WORKSHEET 8

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Branch: CSE **Section/Group: NTPP 603/B**

Semester: 06 **Date of Performance: 20/03/2025**

Subject Name: AP Lab II **Subject Code: 22CSP-351**

1. **Aim**:
   a) Max Units on a Truck
   b) Min Operations to Make Array Increasing
   c) Remove Stones to Maximize Total

2. **Source Code:**

a.

```
class Solution {
 public:
  int maximumUnits(vector<vector<int>>& boxTypes, int truckSize) {
    int ans = 0;

    ranges::sort(boxTypes, ranges::greater{},
                 [](const vector<int>& boxType) { return boxType[1]; });

    for (const vector<int>& boxType : boxTypes) {
      const int boxes = boxType[0];
      const int units = boxType[1];
      if (boxes >= truckSize)
        return ans + truckSize * units;
      ans += boxes * units;
      truckSize -= boxes;
    }

    return ans;
  }
};
```

b.

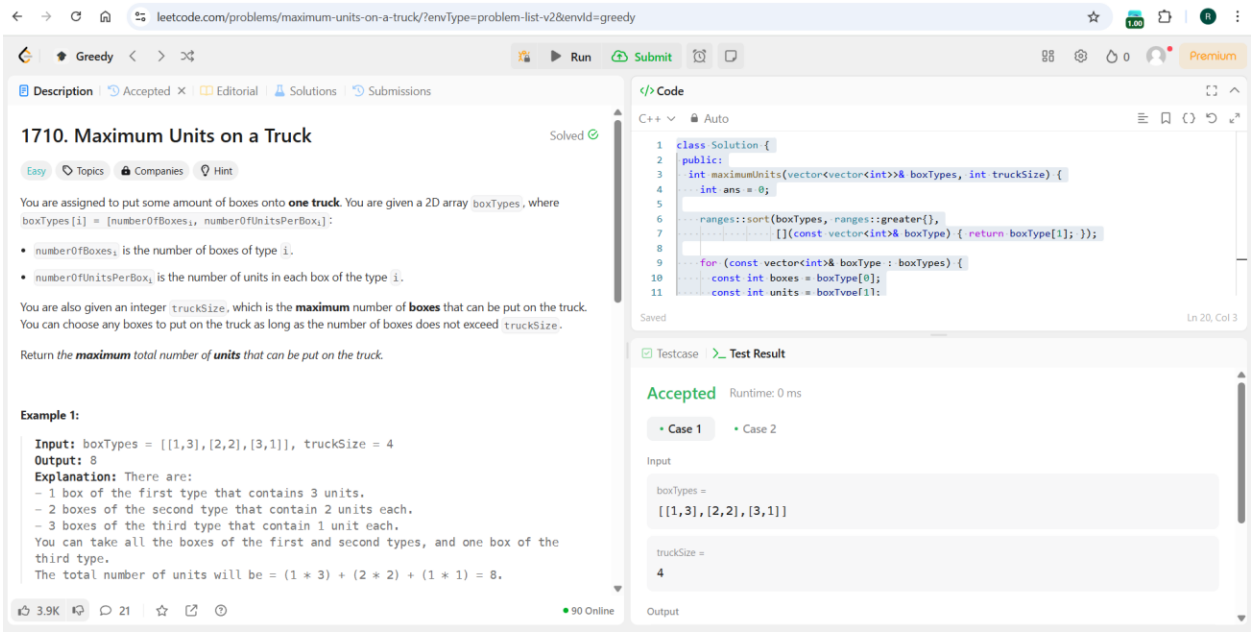
```
class Solution {
 public:
  int minOperations(vector<int>& nums) {
    int ans = 0;
    int last = 0;

    for (const int num : nums) {
      ans += max(0, last - num + 1);
      last = max(num, last + 1);
    }

    return ans;
  }
};
```

C.

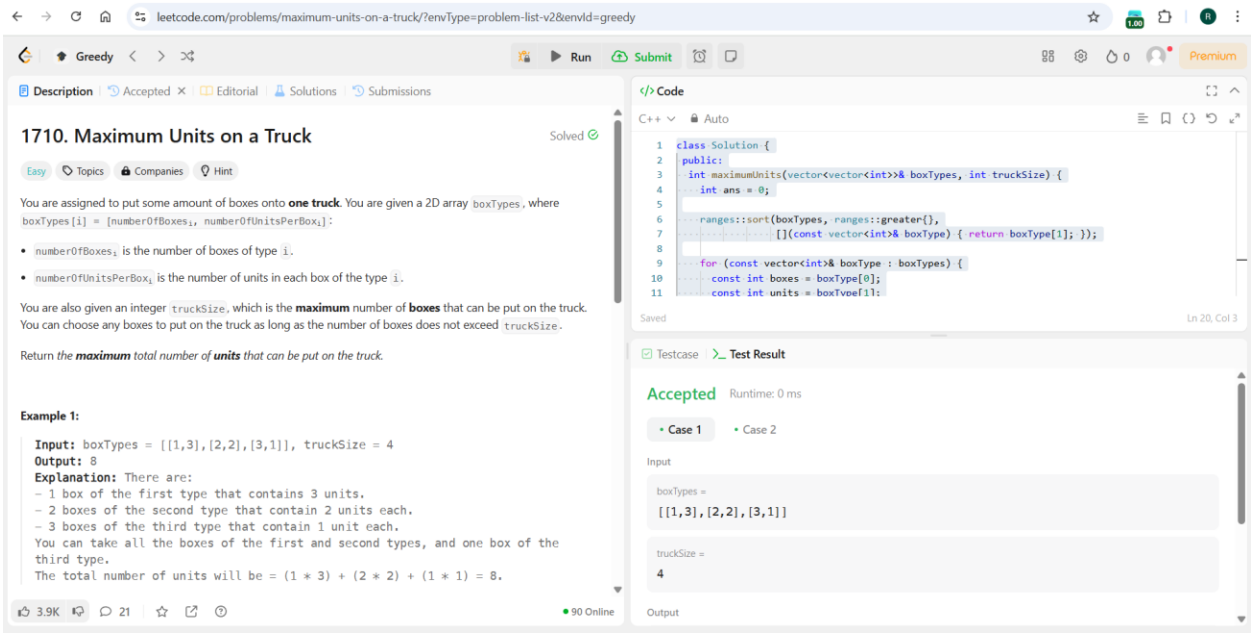
```
class Solution {
 public:
  int minStoneSum(vector<int>& piles, int k) {
    int ans = accumulate(piles.begin(), piles.end(), 0);
    priority_queue<int> maxHeap;

    for (const int pile : piles)
      maxHeap.push(pile);

    for (int i = 0; i < k; ++i) {
      const int maxPile = maxHeap.top();
      maxHeap.pop();
      maxHeap.push(maxPile - maxPile / 2);
      ans -= maxPile / 2;
    }

    return ans;
  }
};
```

Screenshot of Outputs:

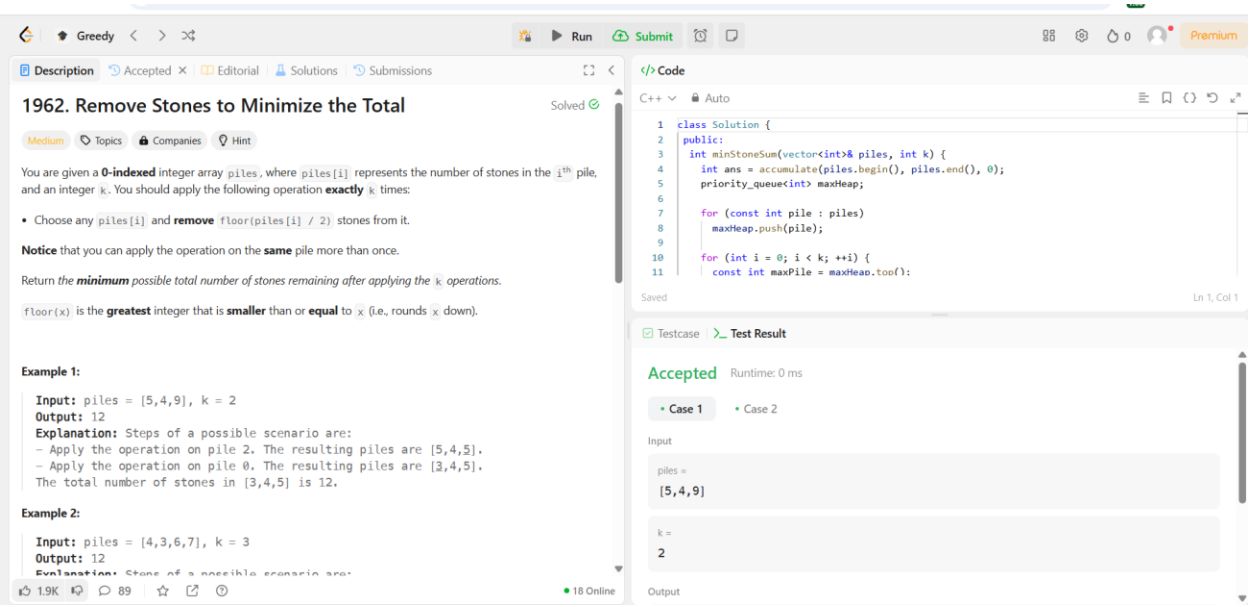
a.



b.



c.



3. Learning Outcomes

(i) Learned about Greedy Programming.