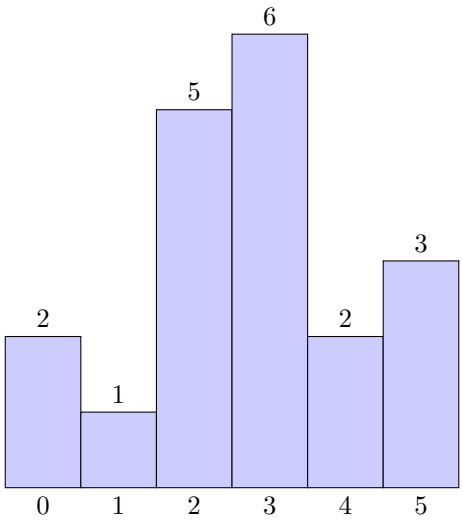
Largest Rectangle in Histogram - Step by Step Visualization

September 23, 2024

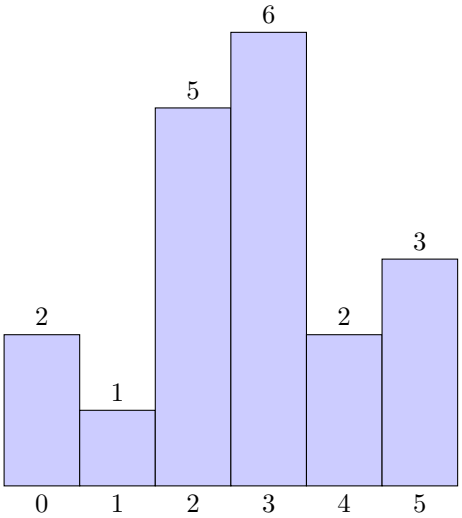
Step 1: Initial Histogram



At the start, we initialize the histogram. Heights: [2, 1, 5, 6, 2, 3], and the stack is empty.

Step 2: Iteration 1 (i = 0)

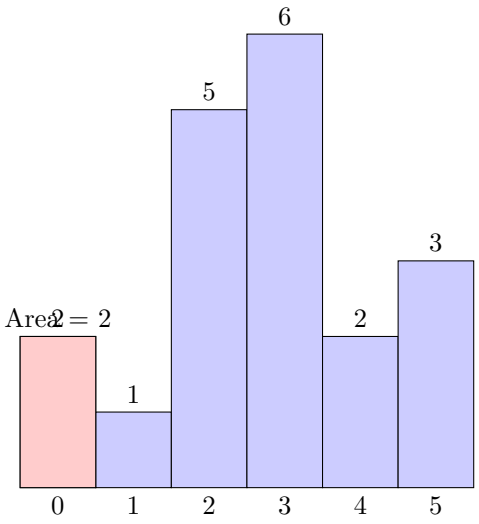
Push index 0 (height 2) onto the stack.



Stack: [0]

Step 3: Iteration 2 (i = 1)

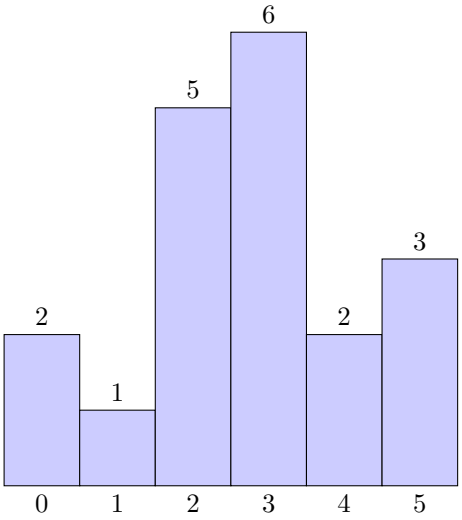
Current height is 1, which is smaller than the height at the top of the stack (height 2 at index 0). So, pop index 0 and calculate the area. Push index 1 (height 1) onto the stack.



Stack: [1]

Step 4: Iteration 3 (i = 2)

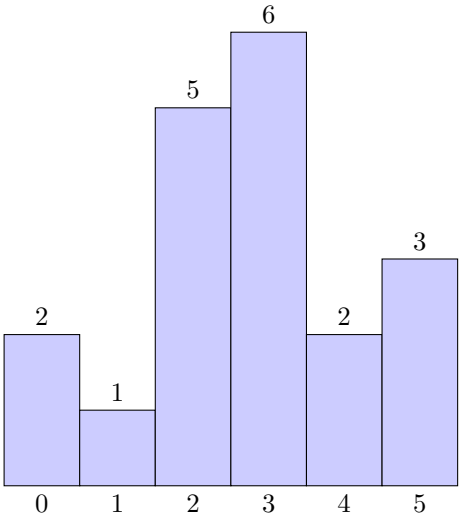
Current height is 5, which is greater than the height at the top of the stack (height 1 at index 1). Push index 2 onto the stack.



Stack: [1, 2]

Step 5: Iteration 4 (i = 3)

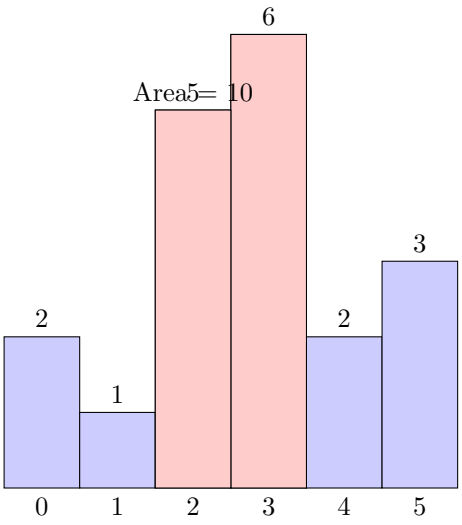
Current height is 6, which is greater than the height at the top of the stack (height 5 at index 2). Push index 3 onto the stack.



Stack: [1, 2, 3]

Step 6: Iteration 5 (i = 4)

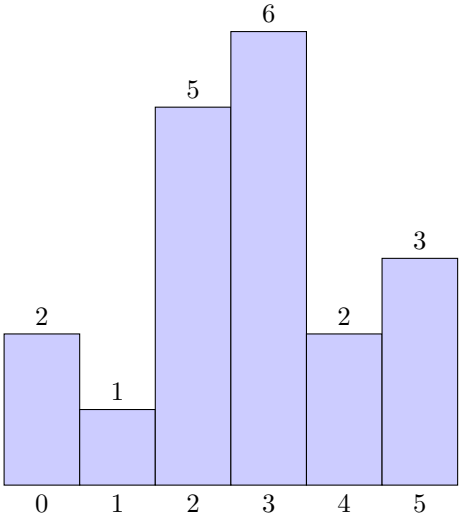
Current height is 2, which is smaller than the height at the top of the stack. Pop index 3 and calculate the area. Pop index 2 and calculate the area. Push index 4 onto the stack.



Stack: [1, 4]

Step 7: Iteration 6 (i = 5)

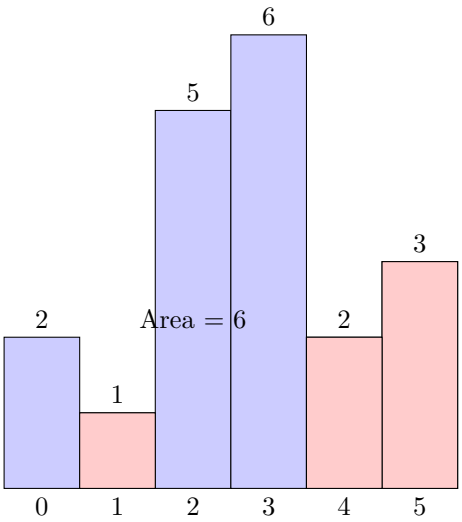
Current height is 3, which is greater than the height at the top of the stack. Push index 5 onto the stack.



Stack: [1, 4, 5]

Step 8: After Iteration (i = 6)

Pop remaining elements from the stack and calculate the areas for the bars.



Stack: [empty]