

The Epic of Aldez: The Mirror of Deceit

Filename: epic

Oh no! It's happened again! The evil dwarf magician, Cannondwarf, has taken the princess Aldez captive. This time, he's brought together pieces of an ancient broken mirror in attempt to unite the worlds of light and dark. Once merged, he plans to bring treachery and deceit to Lowrule, the kingdom of light. Like the epics passed through the generations, the land of Lowrule is in need of its green-clothed hero, Chain. But this time, Chain needs your help!

It's been almost a year now since the announcement of the next title in The Epic of Aldez series of hit games. As an anxious gamer, you have your copy preordered for your GameSquare home entertainment system. Unfortunately, the GameSquare has been unofficially discontinued and will soon be replaced by the over-hyped and relatively rare Woo system. You may replace your preorder with a version for the Woo, so you decide to do some research about the game.

In The Epic of Aldez titles, Chain has an unfortunate habit of being chosen to save Lowrule from the deceitful Cannondwarf. To do so, Chain must slash his way through many elaborate dungeons and defeat the boss in each one. This will weaken Cannondwarf. When all of Cannondwarf's minions are defeated, Chain has a chance at a man-to-dwarf fight, giving Lowrule the upper hand.

Each boss can only be threatened by a special weapon hidden deep within its own lair. It would be easy for Chain if the weapon was readily available, but that wouldn't be very... epic... now would it? While the dungeons seem complicated at first, Chain has noticed (through decades of unwanted experience) that the dungeons are much easier to navigate when given a descriptive map. Better yet, he can always describe the maps with an ASCII block of text. Each map indicates the locations of several locked doors, mini-bosses, treasures, and other surprises.

You have found out that the only difference between the GameSquare and Woo version of the newest installment is how Chain uses the dungeon maps. Unfortunately, Chain has a problem understanding the maps between the two versions of the game, and cannot navigate through any dungeon to the boss. Chain loves to go through dungeons as fast as possible, but he needs your help to do this in the new version. You must write the program that helps him.

The Problem:

While ASCII maps have aided Chain in his past epics, some newly added confusion complicates things. To help you help him, he has provided an ancient tablet. Unknown to him, it is a description for each of the map's markings.

Symbols:

B: Boss
C: Treasure Chest
D: Unlocked Door
E: Entrance
G: Giant Key
L: Locked Door
M: Mini-Boss
S: Small Key
W: Weapon
*: Wall
.: Floor

Example Dungeon Map:

```
*****B*****
**....*...*W.*S*
*S.**...*.*M*.*
*****.*L*.*
*.....*
*L*****L*****
*....S*.....G*C*
*E*****
```

Given this information, you must process each dungeon map to help Chain find his way out of the dungeon. Chain entered at the Entrance (E) and can walk through Floor (.) squares, but not through Wall (*) squares. The only way out is to find the Weapon (W) that kills the boss and the Giant Key (G) that opens the Boss (B) room. Once Chain enters a Boss room with the correct weapon, consider it an easy victory. There is often a Miniboss (M) that Chain may choose to defeat (which may or may not be required in order to exit the dungeon). Unfortunately, Chain may also need to find several Small Keys (S) to unlock the Locked doors (L) along the way. Once a door is unlocked, the key breaks. Therefore, Chain must find a small key for each locked door (note that he must find the key in an accessible area). Unlocked doors (D) require no key and may be used at any time. There are also Treasure Chests (C), but Chain does not need to open these, as he always seems to have a full wallet.

The game designers have done a very good job testing the GameSquare version of the game. In each dungeon, Chain will be able to find the weapon before he enters the Boss room. Also, in order for Chain to encounter one of Cannondwarf's minions, he will have to use all of the available small keys. You may assume that the area surrounding the map is inaccessible. Of course, there is always at least one route from the entrance to the boss room.

After investing some additional time researching the games, you have finally determined why Chain is having trouble navigating through the dungeons. When looking at a particular map, the left side in the GameSquare version has become the right side in the Woo version, and vice versa. Luckily for you, Chain still understands how to navigate through the GameSquare version. So, you must write a program to help Chain through each dungeon of the Woo version by mirroring each map along the vertical axis.

The Input:

There will be multiple dungeons described in the input. Each dungeon starts with two integers, m and n ($5 \leq m, n \leq 80$), on a line by themselves separated by a single space. The next n lines will contain exactly m characters each. Only characters from the tablet will appear in the ASCII map descriptions. The last dungeon will be followed by a line containing two zeroes. This line should not be processed.

The Output:

For each dungeon, you must first output the header "Dungeon x :" where x is the dungeon number, starting from 1. Then, output the corresponding mirrored dungeon map. That is, each row of the map must be reversed so Chain may find his way. After each map, output a blank line.

Sample Input:

```
5 5
.D..E
W*...
****.
.....
G.*B*
16 8
*****B*****
**.....*W.*S*
*S.*.*.*.*M*.*
*****.*L*.*
*.....*
*L*****L*****.*
*.....S*.....G*C*
*E*****
0 0
```

Sample Output:

```
Dungeon 1:
E..D.
...*W
.****
.....
*B*.G

Dungeon 2:
*****B*****
*S*.W*.*.*.*.*
*.*M*.*.*.*.*S*
*.*L*.*.*.*.*.*
*.....*
*.....L*****L*
*C*G.....*S.....*
*****E*
```