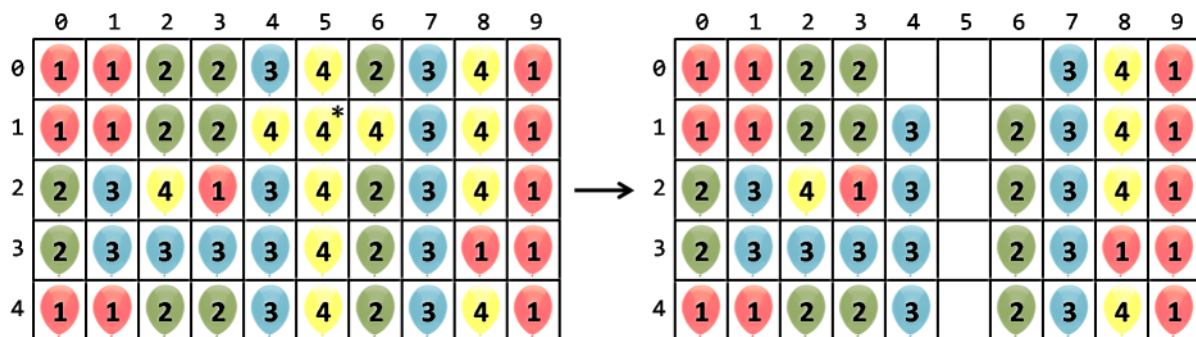


## High-Quality Code Construction – “Balloons Pops” Game

Your task is to write an interactive **console-based implementation of the game “Balloons Pops”** in which **the player sequentially pops balloons in a matrix**. We are given a matrix of size **10 x 5** (5 rows and 10 columns). Each cell of the matrix initially holds a balloon in one of the **4 colors** (see the figure below). When a balloon at some **position is popped**, all its neighbors **having the same color** and staying at the same row or at the same column **are also popped**. After that all balloons staying directly up to an empty cell **fall down** and fill the empty cells (see the figure below). The game starts from a **randomly generated matrix** filled with balloons, each in random color in the range [1...4]. At each turn the player chooses a balloon in the matrix (non-empty cell) and pops it along with its neighbors with the same color at the same row and column. The game finishes when **the last balloon is popped**. When the game is finished, a new game automatically starts. If an invalid balloon coordinate is entered, an error message should be shown.



The player can request starting a new game by entering the command **'restart'**.

Your program should implement a **local top scoreboard** which keeps the best results and the names of their authors. Initially, at the program start, the scoreboard is empty. It keeps the **top 5 results** sorted in ascending order by the number of moves. When a game is finished by popping all balloons, the player's result can enter in the top scoreboard if his or her number of moves is less than some of the other achievements staying in the top scoreboard. When the player's result enters the scoreboard, the player should enter his or her name or nickname.

The player can request printing the top scoreboard during the game by entering the command **'top'**.

The player can request stopping the game and exiting from the program the command **'exit'**.

### Example Game Session

The player's input is shown in *italic*:

```
Welcome to "Balloons Pops" game. Please try to pop the balloons. Use 'top' to view the
top scoreboard, 'restart' to start a new game and 'exit' to quit the game.
```

```

  0 1 2 3 4 5 6 7 8 9
-----
0 | 1 1 2 2 3 4 2 3 4 1 |
1 | 1 1 2 2 4 4 4 3 4 1 |
2 | 2 3 4 1 3 4 2 3 4 1 |
3 | 2 3 3 3 3 4 2 3 1 1 |
4 | 1 1 2 2 3 4 2 3 4 1 |
-----
```

Enter a row and column: 1 5

```

      0 1 2 3 4 5 6 7 8 9
      -----
0 | 1 1 2 2 . . . 3 4 1 |
1 | 1 1 2 2 3 . 2 3 4 1 |
2 | 2 3 4 1 3 . 2 3 4 1 |
3 | 2 3 3 3 3 . 2 3 1 1 |
4 | 1 1 2 2 3 . 2 3 4 1 |
      -----

```

Enter a row and column: 3 4

```

      0 1 2 3 4 5 6 7 8 9
      -----
0 | 1 . . . . . 3 4 1 |
1 | 1 1 2 2 . . 2 3 4 1 |
2 | 2 1 2 2 . . 2 3 4 1 |
3 | 2 3 4 1 . . 2 3 1 1 |
4 | 1 1 2 2 . . 2 3 4 1 |
      -----

```

Enter a row and column: 3 4

Enter a row and column: *cheat*  
Invalid move or command!

Enter a row and column: *top*  
The scoreboard is empty.

Enter a row and column: *restart*

Welcome to "Balloons Pops" game. Please try to pop the balloons. Use 'top' to view the top scoreboard, 'restart' to start a new game and 'exit' to quit the game.

```

      0 1 2 3 4 5 6 7 8 9
      -----
0 | 1 1 1 2 2 1 2 4 1 1 |
1 | 1 3 3 3 3 4 4 4 4 4 |
2 | 1 1 3 2 1 2 2 2 2 1 |
3 | 1 1 3 2 1 1 2 1 1 1 |
4 | 1 1 1 2 1 1 2 1 1 1 |
      -----

```

Enter a row and column: 1 7

```

      0 1 2 3 4 5 6 7 8 9
      -----
0 | 1 1 1 2 2      |
1 | 1 3 3 3 3 1 2  1 1 |
2 | 1 1 3 2 1 2 2 2 2 1 |
3 | 1 1 3 2 1 1 2 1 1 1 |
4 | 1 1 1 2 1 1 2 1 1 1 |
      -----

```

Enter a row and column: 2 6

	0	1	2	3	4	5	6	7	8	9
-----										
0		1	1	1	2	2	.	.	.	.
1		1	3	3	3	3	.	.	.	1
2		1	1	3	2	1	1	.	.	1
3		1	1	3	2	1	1	.	1	1
4		1	1	1	2	1	1	.	1	1
-----										

Enter a row and column: 1 7

Illegal move: cannot pop missing ballon!

Enter a row and column: 1 2

	0	1	2	3	4	5	6	7	8	9
-----										
0		1	.	.	.	.	.	.	.	.
1		1	1	.	2	2	.	.	.	1
2		1	1	.	2	1	1	.	.	1
3		1	1	1	2	1	1	.	1	1
4		1	1	1	2	1	1	.	1	1
-----										

Enter a row and column: 1 3

	0	1	2	3	4	5	6	7	8	9
-----										
0		1	.	.	.	.	.	.	.	.
1		1	1	.	.	.	.	.	.	1
2		1	1	.	.	1	1	.	.	1
3		1	1	1	.	1	1	.	1	1
4		1	1	1	.	1	1	.	1	1
-----										

Enter a row and column: 3 1

	0	1	2	3	4	5	6	7	8	9
-----										
0		.	.	.	.	.	.	.	.	
1		1	.	.	.	.	.	.	.	1
2		1	.	.	.	1	1	.	.	1
3		1	.	.	.	1	1	.	1	1
4		1	.	1	.	1	1	.	1	1
-----										

Enter a row and column: 4 0

	0	1	2	3	4	5	6	7	8	9
-----										
0		.	.	.	.	.	.	.	.	.
1		.	.	.	.	.	.	.	.	1
2		.	.	.	1	1	.	.	1	1
3		.	.	.	1	1	.	1	1	1
4		.	.	1	.	1	1	.	1	1
-----										

Enter a row and column: 4 2

	0	1	2	3	4	5	6	7	8	9
0	.	.	.	.	.	.	.	.	.	.
1	.	.	.	.	.	.	.	.	.	1
2	.	.	.	.	1	1	.	.	1	1
3	.	.	.	.	1	1	.	1	1	1
4	.	.	.	.	1	1	.	1	1	1

Enter a row and column: 4 4

	0	1	2	3	4	5	6	7	8	9
0	.	.	.	.	.	.	.	.	.	.
1	.	.	.	.	.	.	.	.	.	1
2	.	.	.	.	.	.	.	.	1	1
3	.	.	.	.	.	1	.	1	1	1
4	.	.	.	.	.	1	.	1	1	1

Enter a row and column: 4 5

	0	1	2	3	4	5	6	7	8	9
0	.	.	.	.	.	.	.	.	.	.
1	.	.	.	.	.	.	.	.	.	1
2	.	.	.	.	.	.	.	.	1	1
3	.	.	.	.	.	.	.	1	1	1
4	.	.	.	.	.	.	.	1	1	1

Enter a row and column: 3 8

	0	1	2	3	4	5	6	7	8	9
0	.	.	.	.	.	.	.	.	.	.
1	.	.	.	.	.	.	.	.	.	1
2	.	.	.	.	.	.	.	.	1	.
3	.	.	.	.	.	.	.	.	1	.
4	.	.	.	.	.	.	1	.	1	.

Enter a row and column: 4 7

	0	1	2	3	4	5	6	7	8	9
0	.	.	.	.	.	.	.	.	.	.
1	.	.	.	.	.	.	.	.	.	1
2	.	.	.	.	.	.	.	.	.	1
3	.	.	.	.	.	.	.	.	.	1
4	.	.	.	.	.	.	.	.	.	1

Enter a row and column: 4 9

Congratulations! You popped all balloons in 11 moves.

Please enter your name for the top scoreboard: *Bay Ivan*

Scoreboard:

1. Bay Ivan --> 11 moves

Welcome to "Balloons Pops" game. Please try to pop the balloons. Use 'top' to view the top scoreboard, 'restart' to start a new game and 'exit' to quit the game.

```

      0 1 2 3 4 5 6 7 8 9
      -----
0 | 1 1 2 2 2 1 2 4 1 1 |
1 | 2 2 3 3 3 4 4 3 3 4 |
2 | 1 1 3 2 1 2 2 2 3 1 |
3 | 3 1 3 2 2 3 4 4 4 1 |
4 | 1 3 1 2 1 3 2 1 1 1 |
      -----

```

Enter a row and column: *exit*

Good bye!

Some players could try to cheat by entering illegal moves, so be cautious and **prevent illegal input**.