DP Concepts & Questions

Video 37

Just as metal takes shape when struck, we too are forged into our best selves through hard work and perseverance.

MIK...

भाषण
(Motivation)

cswithMIK → Twitter
Facebook, Instagram → codestorywithMIK
whatsapp → codestorywithMIK

- 1-D based DP
- Grid based DP
- String based DP
- Knapsack Series
- Digit DP
- Game Strategy

We'll do :-

(·) RECURSION + MEMOIZATION (Top Down)

(·) Bottom Up.

(·) Time & Space

Knapsack Series

(video -2)

Variants

- Fractional Knapsack ✓
- 0/1 Knapsack ✓
- Unbounded Knapsack. ✓

Fractional Knapsack

Val (Profit) = {100, 280, 120}

wt = {10, 40, 20}

Val/Profit (M)aximize

By Profit:

	A	B	C
Val (Profit)	100,	280,	120
wt	10,	40,	20

10

capacity = ~~10~~ 0

B → 280

wt

20 → 120

1 → $\frac{120}{20}$

10 → $\frac{\cancel{120}^{6}}{\cancel{20}} * 10 = 60$

B → C

$$\boxed{\begin{aligned}\text{Profit} &= 280 + 60 \\ &= 340\end{aligned}}$$

By weight:-

	A	B	C
Val (Profit)	100,	280,	120
wt	10,	40,	20

20

Capacity = 20

A → wt = 10
val = 100

C → wt = 20
val = 120

40 → 280

A → C → B

A → C → B

$$\boxed{\begin{aligned} \text{Profit} &= 100 + 120 + 140 \\ &= 360 \end{aligned}}$$

$1 \rightarrow \frac{280}{40}$ 140

$B \rightarrow 20 \rightarrow \frac{280}{40} * 20 = 140$

Profit per unit weight (Profit/wt)

	A	B	C
Val (Profit)	100,	280,	120
wt	10,	40,	20
Per unit Profit	10,	7,	6

Greedy Approach.

Capacity = ~~50~~ ~~40~~ 0

A → wt = 10

Profit = 10 * 10 = 100

B → wt = 40

Profit = 7 * 40 = 280

$$\boxed{\text{Profit} = \overset{A}{100} + \overset{B}{280} = 380}$$

" Per unit Profit → Sort ".

"Greedy" ~~DP~~

Company = Microsoft.

GFG → Fractional Knapsack.