2. Block Down

Program Name: Block.java Input File: block.dat

The game Block Down takes place on a rectangular grid. The grid can be described as follows:

- Each element in the grid is either empty or occupied by a block.
- The blocks are one of five colors. The colors are red, green, blue, yellow, and purple. Colors are represented using the letters R, G, B, Y, and P.
- Empty cells are indicated with a period.
- A grouping is a set of blocks of the same color that are *connected* to one another.
  - A block is connected to the blocks above, below, to the left, and to the right of it.
  - Connections wrap around so it is possible for a block in the far right column to be connected to blocks in the far left column and for blocks on the bottom row to be connected to blocks on the top row.
  - Connections cannot pass through empty cells.

Here is an example board with five rows and four columns per row. In this example below the second row is `RGGR`. The `R` in the first column is connected to the `R` in the fourth column and vice versa.

```
.RGG
RGGR
BPGY
GBRB
PBBP
```

The Block Down game plays by the following rules:

- A players starts with 0 points.
- A player plays the game by selecting a position in the grid indicated by a row and column, called a block.
- If a player selects an empty block nothing happens and their score is not altered.
- If the block a players selects is part of a grouping of two or fewer blocks they lose one point.
- If the block is part of a grouping of three or more blocks:
  - The player is awarded points equal to the number of blocks in the grouping squared.
  - All of the blocks in the grouping are removed.
  - Any blocks above the removed cells move down towards the bottom of the grid.

For example, suppose the player selects the block in the fourth row and second column of the example board. This block is colored blue. That block is part of a grouping of three blue blocks as shown below, where the grouping is in bold.

```
.RGG
RGGR
BPGY
G**B**RB
P**BB**P
```

For this selection, the player would get nine points, the three blue blocks would be removed and the grid would now look like this.

```
...G
R.GR
BRGY
GGGB
PPRP
```

You are to write a program to simulate the game of Block Down based on an initial set up and a series of player moves.

Input
The first line of input will contain a single integer `n` indicating the number of data sets to process. The remainder of the input consists of those `n` data sets.

Each data set will consist of four parts. The first part will be a line with two integers `r` and `c`. The integer `r` indicates the number of rows and `c` indicates the number of columns per row in the grid for this data set. The next `r` lines are the initial setup of the grid. Each row will have `c` characters. All of the characters will be either a period or R, G, B, Y, or P. The initial setup will be correct in that there will not be any empty cells with blocks above them.

The next line of the input will contain a single integer `m` indicating how many cells the player picks in this data set before giving up. Note that a player may keep making picks even if there aren't moves left that can give them points. The next `m` lines are the player's move for this data set. Each line contains two integers `row` and `col` indicating the row and column of the players next pick. The player numbers the top row of the board 1 and the left most column 1. Moves outside the bounds of the board will not occur in the input.

Output
For each data set output the player's final score based on the initial board, an initial score of zero, and the picks the player makes. It is possible to have a negative score. Print the score on a line by itself. After the score print the final state of the board for that data set.

Example Input File
```
2
5 4
.RGG
RGGR
BPGY
GBRB
PBBP
4
1 1
1 2
4 2
5 1
2 7
RGGGGGR
RRRBRRR
6
2 4
1 2
1 1
2 4
1 1
2 4
```

Example Output To Screen
```
17
....
..GG
R.GR
BRGY
GGRB
86
.......
...B...
```