II) 0/1 Knapsack problem

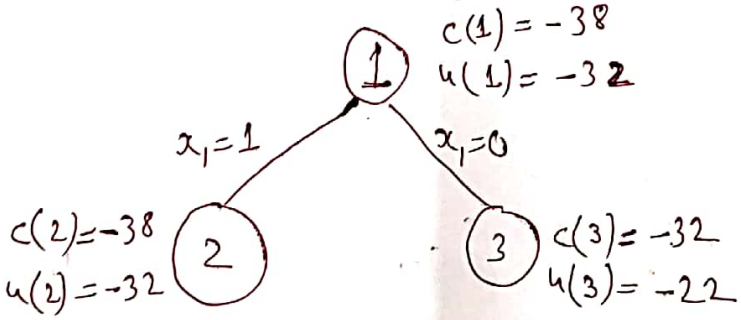
$n = 4$ items
$W = 15$ kg

i	1	2	3	4
P	10	10	12	18
W	2	4	6	9

We want to maximize profit in the knapsack of capacity (15 kg)

Sol^n :- Branch-and-Bound technique is applicable to "Minimization problems" So, here we'll solve this problem (of maximization) by converting it into Minimization problem.

[c (cost) → with fractional
u (upper bound) → without fractional



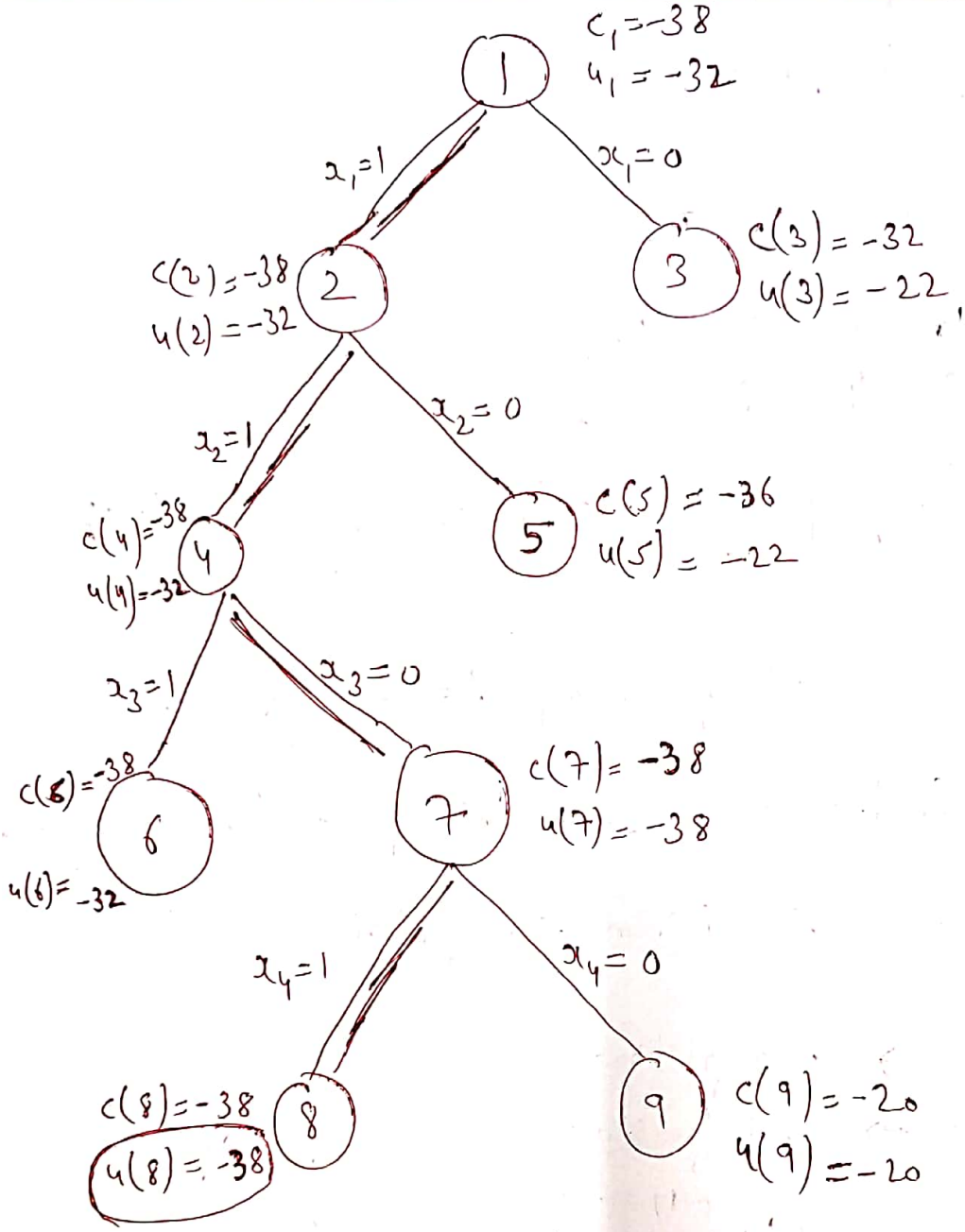
(Explore the Least-Cost Node)

c(1) [fractional]
⇓
i ⇒ 1, 2, 3, $\frac{3}{9}$(4)
P ⇒ 10 + 10 + 12 + $\frac{3}{9}$(18)
= 10 + 10 + 12 + 6
= -38

u(1) [without fractional]
⇓
i ⇒ 1, 2, 3
P ⇒ 10 + 10 + 12
= -32

c(3) [Fractional]
⇓
i ⇒ 2, 3, $\frac{5}{9}$(4)
P ⇒ 10 + 12 + $\frac{5}{9}$(18)
= -32

u(3) [without fractional]
i ⇒ 2, 3
P ⇒ 10 + 12 = -22



c(5)

i ⇒ 1, 3, 4(7/9)

p ⇒ 10 + 12 + (7/9)(18)

= -36

u(5)

i ⇒ 1, 3

p ⇒ 10 + 12

= -22

Profit = 38 units.

Selection = {1, 1, 0, 1} [Items :- 1, 2 and 4]

Q-2

n = 4 items

W = 16 kg

i	1	2	3	4
p	45	30	45	10
w	3	5	9	5