More dynamic programming practice

10/7/24

Administrivia

- Exam due tomorrow night

- Extra credit talk tomorrow: noon in SMC E117

  "It's Organic: Software Testing of Emerging Domains" (and information about graduate school at Iowa State) by Myra Cohen

Problem 14-2

A palindrome is a non-empty string that reads the same forward and backward. Examples of palindromes are civic, racecar, and aibohphobia (fear of palindromes).

Give an efficient dynamic programming algorithm to find the longest palindrome that is a subsequence of a given input string. For example, given the input “character”, your program should return “carac”.

Subset sum

Given a set of n (positive) values v_1, v_2, ..., v_n, is there a subset of them summing to S?

From 1, 3, 4:

- Yes for 5 (1+4)
- No for 6

Which of the following sums cannot be made using the values 7, 4, 1, and 8?

A. 5
B. 13
C. 16
D. 19
E. Not exactly one of the above

Which of the following sums cannot be made using the values 7, 4, 1, and 8?

A. 5
B. 13
C. 16
D. 19
E. Not exactly one of the above (all can be)

Subset sum

Given a set of n (positive) values v_1, v_2, ..., v_n, is there a subset of them summing to S?

- T[i][j] = whether can make i using v_1, v_2, ..., v_j

Subset sum

Given a set of n (positive) values v_1, v_2, ..., v_n, is there a subset of them summing to S?

- T[i][j] = whether can make i using v_1, v_2, ..., v_j
  - T[0][j] = true for all j
  - T[i][0] = false for i ≠ 0
  - T[i][j] = T[i][j-1] || T[i-v_j][j-1]

Making change

Given coin denominations d_1, d_2, ..., d_n, what is the fewest coins needed to make change C?

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a) Show that the strategy of using as many of the largest coins first doesn't work

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a) Show that the strategy of using as many of the largest coins first doesn't work
b) Give an algorithm w/ running time O(Cn)