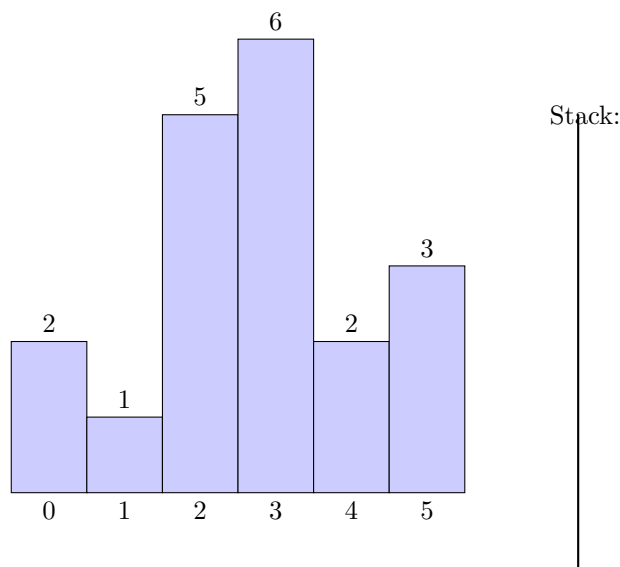


# Largest Rectangle in Histogram - Step by Step Visualization

September 23, 2024

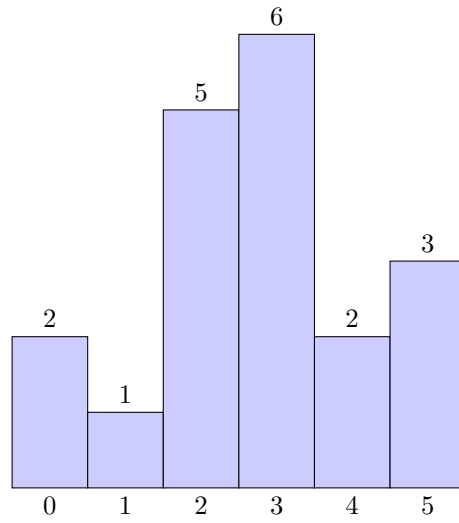
## Step 1: Initial Histogram



Array: [2, 1, 5, 6, 2, 3], stack is empty at the start.

## Step 2: Iteration 1 ( $i = 0$ )

Push index 0 (height 2) onto the stack.

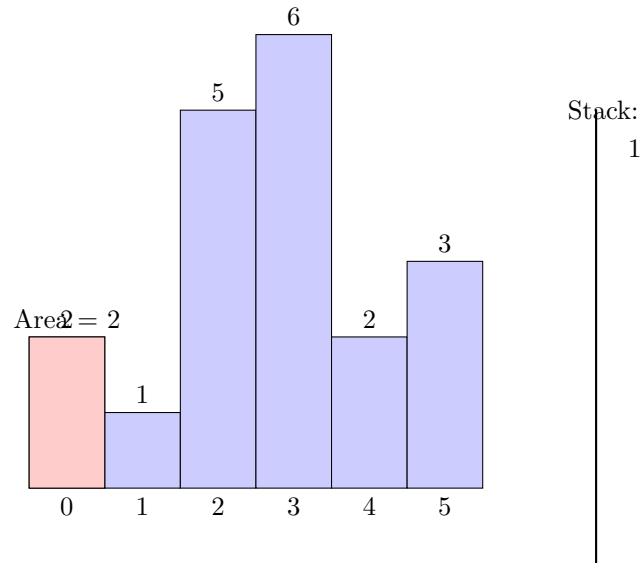


Stack:

0

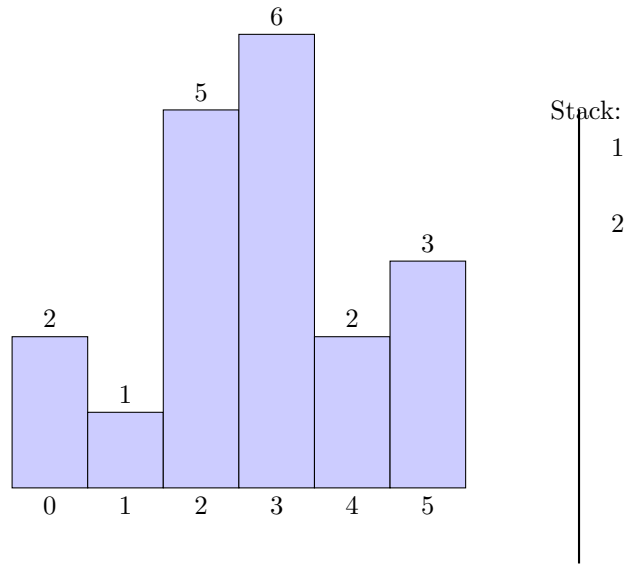
### Step 3: Iteration 2 ( $i = 1$ )

Height 1 is smaller than 2 (top of stack), so we pop 0 and calculate the area for bar at index 0.



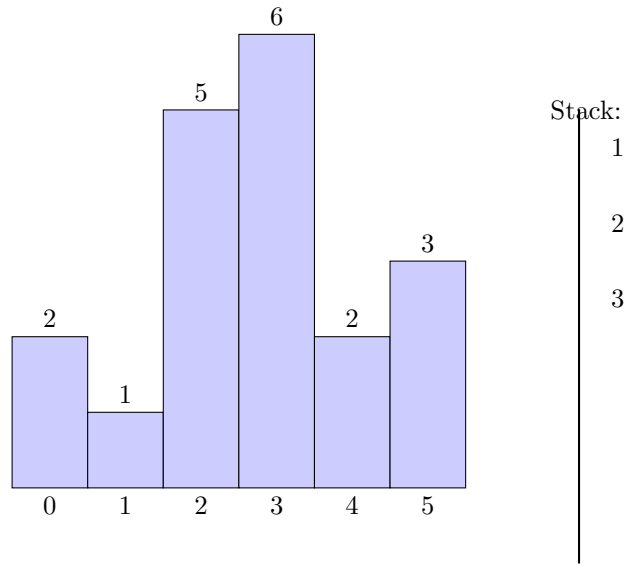
### Step 4: Iteration 3 ( $i = 2$ )

Height 5 is greater than 1 (top of stack), so we push index 2 onto the stack.



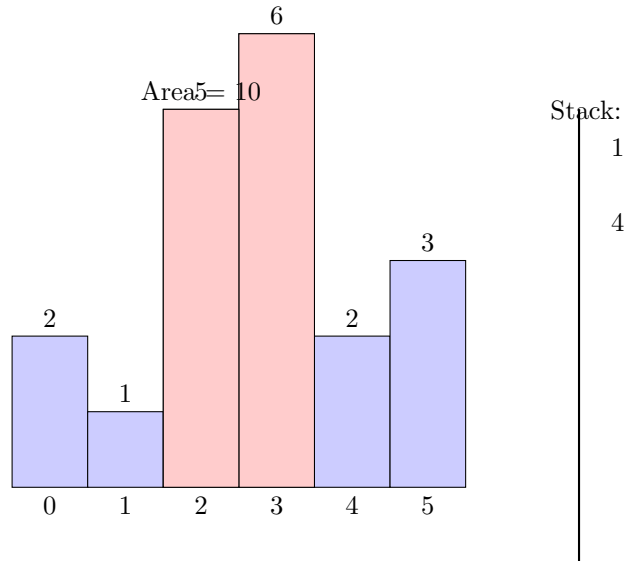
### Step 5: Iteration 4 ( $i = 3$ )

Height 6 is greater than 5 (top of stack), so we push index 3 onto the stack.



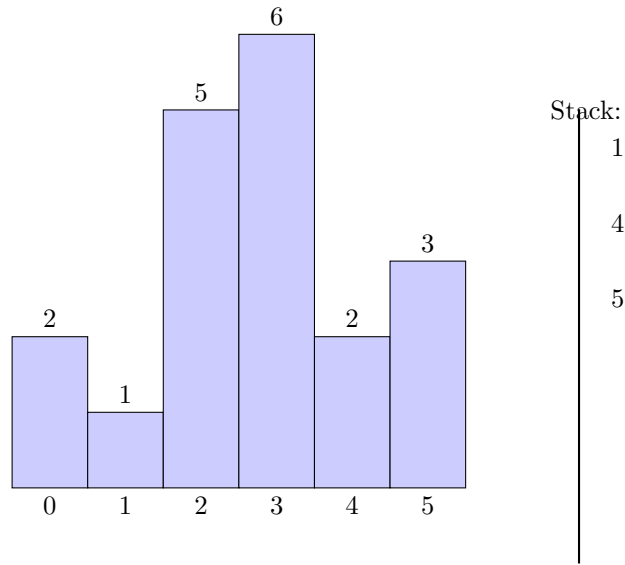
## Step 6: Iteration 5 ( $i = 4$ )

Height 2 is smaller than 6 (top of stack), so we pop 3, calculate the area. Pop 2, calculate the area. Then push index 4.



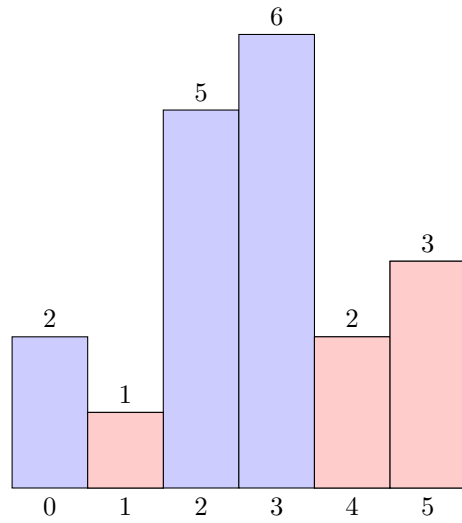
## Step 7: Iteration 6 ( $i = 5$ )

Height 3 is greater than 2 (top of stack), so we push index 5 onto the stack.



## Final Step: End of Array

At the end of the array, we pop remaining elements and calculate their areas.  
Maximum area found is 10.



Stack:  
empty