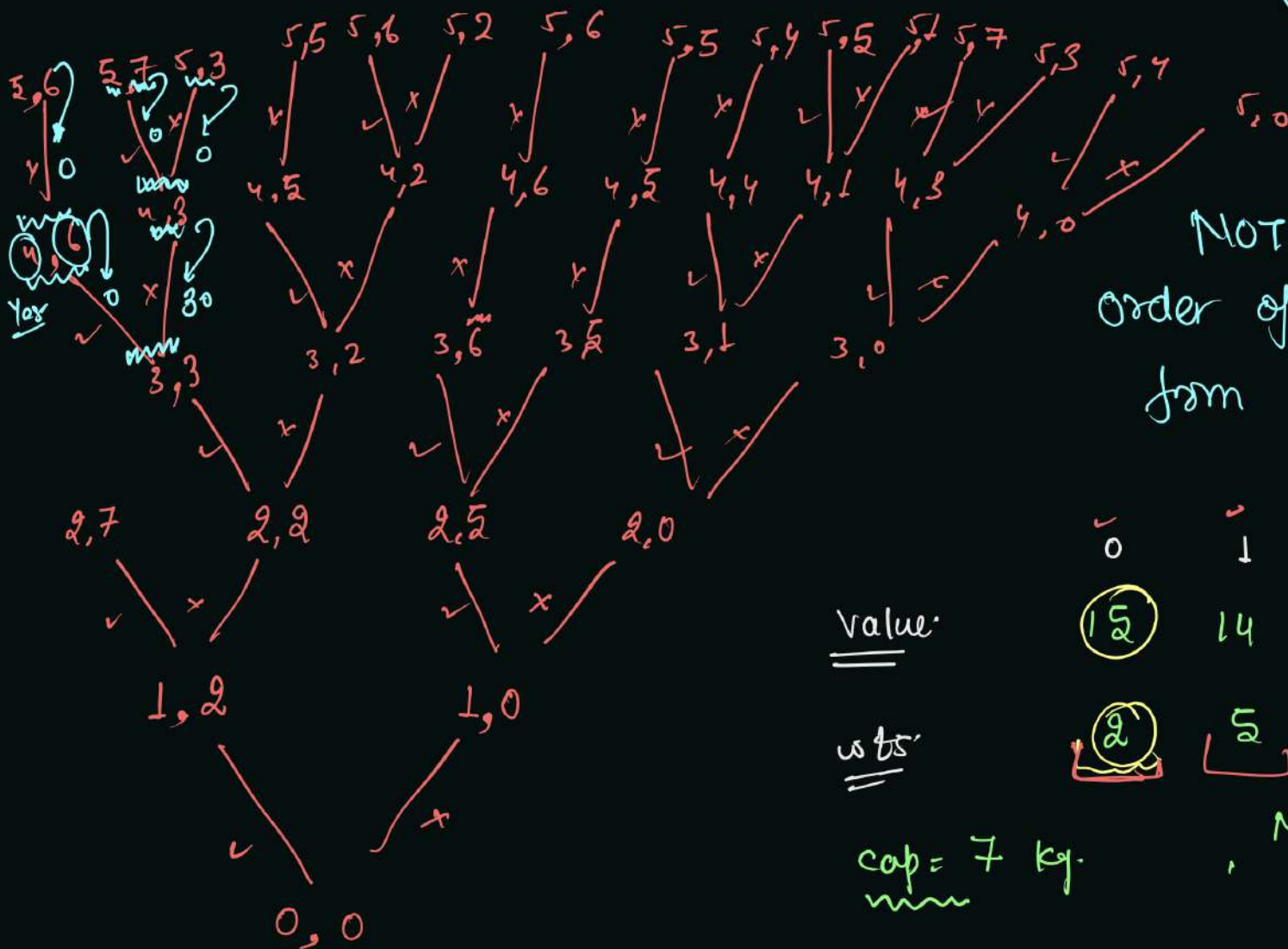


# 0-1 Knapsack

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No. of product = 5.

Total = 7



NOTE: DRY RUN  
order of filling the tabulation  
from ending index to  
starting index

value

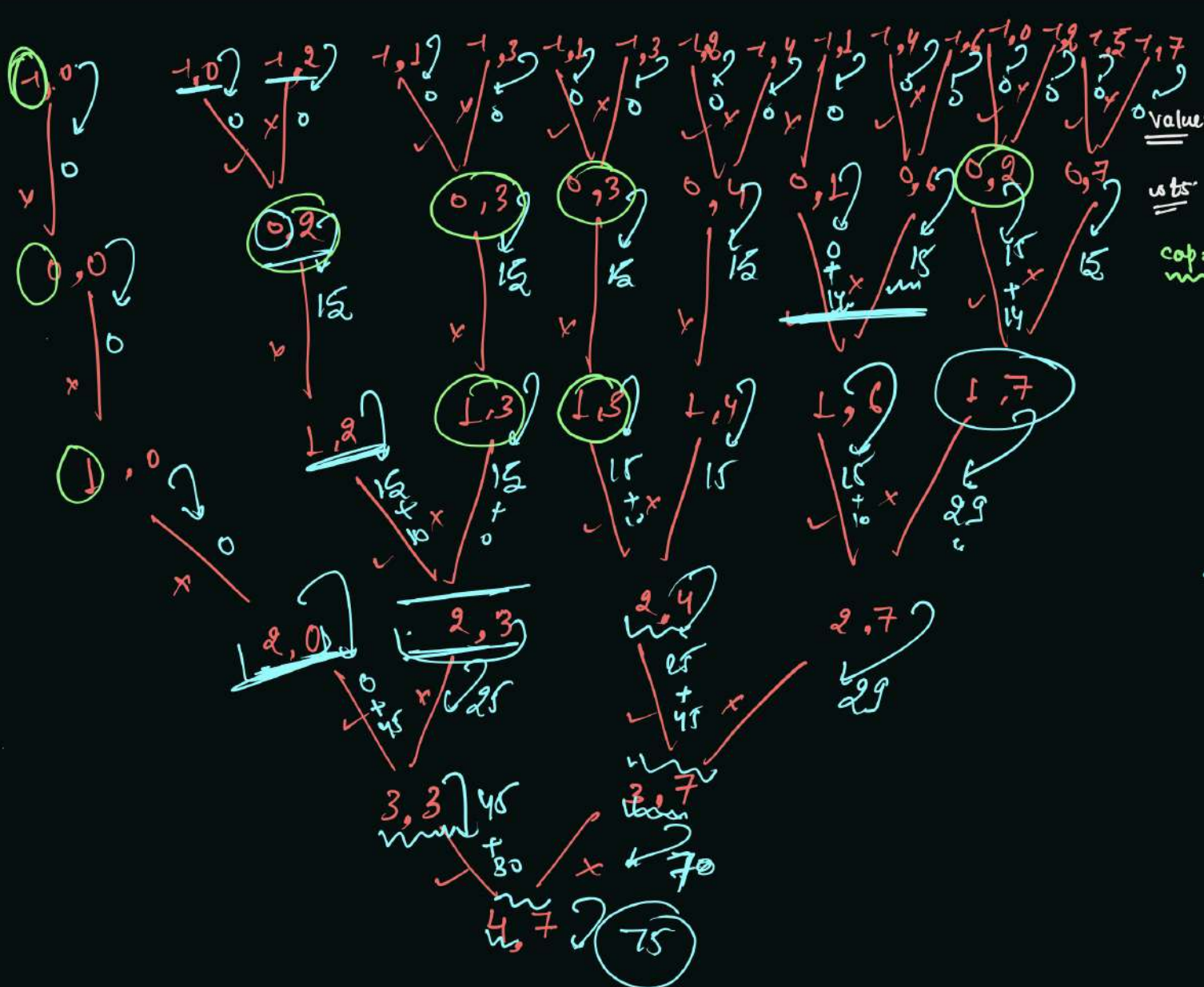
0 1 2 3 4  
(15) 14 10 45 (30)

wt

(2) 5 1 3 4

cap = 7 kg.

Maximum profit = ??



7

	0	1	2	3	4
value	15	14	10	45	20
wt	2	5	1	3	4

Maximum profit = ??

cap = 7 kg.

indx → cap

Final = 75

Tabulation - 0/1 knapsack  $\rightarrow$

$dp[i][j]$  = profit with box till till with  $j$  cap.

val  $\rightarrow$  0 1 2 3 4  
 wt  $\rightarrow$  15 5 1 3 4  
 Maximum profit = ??

val - wt  
 0 0 -  
 1 15 2  
 2 14 5  
 3 10 1  
 4 45 3  
 5 30 4

0	1	2	3	4	5	6	7	cap
0	0	0	0	0	0	0	0	
1	0	15	15	15	15	15	15	
2	0	15	15	15	15	15	29	
3	0	10	25	25	25	25	29	
4	0	10	45	55	60	70	70	
5	0	10	45	55	60	70	75	max



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2) You can pick  
 3) Single box  
 multiple time

$223 \times$  multiple time  
 $822 \times$   
 $283$  Combination } Generate profit  
 Yes  $\rightarrow$  indy some.  
 No  $\rightarrow$  index  $\pm 1$

	Box	1	2	3	4
vals →	15	14	10	45	30
wts →	2	5	1	3	4

cap = 7

cap+1

profit = Maximize

player

0	1	2	3	4
15	14	10	45	30
2	5	1	3	4

vals →

wts →

cap = 7

cap → / Runs

0	1	2	3	4	5	6	7
0	10	20	45	55	65	90	100
		"2"	"2"	"22"	"22"	"222"	"222"

0  
2

1  
5

30

# Fractional Knapsack

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① single box

↳ single time

② I can consider box in fraction as well

cap → 6

vals → 33

wts → 7

$\frac{\text{profit}}{\text{wts}}$

= 4.7

cap →

wts > cap.

Cap 27

2

2 \* 7

14  
64

9 11 6 40 2 15  
9 3 2 1 10 3 3

9

8

11

6

40

2

15

9

3

2

1

10

3

3

1

2.6

2.5

6

4

0.6

5

pair → val  
wts.

frac  $\frac{\text{val}}{\text{wts}}$

max → fact