CE100 Algorithms and Programming II

Week-5 (Dynamic Programming)

Spring Semester, 2021-2022

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<iframe width=700, height=500 frameBorder=0 src="../ce100-week-5-dp.md_slide.html"></iframe>

Quicksort Sort

Outline

- Convex Hull (Divide & Conquer)
- Dynamic Programming
    - Introduction
    - Divide-and-Conquer (DAC) vs Dynamic Programming (DP)

- Fibonacci Numbers
  - Recursive Solution
  - Bottom-Up Solution
- Optimization Problems
- Development of a DP Algorithms

- Matrix-Chain Multiplication
  - Matrix Multiplication and Row Columns Definitions
  - Cost of Multiplication Operations (pxqxr)
  - Counting the Number of Parenthesizations

- The Structure of Optimal Parenthesization
  - Characterize the structure of an optimal solution
  - A Recursive Solution
    - Direct Recursion Inefficiency.
  - Computing the optimal Cost of Matrix-Chain Multiplication
  - Bottom-up Computation

- Algorithm for Computing the Optimal Costs
  - MATRIX-CHAIN-ORDER
- Construction and Optimal Solution
  - MATRIX-CHAIN-MULTIPLY
- Summary

References

TODO