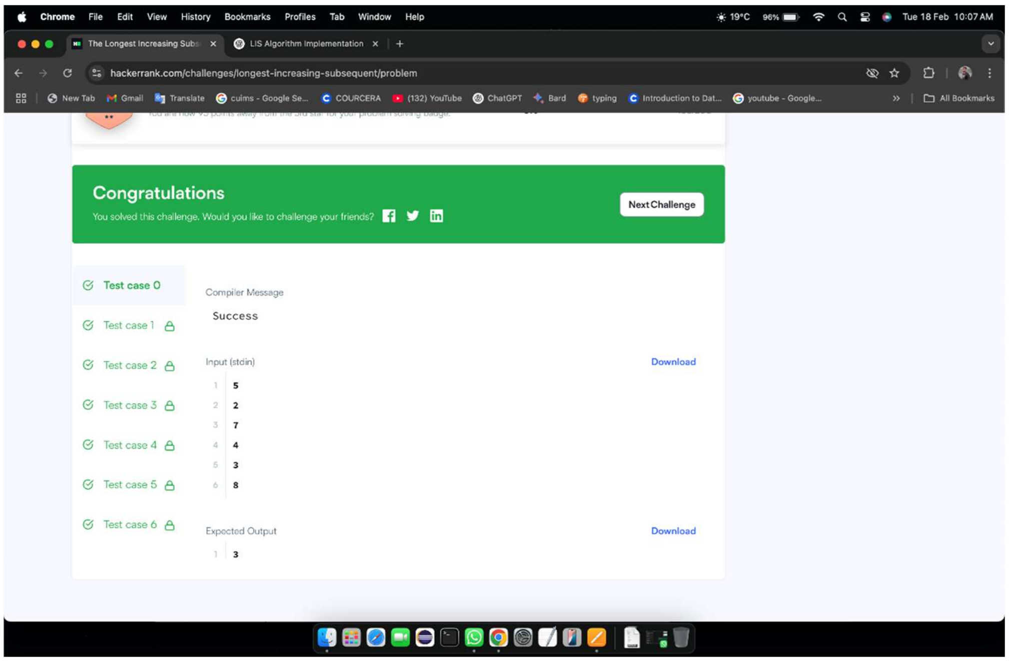
Problem 1

Aim:

The Longest Increasing Subsequence

Code:

```
import java.io.*;
import java.util.*;

class Result {

    public static int longestIncreasingSubsequence(List<Integer> arr) {
        if (arr == null || arr.isEmpty()) return 0;

        List<Integer> sub = new ArrayList<>();

        for (int num : arr) {
            int idx = Collections.binarySearch(sub, num);
            if (idx < 0) idx = -(idx + 1);  // Convert negative index to insertion point

            if (idx < sub.size()) {
                sub.set(idx, num);  // Replace element at found position
            } else {
                sub.add(num);  // Append new element to extend LIS
            }
        }

        return sub.size();
    }
}

public class Solution {
    public static void main(String[] args) throws IOException {
        BufferedReader bufferedReader = new BufferedReader(new InputStreamReader(System.in));
        BufferedWriter bufferedWriter = new BufferedWriter(new
FileWriter(System.getenv("OUTPUT_PATH")));

        int n = Integer.parseInt(bufferedReader.readLine().trim());

        List<Integer> arr = new ArrayList<>();

        for (int i = 0; i < n; i++) {
            int arrItem = Integer.parseInt(bufferedReader.readLine().trim());
            arr.add(arrItem);
        }

        int result = Result.longestIncreasingSubsequence(arr);

        bufferedWriter.write(String.valueOf(result));
        bufferedWriter.newLine();

        bufferedReader.close();
        bufferedWriter.close();
    }
}
```
Output:



Congratulations

You solved this challenge. Would you like to challenge your friends?

Next Challenge

Test case 0
Test case 1
Test case 2
Test case 3
Test case 4
Test case 5
Test case 6

Compiler Message

```
Success
```

Input (stdin) Download

```
5
2
7
4
3
8
```

Expected Output Download

```
3
```

Problem 2

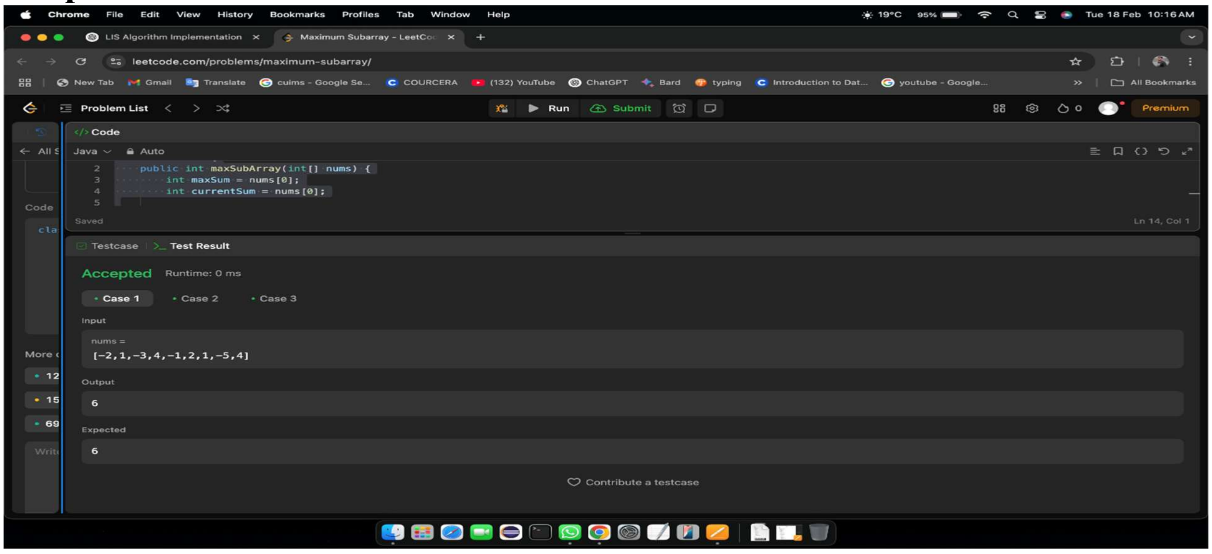
Aim:

Maximum Product Subarray

Code:

```
class Solution {
    public int maxSubArray(int[] nums) {
        int maxSum = nums[0];
        int currentSum = nums[0];

        for (int i = 1; i < nums.length; i++) {
            currentSum = Math.max(nums[i], currentSum + nums[i]);
            maxSum = Math.max(maxSum, currentSum);
        }

        return maxSum;
    }
}
```

Output:



```
    public int maxSubArray(int[] nums) {
        int maxSum = nums[0];
        int currentSum = nums[0];
```

Accepted Runtime: 0 ms

Case 1 · Case 2 · Case 3

Input

```
nums =
[-2,1,-3,4,-1,2,1,-5,4]
```

Output

```
6
```

Expected

```
6
```

Test Case 1

Problem 3

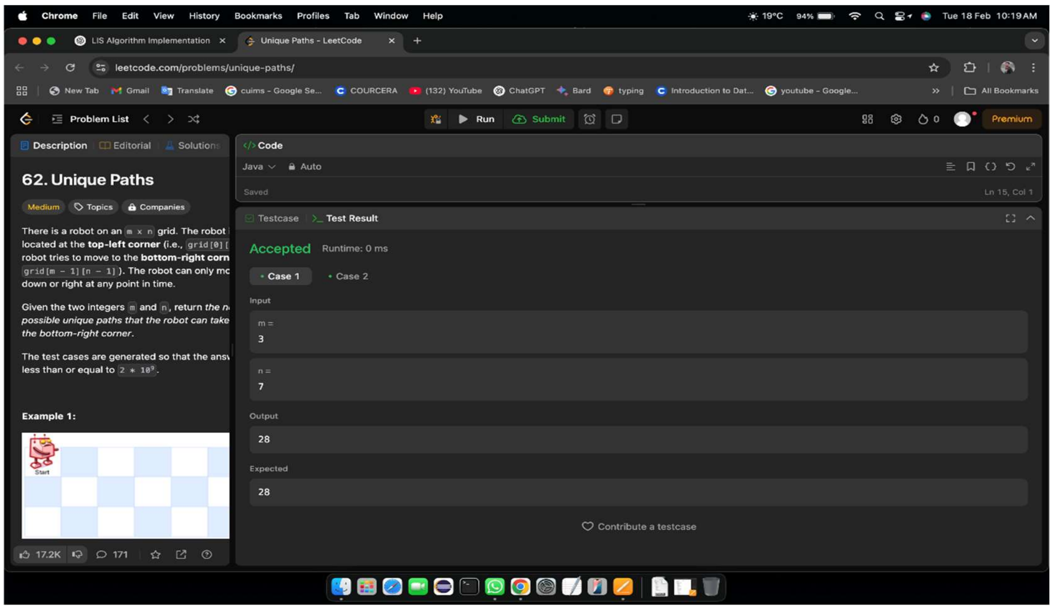
Aim:

Unique Path

Code:

```
class Solution {
    public int uniquePaths(int m, int n) {
        int N = m + n - 2;  // Total moves
        int K = Math.min(m - 1, n - 1);  // Choose the smaller value to reduce computations
        long result = 1;  // Use long to prevent overflow

        // Compute C(N, K) using iterative multiplication
        for (int i = 1; i <= K; i++) {
            result = result * (N - i + 1) / i;
        }
         return (int) result;  // Convert back to int (safe since answer ≤ 2 * 10^9)
    }
}
```

Output:


62. Unique Paths

There is a robot on an `m x n` grid. The robot located at the **top-left corner** (i.e., `grid[0][` robot tries to move to the **bottom-right corn** `grid[m - 1][n - 1]`). The robot can only mc down or right at any point in time.

Given the two integers `m` and `n`, return *the n possible unique paths that the robot can take the bottom-right corner.*

The test cases are generated so that the ansv less than or equal to `2 * 10⁹`.

Example 1:

```
Accepted   Runtime: 0 ms

Case 1   Case 2

Input
m =
3
n =
7

Output
28

Expected
28
```

Case 1

Problem 4

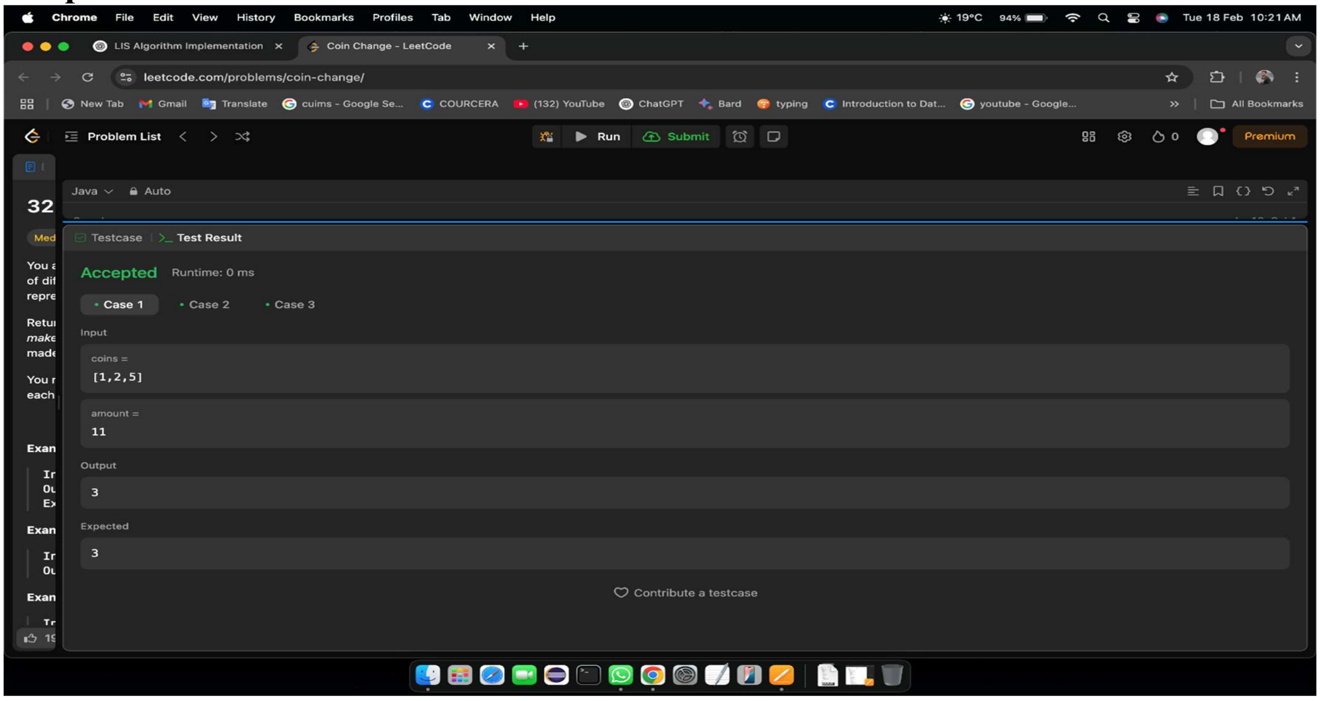
Aim:

Coi Change

Code:

```
import java.util.Arrays;

class Solution {
    public int coinChange(int[] coins, int amount) {
        int max = amount + 1;  // A large value representing "infinity"
        int[] dp = new int[amount + 1];
        Arrays.fill(dp, max);
        dp[0] = 0;  // Base case: 0 coins needed for amount 0

        for (int coin : coins) {
            for (int i = coin; i <= amount; i++) {
                dp[i] = Math.min(dp[i], 1 + dp[i - coin]);  // DP transition
            }
        }
return dp[amount] == max ? -1 : dp[amount];
    }
}
```

Output:



Accepted   Runtime: 0 ms

Case 1   Case 2   Case 3

Input

```
coins =
[1,2,5]
amount =
11
```

Output

```
3
```

Expected

```
3
```

Problem 5

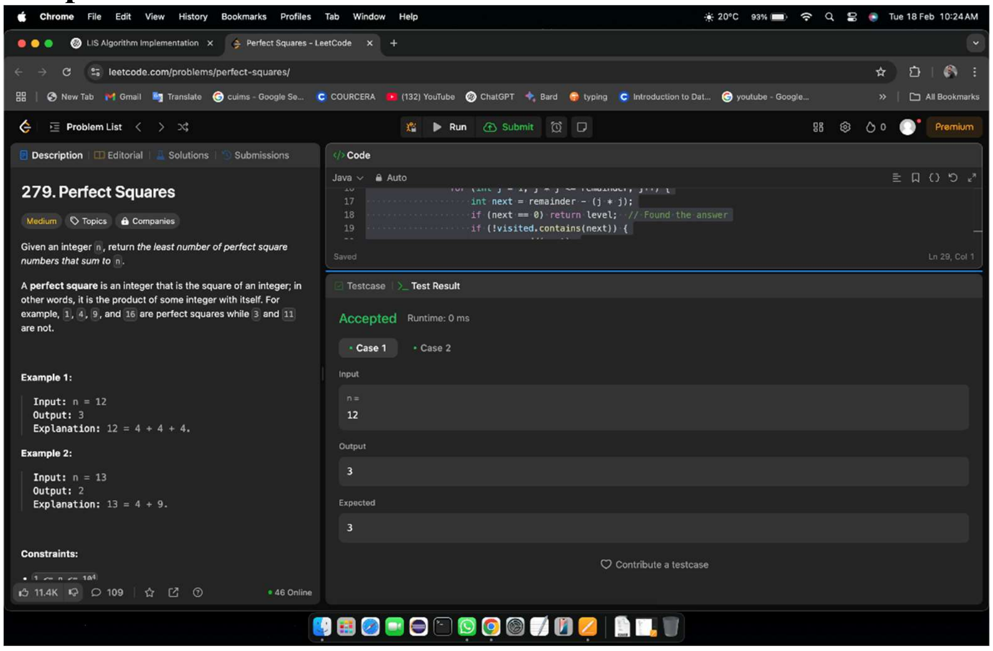
Aim:

Perfect Square

Code:

```
import java.util.*;

class Solution {
    public int numSquares(int n) {
        Queue<Integer> queue = new LinkedList<>();
        Set<Integer> visited = new HashSet<>();
        queue.add(n);
        visited.add(n);

        int level = 0;
        while (!queue.isEmpty()) {
            level++;
            int size = queue.size();
            for (int i = 0; i < size; i++) {
                int remainder = queue.poll();
                for (int j = 1; j * j <= remainder; j++) {
                    int next = remainder - (j * j);
                    if (next == 0) return level;  // Found the answer
                    if (!visited.contains(next)) {
                        queue.add(next);
                        visited.add(next);
                    }
                }
            }
        }
        return -1;
    }
}
```

Output:



LIS Algorithm Implementation | Perfect Squares - LeetCode

leetcode.com/problems/perfect-squares/

279. Perfect Squares

Medium · Topics · Companies

Given an integer `n`, return *the least number of perfect square numbers that sum to* `n`.

A **perfect square** is an integer that is the square of an integer; in other words, it is the product of some integer with itself. For example, `1`, `4`, `9`, and `16` are perfect squares while `3` and `11` are not.

Example 1:

```
Input: n = 12
Output: 3
Explanation: 12 = 4 + 4 + 4.
```

Example 2:

```
Input: n = 13
Output: 2
Explanation: 13 = 4 + 9.
```

Constraints:

Code — Java · Auto

```
                int next = remainder - (j * j);
                if (next == 0) return level;  // Found the answer
                if (!visited.contains(next)) {
```

Saved · Ln 29, Col 1

Testcase | Test Result

Accepted Runtime: 0 ms

Case 1 · Case 2

Input

```
n =
12
```

Output

```
3
```

Expected

```
3
```

Contribute a testcase

Problem 6

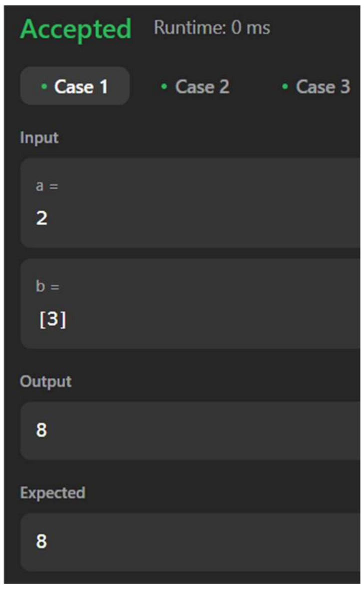
Aim:

Super Pow

Code:

```
class Solution {
private:
   int solve(int base, int power, int mod) {
      int ans = 1;
      while (power > 0) {
         if (power & 1) {
            ans = (ans * base) % mod;
         }
         base = (base * base) % mod;
         power >>= 1;
      }
      return ans;
   }

public:
   int superPow(int a, vector<int>& b) {
      a%=1337;
      int n = b.size();
      int m = 1140;
      int expi = 0;
      for(int i : b){
         expi = (expi*10+i)%m;
      }
      if (expi == 0) {
         expi = m;
      }
      return solve(a,expi,1337);
   }
};
```

Output:



Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

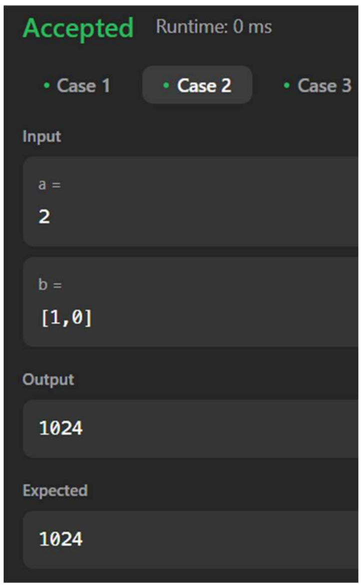
a =
2

b =
[3]

Output
8

Expected
8

Case 1



Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

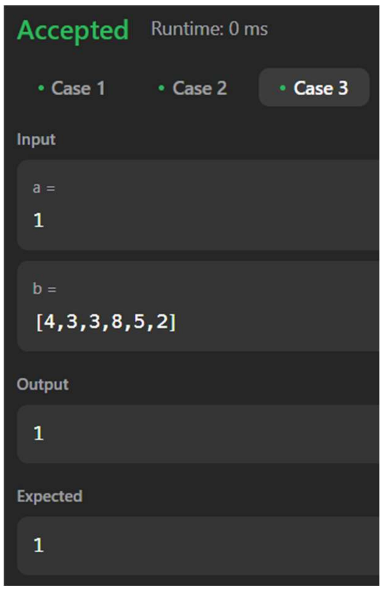
a =
2

b =
[1,0]

Output
1024

Expected
1024

Case 2



Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3

Input

a =
1

b =
[4,3,3,8,5,2]

Output
1

Expected
1

Case 3

Problem 7

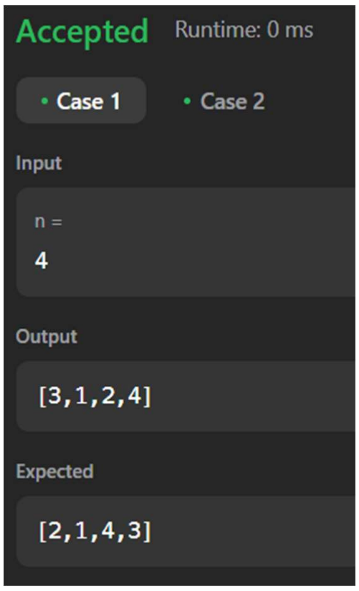
Aim:

Beautiful Array

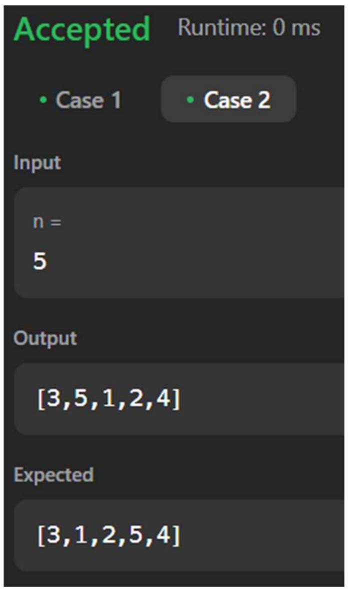
Code:

```
class Solution {
public:
   int partition(vector<int> &v, int start, int end, int mask)
   {
      int j = start;
      for(int i = start; i <= end; i++)
      {
         if((v[i] & mask) != 0)
         {
            swap(v[i], v[j]);
            j++;
         }
      }
      return j;
   }

   void sort(vector<int> & v, int start, int end, int mask)
   {
      if(start >= end) return;
      int mid = partition(v, start, end, mask);
      sort(v, start, mid - 1, mask << 1);
      sort(v, mid, end, mask << 1);
   }

   vector<int> beautifulArray(int N) {
      vector<int> ans;
      for(int i = 0; i < N; i++) ans.push_back(i + 1);
      sort(ans, 0, N - 1, 1);
      return ans;
   }
};
```

Output:



```
Accepted   Runtime: 0 ms
• Case 1   • Case 2
Input
n =
4
Output
[3,1,2,4]
Expected
[2,1,4,3]
```



```
Accepted   Runtime: 0 ms
• Case 1   • Case 2
Input
n =
5
Output
[3,5,1,2,4]
Expected
[3,1,2,5,4]
```

Case 1 Case 2

Problem 8

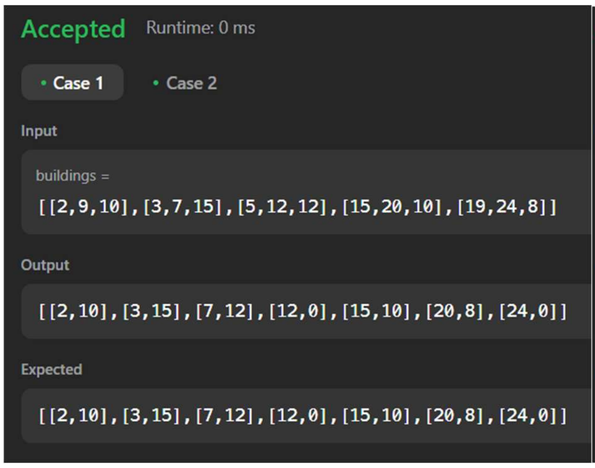
Aim:

The Skyline Problem

Code:

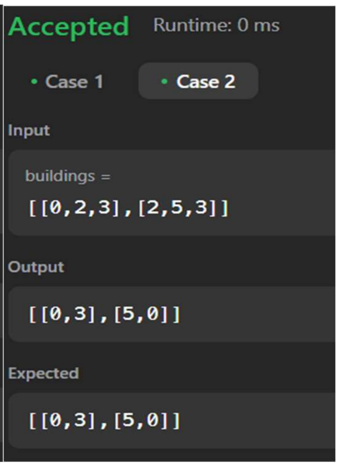
```
class Solution {
public:
   vector<vector<int>> getSkyline(vector<vector<int>>& buildings) {
      int edge_idx = 0;
      vector<pair<int, int>> edges;
      priority_queue<pair<int, int>> pq;
      vector<vector<int>> skyline;

      for (int i = 0; i < buildings.size(); ++i) {
         const auto &b = buildings[i];
         edges.emplace_back(b[0], i);
         edges.emplace_back(b[1], i);
      }
      std::sort(edges.begin(), edges.end());

      while (edge_idx < edges.size()) {
         int curr_height;
         const auto &[curr_x, _] = edges[edge_idx];
         while (edge_idx < edges.size() &&
               curr_x == edges[edge_idx].first) {
            const auto &[_, building_idx] = edges[edge_idx];
            const auto &b = buildings[building_idx];
            if (b[0] == curr_x)
               pq.emplace(b[2], b[1]);
            ++edge_idx;
         }
         while (!pq.empty() && pq.top().second <= curr_x)
            pq.pop();
         curr_height = pq.empty() ? 0 : pq.top().first;
         if (skyline.empty() || skyline.back()[1] != curr_height)
            skyline.push_back({curr_x, curr_height});
      }
      return skyline;
```

```
    }
};
```
Output:



```
Accepted   Runtime: 0 ms
• Case 1   • Case 2
Input
buildings =
[[2,9,10],[3,7,15],[5,12,12],[15,20,10],[19,24,8]]
Output
[[2,10],[3,15],[7,12],[12,0],[15,10],[20,8],[24,0]]
Expected
[[2,10],[3,15],[7,12],[12,0],[15,10],[20,8],[24,0]]
```

Case 1



```
Accepted   Runtime: 0 ms
• Case 1   • Case 2
Input
buildings =
[[0,2,3],[2,5,3]]
Output
[[0,3],[5,0]]
Expected
[[0,3],[5,0]]
```

Case 2