Define how Knapsack Problem is Solved by dynamic programming.

Consider $n=3(w, w, w_1)=(2, 3, 3)$, $(P_1, P_2, P_2)=(1,2,4)$ and 6. Find optimal solution.

n = 3 (number of items) $w_1 = 2, w_2 = 3, w_3 = 3$ (weights of the items) $P_1 = 1, P_2 = 2, P_3 = 4$ (values of the items) W = 6 (maximum weight capacity)

Step 01:

Create table.

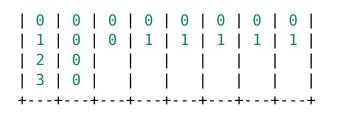
++													
I		0		1	I	2	I	3	4	I	5	6	
+	-+		+		+•		+•		+	-+		+	-+
0		0		0	Ι	0		0	0		0	0	
1		0			I								
2		0			I								
3		0											
+	-+		+		+•		+ •		+	-+		+	-+

Step 02:

Fill in the table:

For item 1 ($w_1 = 2$, $P_1 = 1$):

+---+--+--+--+--+--+ | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | +---+--+--+--+--+--+--+



Step 03:

For item 2

 $(w_2 = 3, P_2 = 2)$:

+++++++++++++++++++++++																
		Τ	0	Τ	1	Ι	2	Ι	3	T	4	Ι	5	Ι	6	
+		+		+		+		+		+		+		+		+
Ι	0	Τ	0	Τ	0	Ι	0	Τ	0	I	0	Ι	0	Ι	0	Ι
									1							
-		-		-		-		-	2	-		-		-		-
-		-		-		-		-		-		-		-		-
+		+		+		+		+		+		+		+		+

Step 04:

For item 3

 $(w_3 = 3, P_3 = 4)$:

+		+		+		+ •		+		+		+		+ •		+
	0	I	0	I	0		0		0	I	0		0		0	
	1		0		0		1		1		1		1		1	
	2		0		0		1		2		2		2		2	
	3		0		0		1		4		4		4		6	
+		+		+		+ •		+		+		+		+		+

The optimal solution is the value in the bottom-right corner of the table, which is dp[3][6] = 6. Therefore, the maximum value that can be achieved without exceeding the weight capacity of 6 is 6.