Lecture 13

i>clicker

Q1: How much work is it to tackle knapsack using DP?

In general, for a knapsack problem with

N types of products, (with integer weights $w_1, \ldots, w_N \geq 1$,) and knapsack weight capacity of **W** (also integer),

What is the size of the state space?

A. N
B. W+1
C. N+W+1
D. N(W+1)
E. N/W

Q1: How much work is it to tackle knapsack using DP?

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What is the size of the state space?

A. N
B. W+1; So, it is of order O(W) ("linear in W")
C. N+W+1
D. N(W+1)
E. N/W

Q2: How much work is it to tackle knapsack using DP?

In general, for a knapsack problem with

N types of products, (with unit weights and volumes ≥1,)
knapsack weight capacity of **W**,
and knapsack volume capacity of **V**,

What is the size of the state space?

A. N
B. W+1
C. V+1
D. (W+1)(V+1)
E. N(W+1)(V+1)

Q2: How much work is it to tackle knapsack using DP?

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knapsack weight capacity of **W**,
and knapsack volume capacity of **V**,

What is the size of the state space?

A. N
B. W+1
C. V+1
D. (W+1)(V+1); So, it is of order O(WV)
E. N(W+1)(V+1)

Q3: How much work is it to tackle knapsack using DP?

In general, for a knapsack problem with

N types of products, (with "sizes" per unit ≥1,)

d different capacities constraints, with capacities: $\mathbf{C_1}$, $\mathbf{C_2}$, …, $\mathbf{C_d}$,

What is the size of the state space?

A. N
B. C_1+1
C. $(C_1+1)(C_2+1)\ldots(C_d+1)$
D. $N(C_1+1)(C_2+1)\ldots(C_d+1)$
E. $(N+1)(C_1+1)(C_2+1)\ldots(C_d+1)$

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d different capacities constraints, with capacities: $\mathbf{C_1}$, $\mathbf{C_2}$, …, $\mathbf{C_d}$,

What is the size of the state space?

$(C_1+1)(C_2+1)\ldots(C_d+1)$; So it is of order $O(C^1C^2\ldots C^d)$

Suppose that $C_i \approx C$ for all i, then, it is of order $O(NC^d)$