

# Problem 84: Largest Rectangle in Histogram

## Problem Information

**Difficulty:** Hard

**Acceptance Rate:** 48.67%

**Paid Only:** No

**Tags:** Array, Stack, Monotonic Stack

## Problem Description

Given an array of integers `heights` representing the histogram's bar height where the width of each bar is `1`, return the area of the largest rectangle in the histogram.

**Example 1:**



**Input:** heights = [2,1,5,6,2,3] **Output:** 10 **Explanation:** The above is a histogram where width of each bar is 1. The largest rectangle is shown in the red area, which has an area = 10 units.

**Example 2:**



**Input:** heights = [2,4] **Output:** 4

**Constraints:**

$1 \leq \text{heights.length} \leq 10^5$   $0 \leq \text{heights}[i] \leq 10^4$

## Code Snippets

**C++:**

```
class Solution {  
public:  
    int largestRectangleArea(vector<int>& heights) {  
  
    }  
};
```

### Java:

```
class Solution {  
    public int largestRectangleArea(int[] heights) {  
  
    }  
}
```

### Python3:

```
class Solution:  
    def largestRectangleArea(self, heights: List[int]) -> int:
```