CS 310

Q) How many computer scientists does it take to kill a cockroach?

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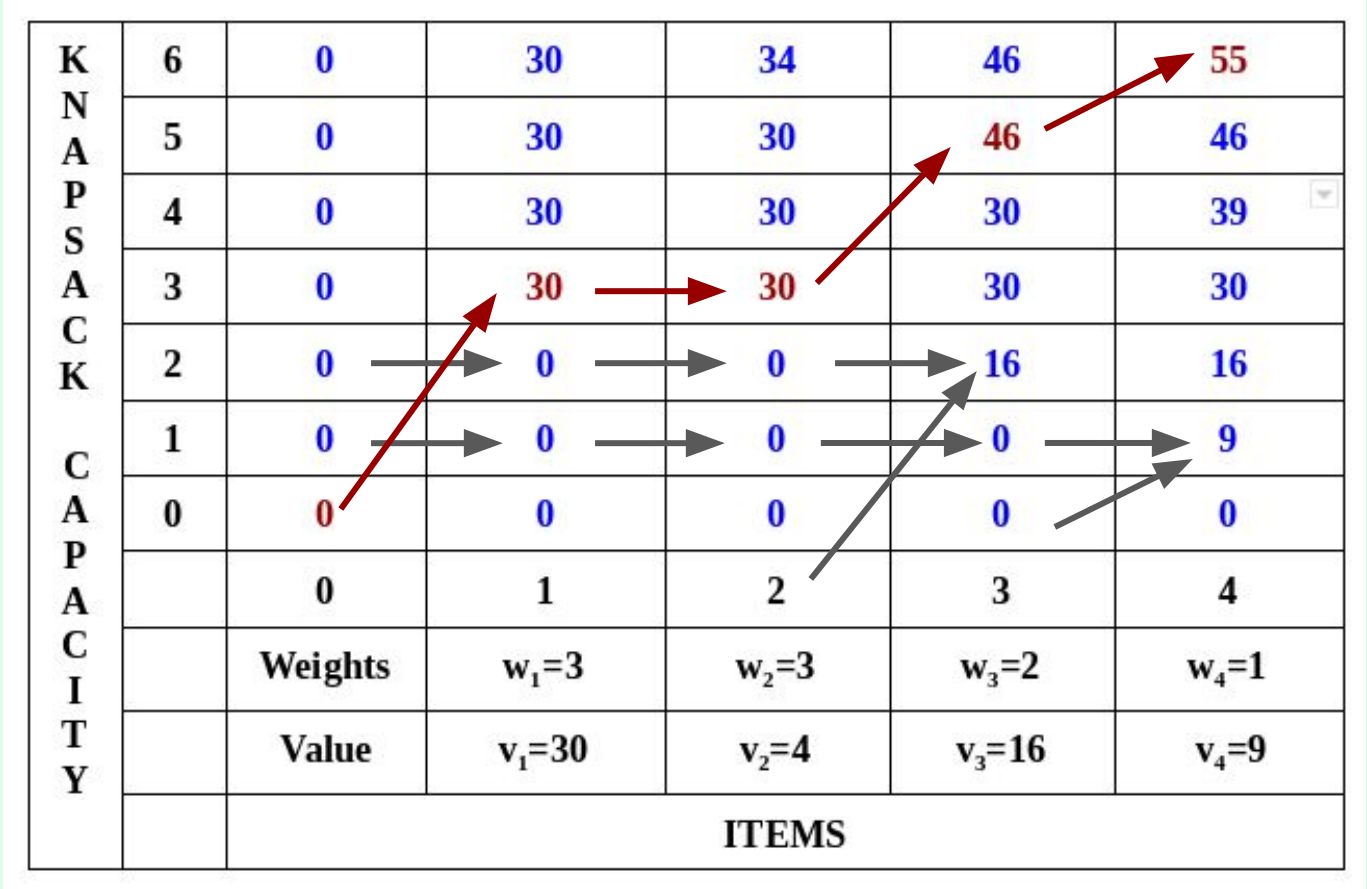
A) Two. One of them holds it down and the other installs Windows on it.

Homework 7

Underlying DAG

Time Complexity?



KNAPSACK CAPACITY						
	6	0	30	34	46	55
	5	0	30	30	46	46
	4	0	30	30	30	39
	3	0	30	30	30	30
	2	0	0	0	16	16
	1	0	0	0	0	9
	0	0	0	0	0	0
		0	1	2	3	4
		Weights	w_1=3	w_2=3	w_3=2	w_4=1
		Value	v_1=30	v_2=4	v_3=16	v_4=9
		ITEMS				

No one knows of a polynomial algorithm for Knapsack.

Subset Sum Problem

Given, non-negative integer weights, item i weighs $w_i > 0$.
Bound or capacity: W

Select a subset S $\sum_{i \in S} w_i \leq W$

This sum should be as large as possible.

$$\textit{If } w < w_i \textit{ then } \text{OPT}(i, w) = \text{OPT}(i-1, w).$$

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$$\text{OPT}(i, w) = \max(\text{OPT}(i-1, w), w_i + \text{OPT}(i-1, w-w_i)).$$

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Base case?

Applications of Knapsack

- Resource constrained selection problems