Thank you for taking the Week 10: Assignment 1.

Week 10: Assignment 1

Your last recorded submission was on 2022-10-10, 20:49 Due date: 2022-10-12, 23:59 IST. IST

1) Consider a money system consisting of n coins. Each coin has a positive integer value.

Your task is to calculate the number of distinct ordered ways you can produce a money sum x using the available coins.

For example, if the coins are {2,3,5} and the desired sum is 9, there are 3 ways:

2+2+5
3+3+3
2+2+2+3

Further, if the coins are {2,3,5} and the desired sum is 12, how many ways are there?

5

1 point

2) Continuing the previous question, if the coins are {1,2} and the desired sum is 5, how many ways are there?

3

1 point

3) Let **dp[w,i]** equal the number of *ordered* ways to choose coins so that they add up to w, but assume that we are only allowed to make use of the first i coins. Which of the following recurrences are valid? ***2 points***

Note: coins[i] denotes the value of the i-th coin.

Assessment submitted.
X

- (●) dp[w,i] := dp[w,i-1] + dp[w-coins[i],i]
- ( ) dp[w,i] := dp[w,i-1] + dp[w-coins[i],i-1]
- ( ) dp[w,i] := dp[w,i] + dp[w-coins[i],i-1]
- ( ) dp[w,i] := dp[w,i] + dp[w-coins[i],i]

4) You are given an integer n. On each step, you may subtract one of the digits from the number.

What is the smallest number of steps required to make the number equal 27 to 0?

5

1 point

5) You are given an integer n. On each step, you may subtract one of the digits from the number.

What is the smallest number of steps required to make the number equal 150 to 0?

27

Hint

2 points

6) Consider the previous question once more. You are given an integer n. On each step, you may subtract one of the digits from the number. ***2 points***

We want to know what is the smallest number of steps that are required to make a given number equal n to 0.

Let dp[n] denote the solution. Which of the following recurrences are valid? Remember the hint from the previous question.

- [x] dp[n] = min$_{d \in digits}$(n) dp[n-d].
- [x] dp[n] = dp[n-d*], where d* is the largest digit in n
- [ ] dp[n] = max$_{d \in digits}$(n) dp[n-d].
- [ ] dp[n] = dp[n-d*], where d* is the smallest digit in n

7) What is the value of dp[n] defined in the previous question if n is a **single digit** number? ***1 point***

- ( ) n
- ( ) 0
- (●) 1
- ( ) n-1

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers

Assessment submitted.
X

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