

WOP3SD3 4/7/22

① Fewest Coins

② Knapsack (0-1)

denominations of coins $d_0, d_1, d_2, \dots, d_{n-1}$

$d_0 = 1$. Given a value V what is the fewest # of coins I can use to make change for V cents.

1, 2, 6, 7
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Greedy
 $124 \Rightarrow 7, 2, 2, 1$
better $\Rightarrow 6, 6$

$$f(12) = \min \begin{cases} f(5) + 1 \\ f(6) + 1 \\ f(10) + 1 \\ f(11) + 1 \end{cases}$$

if built up in an array update w/o recursion

Knapsack

Items	weight	value
✓ 0	4	6
✓ 1	2	4
✓ 2	3	5
3	1	3
4	6	9
5	4	7

$W=10$

$dp[i] = \text{max value of knapsack with weight } i \text{ or less.}$

0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	6	6	6	6	6	6	6
0	0	4	4	6	6	10	10	10	10	10
0	0	4	5	6	9	10	11	11	15	15

for (int i = 0; i < n; i++)
for (int j = W; j >= w[i]; j--)
dp[j] = max(dp[j],

