



Greetings From Globussoft

- ❖ Given below are 5 Programming questions, you have to solve any 3 out of 5 questions.
- ❖ These 5 questions you can attempt in any technology like C/C++, java, .Net, PHP
- ❖ To solve these 3 questions you've max. 3 hours.
- ❖ While Solving these questions you are not allowed to use any **Search Engine** like Google, Yahoo, Bing ...

All the best for your test

Globussoft

QUESTION - 1

There is a Chipmunk with "**Brain**" and he want to dig holes in a yard to store his food. There is a rectangular yard which is divided into unit cells, initially having some holes(**H**) and sand(**S**). The chipmunk can dig one row at a time, But he have to dig all the sand(**S**) positions simultaneously and due to this holes(**H**) which are already there got filled with sand.

Example:

Suppose a Row is "**SHSHH**" then after digging the row becomes "**HSHSS**" i.e all "**S**" replace with "**H**" and vice versa.

Now Chipmunk wants to have a **large square of holes** somewhere in the yard. The sides of square must be parallel to the sides of the yard. Find a sequence of turns that produces the largest possible square of holes somewhere in the yard and help him to find the area of that square.

Input

Given two interger Rows(**R**) and column(**C**) ($1 \leq R, C \leq 30$)
Next line contain a **RxC** rectangular yard of sand (**S**) and hole (**H**).

Output

Print largest "Area of the Square" that can be obtain after sequence of turns.

Example

Input:

```
2 2
SS
HH
```

Output:

```
4
```

Input:

```
5 1
H
S
H
H
H
```

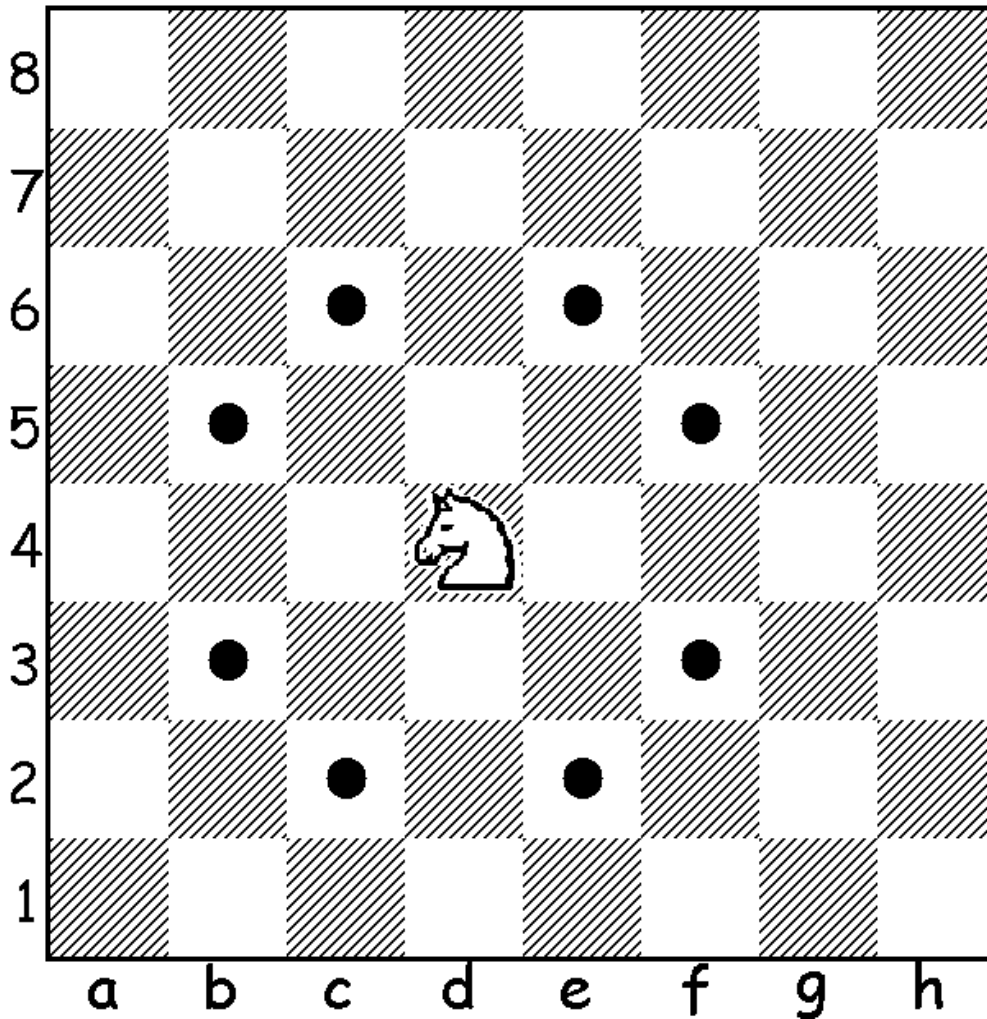
Output:

```
1
```

QUESTION – 2

Your task is simple. A knight is placed on the top left corner of a chessboard having $2n$ rows and $2n$ columns.

In how many ways can it move such that it ends up at a corner after atmost k moves ?



Input

The first line contains an integer T , the number of test cases. Each of the next T lines contains 2 integers : n, k .

Output

Output T lines, one for each test case, containing the required total number of configurations. Since the answer can get very big, output it modulo 1000007.

Example

Input :

```
3
2 1
2 2
3 3
```

Output :

```
1
5
7
```

QUESTION – 3

Digo and Sharry like to play with numbers and sequences. They decide to write an infinite sequence. For this they start by choosing a number each. They start making the sequence by following these rules :

- (i) Digo writes his number on a piece of paper. This is the 0th number of the sequence.
- (ii) Then Sharry writes his number on the paper, as many times as Digo's number. eg if Digo wrote 2, then Sharry would write his number 2 times, making the total sequence of length 3.
- (iii) Then Digo writes his number on the paper, which becomes the next element of the sequence.
- (iv) Then Sharry writes his number as many times as the number indexed 1 in the sequence.
- (v) Then Digo writes his number on the paper, which becomes the next element of the sequence.
- (vi) Then Sharry writes his number as many times as the number indexed 2 in the sequence.
-

And the cycle goes on.

Now Digo starts to feel that the sequence that they are generating is very trivial. He claims he can tell the digit at the nth place without having to play the game. So Sharry challenges him to tell the digit which will come at the nth place.

Help Digo complete Sharry's challenge.

It is given that Digo chooses 4 as his number and Sharry chooses 5 as his number.

Input Format:-

First line of the input contains an integer T - the number of testcases.
T lines follow, each containing an integer N.

Output Format:-

Print T lines. For every test case, print the digit that appears in the Nth place.

Constraints :

$1 < T < 100$
 $0 \leq N < 1000000000$

Sample Input :

3
0
4
7

Sample Output :

4
5
5

QUESTION – 4

Statement

Mario is one the most famous video games ever. In this problem, we will be helping Mario save the princess(again :P). In this game of mario, **each world will be represented by a 2-D rectangular grid**. There are **multiple worlds** and all the worlds are of size $R \times C$. The world contains many objects each covering exactly one cell.

The cell with 'S' denotes Mario's starting position. A cell with '.' denotes an empty cell over which Mario can walk safely. From that cell he can move to any of its 4 adjacent cells (which share an edge with it). A cell with 'D' denotes a pipe that leads to the world below. A cell with 'U' denotes a pipe that leads to the world above. If Mario enters a cell containing a pipe, he must enter the pipe. A cell with 'C' represents a coin and Mario collects these. After collecting the coin, the cell becomes an empty cell. A cell with '#' denotes bricks and Mario can't enter this cell no matter what. A cell with 'M' denotes the monster(Bowser), Mario has to defeat Bowser to save the princess. Mario initially start from an empty cell.

Our Mario is very determined and so he will be always able to defeat Bowser on a 1 on 1 battle. But he is greedy and will always want to collect all the coins before going to save the princess. **If he is not able to collect all the coins, he won't save the princess!**. Help Mario to find the minimum number of steps to do this feat.

Note:

If 'U' is present in topmost world or 'D' is present in the bottommost world, Mario can't enter the cell.

Input format:

Input contains multiple test cases.

First line of each test case will have 3 integers R, C and W.

'R X C' represents Grid dimension and 'W' represents number of worlds.

It will be followed by R X W lines. Each line will have 'C' characters.

First R lines describe the first world, second R lines describe the second world and so on upto W worlds.

Input ends by the line, "0 0 0".

Output format:

For each test case, print a single line "Mario saved the princess in K steps" where K is the minimum number of steps if he defeat the monster else Print "Mario failed to save princess".

constraints:

$1 \leq R, C \leq 15$

$1 \leq W \leq 9$

$0 \leq [\text{Total number of coins}] \leq 10$

All characters in the grid will be from the set {'S', '.', 'M', 'C', 'D', 'U', '#' }

INPUT:

2 2 1

SM

.D

2 2 2

SM

.D

C.

UC

3 3 2

S.M

C#.

D..

###

C.C

C.U

2 2 1

SM

#C

0 0 0

SAMPLE OUTPUT:

Mario saved the princess in 1 steps

Mario saved the princess in 7steps

Mario saved the princess in 8 steps

Mario failed to save princess

QUESTION – 5

Bhagat is student of CSE at ISM Dhanbad. In mid-semester exam somehow he was able to score full marks in Boolean algebra. So his profs doubt how can he score full marks. So profs decided to check his ability. They gave Bhagat a list student's admission number and ask him to find total kaptiness (K) of list.

Kaptiness is defined as or operation on every dukkerness(d_i) value. Dukkerness value is xor operation on every pair of number in list. As we all know Bhagat is not good in Boolean algebra. Can you help him to prove his profs that he can score full out of full in boolean algebra.

Example:-

If list contain three number 10,15 & 17. Then there will be total 3 pairs .

$$d_1 = 10 \oplus 15 = 5;$$

$$d_2 = 10 \oplus 17 = 27;$$

$$d_3 = 17 \oplus 15 = 30;$$

$$k = d_1 \mid d_2 \mid d_3;$$

$$K = 31;$$

Input

First line of input contain N ($2 \leq N \leq 10^6$). N is total number of admission number(a_i) in list.

Then following N line will contain admission number. ($0 \leq a_i \leq 10^{18}$)

Output

Output only one line containing K .

Example

Input:

3

10

15

17

Output:

