Example

standard input	standard output
10	1
13 1	2
6 3	2
14 3	2
16 3	2
8 3	2
10 3	1
14 2	3
15 3	2
5 3	2
16 3	

Problem E. NekoPass and SUPER MINER

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

After learning math for 1 minute, NekoPass realizes that it is time to play some games. He is playing a game called "SUPER MINER" designed by famous game producer Lanly. The game happens in a cavern with N minerals in it. The ith mineral has its rarity a_i and weight b_i, and your goal is to bring out as many minerals as you can. You have a backpack with tot capacity. If you select k minerals, let's say they are the p_1-th,p_2-th,... p_k-th ($1 \le p_i \le n$, $p_i \ne p_j$ if $i \ne j$)minerals, then they will occupy $S = max_{i=1}^{k} a_{p_i} + k * \sum_{i=1}^{k} b_{p_i}$ capacity. Obviously, if $S > tot$, you may not bring the minerals out with the backpack. The game is so hard that even the designer Lanly doesn't know the best way to carry out minerals. But this is just a piece of cake to NekoPass. Now you have to solve this problem faster than NekoPass, otherwise he will start showing off his legendary game skill to you.

Input

Read the number of minerals N, and then your backpack's capacity tot.

Then follow with N lines. Each line contains two integers a_i and b_i representing the rarity and the weight of the i-th mineral.

$N \le 10^6$

$tot \le 10^{15}$

$0 < a_i \le 10^{15}, \ 0 < b_i \le 10^9$

Output

The maximum k satisfying $S \le tot$.

Example

standard input	standard output
6 100 31 3 59 2 100 1 2 3 63 1 29 3	4

Note

In the example, one way to carry 4 minerals is to carry minerals whose a_i is $29, 31, 59, 63$, and they will occupy $63 + 4 * (3 + 3 + 1 + 2) = 99$ capacity. It can be proved that you can't carry any 5 minerals at the same time.

In this problem, you may need to input a lot of data, so you should use a faster method to read .

Problem F. NekoPass and Game

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

With great intelligence of NekoPass, he soon beats the game SUPER MINER by recharging money to increase the backpack's capacity to 114^{514}. With plenty of capacity, he can easily bring all the minerals out. Then he checks his wallet to see how much should his intelligent action pay. He has -114^{514} money now! What an uncountable number of money! So he turns to *soj.acmm.club* to find the page he has just seen which claimed that will repay him uncountable treasure.

The UNCOUNTABLE treasure is an opportunity to watch the best game in the world and bet on the game. The best game in the world is played by two game expert ITcarrot and Windberu. They both have unimaginable knowledge in gaming so they will both play optimally.

Now they are having a warm-up game. There are T warm-up game in total. In each warm-up game, there will be n piles of coins and the i-th pile have a_i coins. The expert gamers play in turn and in one's turn, he can select a non-empty pile and do one of the following operations.

1. Pick 1 coin from a non-empty pile.

2. Pick all the coins from a non-empty pile.

3. Split the pile into two piles and distribute the coins in this pile to let the two new piles EXACTLY EQUAL numbers of coins. (If you can't do so, then you should NOT do this operation.)

When someone can't do any operation in his turn, then he loses and the game ends.

To show respect for game expert, Windberu will always let ITcarrot play first. But they will still play optimally without any mercy in the game.

To waste his uncountable money, NekoPass have to bet on one of the players. But NekoPass is so bad in this game that he expects you to write a program for him to predict who will win the game.

Input

The first line contains one integer T, denoting the number of test cases.

For each test case:

The first line contains one integer N, denoting the number of coin piles. Then follow N lines. the i-th line contains one integer a_i, denoting the number of coins in the i-th pile.

$T \leq 10$

$N \leq 10^5$, $\sum N \leq 2 * 10^5$

$1 \leq a_i \leq 10^9$

Output

Each test cases output "ITcarrot" or "Windberu" , denoting that ITcarrot wins or Windberu wins.

Example

standard input	standard output
3	Windberu
4	Windberu
11 14 1 2	ITcarrot
2	
2 2	
3	
14 10 13	

Problem G. NekoPass and ACMM

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

By betting on the one who would lose the game, NekoPass finally loses all his -114^{514} yuan. However, due to bad calculation, NekoPass accidentally set his account to 0 yuan and locked it up so he can't earn any money in the game now. The love for ACMM quickly fills his heart and he can't wait to express it. Therefore, he decides to make you write a program to print "%\ACMM/ \Yes/ !"(without quotes) to express his overflowing love for ACMM.

Input

No inputs.

Output

One line, the string "%\ACMM/ \Yes/ !"(without quotes).

Example

standard input	standard output
`<no input>`	`%\ACMM/ \Yes/ !`