

Computer Programming 1 Lab

2023-05-17

Outline

- HW07
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HW07

How to solve this problem?

Approach 1

Why don't we just expand all possible ways?

Possible ways: $n * (n - 1) * (n - 1) * \dots = n^n$

Time complexity: $O(N^N)$

May be acceptable on small data, but not on $N = 25$.

Improve

We can see that both sequence $1 \rightarrow 4 \rightarrow 5$ and $1 \rightarrow 6 \rightarrow 5$ end up with currency 5.

So, let's say, If the sequence

- $1 \rightarrow 4 \rightarrow 5$ end up with \$100 of currency 5.
- $1 \rightarrow 6 \rightarrow 5$ end up with \$110 of currency 5.

Then we don't have to keep the result of sequence 1 any more. Because sequence 2 can always make more money than sequence 1.

In conclusion, if two sequences:

- Have same start currency.
- Have same end currency.
- Have same length of chain.

Then we can only keep the one with the highest value.

Approach 2

1. Start with currency S .
2. Try to change from any currency to any currency.
3. For each of the tail currency, only keeps the sequence with most value and eliminate the rest.
4. Check for profit. if the value of currency S is more than start value of currency $S^* 1.01$, record the chain and its length.
5. Repeat step 2~4 for N times since the description says the max times of change is N .
6. Repeat step 1~5 for N times. Each time starts with different S .

More DP problems

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EX05

How to solve this problem?

Approach 1

1. Split input with '/'
2. Make an vector of string.
3. For each string section, do:
 - 3-1. If the string section is ".", continue.
 - 3-2. If the string section is "..", pop one directory.
 - 3-3. Otherwise, push the string section into vector.
4. Print the answer with a "/" before each element in the vector.

HW08

Hint

- See course slides / last week's slide.
- We know this is a classic question, and you can find a lot of solutions online. SO DO NOT CHEAT! WE WILL CHECK FOR PLAGIARISM!

Any Question?