

CS 305
Design and Analysis of Algorithms

10 / 14 / 2021

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Today's Topics

- Questions / Comments?
- More Dynamic Programming
 - Characteristics of a problem suited for dynamic programming
 - Characteristics of the dynamic programming solution
 - Suggestions when forming the solution

Characteristics of a problem suited for Dynamic Programming

- 1. It is an optimization problem
- 2. It has optimal substructure (the optimal solution consists of optimal solutions to subproblems --- in other words, the answer is based **ONLY** on answers to smaller problems)
- 3. It contains overlapping subproblems

Characteristics of a Dynamic Programming solution

- 1. Define the value of the optimal solution recursively
- 2. Compute the values starting at the base case 1st
- 3. Compute the overall solution based on the value table

Suggestions when approaching a dynamic programming solution

- Define a problem and create a list of choices that can be made
- State each choice as a subproblem
- Write down the immediate cost or reward of each choice
- Put the above in a table of 3 columns
- Define a function F which is the value of the optimal solution to a subproblem