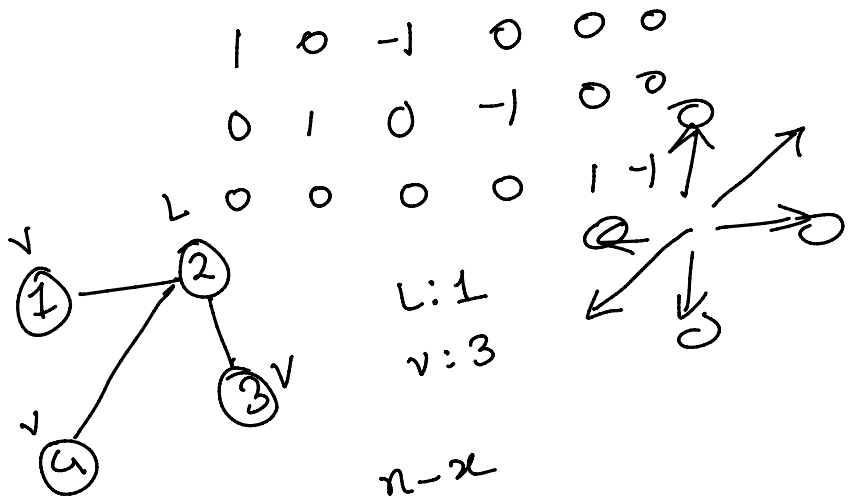
Class 22

Wednesday, December 8, 2021 9:53 PM



Segment Tree:

- Data Structure
- Range Query
- Update (Point / Range)

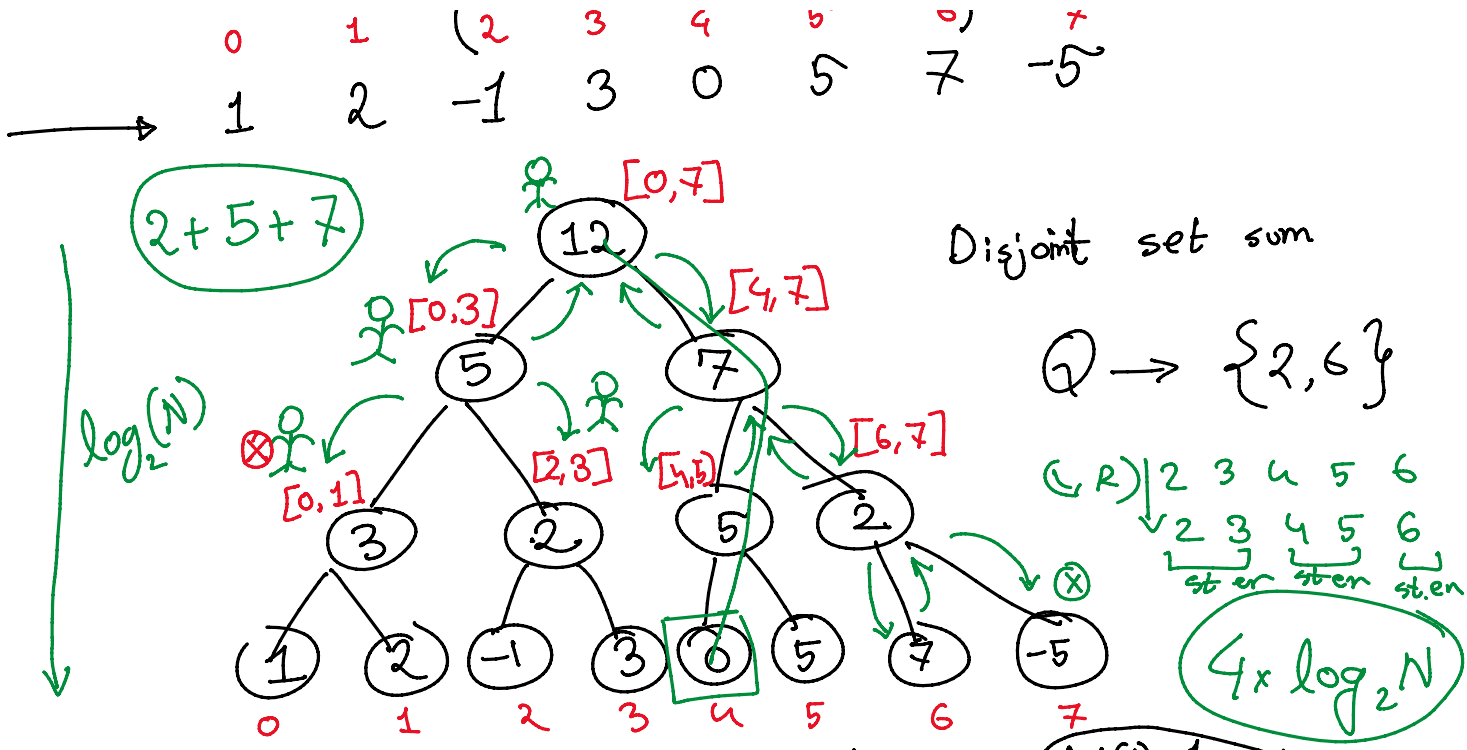
N=7

1 2 (-1 3 0 5) 7

	Brutefoce	Prefix Sum	Segment Tree
U	O(1)	O(N)	O(log N)
Q	O(N)	O(1)	O(log N)

0 1 (2 3 4 5 6) 7

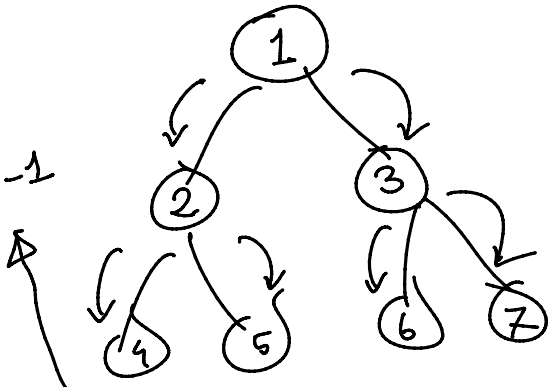
1 2 -1 3 0 5 7 -5

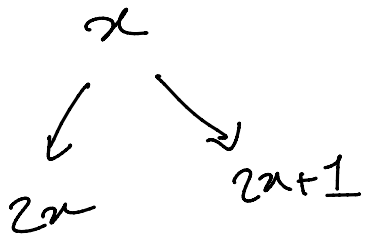


$1+2+4+8 = 15 = 2^4 - 1 = 2^{\log(N)+1} - 1$

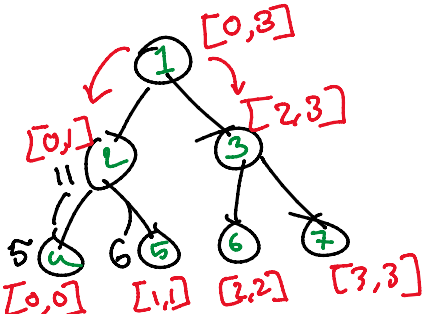
$2^{\log_2(N)} \cdot 2 - 1$

$N \cdot 2 - 1 = 2N - 1$

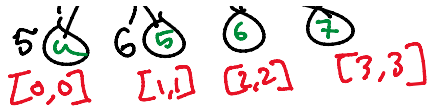




N → 2N → $2^{(en)} - 1$ = $4N - 1$ (N=5)




```
if (st == en):
    tree[nd] = arr[st];
    return;
build(st, (st+en)/2, 2*nd)
build((st+en)/2 + 1, en, 2nd+1)
```



build(st, (st+en)/2, 2*nd)
build((st+en)/2 + 1, en, 2nd+1)