Experiment

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Semester: 6th
Subject Name: AP Lab-II

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Subject Code: 22CSP-351

A. Max Units on a Truck

1. Aim: You are assigned to put some amount of boxes onto one truck. You are given a 2D array boxTypes, where boxTypes[i] = [numberOfBoxesi, numberOfUnitsPerBoxi]:

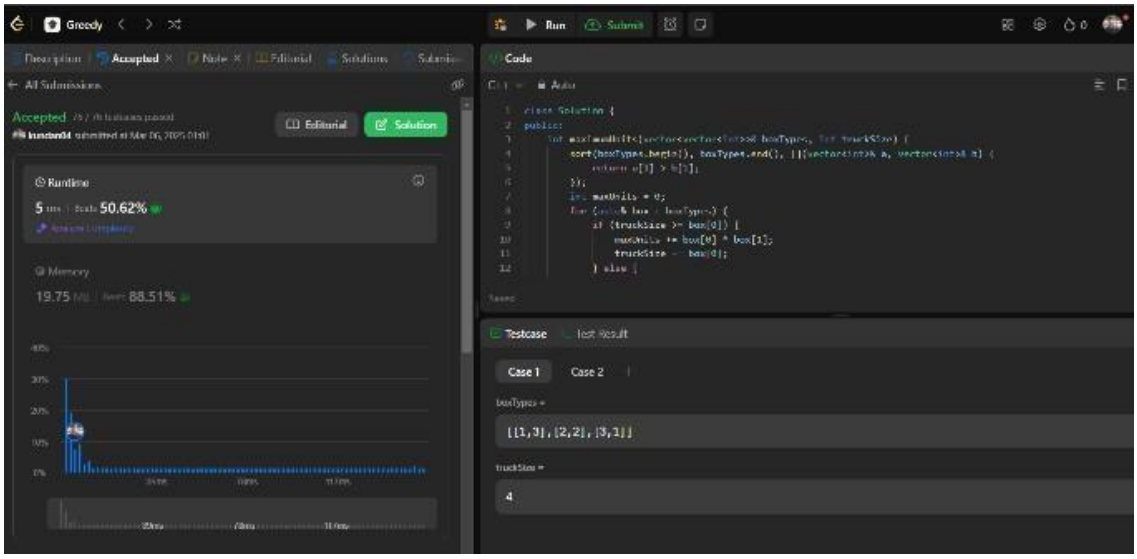
- numberOfBoxesi is the number of boxes of type i.
- numberOfUnitsPerBoxi is the number of units in each box of the type i.

You are also given an integer truckSize, which is the maximum number of boxes that can be put on the truck. You can choose any boxes to put on the truck as long as the number of boxes does not exceed truckSize. Return the maximum total number of units that can be put on the truck.

2. Code

```
class Solution {
public:
    int maximumUnits(vector<vector<int>>& boxTypes, int truckSize) {
   sort(boxTypes.begin(), boxTypes.end(), [](vector<int>& a, vector<int>& b) {

            return a[1] > b[1];
        }
);
        int maxUnits = 0;

        for (auto& box : boxTypes) {

            if (truckSize >= box[0]) {
                maxUnits += box[0] * box[1];
                truckSize -= box[0];

            }
              else {
                maxUnits += truckSize * box[1];
                break;
            }
               }
        return maxUnits;
    }};
```

3. Output:



B. Minimum Operations to Make the Array Increasing

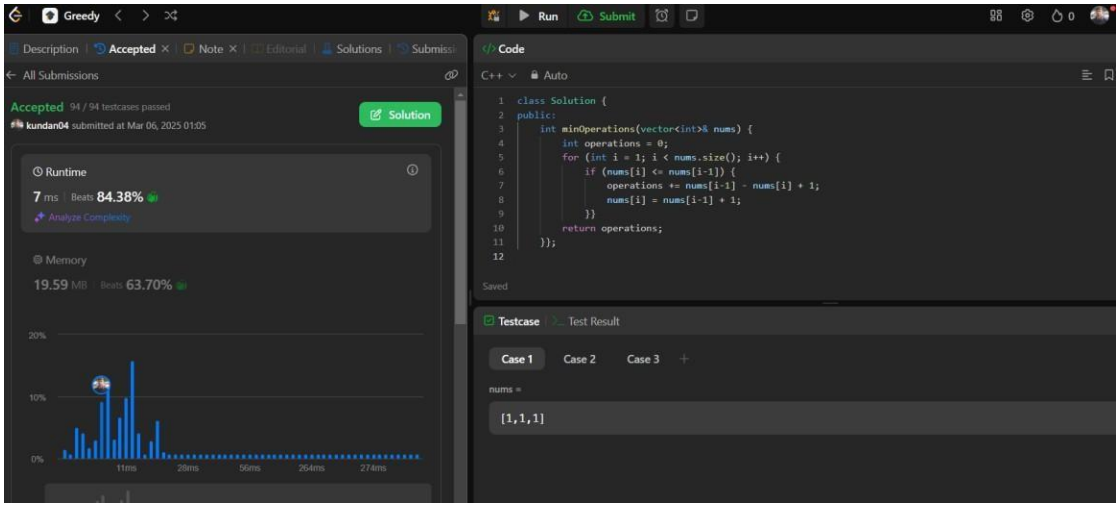
1. **Aim:** You are given an integer array nums (0-indexed). In one operation, you can choose an element of the array and increment it by 1. For example, if nums = [1,2,3], you can choose to increment nums[1] to make nums = [1,3,3]. Return the minimum number of operations needed to make nums strictly increasing. An array nums is strictly increasing if nums[i] < nums[i+1] for all 0 <= i < nums.length - 1. An array of length 1 is trivially strictly increasing.

2. Code:

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

```
        }};
```

3. **Output:**



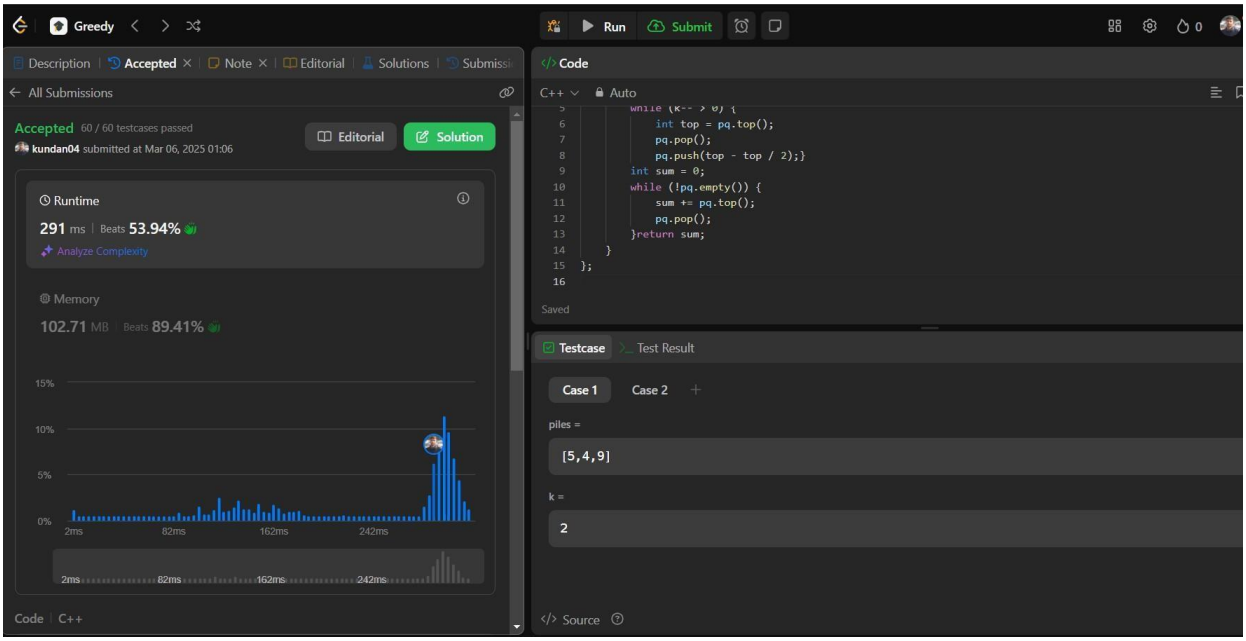
C. Remove Stones to Minimize the Total

1. **Aim:** You are given a 0-indexed integer array piles, where piles[i] represents the number of stones in the ith pile, and an integer k. You should apply the following operation exactly k times: Choose any piles[i] and remove floor(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. floor(x) is the greatest integer that is smaller than or equal to x (i.e., rounds x down).

2. Code

```
class Solution {
public:
    int minStoneSum(vector<int>& piles, int k) {
        priority_queue<int> pq(piles.begin(), piles.end());
        while (k-- > 0) {
            int top = pq.top();
            pq.pop();
            pq.push(top - top / 2);}
        int sum = 0;
        while (!pq.empty()) {
            sum += pq.top();
            pq.pop();
        }return sum;
    }
};
```

3. Output:


Greedy
Run
Submit
Description
Accepted
Note
Editorial
Solutions
All Submissions
Accepted 60 / 60 testcases passed
kundan04 submitted at Mar 06, 2025 01:06
Editorial
Solution
Runtime
291 ms | Beats 53.94%
Analyze Complexity
Memory
102.71 MB | Beats 89.41%
15%
10%
5%
0%
2ms
82ms
162ms
242ms
Code | C++
Code
C++
Auto
int top = pq.top();
pq.pop();
pq.push(top - top / 2);}
int sum = 0;
while (!pq.empty()) {
sum += pq.top();
pq.pop();
}return sum;
}
};
Saved
Testcase
Test Result
Case 1
Case 2
piles =
[5,4,9]
k =
2
Source