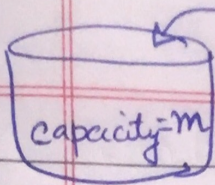


# Knapsack Problem



profit earned  
=  $p_i x_i$

weight occupy =  $w_i x_i$

$0 \leq x_i \leq 1$   
(not taking)

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Objective function: -  $\max \sum_{1 \leq i \leq n} p_i x_i$

Constraint to be fulfilled: -  $\sum_{1 \leq i \leq n} w_i x_i \leq m$   
(feasible sol.)

Solve Knapsack Problem using Greedy Algorithm

$\frac{p}{w}$  = profit per weight

$$\frac{p_i}{w_i} \geq \frac{p_{i+1}}{w_{i+1}}$$

decreasing order

$p=1$	$w=1$
$p=10$	$w=2$
$p=12$	$w=4$

$U = m$

$w_i \leq U$

$U = U - w_i$

net

$i++$

$w_i > U$  X

$i \leq n$

$\rightarrow$

$$\frac{U}{w_i}$$

fraction

$$15 < 20 \checkmark \quad U = 20 - 15 = 5$$

$$10 < 20 \text{ X} \quad \frac{U}{w_i} = \frac{5}{10} = \frac{1}{2}$$

$m = 5$

$$\textcircled{1} \quad 12 + 1 \Rightarrow p = 13$$

$$w(4) + (1) = w = 5$$

$$\textcircled{2} \quad 10 + 10 + 1 \Rightarrow p = 21$$

$$w(2) + (2) + (1) \Rightarrow w = 5$$

$p_i$	$w_i$	
24	15	} $m = 20$
15	10	
25	18	

$$\rightarrow 10/2 = 5$$

$$5 \rightarrow p = 15/2 = 7.5$$

$$15 \rightarrow p = 24$$

$$p = 24 + 7.5 = 31.5$$