Algorithms

DP Homework 1

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Problem #1: LeetCode 746 - Min Cost Climbing Stairs

You are given an integer array `cost` where `cost[i]` is the cost of i^{th} step on a staircase. Once you pay the cost, you can either climb one or two steps.

You can either start from the step with index `0`, or the step with index `1`.

Return *the minimum cost to reach the top of the floor*.

Constraints:

- `2 <= cost.length <= 1000`
- `0 <= cost[i] <= 999`

Example 1:

```
Input: cost = [10,15,20]
Output: 15
Explanation: You will start at index 1.
- Pay 15 and climb two steps to reach the top.
The total cost is 15.
```

Example 2:

```
Input: cost = [1,100,1,1,1,100,1,1,100,1]
Output: 6
Explanation: You will start at index 0.
- Pay 1 and climb two steps to reach index 2.
- Pay 1 and climb two steps to reach index 4.
- Pay 1 and climb two steps to reach index 6.
- Pay 1 and climb one step to reach index 7.
- Pay 1 and climb two steps to reach index 9.
- Pay 1 and climb one step to reach the top.
The total cost is 6.
```

Problem #2: LeetCode 279 - Perfect Squares

- Background: For any integer x, we call y = x * x a perfect square
  - That is, sqrt(y) is an integer
  - We can generate perfect squares: 1x1, 2x2, 3x3, ….. And so on
  - For example, 1, 4, 9, and 16 are perfect squares while 3 and 11 are not.
- Given an integer n, return the least number of **perfect square numbers** that sum to n.
  - 12 ⇒ 3 from 4+4+4
  - 13 ⇒ 2 from 4+9 (2 numbers) or 1 + 4+4+4 (4 numbers)
  - 15 ⇒ 4
  - 16 ⇒ 1 16 is a perfect square
  - 17 ⇒ 2 1+16
  - 7852 ⇒ 3

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."