Connected Component Labelling Algorithm

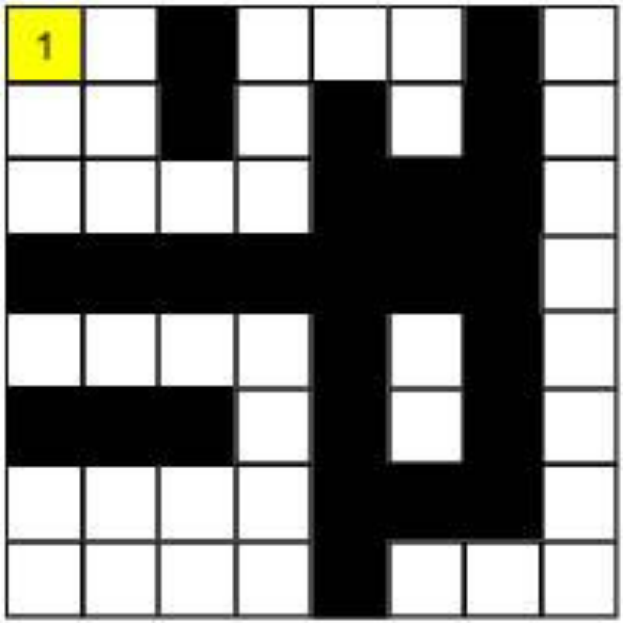
1	1	0	1	1	1	0	1
1	1	0	1	0	1	0	1
1	1	1	1	0	0	0	1
0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	1
0	0	0	1	0	1	0	1
1	1	1	1	0	0	0	1
1	1	1	1	0	1	1	1

Connected Component Labelling Algorithm

The first pass

We check the top and left pixels. They do not exist... so we need to create a new label. Thus, we set the label for the top left pixel as 1 (shown as yellow).

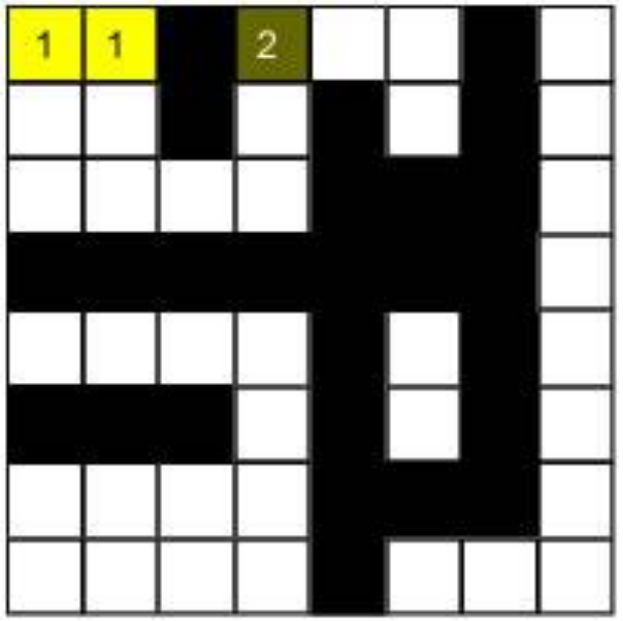
1	1	0	1	1	1	0	1
1	1	0	1	0	1	0	1
1	1	1	1	0	0	0	1
0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	1
0	0	0	1	0	1	0	1
1	1	1	1	0	0	0	1
1	1	1	1	0	1	1	1



Connected Component Labelling Algorithm

Next we check the pixel in row 1, column 2, or simply pixel (1, 2). It does has a pixel to its left. So we copy its label. The next pixel, (1, 3) is a background pixel. We're not interested in it. So we simply skip it and let it be black (a label of 0).

1	1	0	1	1	1	0	1
1	1	0	1	0	1	0	1
1	1	1	1	0	0	0	1
0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	1
0	0	0	1	0	1	0	1
1	1	1	1	0	0	0	1
1	1	1	1	0	1	1	1

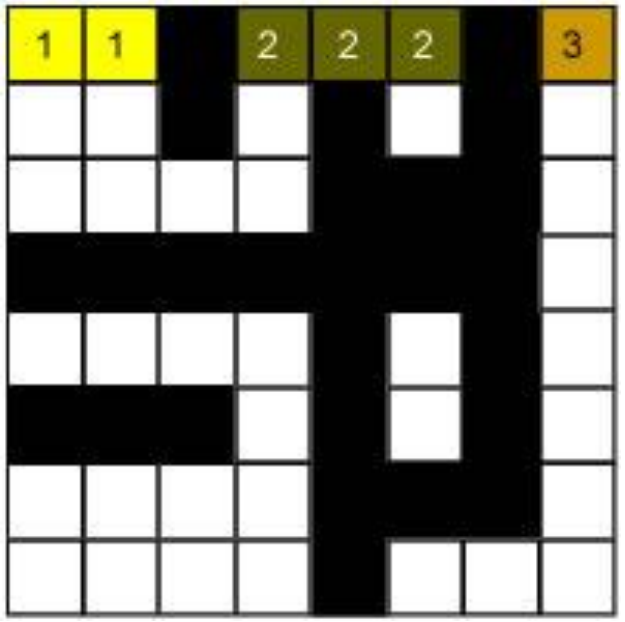


Next comes the pixel (1, 4). There are no pixels above it. But the pixel to its left is a background pixel. So we create a new label. So, we mark (1, 4) with label 2 (shown as dark yellow).

Connected Component Labelling Algorithm

We check the top and left pixels. They do not exist... so we need to create a new label. Thus, we set the label for the top left pixel as 1 (shown as yellow).

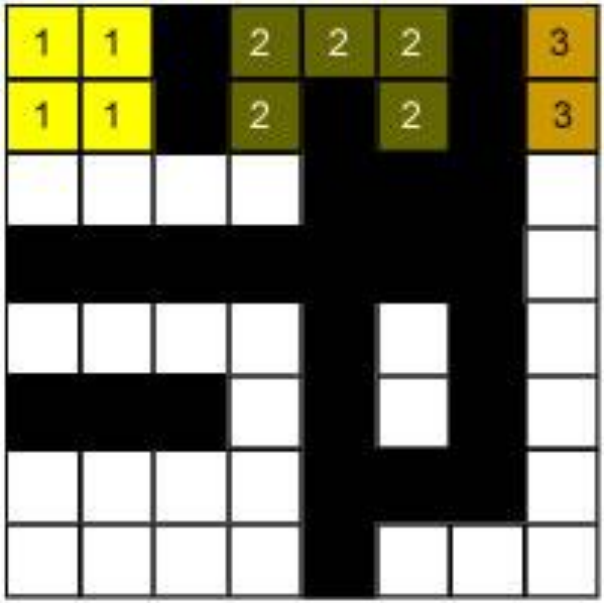
1	1	0	1	1	1	0	1
1	1	0	1	0	1	0	1
1	1	1	1	0	0	0	1
0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	1
0	0	0	1	0	1	0	1
1	1	1	1	0	0	0	1
1	1	1	1	0	1	1	1



Connected Component Labelling Algorithm

Now the pixel (2, 1) does not have anything to its left. But it does have a pixel just above it. Its label is '1', so we copy that. Similarly for (2, 2). In fact, the same thing holds for the entire row. All pixels in the second row have a pixel just above them. So the result looks like this:

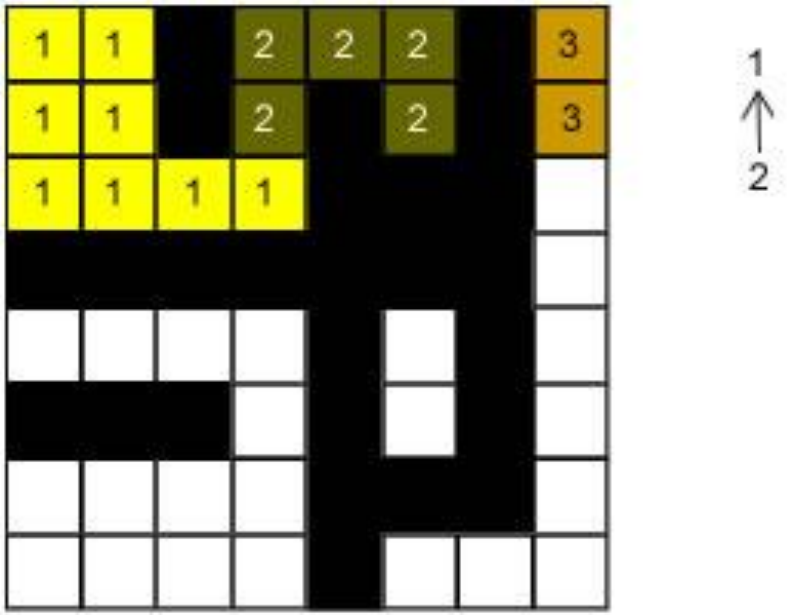
1	1	0	1	1	1	0	1
1	1	0	1	0	1	0	1
1	1	1	1	0	0	0	1
0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	1
0	0	0	1	0	1	0	1
1	1	1	1	0	0	0	1
1	1	1	1	0	1	1	1



Connected Component Labelling Algorithm

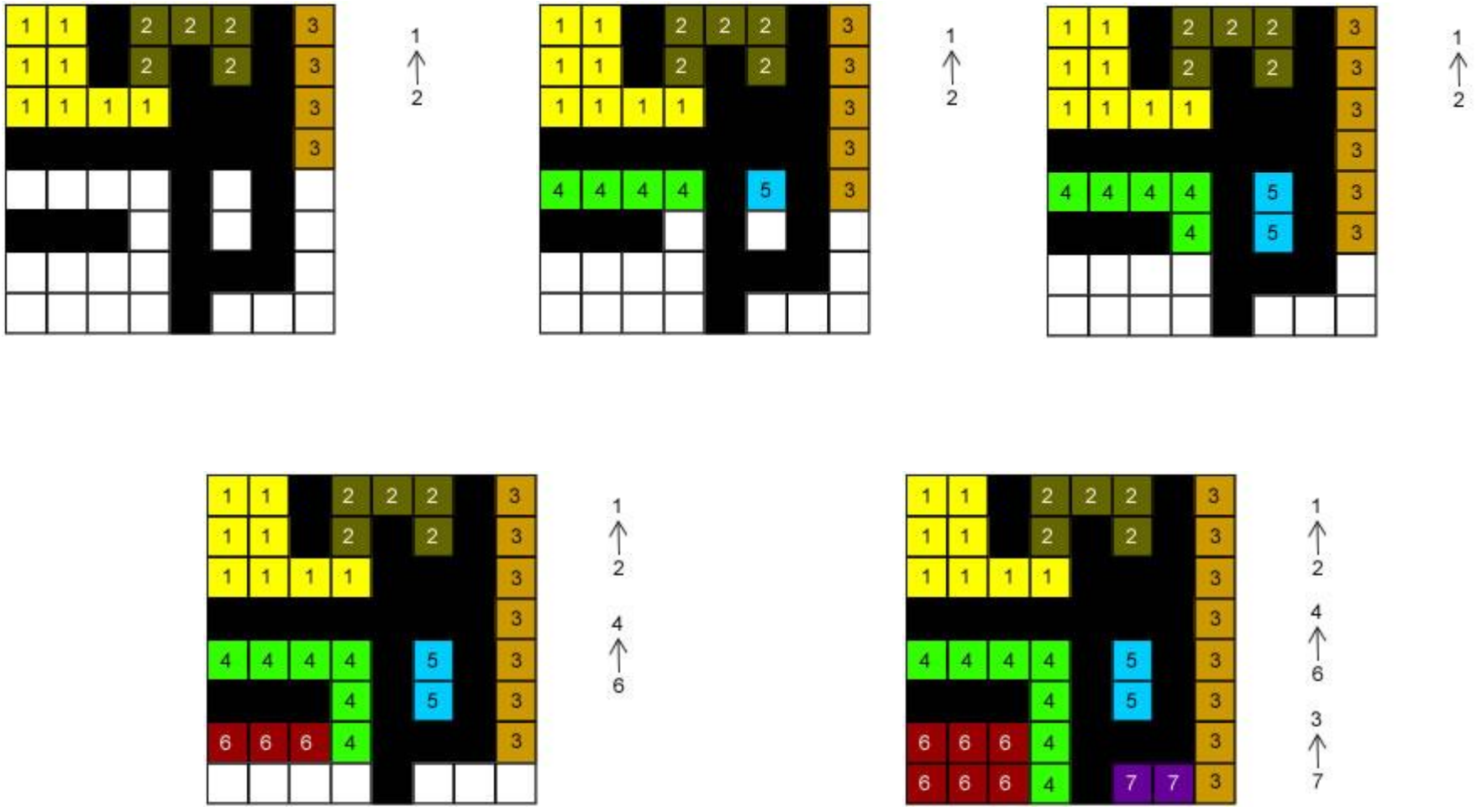
In the third row, pixels (3, 1) (3,2) and (3, 3) are quite straight forward. They get the label '1'. But pixel (3, 4) is a tricky one?

1	1	0	1	1	1	0	1
1	1	0	1	0	1	0	1
1	1	1	1	0	0	0	1
0	0	0	0	0	0	0	1
1	1	1	1	0	1	0	1
0	0	0	1	0	1	0	1
1	1	1	1	0	0	0	1
1	1	1	1	0	1	1	1



Well, you take the smaller label (in this case '1') and put that on (3, 4). And, you also store that 2 (the numerically larger label) is a child of 1

Connected Component Labelling Algorithm



Connected Component Labelling Algorithm

The second pass