

## G: Grain Silos

Source file name: `grain.c`, `grain.cpp`, `grain.java`, or `grain.py`

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Winter is coming! King Arthur can feel it in his bones and Camelot needs to prepare for it. This is a gigantic amount of work, including harvesting grass for the cattle, salting and smoking meat, collecting firewood, and the sort.

One crucial task is to stockpile grain sacks to survive the winter. Camelot, being a prosperous kingdom, harvests and collects different types of grain: barley, wheat, rye, and many more. They are bagged in sacks, which are --in turn-- stacked in silos. All silos follow the same simple design: all have the same capacity and grain sacks are piled on top of each other.

An industrious, but not very grain-virtuoso, Sir Lancelot was bestowed with the noble task of gathering all the grain in the Kingdom. When King Arthur --his boss-- came to inspect his work, he found that Sir Lancelot mixed sacks from different types of grain in the same silo. This is a major disaster because it makes accounting, planning, and distribution rather difficult. There is also the risk of cross-contamination.

Your task is to help Sir Lancelot in sorting the sacks of grain in the silos, so that each silo ends up with one type of grain and all sacks of the same type are stored in a single silo. You need to find an efficient way to do it (i.e., one with the minimum amount of moves). Remember, it is late already and winter is coming, and King Arthur is not highly pleased with the current situation.

Keep in mind that:

- Silos only have a hatch at the top. You can only take the top sack of grain from one silo and place it at the top of another silo.
- You can move a sack of grain from one silo to another only if the target silo is empty or contains the same type of grain at the top. The capacity of a silo cannot be exceeded at any point in time.
- You cannot leave any sack of grain in the open at any point in time or you'll be feeding the crows, which is considered a bad omen.

Consider the following example, where Sir Lancelot has five silos to account for, each with capacity for 3 sacks. Each grain sack is represented by a letter corresponding to the type of grain it contains: W for wheat, B for barley, and R for rye.

```

B R
B R W
W B W R
-----
1 2 3 4 5

```

Some valid moves are:

- Moving the top sack of grain (R) from silo 2 to silo 4.
- Moving the top sack of grain (W) from silo 3 to silo 5.

Some invalid moves would be:

- Moving the top sack of grain (R) from silo 2 to silo 3, since silo 3 contains a different type of grain at the top.

- Moving any sack to silo 1, since it is at full capacity.

The following sequence of moves sorts the grain as King Arthur requires:

B R	B	B	R
B R W	B R W R	B	W R
W B W R	W B W R	W B W R	W B W R
-----	-----	-----	-----
1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
R	B R	B W R	B W R
B B W R	B W R	B W R	B W R
W B W R	W B W R	B W R	B W R
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1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Although there may be different ways to sort this mess, 5 moves is the best available option.

### Input

The input consists of several test cases. Each case begins with a line containing two blank-separated integers  $N$  and  $C$ ,  $1 \leq N, C \leq 15$ , indicating the number of silos and the capacity of each silo, respectively. Then,  $C$  lines follow, each with exactly  $N$  characters. They define the initial configuration of the  $N$  silos, where each silo configuration is given by the corresponding column (from top to bottom, similar to the descriptions used in the problem statement). A letter represents a sack of grain and a period '.' an empty slot in a silo. There are not empty slots beneath a sack grain. You can assume that there are at most  $N$  different types of grain (i.e., each type of grain may have its own silo) and at most  $C$  number of sacks of the same type of grain (i.e., all sacks of the same grain will fit in a single silo).

The last line contains two blank-separated zeros, which should not be processed.

*The input must be read from standard input.*

### Output

For each test case, output a single line with the minimum number of moves required to sort the grain according to the given rules and King Arthur's standards. If it is not possible, output 'Camelot Will Starve!'.

*The output must be written to standard output.*

Sample Input	Sample Output
5 3 BR... BRW.. WBWR. 3 2 BB. RR. 3 4 ... BBB RRR WWW 0 0	5 3 Camelot Will Starve!