Dynamic Programming

Coin-row problem • Change-making problem • Knapsack problem

Presenters: Halim, Orhan, Arafat

WHAT IS DYNAMİC PROGRAMMİNG ?

DP İNTUİTİON

(REAL LİFE)

“Don’t solve the same problem twice”

COİN-ROW PROBLEM

* Coins in a row
* Each coin has a value
* You cannot take two adjacent coins
* Goal: maximum total value

COİN-ROW PROBLEM

(REAL LİFE)

Houses in a street with money

Robber cannot rob two neighboring houses

CHANGE-MAKİNG PROBLEM

* Given coin denominations
* Make a target amount
* Use minimum number of coins

CHANGE-MAKİNG PROBLEM

(REAL LİFE)

Paying in a shop with minimum coins

KNAPSACK PROBLEM

* Items have weight and value
* Bag has limited capacity
* Choose items to maximize value

KNAPSACK

(REAL LİFE)

Packing a travel backpack

WHY USE DP?

TİME COMPLEXİTY (EFFİCİENCY)

* Faster than brute force
* Uses memory to save time

CONCLUSİON

- Dynamic Programming solves problems step by step
- It saves results to avoid repeated work
- Coin-row, Change-making, and Knapsack follow the same DP idea
- DP helps find optimal solutions efficiently

END OF THE PRESENTATION