fractional Knapsack

	1	2	3	4	5	6	7
Profit	25	75	100	50	45	90	30
Weight	5	10	12	4	7	9	3

M = 37

n = 7

Profit maximum ← (objects profit)

constraint

> M — cannot pick those objects

Step 1

n	1	2	3	4	5	6	7
Profit/ Weight	5	7.5	8.3	25	6.4	10	10

— O(n)

Step 2

Sort Profit/Weight

n	4	6	7	3	2	5	1
Profit/ Weight	25	10	10	8.3	7.5	6.4	5

— O(nlogn)

Step-3

x (fraction) 1 1 1 1 9/10 0 0

M = 37

O(n)

Net Weight	Net Profit
37 - 4 = 33	50
33 - 9 = 24	50 + 90 = 140
24 - 3 = 21	140 + 30 = 170
21 - 12 = 9	170 + 100 = 270
9 - 10 * 9/10 = 0	270 + 9/10 * 75

Reducing weight & increasing Profit

= 337.5 → Net Profit

Time complexity

$$n + n\log n + n \approx O(n\log n)$$