

$$\text{Opt}(n, W)$$

$$\text{Opt}(j, w') =$$

$$\begin{cases} \text{Max} \left(\text{Opt}(j-1, w'), \right. \\ \quad \left. \text{Opt}(j-1, w' - w_j) + v_j \right) \\ \text{Opt}(j-1, w') \text{ if } w' < w_j \\ \emptyset \text{ if } j=0 \end{cases}$$

$$\begin{aligned} T(n) &= T(n-1) + T(n-1) + 1 \\ &= 2T(n-1) + 1 \\ &= 1 + 2 + 2^2 T(n-2) \\ &= 1 + 2 + 2^2 + \dots + 2^n T(0) \\ &= O(2^n) \end{aligned}$$

		w'				
j	0	0	0	0	0	...
	1	0				
	2	0				
	...					
	n	0				

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

Item	Value	Weight
1	1	1
2	6	2
3	18	5
4	22	6
5	28	7

$$\text{opt}(1, 1)$$

$$\text{opt}(1, 2)$$

$$\text{opt}(2, 1)$$

$$\text{opt}(2, 2) = \max(\text{opt}(1, 2), \text{opt}(1, 0) + v_2)$$

$$\begin{aligned} \text{opt}(2, 3) &= \max(\text{opt}(1, 3), \text{opt}(1, 3-2) + v_2) \\ &= 7 \end{aligned}$$

$$O(nW)$$

$$J = \sum (y_i - ax_i - b)^2$$

$$\frac{\partial J}{\partial a} = -2 \sum x_i (y_i - ax_i - b) = 0$$

$$\frac{\partial J}{\partial b} = -2 \sum (y_i - ax_i - b) = 0$$