Programming challenges in Java

5. Exploring algorithms (I). Brute force

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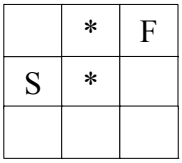
Programming challenges in Java

1. Brute force algorithms

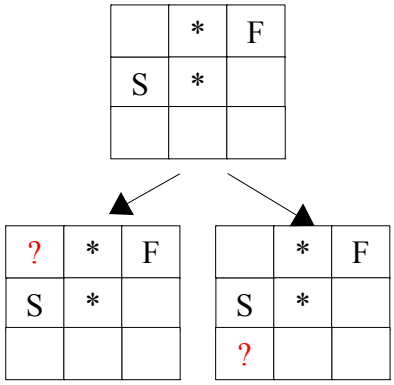
Brute force algorithms are algorithms that explore all the possible paths of a given problem in order to find a solution. Depending on the problem itself, we may need an array, list, multi-dimensional array... and often a recursive function to solve the problem.

Let's have a look at this challenge from Acepta el Reto.

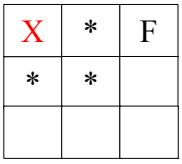
We need to explore a bidimensional map in order to find a path from the starting point (S) to the finish point (F). Let's suppose that we have a 3 x 3 map with this structure:



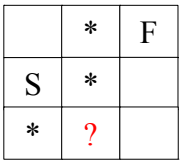
How could we check if there is a solution (a path from S to F)? We need to apply a brute force algorithm: starting from S, we need to explore all the contiguous cells that are empty (this is, the don't have a '*'). In this case, we have two possible options:



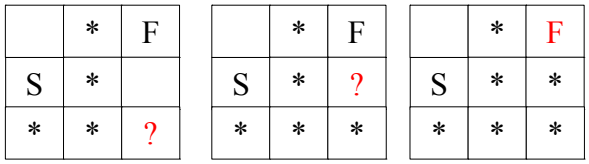
So we mark our cell as "visited" and check these two options: From the first one, there is no possible "next cell", so we discard this option:



Regarding the second path, we can go right:



And we can apply the same procedure until we find the way to the finish point:



We need to define a recursive function that takes the map as a parameter, and the current position of the explorer (row and column), then, it must explore all the possible next steps (up, down, left and right) and return *true* whenever the "F" point is reached.

```
public static boolean findExit(char[][] map, int row, int col)
{
    // If we found the "F", return true
    // Else, return if we find it going up, down, left or right
}
```

1.1. Try yourself: Escapando de las fuerzas imperiales

Try to apply this algorithm to this challenge and solve it.