> *"First, the breath of God.*
> *Only the penitent man will pass.*
> *Second, the Word of God,*
> *Only in the footsteps of God will he proceed.*
> *Third, the Path of God,*
> *Only in the leap from the lion's head will he prove his worth."*

(taken from the movie "Indiana Jones and the Last Crusade", 1989)

To get to the grail, Indiana Jones needs to pass three challenges. He successfully masters the fir
one and steps up to the second. A cobblestone path lies before him, each cobble is engraved with
letter. This is the second challenge, the Word of God, the Name of God. Only the cobbles having o
of the letters "IEHOVA" engraved can be stepped on safely, the ones having a different letter will bre
apart and leave a hole.

Unfortunately, he stumbles and falls into the dust, and the dust comes into his eyes, making
impossible for him to see. So he calls for Marcus Brody and asks Marcus to tell him in which directi
to go to safely reach the other side of the cobblestone path. Because of the dust in his eyes, Indy on
can step "forth" to the stone right in front of him or do a side-step to the stone on the "left" or t
"right" side of him. These ('forth', 'left', 'right') are also the commands Marcus gives to him.

Input

The first line of the input contains a single number indicating the number of test cases that follow.

Each test case starts with a line containing two numbers m and n ($2 \leq m, n \leq 8$), the length
and the width n of the cobblestone path. Then follow m lines, each containing n characters ('A' to '2
'@', '#'), the engravement of the respective cobblestone. Indy's starting position is marked with the '
character in the last line, the destination with the character '#' in the first line of the cobblestone pat

Each of the letters in 'IEHOVA' and the characters '@' and '#' appear exactly once in each test cas
There will always be exactly one path from Indy's starting position via the stones with the lette
'IEHOVA' engraved on (in that order) to the destination. There will be no other way to safely reach t
destination.

Output

For each test case, output a line with the commands Marcus gives to Indy so that Indy safely reach
the other side. Separate two commands by one space character.

Sample Input

```
2
6 5
PST#T
BTJAS
TYCVM
YEHOF
XIBKU
N@RJB
5 4
JA#X
```

```
JVBN
XOHD
DQEM
T@IY
```

Sample Output

```
forth forth right right forth forth forth
right forth forth left forth forth right
```