

Today: dynamic programming contd. §§ 15.4,5.

Next class: Quiz 01 (all material before quiz date). Also, mini-recap and synthesis.

Reminders: Use the class newsgroup for questions and discussions (esp. for quiz).

1. List the members of your group below. Underline your name.

2. Recall the notation $[n]$ to represent the set of n integers $[1, 2, 3, \dots, n]$, for $n \geq 0$. (Thus $[0]$ represents the empty set in this notation.) Let Σ be a finite set, called the *alphabet*. A finite *sequence*, of length $n \geq 0$, over Σ is essentially a function from the set $[n]$ to Σ .
 - (a) Consider $\Sigma = \{A, B, C\}$, $n = 5$, and a function s that maps $1, 2, 3, 4, 5$ to A, A, C, B, C , respectively (e.g., $s(3) = C$).
 - (b) It is conventional to denote $s(i)$ by s_i , so that we may say $s_3 = s_5 = C$, and $s_2 = A$.
 - (c) It is also conventional to denote a sequence by simply concatenating the s_i values for $i = 1, 2, \dots, n$, in order. Thus, we may write $s = AACBC$.

Consider the sequence (using the third convention) $t = \textit{banana}$. Represent it using the other two conventions.

3. Recall the textbook's definition of *subsequence* (p. 391). Of the two sequences below, is the second a *subsequence* of the first? Why or why not?

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Y A B A D A B A D A A B
B A D A D A

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4. If s is a subsequence of both t_1 and t_2 then s is called a *common subsequence* of t_1 and t_2 . Find three different common subsequences of the two sequences of Question 3.

5. Determine, using an arbitrary method, the *longest common subsequence (LCS)* of the two sequences below. Briefly explain why your answer is correct.

Y A B A D A B A D A A B
B Y A D A D D A B A Y

6. How many sequences (exact number) would be checked by the exhaustive enumeration algorithm (noted near the top of page 392 of the textbook)? Justify your answer.

7. Use the result of Question 9 to generate an *edit script* that edits the first sequence of Question 5 into the second. Describe your algorithm and explain why it is correct.

8. Trace the operation of the `LCS-LENGTH` algorithm (p. 394) on the sequences of Question 5. Depict the state of the b and c arrays (1) after four iterations of the outer nested loop and (2) at the end of the algorithm.

9. Trace the operation of the `PRINT-LCS` algorithm (p. 395) on the result of Question 8. Provide the arguments for each of recursive call of `PRINT-LCS`.