

Problem CSI: CSI Forensics

You are a forensic technician examining a fragment of a hundred-dollar bill that was found at a crime scene. There may be a match between this target fragment and several candidate fragments that were brought in by detectives. Each fragment is described by a 7-by-7 square of characters. The square is flattened into a String by concatenating its rows from top to bottom. For example, the fragment

```
XXXXXXX
.XXXXXX
.XX.XXX
.XX.X.X
.X..X..
....X..
.....
```

is flattened into

```
XXXXXXXX.XXXXXX.XX.XXX.XX.X.X.X..X.....X.....
```

while the fragment

```
.XXXXXX
.....XX
...XXX
..XXXXX
.....X
...XXXX
...XXX
```

is flattened into the following:

```
.XXXXXX.....XX...XXX..XXXXX.....X...XXXX...XXX
```

A fragment contains 7 horizontal or vertical consecutive sequences of 'X' characters that all begin at the same edge of the square, which can be the top, right, bottom, or left edge, depending on the orientation of the fragment. If a fragment has top orientation, then in each column, a consecutive sequence of between 1 and 6 'X' characters, inclusive, begins at the top edge and extends toward the bottom. Similar constraints apply to a fragment of right, bottom, or left orientation. For example, the two fragments presented above have top and right orientations.

A pair of fragments are said to match if they can be fitted together, possibly after rotation and/or reflection, to make a solid 7-by-7 square of 'X' characters without overlap. For instance, the two fragments shown above are matched in this way. To see this, rotate the second fragment 90 degrees clockwise and reflect it to obtain:

```
.....
X.....
X..X...
X..X.X.
X.XX.XX
XXXX.XX
XXXXXXX
```

Now these 2 fragments can be fitted together.

```
XXXXXXXX      .....      XXXXXXXX
.XXXXXX      X.....      XXXXXXXX
.XX.XXX      X..X...      XXXXXXXX
.XX.X.X      X..X.X.      XXXXXXXX
.X..X..      X.XX.XX      XXXXXXXX
....X..      XXXX.XX      XXXXXXXX
.....      XXXXXXXX      XXXXXXXX
```

Input

The first line holds the number of test cases. Each testcase starts with a number on a single line, the number of candidate fragments. The second line contains the string representing the target fragment. Afterwards follow the candidate fragments.

There will be at most 50 candidate fragments. Each candidate fragment will satisfy the same constraints as the target fragment: The target fragment will contain exactly 49 characters. Each character in the target fragment will be either

'X' or '.'. When formed into a 7-by-7 square, the target fragment will make a fragment of top, right, bottom, or left orientation, as described in the problem statement.

Output

For each test case print an error code on one line. If the target fragment fails to match any of the candidate fragments, print the error code -1. If there are several matches, print -2. Otherwise, print the zero-based index of the unique candidate fragment that matches the target fragment.

Sample Input 1

```
5
3
XXXXXXXX.XXXXXX.XX.XXX.XX.X.X.X..X.....X.....-2
XXX....XX.....XXX....XXX....XXXXXXXX.X.....XXXX...0
.XXXXXX.....XX....XXX..XXXXX.....X...XXXX....XXX-1
.....X...X..X..XX..X..XX.XX..XX.XXX.XX.XXXXXXXXXX

4
XXXXXXXX.XXXXXX.XX.XXX.XX.X.X.X..X.....X.....
XXX....XX.....XXX....XXX....XXXXXXXX.X.....XXXX...
.XXXXXX.....XX....XXX..XXXXX.....XX...XXXX....XXX
XXXXXXXX.XXXXXX.XX.XXX.XX.X.X.X..X.....
.....X...X..X..XX..X..XX.XX..XX.XXX.XX.XXXXXXXXXX

4
XXXXXXXX.XXXXXX.XX.XXX.XX.X.X.X..X.....X.....
XXX....XX.....XXX....XXX....XXXXXXXX.X.....XXXX...
.XXXXXX.....XX....XXX..XXXXX.....X...XXXX....XXX
.....X...X..X..XX..X..XX.XX..XX.XXX.XX.XXXXXXXXXX
XXX....XXXX...X.....XXXXX..XXX....XX....XXXXXX.

1
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX.XXXXXX.....
.....XXXXXXXXX

2
XXXX...X.....XXX....XXXX...X.....XX.....XXX....
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX.XXX.X.X..X.X.X..X.....
...XXXX...XXXX.XXXXXX....XXX..XXXXX....XXX.XXXXXX
```

Sample Output 1

```
1
-1
-2
0
-1

4

4

1

2
```