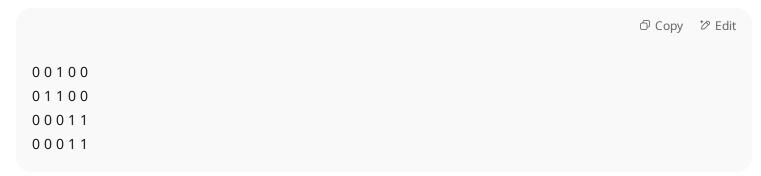
Max island Area

Got it! Let's carefully explain this step by step.

We are finding the largest island area (count of connected 1 s) in a grid.

We only move UP, DOWN, LEFT, RIGHT (no diagonals).

Your grid:



We scan row by row.

\checkmark Step 1: Scan (0,0) → 0 → skip

Scan $(0,1) \rightarrow 0 \rightarrow \text{skip}$

Scan $(0,2) \rightarrow 1 \rightarrow$ found a new island!

We start DFS at (0,2).

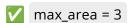
V DFS from (0,2)

- Visit $(0,2) \rightarrow \text{mark as } 0 \rightarrow \text{area} = 1$
 - Neighbors:
 - UP = out of bounds
 - DOWN = $(1,2) \rightarrow 1 \rightarrow visit$
 - LEFT = $(0,1) \rightarrow 0$
 - RIGHT = $(0,3) \to 0$
- Now DFS from $(1,2) \rightarrow \text{mark as } 0 \rightarrow \text{area} = 2$
 - Neighbors:
 - UP = (0,2) → already 0
 - DOWN = $(2,2) \rightarrow 0$
 - LEFT = $(1,1) \rightarrow 1 \rightarrow visit$
 - RIGHT = $(1,3) \rightarrow 0$
- Now DFS from $(1,1) \rightarrow$ mark as $0 \rightarrow$ area = 3

- Neighbors:
 - UP = $(0,1) \rightarrow 0$
 - DOWN = $(2,1) \to 0$
 - LEFT = $(1,0) \to 0$
 - RIGHT = (1,2) → already 0

No more moves \rightarrow DFS finishes.

So this island's area = 3.



Now grid becomes:

00000 00000 00011 00011

✓ Step 2: Continue scanning

• Row 2 \rightarrow reach (2,3) \rightarrow 1 \rightarrow new island!

Start DFS at (2,3)

V DFS from (2,3)

- Visit $(2,3) \rightarrow \text{mark as } 0 \rightarrow \text{area} = 1$
 - Neighbors:
 - UP = $(1,3) \rightarrow 0$
 - DOWN = $(3,3) \rightarrow 1 \rightarrow \text{visit}$
 - LEFT = $(2,2) \to 0$
 - RIGHT = $(2,4) \rightarrow 1 \rightarrow visit$
- DFS from $(3,3) \rightarrow \text{mark as } 0 \rightarrow \text{area} = 2$
 - Neighbors:
 - UP = (2,3) → already 0
 - DOWN = out of bounds

- LEFT = $(3,2) \rightarrow 0$
- RIGHT = $(3,4) \rightarrow 1 \rightarrow visit$
- DFS from $(2,4) \rightarrow \text{mark as } 0 \rightarrow \text{area} = 3$
 - Neighbors:
 - UP = $(1,4) \rightarrow 0$
 - DOWN = $(3,4) \rightarrow 1 \rightarrow visit$
 - LEFT = (2,3) → already 0
 - RIGHT = out of bounds
- DFS from $(3,4) \rightarrow \text{mark as } 0 \rightarrow \text{area} = 4$
 - Neighbors all 0 or out of bounds

Done \rightarrow DFS finishes.

So this island's area = 4.

 $\sqrt{}$ max_area = max(3, 4) = 4

Now grid becomes:

00000 00000 00000 00000

☑ Step 3: Continue scanning

No more 1 s.

So final max_area = 4.

What's happening conceptually?

- DFS explores all connected 1 s (up/down/left/right) starting from one cell
- Counts how many cells belong to that island
- Updates max_area
- Marks them 0 so we don't visit again

Would you like me to draw a visual diagram showing how DFS expands step by step for this example?