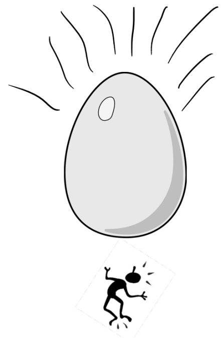
Egg Drop



There is a classic riddle where you are given two eggs and a k-floor building and you want to know the highest floor from which you can drop the egg and not have it break.

It turns out that you have stumbled upon some logs detailing someone trying this experiment! The logs contain a series of floor numbers as well as the results of dropping the egg on those floors. You need to compute two quantities—the lowest floor that you can drop the egg from where the egg could break, and the highest floor that you can drop the egg from where the egg might not break.

You know that the egg will not break if dropped from floor 1, and will break if dropped from floor k. You also know that the results of the experiment are consistent, so if an egg did not break from floor x, it will not break on any lower floors, and if an egg did break from floor y, it will break on all higher floors.

Input

The first line of input contains two space-separated integers n and k ($1 \leq n \leq 100$, $3 \leq k \leq 100$), the number of egg drops and the number of floors of the building, respectively. Each of the following n lines contains a floor number and the result of the egg drop, separated by a single space. The floor number will be between 1 and k, and the result will be either `SAFE` or `BROKEN`.

Output

Print, on a single line, two integers separated by a single space. The first integer should be the number of the lowest floor from which you can drop the egg and it could break and still be consistent with the results. The second integer should be the number of the highest floor from which you can drop the egg and it might not break.

Sample Input

```
2 10
4 SAFE
7 BROKEN
```

Sample Output

```
5 6
```

Sample Input

```
3 5
2 SAFE
4 SAFE
3 SAFE
```

Sample Output

```
5 4
```

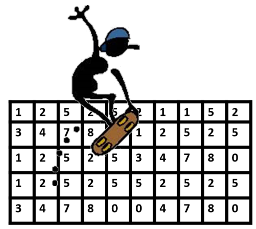
Sample Input

```
4 3
2 BROKEN
2 BROKEN
1 SAFE
3 BROKEN
```

Sample Output

```
2 1
```

Grid



You are on the top left square of an $m \times n$ grid, where each square on the grid has a digit on it. From a given square that has digit k on it, a *move* consists of jumping exactly k squares in one of the four cardinal directions. What is the minimum number of moves required to get from the top left corner to the bottom right corner?

Input

The first line of input contains two space-separated positive integers m and n ($1 \leq m, n \leq 500$). It is guaranteed that at least one of m and n is greater than 1. The next m lines each consists of n digits, describing the $m \times n$ grid. Each digit is between 0 and 9.

Output

Print, on a single line, a single integer denoting the minimum number of moves needed to get from the top-left corner to the bottom-right corner. If it is impossible to reach the bottom-right corner, print `IMPOSSIBLE` instead.

Sample Input	Sample Output
2 2 11 11	2

Sample Input	Sample Output
2 2 22 22	IMPOSSIBLE

Sample Input	Sample Output
5 4 2120 1203 3113 1120 1110	6

Problem C A multiplication game

Time limit:	0.5 seconds
Memory limit:	256 megabytes

Stan and Ollie play the game of multiplication by multiplying an integer p by one of the numbers 2 to 9. Stan always starts with $p = 1$, does his multiplication, then Ollie multiplies the number, then Stan and so on.

Before a game starts, they draw an integer n $(1 < n < 4294967295)$ and the winner is who first reaches $p \geq n$. Each line of input contains one integer number n.

Input

Each line of input contains one integer number n $(1 < n < 4294967295)$. At most there are 40 values n in the test.

Output

For each line of input output one line either `Stan wins.` or `Ollie wins.` assuming that both of them play perfectly.

Example

standard input	standard output
162 17 34012226	Stan wins. Ollie wins. Stan wins.

Problem D — limit 5 seconds

Number Game

Alice and Bob are playing a game on a line of N squares. The line is initially populated with one of each of the numbers from 1 to N. Alice and Bob take turns removing a single number from the line, subject to the restriction that a number may only be removed if it is not bordered by a higher number on either side. When the number is removed, the square that contained it is now empty. The winner is the player who removes the 1 from the line. Given an initial configuration, who will win, assuming Alice goes first and both of them play optimally?

Input

Input begins with a line with a single integer T, $1 \leq T \leq 100$, denoting the number of test cases. Each test case begins with a line with a single integer N, $1 \leq N \leq 100$, denoting the size of the line. Next is a line with the numbers from 1 to N, space separated, giving the numbers in line order from left to right.

Output

For each test case, print the name of the winning player on a single line.

Sample Input

```
4
4
2 1 3 4
4
1 3 2 4
3
1 3 2
6
2 5 1 6 4 3
```

Sample Output

```
Bob
Alice
Bob
Alice
```

PROBLEM E — LIMIT 5 SECONDS

Pushups

A friend of yours is on the cheer squad for their football team. Each time the team scores, the cheer squad does pushups—one for each point the team has scored so far. If the teams scores a touchdown (7 points), the squad does 7 pushups. If the team then scores a field goal (3 points), the cheer squad does 10 pushups. If the team then scores a safety (2 points), the squad will do 12 pushups. At the end of that game, the squad will end up having done 7+10+12=29 pushups!

You meet your friend after a game, and they say "Boy, am I tired! I did a total of n pushups at the game today!" and promptly collapse from exhaustion. Given n, the number of pushups, can you figure out how the team scored? More than one score may be possible. For example, for 29 pushups, the team could have scored 3, then 2, then 2, then 7, for a total of 14 points. If so, find the highest possible score.

Input

The input will start with a single number on the first line giving the number of test cases, between 1 and 20, inclusive. Each test case will begin with two integers N and M $1 \leq N \leq 5{,}000, 1 \leq M \leq 10$ where N is the number of pushups the cheer squad did, and M is the number of ways a team can score points in that sport. On the next line will be M unique integers S_i, $1 \leq S_i \leq 20$, with a single space between them, indicating the number of points the team gets for each kind of score. The scores are independent; a team can accrue scores in any order.

Output

For each test case, output a single integer indicating the team's final score. If more than one final score can lead to the given number of pushups, output the largest one. If no final score can lead to the given number of pushups, then your friend must have miscounted. In this case, output '-1'. Output no extra spaces.

Sample Input	Sample Output
4 29 3 7 3 2 15 1 1 16 1 1 6 2 3 1	14 5 -1 3