

Assessment sub
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NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Getting Started with Competitive Programming (course)



Course
outline

How does an
NPTEL
online
course
work? ()

Week 0 ()

Week 1 ()

Week 2 ()

Week 3 ()

Week 4 ()

Week 5 ()

Week 6 ()

Week 7 ()

Week 8 ()

Week 9 ()

Week 10 ()

● Top-Down
Dynamic
Programming
with Frog

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?

1 point

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

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?

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

Assessment submitted (unit=95&lesson=96)

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1_Part A (unit=95&lesson=96)

Top-Down Dynamic Programming with Frog 1_Part B (unit=95&lesson=97)

Bottom-Up Dynamic Programming with Dice Combinations (unit=95&lesson=98)

Practice: Week 10: Assignment 10 (Non Graded) (assessment? name=178)

Quiz: Week 10: Assignment 1 (assessment? name=188)

Week 10: Programming Assignment 1 (/noc22_cs82/progassignment1 name=183)

Week 10 Feedback Form: In order of preference: Algorithmic Puzzles Algorithms Implemented Data Structures and Algorithms with C++ and Python Algorithms for Competitive Programming (unit=95&lesson=99)

Week 11 ()

Week 12 ()

- ☒ $dp[w,i] := dp[w,i-1] + dp[w-coins[i],i]$
- ☐ $dp[w,i] := dp[w,i-1] + dp[w-coins[i],i-1]$
- ☐ $dp[w,i] := dp[w,i] + dp[w-coins[i],i-1]$
- ☐ $dp[w,i] := dp[w,i] + dp[w-coins[i],i]$

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.

- ☒ $dp[n] = \min_{d \in \text{digits}(n)} dp[n-d]$.
- ☒ $dp[n] = dp[n-d^*]$, where d^* is the largest digit in n
- ☐ $dp[n] = \max_{d \in \text{digits}(n)} dp[n-d]$.
- ☐ $dp[n] = dp[n-d^*]$, 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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