29 Battleship Board Sketcher

20 points

Introduction

Brugilda is developing a smartphone application to play the well-known *Battleship* game (aka *Hundir la flota*). She is starting with a very basic user interface to sketch the board and the result of several shots.

Battleship is a strategy-type guessing game of two players. Each player has a board with rows and columns and places its own fleet of warships secretly. The objective is to destroy the opposing player fleet by calling "shots", trying to guess the position of the different warships.

The fleet consists in different warships of several sizes:

Warship Name	Size
Carrier	5
Battleship	4
Destroyer	3
Submarine	3
Patrol Boat	2

The size of each ship indicates the number of cells it occupies when placed on the board. Remember that players must leave a safety perimeter of 1 cell around each warship, except in case the warship is placed at any corner or along the board's edges.

The board must have 10 rows and 10 columns. Rows named from 1 to 10 and columns from A to J.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Check the following example picture. Several boats have been added to the board:

- Carrier warship horizontally at location "C3"
- Patrol Boat vertically at "F6"
- Destroyer horizontally at A8
- Submarine located at H10, also horizontally

Notice how the 1 cell safety perimeter is respected in all cases.

	A	B	C	D	E	F	G	H	I	J
1										
2										
3			C	C	C	C	C			
4										
5										
6						P				
7						P				
8	D	D	D							
9										
10								S	S	S

Calling a shot requires to specify the column (A, B, C, ...) and the row (1,2,3,...). If a warship receives as many shots as its size, it is considered destroyed, so all the cells around the ship must be immediately marked.

Following the example, we draw many shots on the current board. The Carrier received a shot at "D3", the Destroyer stays intact, the Submarine also received one shot at H10 and the Patrol Boat received two shots ("F6" and "F7") being completely destroyed.

	A	B	C	D	E	F	G	H	I	J
1			X		X					
2		X								
3	X		C	X	C	C	C			
4		X								
5					X	X	X			
6	X				X	X	X			
7		X			X	X	X			
8	D	D	D		X	X	X			
9									X	
10								X	S	S

Code Requirements

Would you like to help Brugilda writing her prototype? The code must accomplish the following requirements:

- Input the number of ships.
- Input the position (cell column and row) and orientation of each boat (horizontal and vertical).
- Input several shot calls, each one defined as a cell (column and row).
- With input data, draw a 10x10 board with ships properly placed, shots received and a player health status.
- After all input data is entered the prototype must ensure that a valid board will be drawn:
  - Ships do not exceed board dimensions.
  - There are no ships overlapping. That is, a board cell can only contain one type of warship.
  - Once ships are placed, they respect the 1 cell safe perimeter around each ship.

Input

The input of this problem consists in 3 lines:

- First line is the number of ships. For example: `Number of ships:4`
- Subsequent lines correspond to the description and position of each boat in the form of `Boat Name,Cell,Orientation`

```
Carrier,C3,H
Destroyer,A8,H
Patrol Boat,F6,V
Submarine,H10,H
```

Third line corresponds to the shots, separated by comas: `Shots:D3,F6,F7`

It is not mandatory to enter any shot for the prototype to draw the board.

Output

The game board with the ships in its positions and the shots marked as "X". Each boat is identified as follows:

- Carrier: `C`
- Battleship: `B`
- Destroyer: `D`
- Submarine: `S`
- Patrol Boat: `P`

The board must show named columns and rows using `|` as column separator. The player health status will use symbols "*" and "-" to indicate remaining 'life' of each boat. See the example:

```
  |A|B|C|D|E|F|G|H|I|J|
1 | | |X| |X| | | | | |
2 | |X| | | | | | | | |
3 |X| |C|X|C|C|C| | | |
4 | |X| | | | | | | | |
5 | | | | |X|X|X| | | |
6 |X| | | |X|X|X| | | |
7 | |X| | |X|X|X| | | |
8 |D|D|D| |X|X|X| | | |
9 | | | | | | | | |X| |
10| | | | | | | |X|S|S|

Your Board Status:
Carrier at C3: ****-
Destroyer at A8: ***
Patrol Boat at F6: --
Submarine at H10: **-
```

Finally, as the prototype must check some board validity parameters, different output messages will be showed according to the error found at input data:

- If any input ship, when placed at the board, exceeds board dimensions: `ERROR: At least one warship's location exceeds board's dimensions`
- If any input ship, when placed at the board, causes overlap with another ship: `ERROR: There is overlap between at least two ships`

- After placing warships, if the 1 cell safety perimeter is not satisfied: `ERROR: Safety perimeter is not respected`
- If any shot goes outside of the board: `ERROR: There is at least one shot going outside the board`

Example 1

Input

```
Number of ships:4
Carrier,C3,H
Destroyer,A8,H
Patrol Boat,F6,V
Submarine,H10,H
Shots:C1,E1,B2,A3,D3,B4,A6,E6,F6,G6,F7,B7,H10,I9
```

Output

```
  |A|B|C|D|E|F|G|H|I|J|
1 | | |X| |X| | | | | |
2 | |X| | | | | | | | |
3 |X| |C|X|C|C|C| | | |
4 | |X| | | | | | | | |
5 | | | | |X|X|X| | | |
6 |X| | | |X|X|X| | | |
7 | |X| | |X|X|X| | | |
8 |D|D|D| |X|X|X| | | |
9 | | | | | | | | |X| |
10| | | | | | | |X|S|S|

Your Board Status:
Carrier at C3: ****-
Destroyer at A8: ***
Patrol Boat at F6: --
Submarine at H10: **-
```

Example 2

Input

```
Number of ships:1
Carrier,H10,V
Shots:A7
```

Output

```
ERROR: At least one warship's location exceeds board's dimensions
```

Example 3

Input

```
Number of ships:3
Carrier,C4,H
Battleship,D3,V
Submarine,F5,H
Shots:D7
```

Output

```
ERROR: There is overlap between at least two ships
```

Example 4

Input

```
Number of ships:1
Carrier,D3,H
Shots:L17
```

Output

```
ERROR: There is at least one shot going outside the board
```