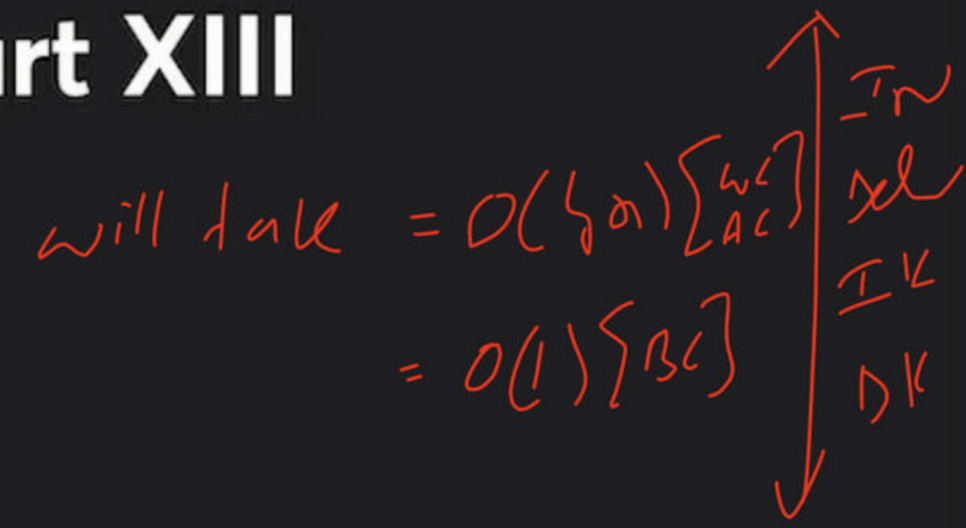
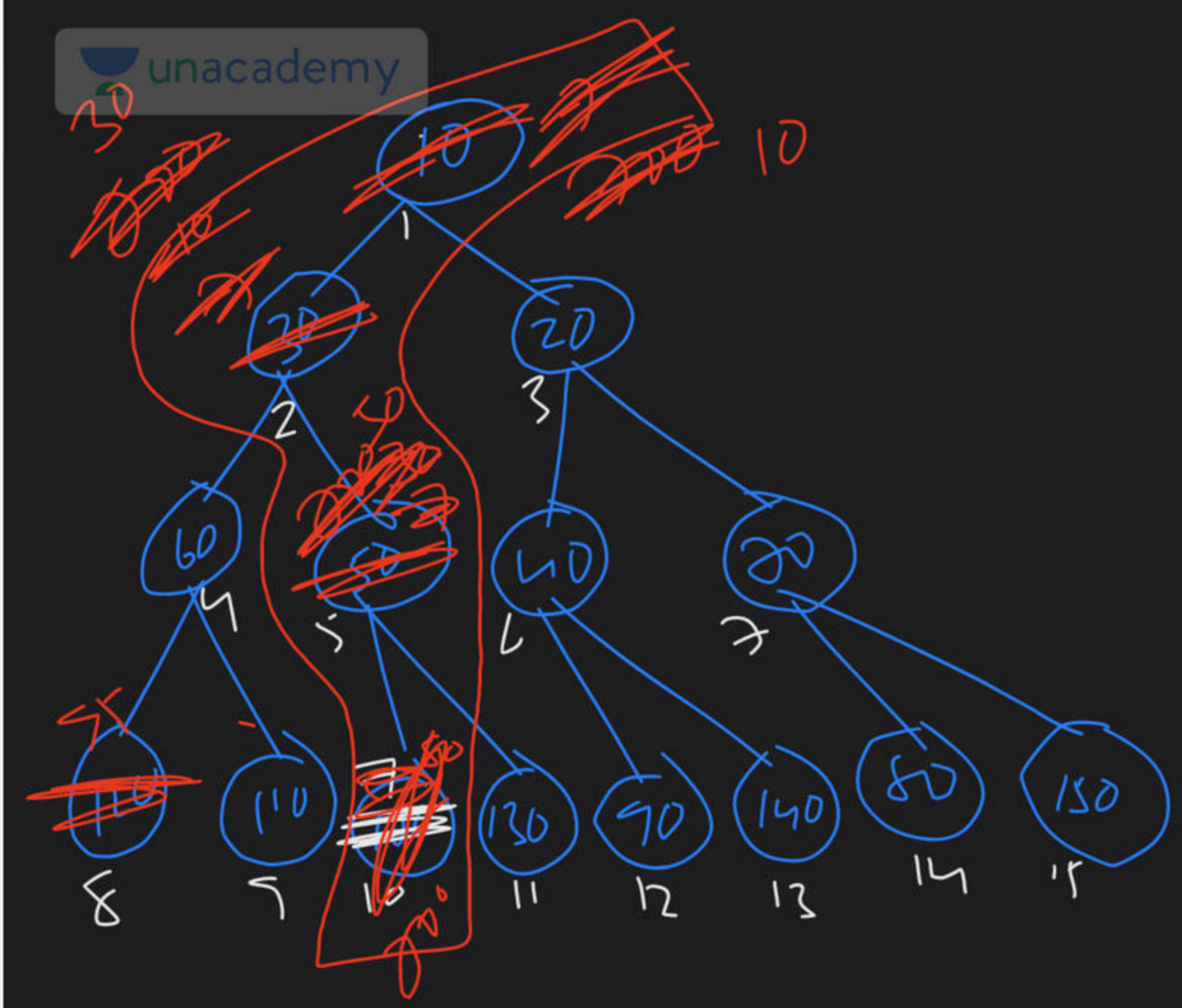
unacademy

Dynamic Programming - Part XIII

Complete Course on Algorithms - GATE



Subbarao Lingamgunta • Lesson 50 • May 17, 2023



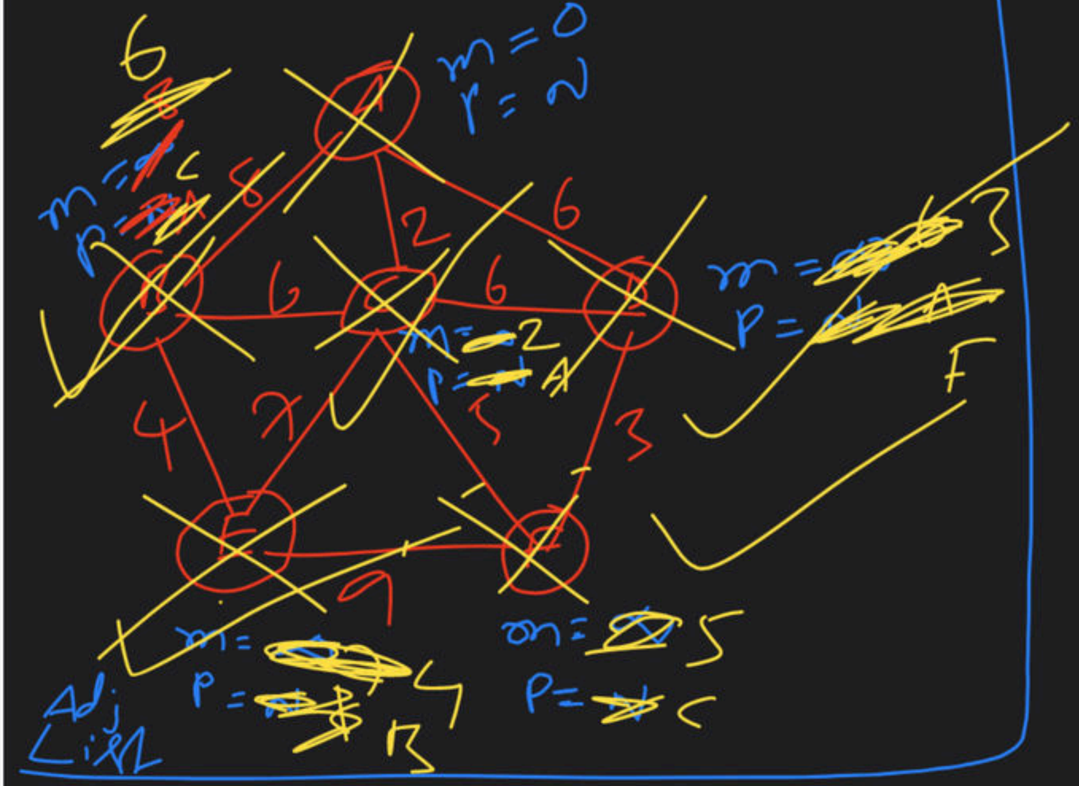
$O(\log n)$

DecreaseKey$(9, 10, 7)$

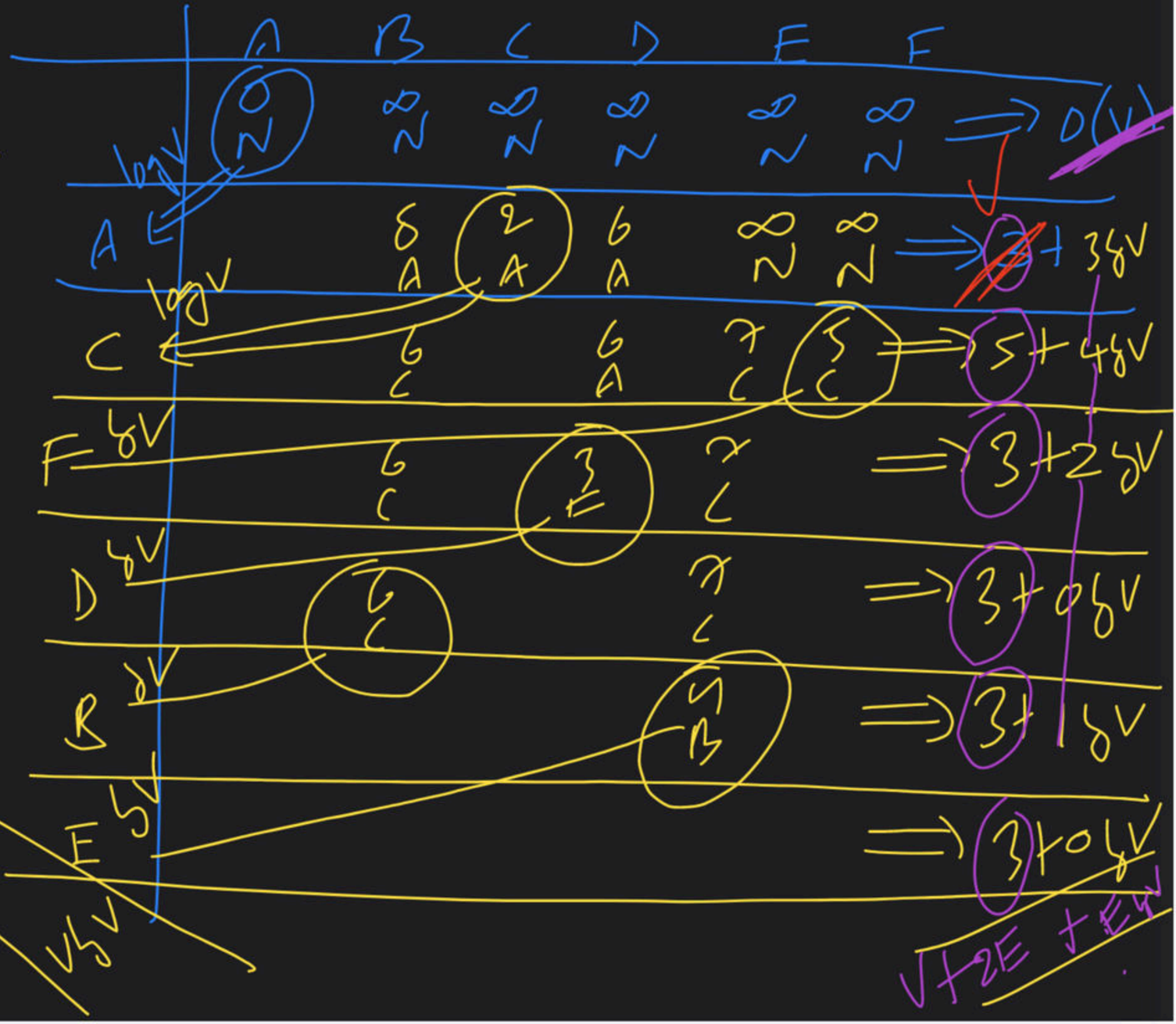
$= (9, 8, 95)$

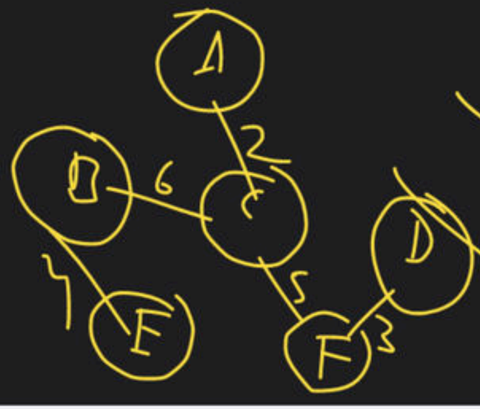
IncreaseKey$(9, 1, \ldots)$

TC of prims



Present in minheap

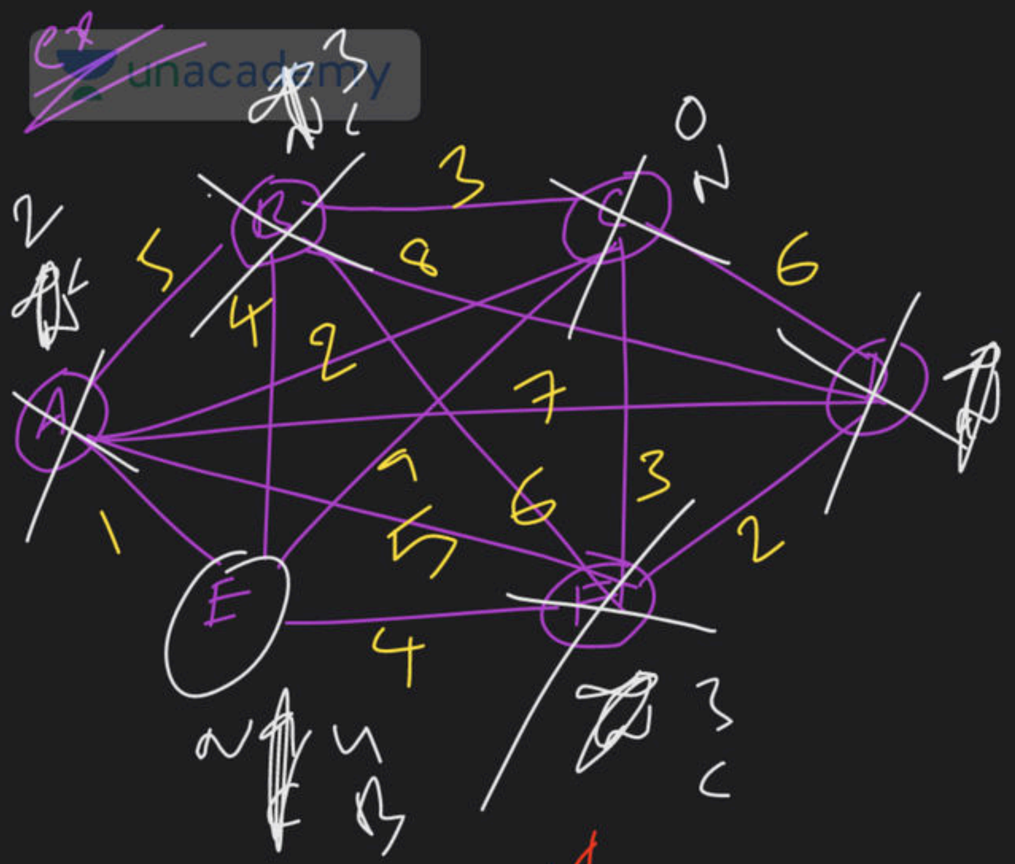




$$TC(prims) = V \lg V + V + 2E + E \lg V$$

$$= V \lg V + E \lg V$$

$$= O\left[\left(V + \frac{E}{V-1}\right) \log V\right] \xrightarrow{\text{if connected}} O(E \lg V)$$



Packet in array minheap

A	B	C	D	E	F
∞	∞	0	∞	∞	∞
∞	∞	0	6	3	5
∞	∞	0	6	3	5
7	∞	0	6	3	5
7	4	0	6	3	5
7	4	0	6	3	5
7	4	0	6	3	5
7	4	0	6	3	5

$O(V)$

$V + E$

$TC(\text{prims}) = V\log V + V + 2E + E\log V$

$= V\log V + E\log V$

$= O\{(V+E)\log V\}$ is → $O(E\log V)$

$E \Rightarrow V-1 \mid V^2$

using A. List minheap

$= V\log V + V + V^2 + E\log V$

$= O\{V^2 + E\log V\}$

using A. Matrix minheap

$= V^2 + V^2 + E$

$= O(V^2)$

using A. Matrix array

$= V^2 + 2E + E$

$= O(V^2)$

using A. List array