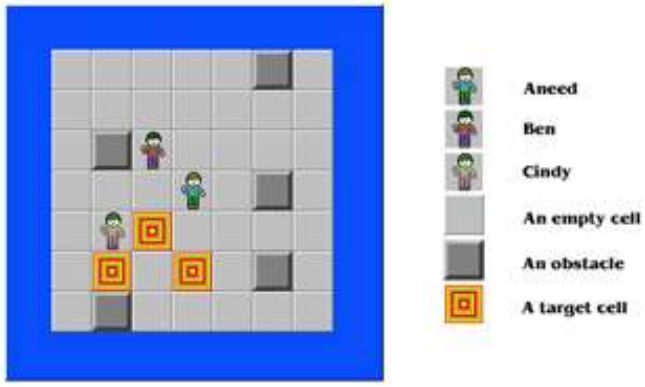
1055 – Going Together

You are playing a computer game in which three robots (Aneed, Ben and Cindy) are trapped in a labyrinth. Initially all three are situated in three different locations in the maze. There are three outlets through which the robots have to exit. As expected, there are several obstacles in the maze and the robots can't go through them.

The maze can be modeled as a square grid with **N x N** cells. The robots are placed on three different cells into the maze. You can command them to move. A single command will be activated for the three robots simultaneously. A robot will move to a new position (whatever its current situation is) if it is an empty cell within the maze or it is one of the free target cells, otherwise the command will be ignored for that robot. Your task is to command them such a way that all of them are on three exit cells (in any order).



A move consists of one of the following (Each move takes 1 unit of time):

Move North	The robots move one cell north.
Move East	The robots move one cell east.
Move South	The robots move one cell south.
Move West	The robots move one cell west.

Each cell consists of one of the following characters:

A – Initial position of Aneed
B – Initial position of Ben
C – Initial position of Cindy
. – An empty cell
- An obstacle
X – A target cell

You can assume that for every maze each of the letters **(A B C)** will appear exactly once and the letter **X** will appear exactly three times.

Input

Input starts with an integer **T (≤ 50)**, denoting the number of test cases.

Each case starts with an integer **N (2 < N < 10)**. Each of the next **N** lines contains **N** characters that fill up the maze.

Output

For each case, output the case number followed by the minimum time required. If it is impossible to move them as described, print 'trapped' instead of the time.

Sample Input	Output for Sample Input
3 7 .....#. ....#B.... ...A.#. .CX.... .X.X.#. .#..... 3 ABC ... XXX 3 ABC ### XXX	Case 1: 2 Case 2: 2 Case 3: trapped