STEP 4 : When $i=4$, $w_4 = 3$, $P_4 = 36$

$j=1$ $V[4,1] = V[3,1] = 0$

$j=2$ $V[4,2] = V[3,2] = 25$

$j=3$ $V[4,3] = \max\{ V[3,3], V[3,0]+36 \} = 36$

$j=4$ $V[4,4] = \max\{ V[3,4], V[3,1]+36 \} = 36$

$j=5$ $V[4,5] = \max\{ V[3,5], V[3,2]+36 \} = 61$

$j=6$ $V[4,6] = \max\{ V[3,6], V[3,3]+36 \} = 70$

$j=7$ $V[4,7] = \max\{ V[3,7], V[3,4]+36 \} = 75$

$j=8$ $V[4,8] = \max\{ V[3,8], V[3,5]+36 \} = 91$

$j=9$ $V[4,9] = \max\{ V[3,9], V[3,6]+36 \} = 106$

$j=10$ $V[4,10] = \max\{ V[3,10], V[3,7]+36 \} = 111$

⇒ Optimal solution : $V[n,m] = V[4,10]$

$= 111$.

: 4 th object is selected as max profit is there.

So $111 - \text{Profit} = 111 - 36 = 75$

So $V[3,7] = V[2,7] = 75$

3rd obj. is not selected.

$V[2,7] \neq V[1,7]$

2nd obj. is selected.

$75 - P_2 = 75 - 45 = 30$

$V[1,3] \neq V[0,3]$

$30 \neq 0$

1st obj. is selected.

x_1	x_2	x_3	x_4
1	1	0	1

STEP 2: When $i=2$, $w_2 = 4$, $P_2 = 45$.

$j=1$ $\quad v[2,1] = v[1,1] = 0$

$j=2$ $\quad v[2,2] = v[1,2] = 0$

$j=3$ $\quad v[2,3] = v[1,3] = 30$

$j=4$ $\quad v[2,4] = \max\{v[1,4], v[1,0]+45\} = 45$

$j=5$ $\quad v[2,5] = \max\{v[1,5], v[1,1]+45\} = 45$

$j=6$ $\quad v[2,6] = \max\{v[1,6], v[1,2]+45\} = 45.$

$j=7$ $\quad v[2,7] = \max\{v[1,7], v[1,3]+45\} = 75$

$j=8$ $\quad v[2,8] = \max\{v[1,8], v[1,4]+45\} = 75$

$j=9$ $\quad v[2,9] = \max\{v[1,9], v[1,5]+45\} = 75$

$j=10$ $\quad v[2,10] = \max\{v[1,10], v[1,6]+45\} = 75$

STEP 3: When $i=3$, $w_3 = 2$, $P_3 = 25$

$j=1$ $\quad v[3,1] = v[2,1] = 0$

$j=2$ $\quad v[3,2] = \max\{v[2,2], v[2,0]+25\} = 25$

$j=3$ $\quad v[3,3] = \max\{v[2,3], v[2,1]+25\} = 25$

$j=4$ $\quad v[3,4] = \max\{v[2,4], v[2,2]+25\} = 25$

$j=5$ $\quad v[3,5] = \max\{v[2,5], v[2,3]+25\} = 55$

$j=6$ $\quad v[3,6] = \max\{v[2,6], v[2,4]+25\} = 70$

$j=7$ $\quad v[3,7] = \max\{v[2,7], v[2,5]+25\} = 75$

$j=8$ $\quad v[3,8] = \max\{v[2,8], v[2,6]+25\} = 75$

$j=9$ $\quad v[3,9] = \max\{v[2,9], v[2,7]+25\} = 100$

$j=10$ $\quad v[3,10] = \max\{v[2,10], v[2,8]+25\} = 100$

Knapsack Problem

Item	Weight	Profit
1	3	30
2	4	45
3	2	25
4	3	36

$$V[i,j] = \begin{cases} 0 & \text{if } i=0 \text{ \& } j=0 \\ V[i-1,j] & \text{if } w_i > j \\ \max\{V[i-1,j],\ V[i-1,j-w_i] + P_i\} & \text{if } w_i \le j \end{cases}$$

m → / n ↓	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	30	30	30	30	30	30	30	30
2	0	0	0	30	45	45	45	75	75	75	75
3	0	0	25	25	25	55	70	75	75	100	100
4	0	0	25	36	36	61	70	75	91	106	111

Step 1: When $i=1$, $w_1 = 3$, $P_1 = 30$

$j=1$, $V[1,1] = V[0,1] = 0$

$j=2$; $V[1,2] = V[0,2] = 0$

$j=3$; $V[1,3] = \max\{V[0,3], V[0,0] + 30\} = 30$

$j=4$; $V[1,4] = \max\{V[0,4], V[0,1] + 30\} = 30$

$j=5$; $V[1,5] = \max\{V[0,5], V[0,2] + 30\} = 30$

$j=6$; $V[1,6] = \max\{V[0,6], V[0,3] + 30\} = 30$

$j=7$; $V[1,7] = \max\{V[0,7], V[0,4] + 30\} = 30$

$j=8$; $V[1,8] = \max\{V[0,8], V[0,5] + 30\} = 30$

$j=9$; $V[1,9] = \max\{V[0,9], V[0,6] + 30\} = 30$

$j=10$; $V[1,10] = \max\{V[0,10], V[0,7] + 30\} = 30$