Portable Device

Lea, always equipped with the latest technology, has sniped something magical off of ebay: A portable device that allows you to walk through walls. Using complicated quantum effects, you can lean against a wall (which may be at most 70 cm thick), activate it and you will simply emerge on the other side.

Of course this comes at a huge cost: The device can only be used three times until its batteries are dead. Lea wants to use this device in the upcoming "Competition of Mazes", a contest to see who can escape first from a given maze. She just needs to plan her route perfectly.

Given the map of the maze, tell her which walls she needs to pass through to reach the target as fast as possible. Even though you pass through a wall and thus move two grid positions, using the device counts as one step. Note that Lea can only pass through a wall if the location directly behind it is walkable. Furthermore, Lea cannot walk diagonally. Since she does not want to be identified as a cheater, she has to exit the maze through the usual exit, not by using the portal device on an outer wall.

Input

The first line of the input contains an integer t. t test cases follow, each of them separated by a blank line.

Each test case starts with a line containing two integers w and h, the width and height of the maze. h lines follow describing the maze, with w characters each.

Each line will contain only the characters "`@`", "`_`" and "$\star$" , where "`@`" is a wall (of thickness 70 cm), "`_`" is a walkable position and "$\star$" is the position where Lea starts.

Output

For each test case, print a line containing "Case #i:" where i is its number, starting at 1. Print three more lines containing either two coordinates x y, the (1-based) positions of walls Lea should skip to reach the target as fast as possible, or "unused" if you did not use that charge of the device. Each line of the output should end with a line break.

Constraints

- $1 \leq t \leq 20$
- $3 \leq w, h \leq 200$
- The maze will always have a unique exit, i.e. a walkable position on the border of the grid.
- The exit will always be reachable from the starting position, even without the portable device.

Sample Input 1

```
3
5 5
@@@@@
@__*@
@_@@@
@__@@
@@_@@

8 7
@@@@@@@@
________@
@@@@@@_@
@_______@
@_@@@@@@
@_____*_@
@@@@@@@@@

10 10
@@@@@@@@@@
@@@_______@
@@@@@_@_@@
@_@@____@_@
__@@@_@__@
@_@______@@
@____@@__@@
@_@@_@@@*@
@__________@
@@@@@@@@@@
```

Sample Output 1

```
Case #1:
3 3
unused
unused
Case #2:
3 3
3 5
unused
Case #3:
3 6
4 8
unused
```

Sample Input 2

```
3
8 5
@@@@@@_@
@@@__*_@
@@@@@__@
@@@@@__@
@@@@@@@@

7 6
@@@@@@@
@*___@@
@@___@@
_____@@
@@@@@@@
@@@@@@@

8 5
@@@@@@@@
@_____@@@
@__@__@@
@*@_@_@@
@@@@@_@@
```

Sample Output 2

```
Case #1:
unused
unused
unused
Case #2:
2 3
unused
unused
Case #3:
5 4
3 4
unused
```