December 7, 2021 • Arrays / Data Structure / Stack

Area of largest rectangle in Histogram

Problem Statement: 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 histogram.

Example:

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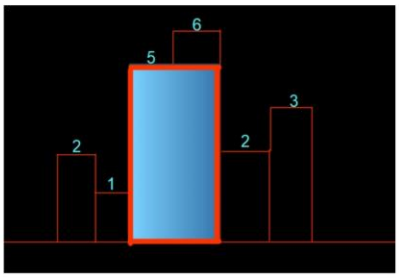
Input: N =6, heights[] = {2,1,5,6,2,3}

Output: 10

Explanation:
```

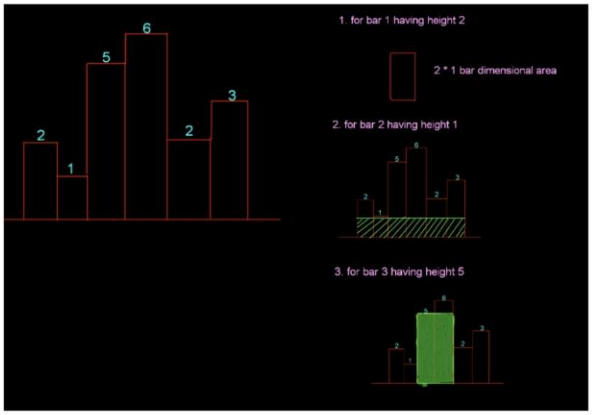


Solution

Disclaimer. *Don't jump directly to the solution, try it out yourself first.*

Solution 1: Brute Force Approach

Intuition: The intuition behind the approach is taking different bars and finding the maximum width possible using the bar.



Similarly for other bars, we will find the areas possible:-

For first bar, area possible = 2* 1 =2 sq . units

For second bar, area possible = 1 * 6 =6 sq . units

For third bar , area possible = 5 *2 = 10 sq . units

For fourth bar , area possible = 6 * 1 = 6 sq . units

For Fifth bar , area possible = 2 * 4 = 8 sq . units

For Sixth bar , area possible = 3 * 1 =3 sq . units

So, the maximum area possible = 10 sq units.

Approach:

The approach is to find the right smaller and left smaller element and find the largest Rectangle area in Histogram.

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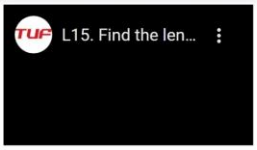

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