



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Experiment -9

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UID: 22BCS12914

Branch: BE-CSE

Section/Group: IOT-601(A)

Semester: 5th

Date of Performance: 23/04/25

Subject Name: Advanced Programming Lab

Subject Code: 22CSP-351

Ques 1: Minimum Operations to Make the Array Increasing

You are given an integer array **nums** (**0-indexed**). In one operation, you can choose an element of the array and increment it by 1.

For example, if **nums** = [1,2,3], you can choose to increment **nums**[1] to make **nums** = [1,**3**,3].

Return *the **minimum** number of operations needed to make **nums** **strictly increasing**.*

An array **nums** is **strictly increasing** if **nums**[i] < **nums**[i+1] for all $0 \leq i < \text{nums.length} - 1$.

An array of length 1 is trivially strictly increasing.

Code:

```
class Solution {
public:
    int minOperations(vector<int>& nums) {
        int count=0;
        for(int i =1;i<nums.size();i++){
            if(nums[i]<=nums[i-1]){
                count+=(nums[i-1]-nums[i]+1);
                nums[i]=nums[i-1]+1;
            }
        }
        return count;
    }
};
```



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OUTPUT:

Testcase

Test Result

Accepted Runtime: 4 ms

Case 1

Case 2

Case 3

Input

nums =
[1,1,1]

Output

3

Expected

3

Description

Accepted

Editorial

Solutions

Submit

All Submissions

Accepted 94 / 94 testcases passed

Parshant Vardhan submitted at Apr 23, 2025 14:33

Solution

Runtime

10 ms | Beats 58.00%

Analyze Complexity

Memory

19.52 MB | Beats 63.17%

C++

Auto

1 class Solution {
2 public:
3 int minOperations(vector<int>& nums) {
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Ques 2 Remove Stones to Minimize the Total:

You are given a **0-indexed** integer array `piles`, where `piles[i]` represents the number of stones in the i^{th} pile, and an integer `k`. You should apply the following operation **exactly** `k` times:

Choose any `piles[i]` and **remove** $\text{floor}(\text{piles}[i] / 2)$ stones from it.

Notice that you can apply the operation on the **same** pile more than once.

Return the **minimum** possible total number of stones remaining after applying the `k` operations.

$\text{floor}(x)$ is the **greatest** integer that is **smaller** than or **equal** to `x` (i.e., rounds `x` down).

CODE:

```
class Solution {
public:
    int minStoneSum(vector<int>& piles, int k) {
        priority_queue<int> maxHeap(piles.begin(), piles.end());

        while (k--) {
            int largestPile = maxHeap.top();
            maxHeap.pop();
            largestPile -= floor(largestPile / 2);
            maxHeap.push(largestPile);
        }
        int res=0;
        while(!maxHeap.empty()){
            res += maxHeap.top();
            maxHeap.pop();
        }
        return res;
    }
};
```



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☒ Testcase ☒ Test Result

Accepted Runtime: 0 ms

• Case 1

• Case 2

Input

piles =
[5,4,9]

k =
2

Output

12

Expected

12

Description | **Accepted** × | Editorial | Solutions | <

← All Submissions >

Accepted 60 / 60 testcases passed

📖 Solution

👤 Parshant Var... submitted at Apr 23, 2025 14:35

⌚ Runtime ⓘ

284 ms | Beats 60.95% 🏆

🔗 Analyze Complexity

💾 Memory

102.90 MB | Beats 72.51% 🏆

15%

10%

5%

</> Code

C++ ▾ 🔒 Auto

1 class Solution {

Saved

☒ Testcase ☒ Test Result

Accepted Runtime: 0 ms

• Case 1

• Case 2

Input

piles =
[5,4,9]

k =
2

Output

Ques3: Number of Islands

Given an 2D binary grid which represents a map of 1s (land) and 0s (water), return the number of islands.

An island is surrounded by water and is formed by connecting adjacent lands horizontally or vertically. You may assume all four edges of the grid are all surrounded by water.

CODE:

```
class Solution {
public:
    void dfs(vector<vector<char>>& grid, int i, int j){
        if(i < 0 || i >= grid.size() ||
           j < 0 || j >= grid[0].size() || grid[i][j]=='0') return;
        grid[i][j]='0';
        dfs(grid,i-1,j);
        dfs(grid,i+1,j);
        dfs(grid,i,j-1);
        dfs(grid,i,j+1);
    }
    int numIslands(vector<vector<char>>& grid) {
        int count=0;
        for(int i=0;i<grid.size();i++){
            for(int j =0;j<grid[0].size();j++){
                if(grid[i][j]=='1'){
                    dfs(grid, i, j);
                    count++;
                }
            }
        }
        return count;
    }
};
```



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☒ Testcase | ☒ Test Result

Accepted Runtime: 0 ms

• Case 1

• Case 2

Input

grid =
[["1","1","1","1","0"],["1","1","0","1","0"],["1","1","0","0","0"],["0","0","0","0","0"]]

Output

1

Expected

1

Description | Accepted x | Editorial | Solutions | Submit

← All Submissions

Accepted 49 / 49 testcases passed

Parshant Var... submitted at Apr 23, 2025 14:37

Solution

Runtime

25 ms | Beats 73.27%

Analyze Complexity

Memory

16.30 MB | Beats 77.26%

15%
10%
5%
0%

29ms 57ms 86ms

</> Code

C++ v Auto

Saved

☒ Testcase | ☒ Test Result

Accepted Runtime: 0 ms

• Case 1

• Case 2

Input

grid =
[["1","1","1","1","0"],["1","1","0","1","0"],["1","1","0","0","0"],["0","0","0","0","0"]]

Output

1

Expected

1