TalkTalk
For Everyone

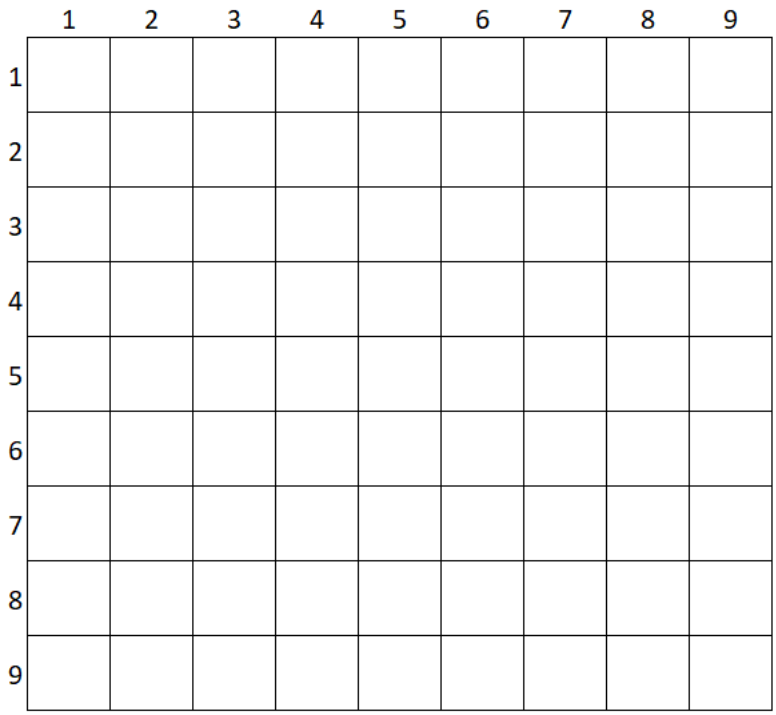
Problem Solving Exercise – Painting Pixels

Some Guidelines

- Please complete the exercise in either C#, Java, or Javascript (Typescript)
- Avoid using 3rd party libraries or packages
- As well as implementing the solution, think about proving that your solution delivers the expected results
- Quality is more important than quantity
- Please submit your solution either via email (as a collection of source files) or by uploading to a private repository (e.g. GitHub) and providing us with the credentials

The Problem

This exercise is based around a grid of pixels. The grid is of no specific fixed dimensions, but is illustrated here as 9 pixels wide by 9 pixels tall:



Your challenge is as follows:

1. Develop a solution in which this grid is represented by an appropriate data structure, and the following functions can be performed upon the grid:

    a. Fill a pixel at a specific location using a chosen colour
    b. Fill a row of pixels (between two specified columns) using a chosen colour
    c. Fill a column of pixels (between two specified rows) using a chosen colour

2. Extend your solution by developing a further “flood” function which:
    - Is supplied with a pixel at a specific location
    - Fills that pixel with a chosen colour
    - Also fills any horizontally or vertically adjacent pixels that are the same original colour, with the chosen colour

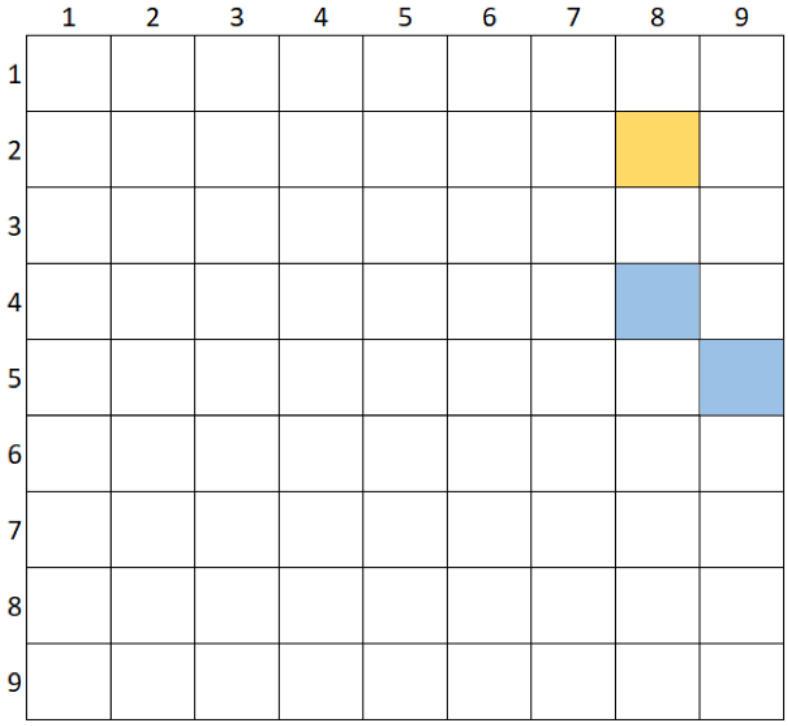
Some hints and tips:

- No graphical interface or user input is required. It is enough to represent the grid using a data structure and to perform operations on that data structure

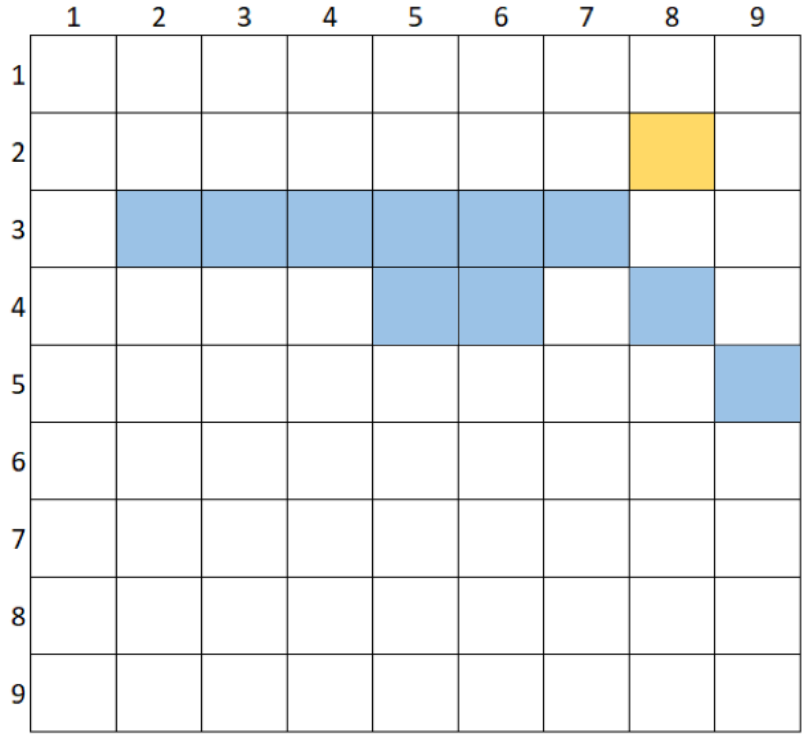
- Given that there is no user interface consider how you can prove that your solution works and delivers the expected results

- For any requirements which are ambiguous or incomplete, you can use your own creativity and ingenuity to decide on an appropriate implementation. There is no right or wrong answer.

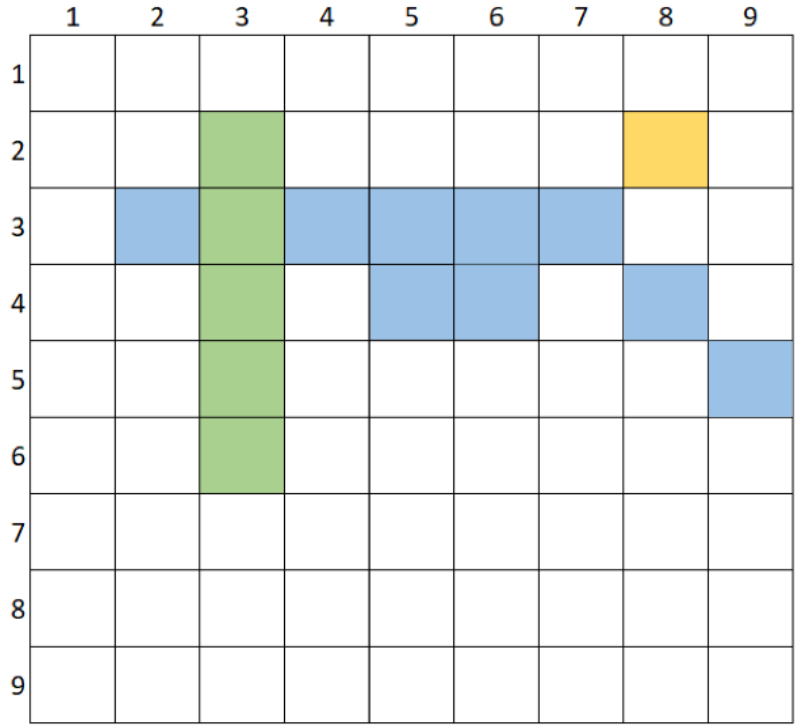
Example 1: Fill pixels at: (8,2) using Yellow, (8,4) and (9,5) using Blue:



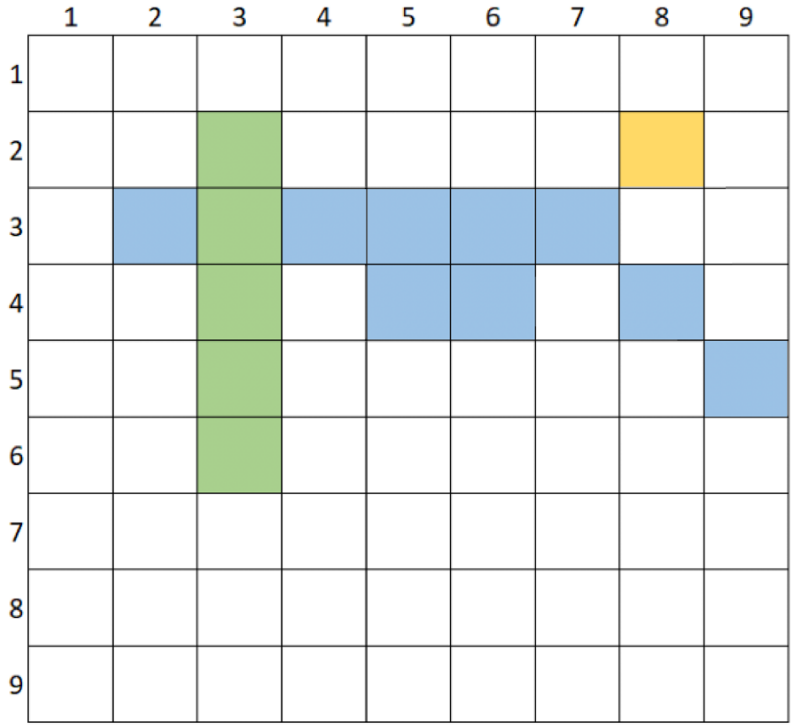
Example 2: Fill row 3 from column 2 to 7 and row 4 from column 5 to 6 using Blue:



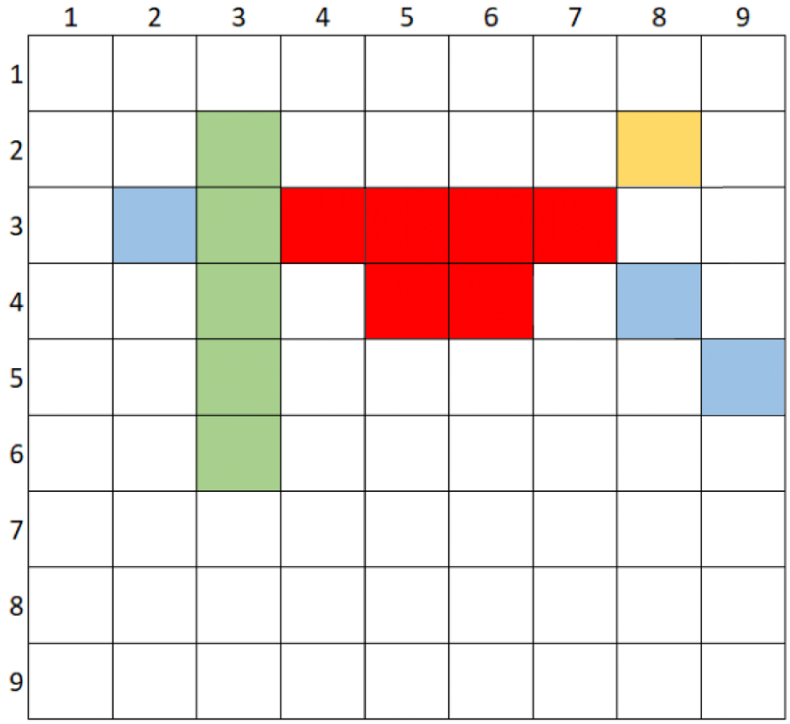
Example 3: Fill column 3 from row 2 to 6 using Green:



Example 4: Flood pixel at (6,3) using Red:



Note that the flood stopped at pixel (3,3) because this pixel was not blue
Also note that the flood did not affect pixel (8,2), (8,4) and (9,5) as it is not horizontally or vertically adjacent


1 2 3 4 5 6 7 8 9
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