Q1
40 Points

There are over 200 LeetCode problems on Dynamic Programming.

In this question, you will create a $\mathbf{mini-portfolio}$ consisting of 7 LeetCode problems on Dynamic Programming, chosen from the following website.

https://leetcode.com/tag/dynamic-programming

As always, you may code your algorithms in the programming language of your choice.

$NOTES$:
The choice of problems is yours, though you may only include problems that took you a minimum of 30 minutes to solve.

I ask you to only include new problems that you will solve in the next seven days. However, I will make an exception if you previously solved a problem in an inefficient way (but still got the solution accepted by LeetCode) and then found a new way to solve the same problem using the methods uncovered in this module on Dynamic Programming.

You will get full credit for any correct solution accepted by LeetCode, regardless of how well your runtime and memory usage compares with other LeetCode participants.

Q1.1 Problem 1
5 Points

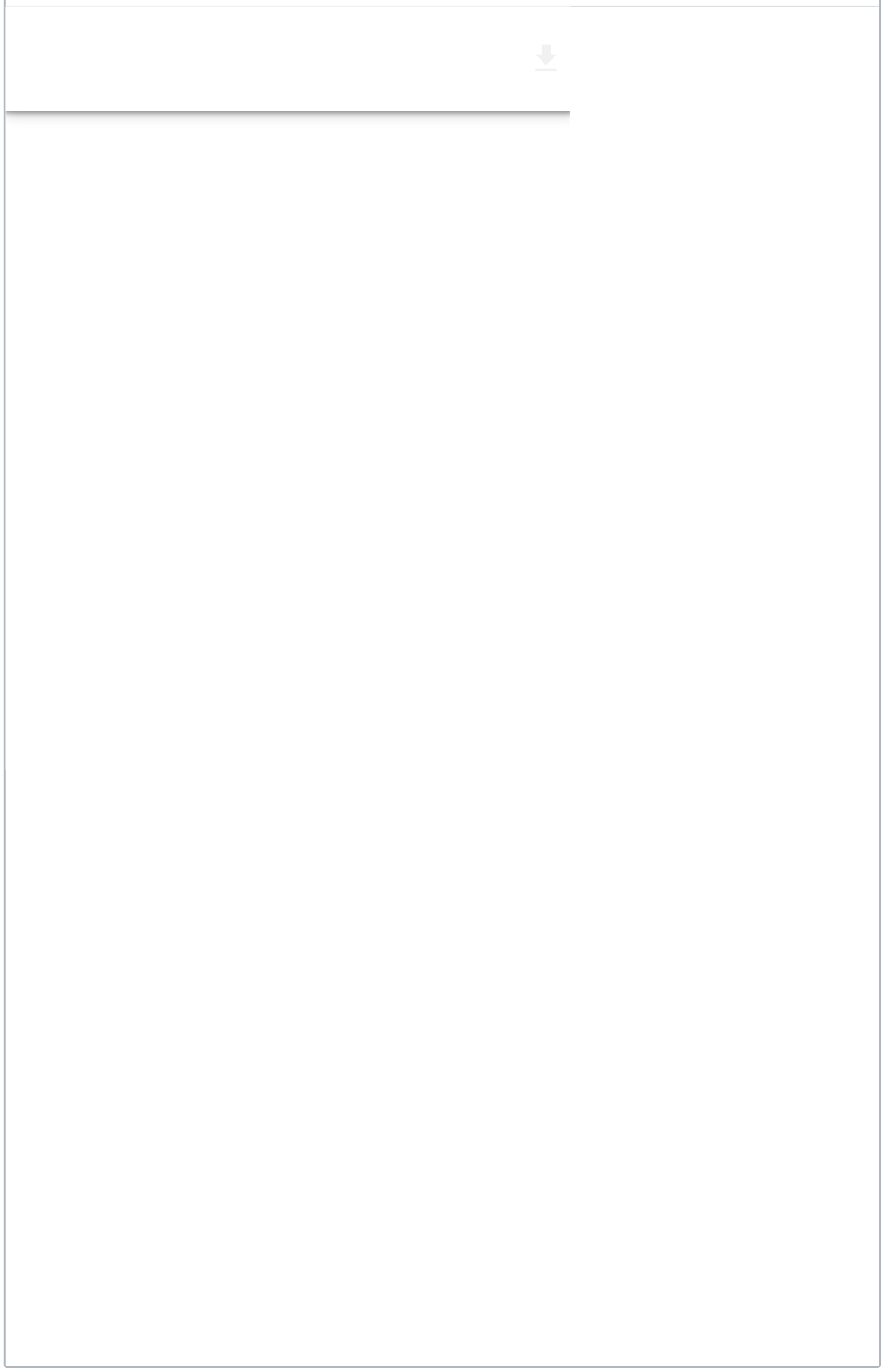
(2 points) Provide the problem number, problem title, difficulty level

1595. Minimum Cost to Connect Two Groups of Points Hard

(3 points) Provide the screenshot of you getting your solution accepted by LeetCode.
Note: Each $easy$ problem will be awarded 1 mark, each $medium$

problem will be awarded 2 marks, and each $hard$ problem will be awarded 3 points.

Q1.1.pdf Download



Q1.2 Problem 2

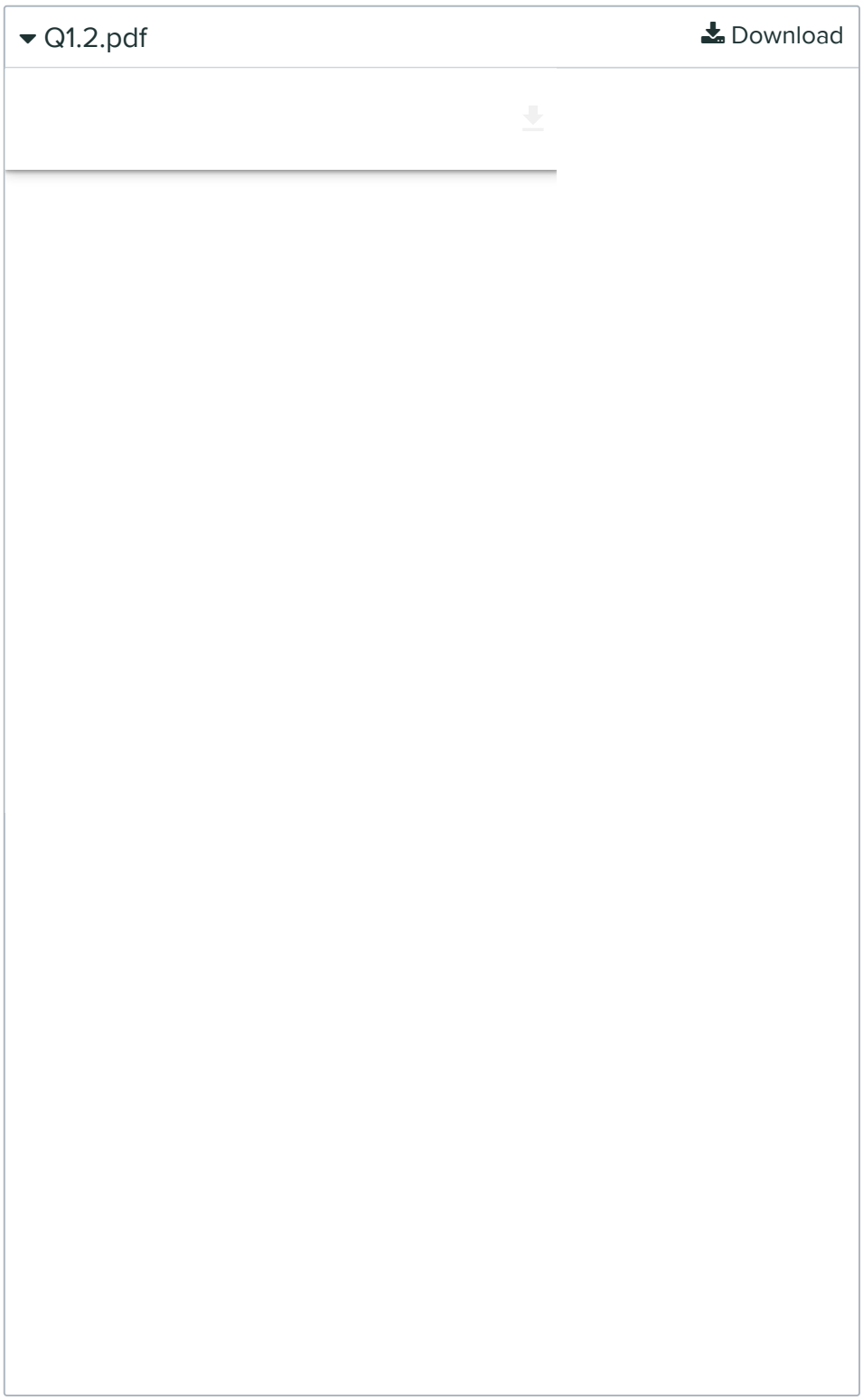
5 Points

(2 points) Provide the problem number, problem title, difficulty level

1655. Distribute Repeating Integers Hard

(3 points) Provide the screenshot of you getting your solution accepted by LeetCode.
Note: Each $easy$ problem will be awarded 1 mark, each $medium$ problem will be awarded 2 marks, and each $hard$ problem will be awarded 3 points.

Q1.2.pdf Download



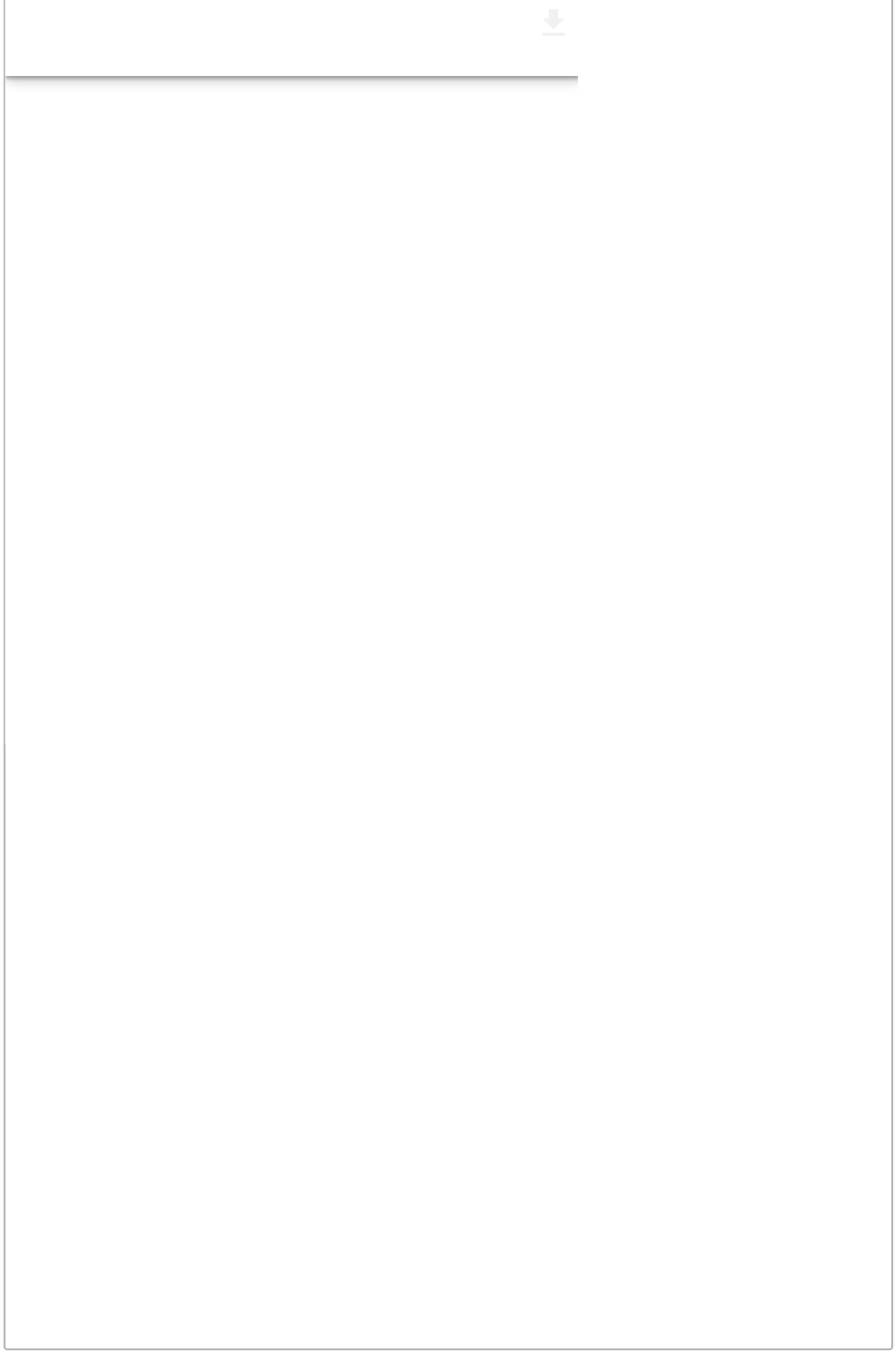
Q1.3
5 Points

(2 points) Provide the problem number, problem title, difficulty level

1125. Smallest Sufficient Team Hard

(3 points) Provide the screenshot of you getting your solution accepted by LeetCode.
Note: Each $easy$ problem will be awarded 1 mark, each $medium$ problem will be awarded 2 marks, and each $hard$ problem will be awarded 3 points.

Q1.3.pdf Download



Q1.4 Problem 4

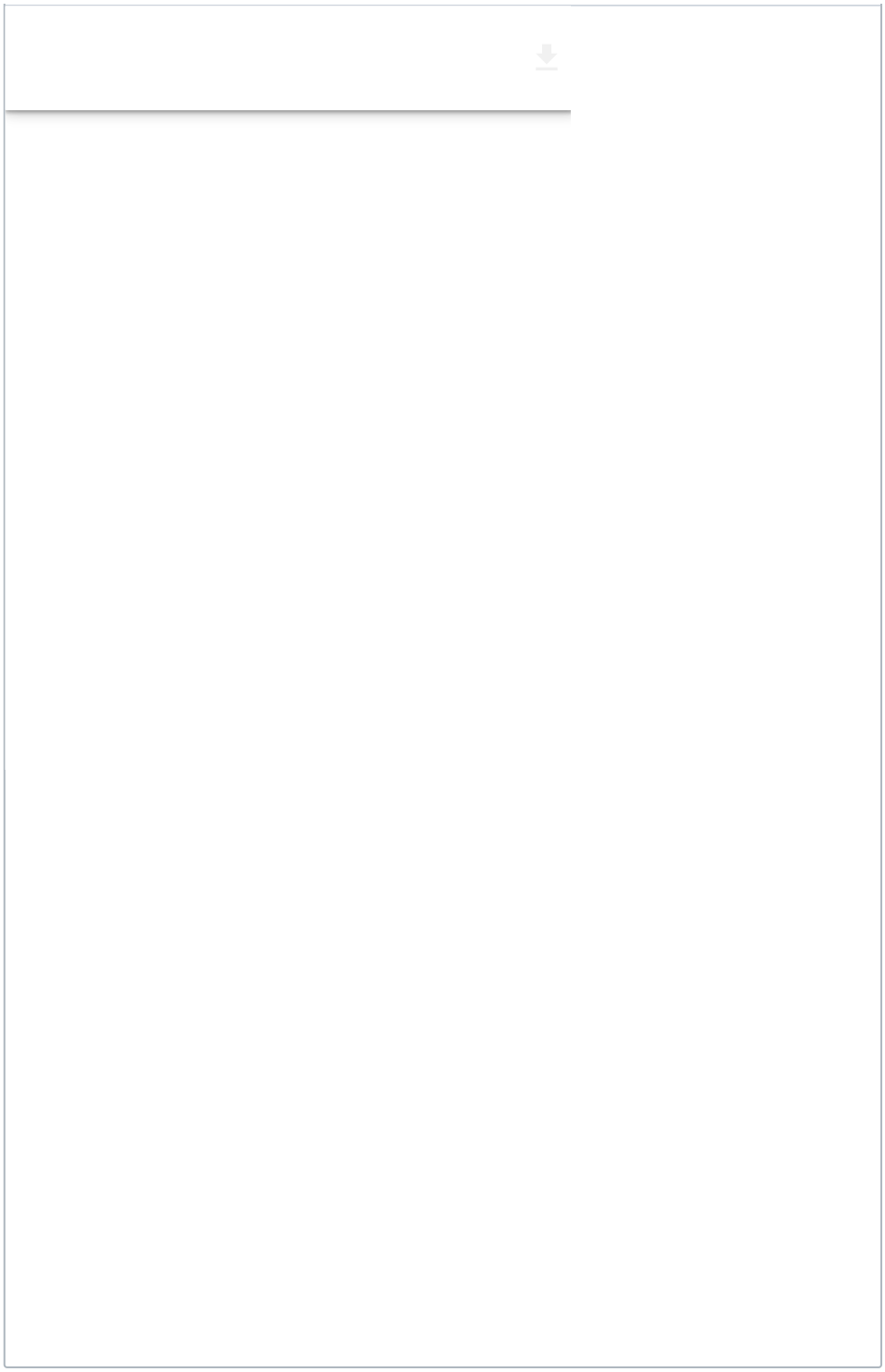
5 Points

(2 points) Provide the problem number, problem title, difficulty level

879. Profitable Schemes Hard

(3 points) Provide the screenshot of you getting your solution accepted by LeetCode.
Note: Each $easy$ problem will be awarded 1 mark, each $medium$ problem will be awarded 2 marks, and each $hard$ problem will be awarded 3 points.

▾ Q1.4.pdf Download



Q1.5 Problem 5

5 Points

(2 points) Provide the problem number, problem title, difficulty level

1771. Maximize Palindrome Length From Subsequences Hard

(3 points) Provide the screenshot of you getting your solution accepted by LeetCode.

Note: Each $easy$ problem will be awarded 1 mark, each $medium$ problem will be awarded 2 marks, and each $hard$ problem will be awarded 3 points.

Q1.5.pdf Download

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Q1.6 Problem 6

5 Points

(2 points) Provide the problem number, problem title, difficulty level

656. Coin Path Hard

(3 points) Provide the screenshot of you getting your solution accepted by LeetCode.
Note: Each $easy$ problem will be awarded 1 mark, each $medium$ problem will be awarded 2 marks, and each $hard$ problem will be awarded 3 points.

Q1.6.pdf Download

1 / 2

Q1.7 Problem 7

5 Points

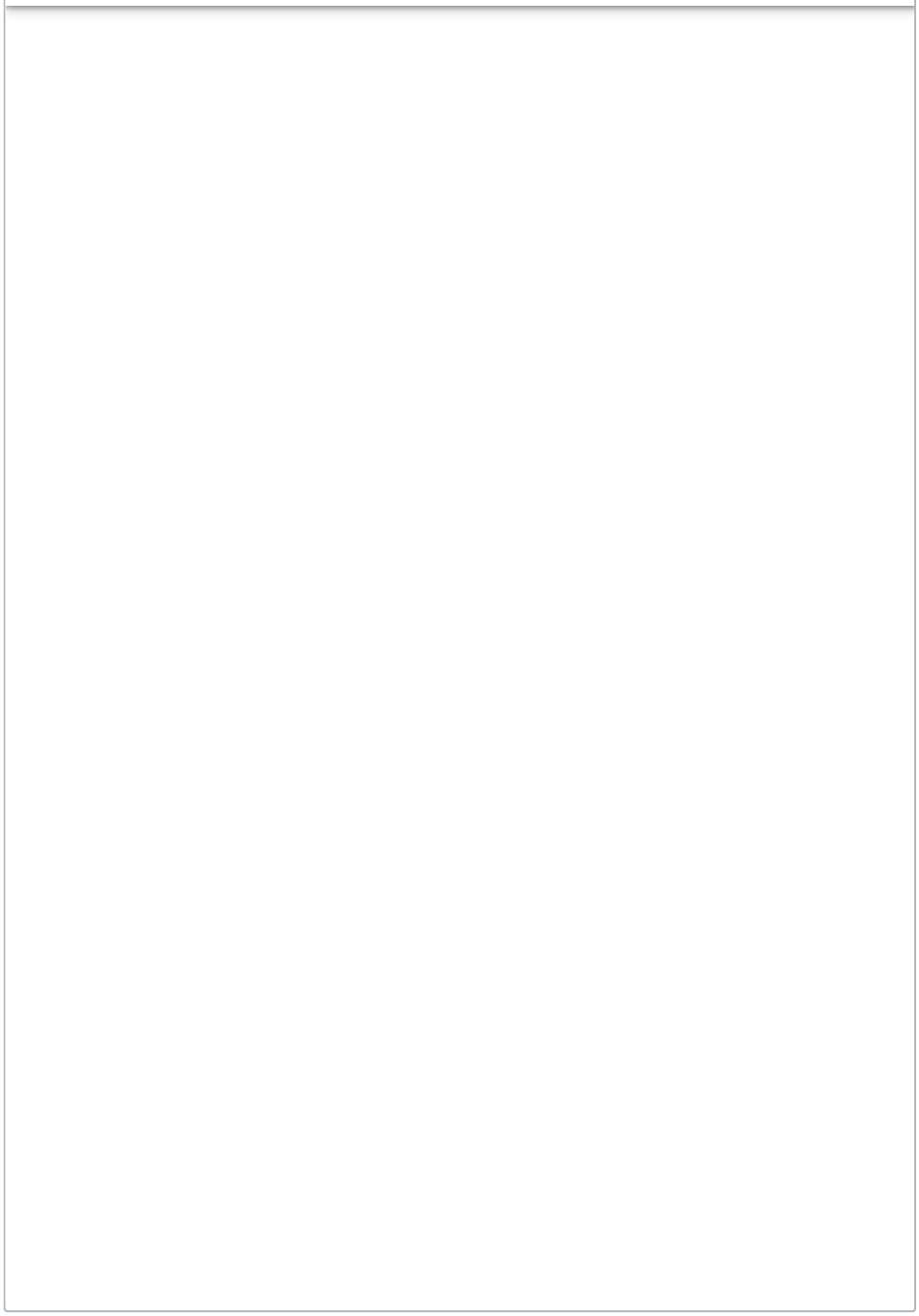
(2 points) Provide the problem number, problem title, difficulty level

2209. Minimum White Tiles After Covering With Carpets Hard

(3 points) Provide the screenshot of you getting your solution accepted by LeetCode.
Note: Each $easy$ problem will be awarded 1 mark, each $medium$ problem will be awarded 2 marks, and each $hard$ problem will be awarded 3 points.

Q1.7.pdf Download

1 / 2



Q1.8

5 Points

For **one** of the problems you are including in your mini-portfolio (please state the actual problem number and include your solution screen shot), explain the various ways you tried to solve this problem, telling us what worked and what did not work. Describe what insights you had as you eventually found a correct solution. Reflect on what you learned from struggling on this problem, and describe how the struggle itself was valuable for you.

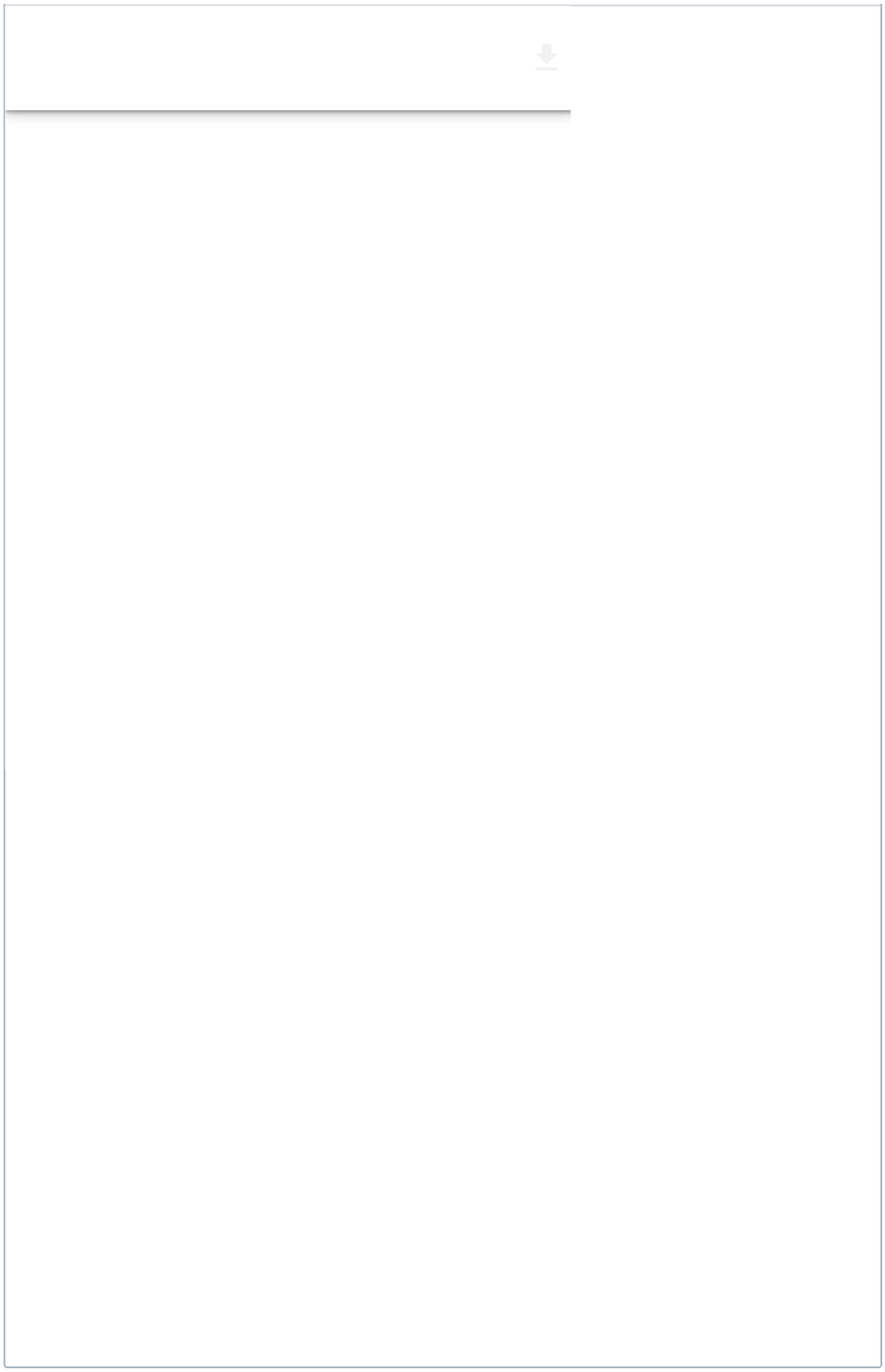
I would say almost each of the hard DP questions is very challengeable for me and it always take me long time to think and figure it out
I'll pick up 656. Coin Path Hard question(Q1.6).

Initially, I just have a solution to figure out this question using brute force, for every such function call, we also need to return this minimum cost, so it need to take calculation every time, so I got TLE.

Then, I tried to solve this problem using Memoization, and this time I don't need to calculate every time, I just need to store the result using a memo array, which can reduce the cost of jumps to reach the end of the array. This solution is accepted by LeetCode.
Last, i tried to use DP solution and solve this problem.

What the struggle is that I don't know how to start use a DP solution at the first beginning and I only know the brute force but it is TLE, which took me a long time and I tried to understand this question. Finally, I found that I don't need to repeat the calculation every step, I can store the calculation results in an array, and call them directly next call, which greatly reduces the cost. Later, the idea of DP is the same, which is the most valuable place for me.

▾ Q1.8.pdf Download



Problem Set 8 - Programming

GRADED

STUDENT
Kejian Tong

TOTAL POINTS

40 / 40 pts

QUESTION 1

(no title) **40** / 40 pts

1.1	Problem 1	**5** / 5 pts
1.2	Problem 2	**5** / 5 pts
1.3	(no title)	**5** / 5 pts
1.4	Problem 4	**5** / 5 pts
1.5	Problem 5	**5** / 5 pts
1.6	Problem 6	**5** / 5 pts
1.7	Problem 7	**5** / 5 pts
1.8	(no title)	**5** / 5 pts