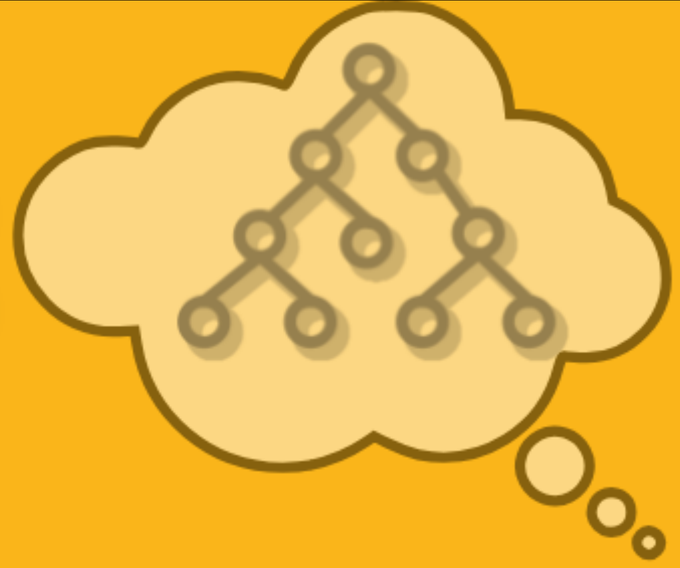
DATABASE INDEXES

B & B+ TREES

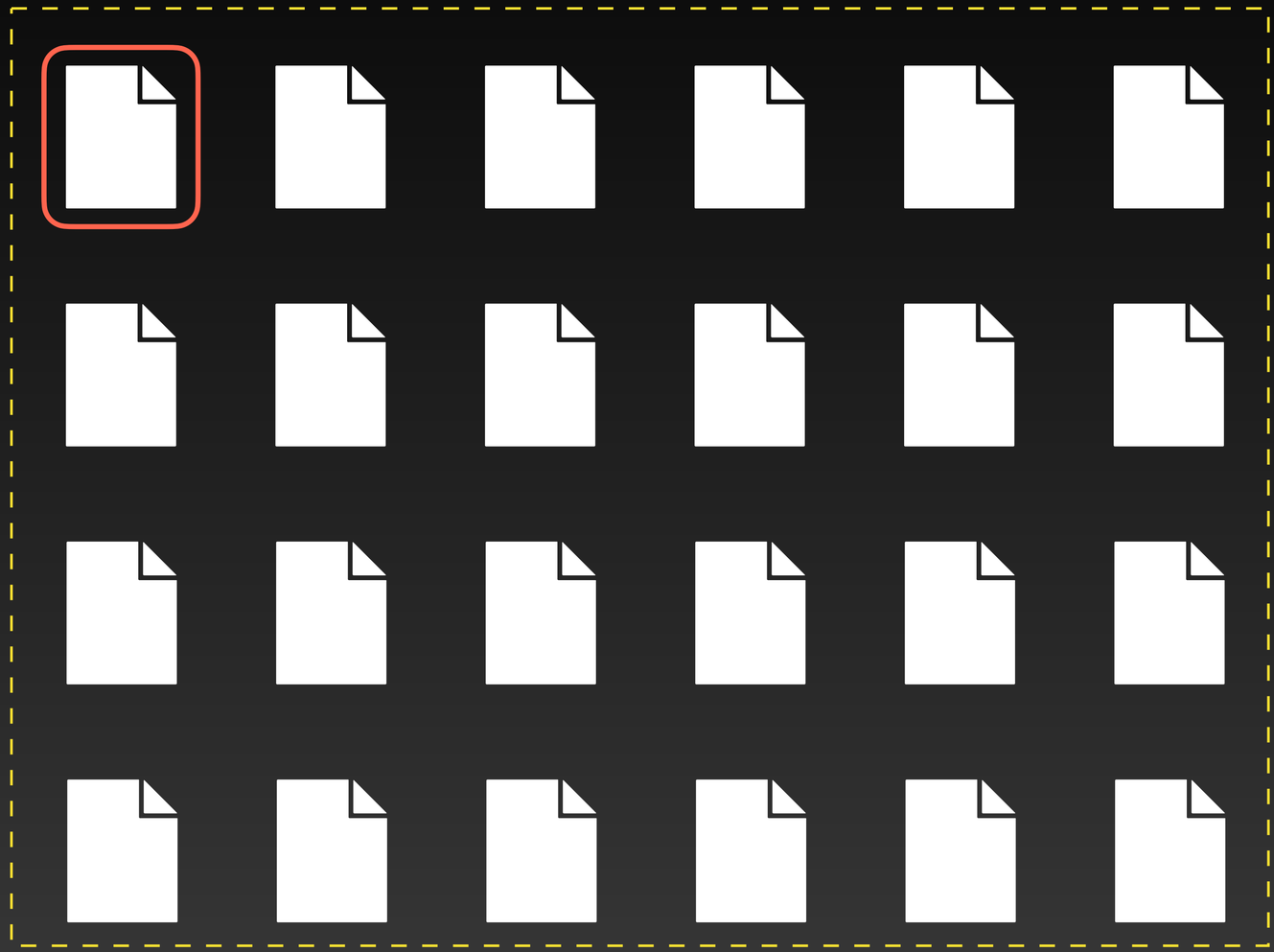


Amr Elhelw's TECH VAULT

Find rows with x=25

All pages

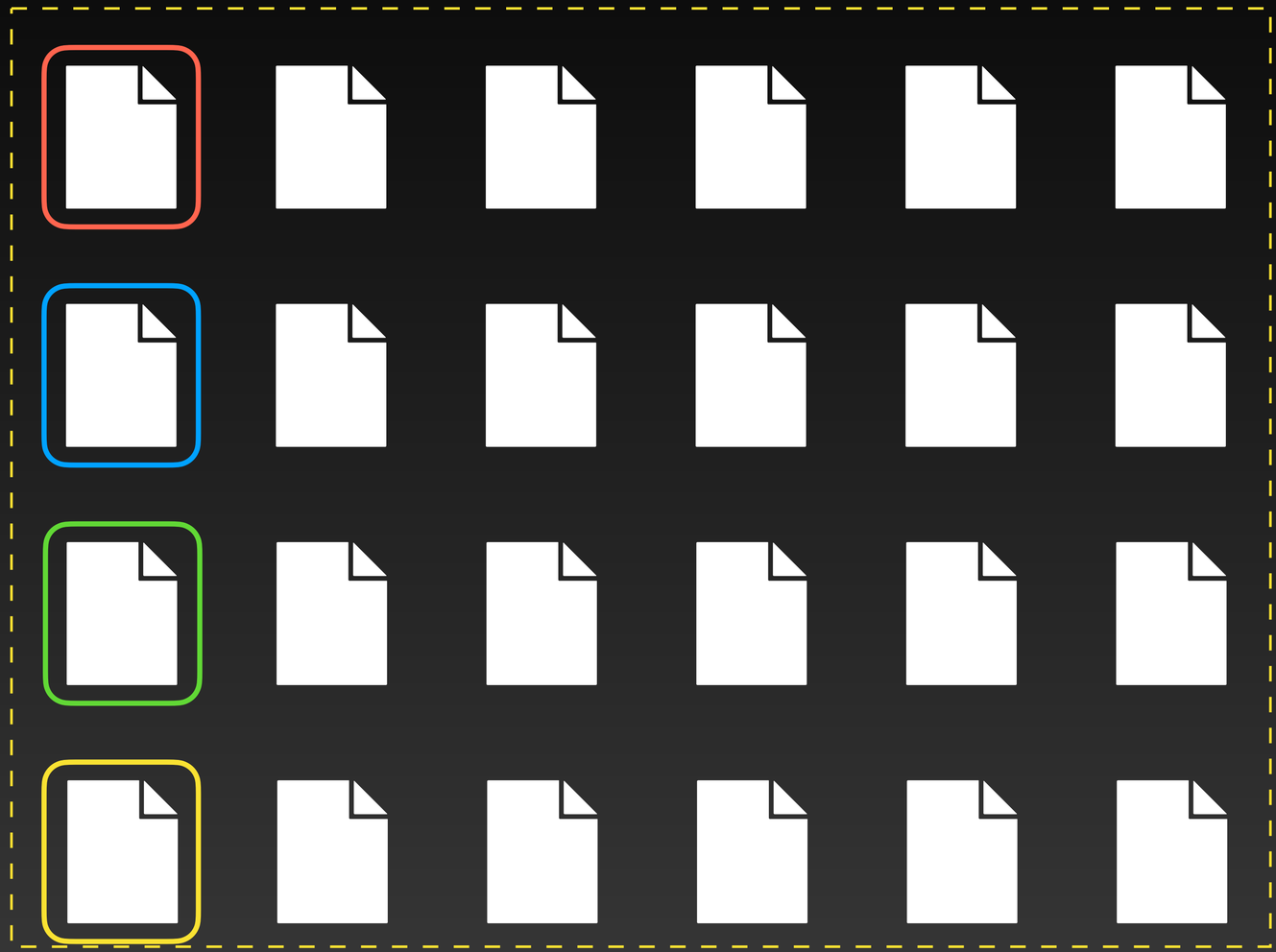
for table T



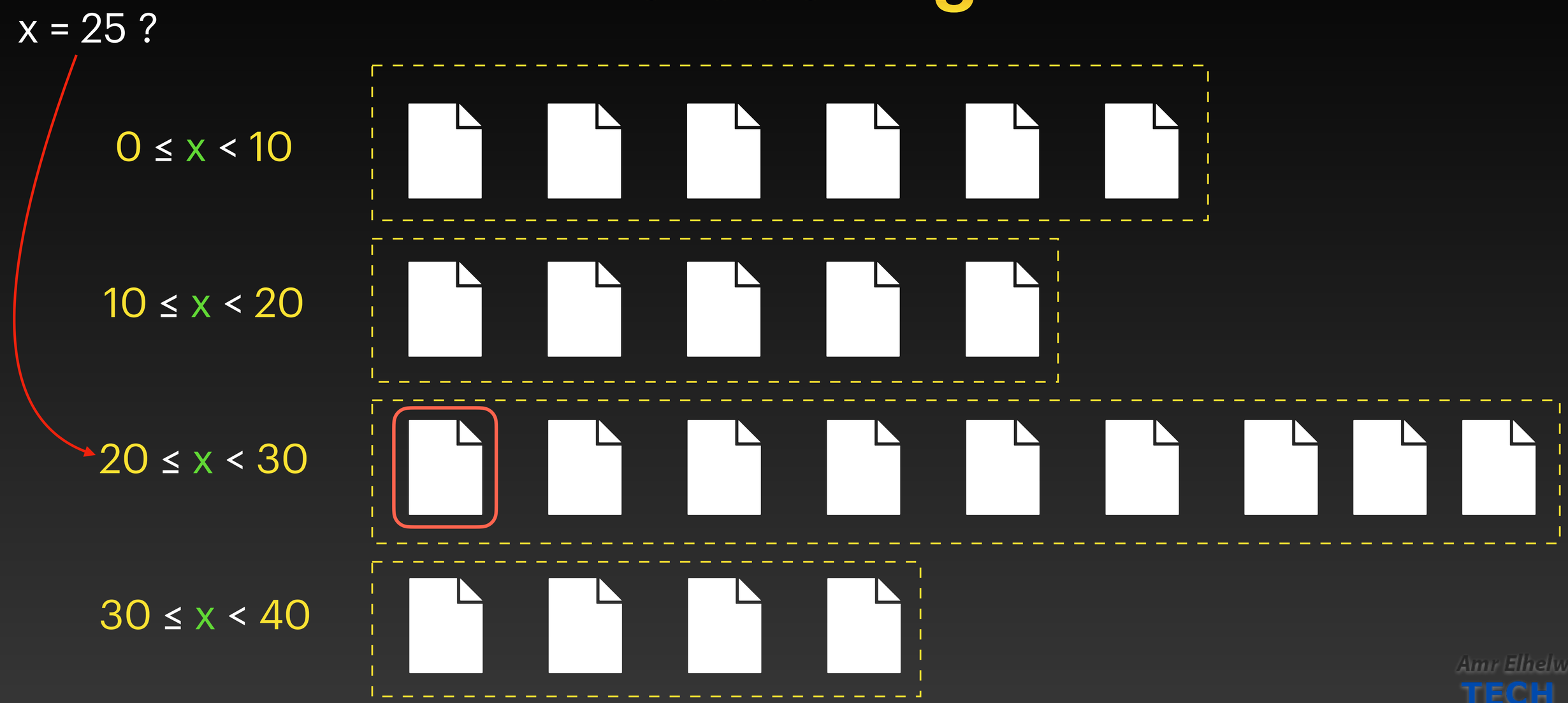
Parallel Scanning

All pages

for table T



Partitioning



Index

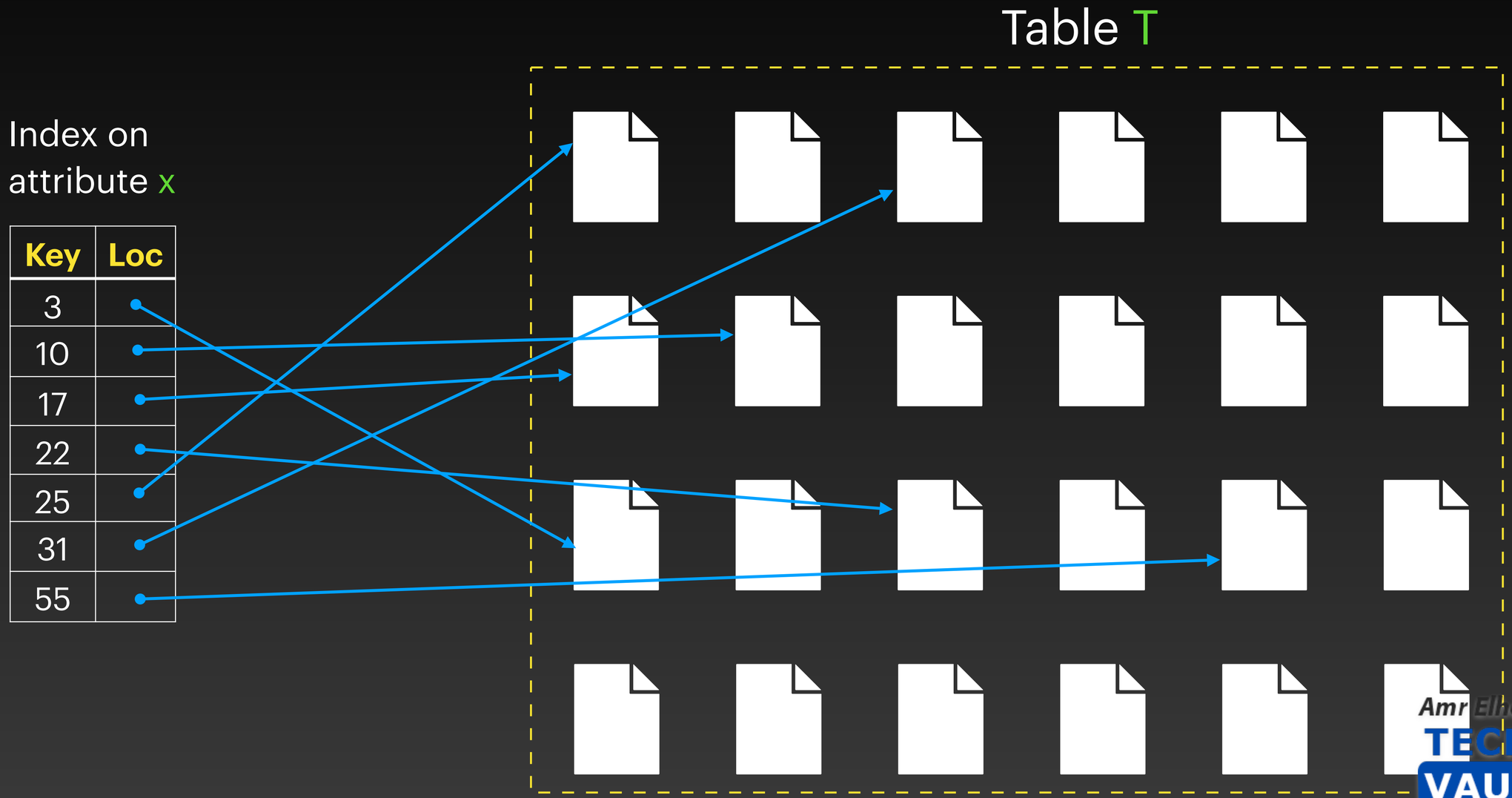


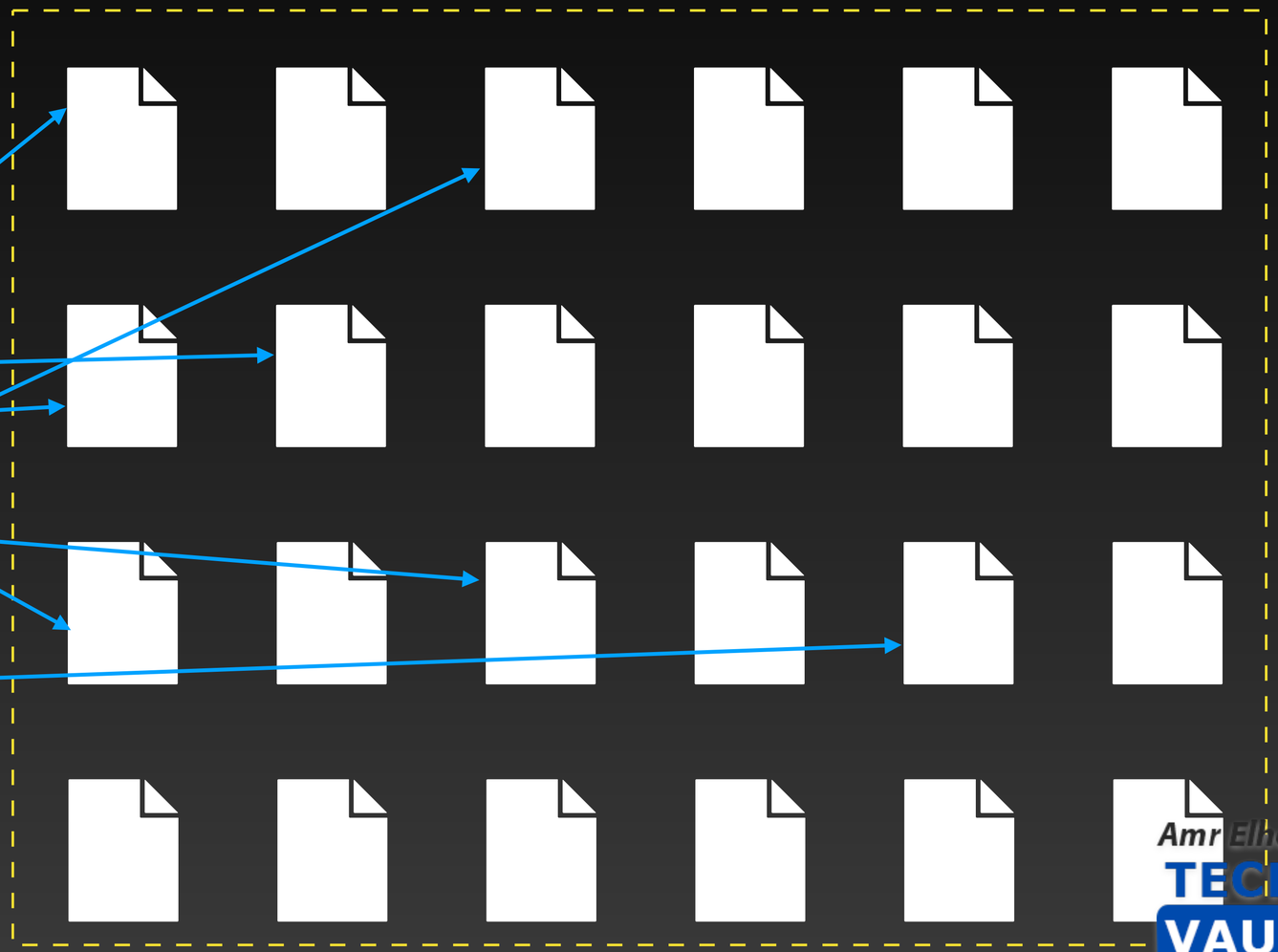
Table T
Index on attribute x
Key
Loc
3
10
17
22
25
31
55
Amr Elhelw's
TECH
VAULT

Naive Approach - List

x = 25 ?

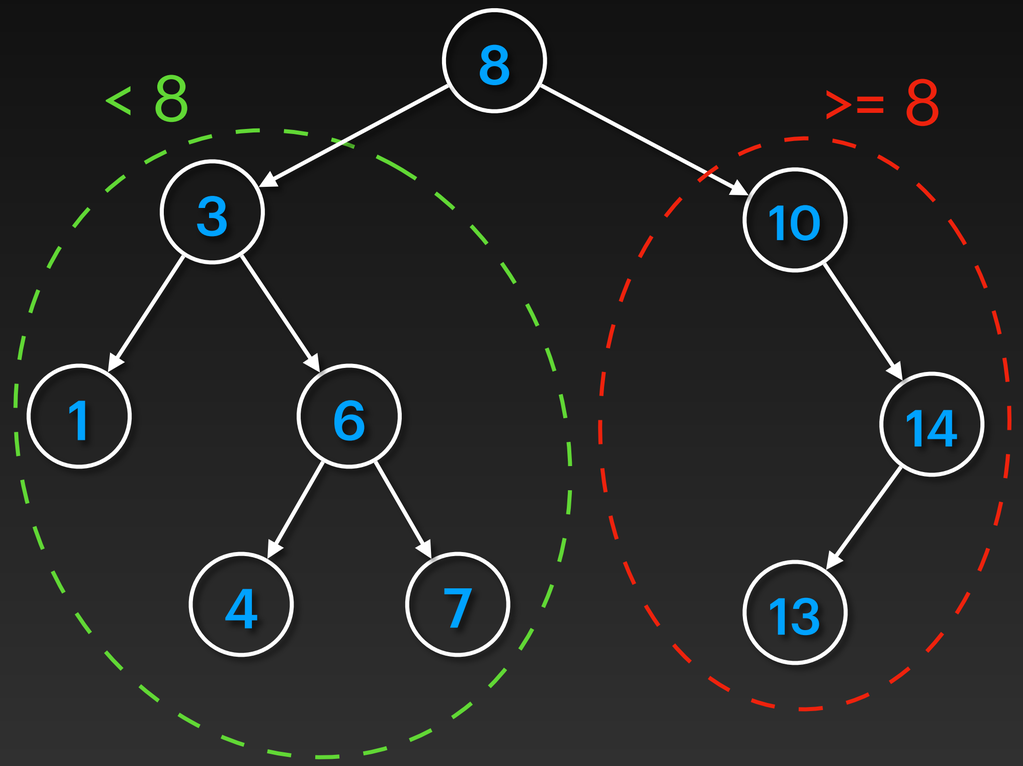
Index on attribute x

Key	Loc
3	
10	
17	
22	
25	
31	
55	



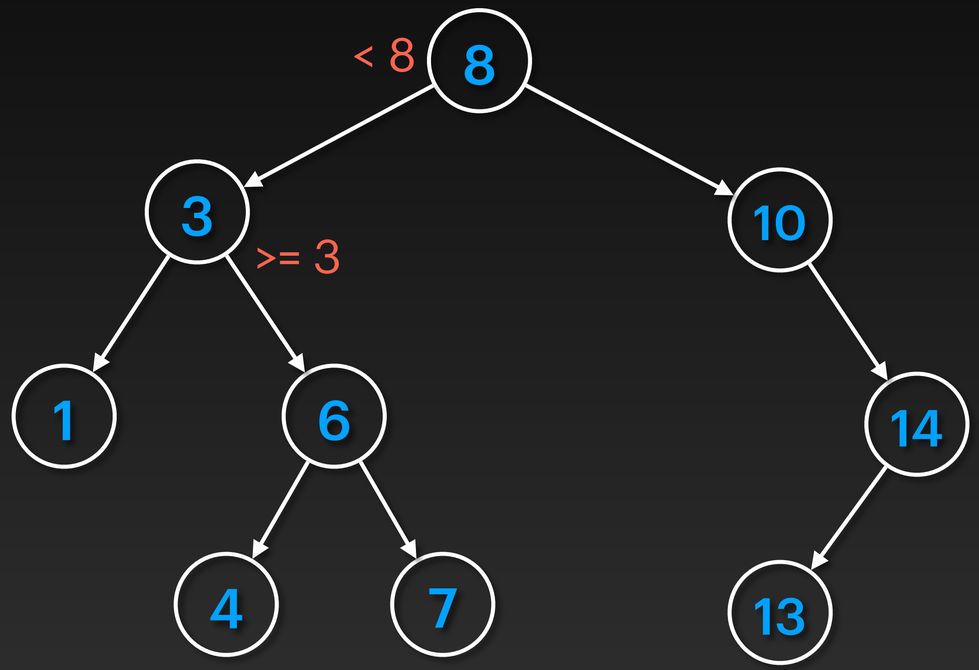
Search: O(n)

Binary Search Tree (BST)

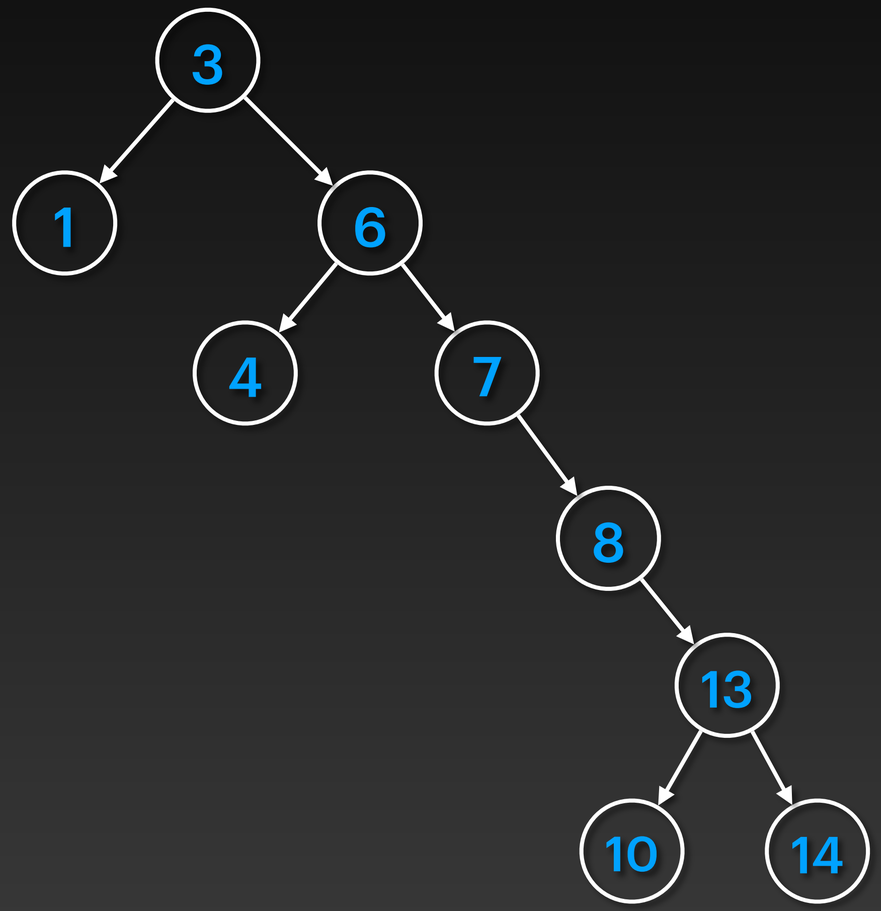


Binary Search Tree (BST)

x = 6 ?



Binary Search Tree (BST)

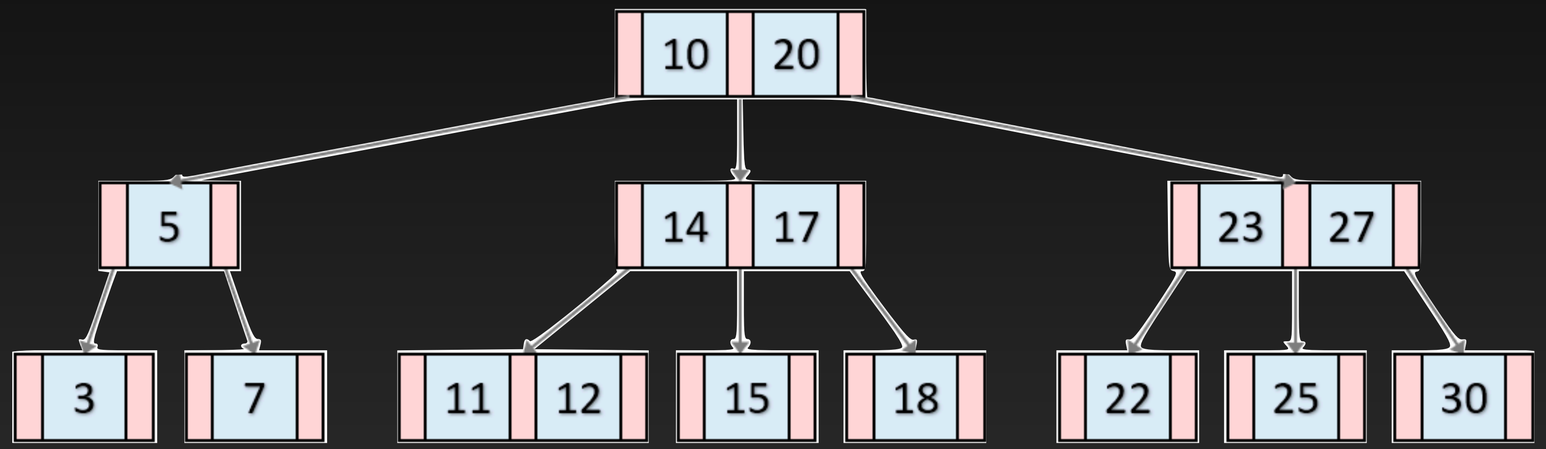


Search: O(n)

B-tree

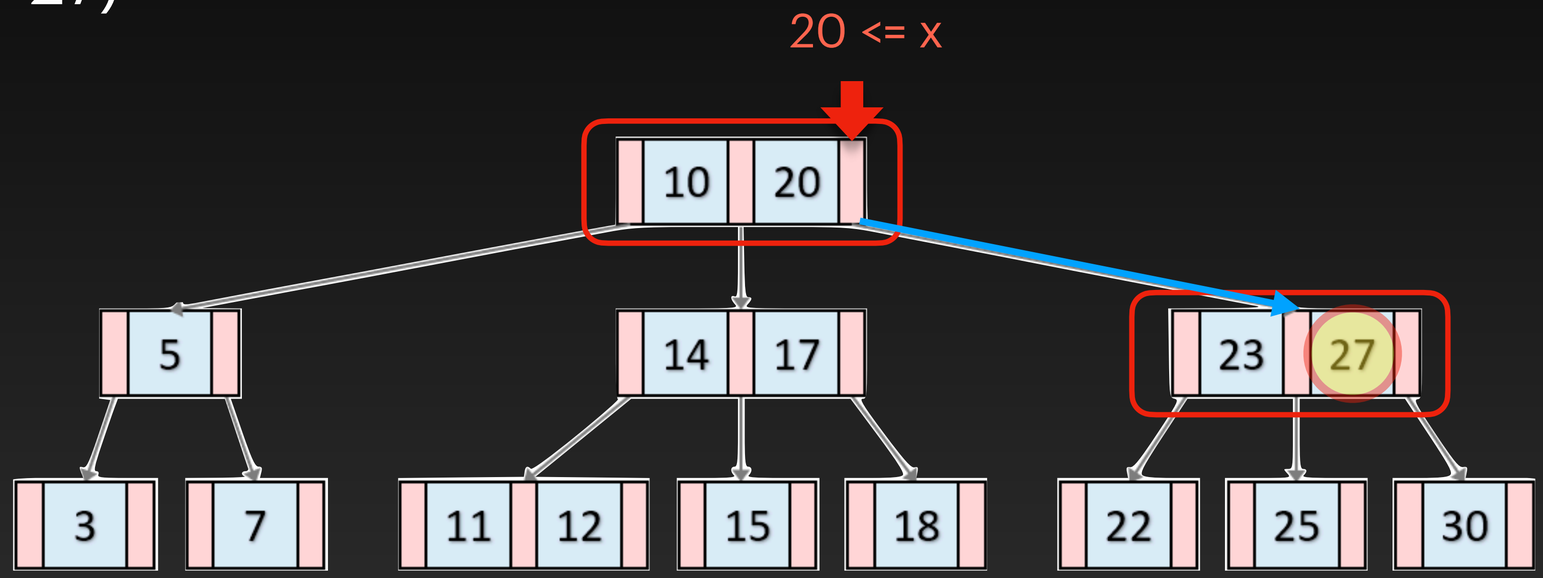
- Ordered
- Each node can have up to *k* children (and *k-1* keys).
- Balanced
- Every node (other than the root) must be at least half full

k = 3



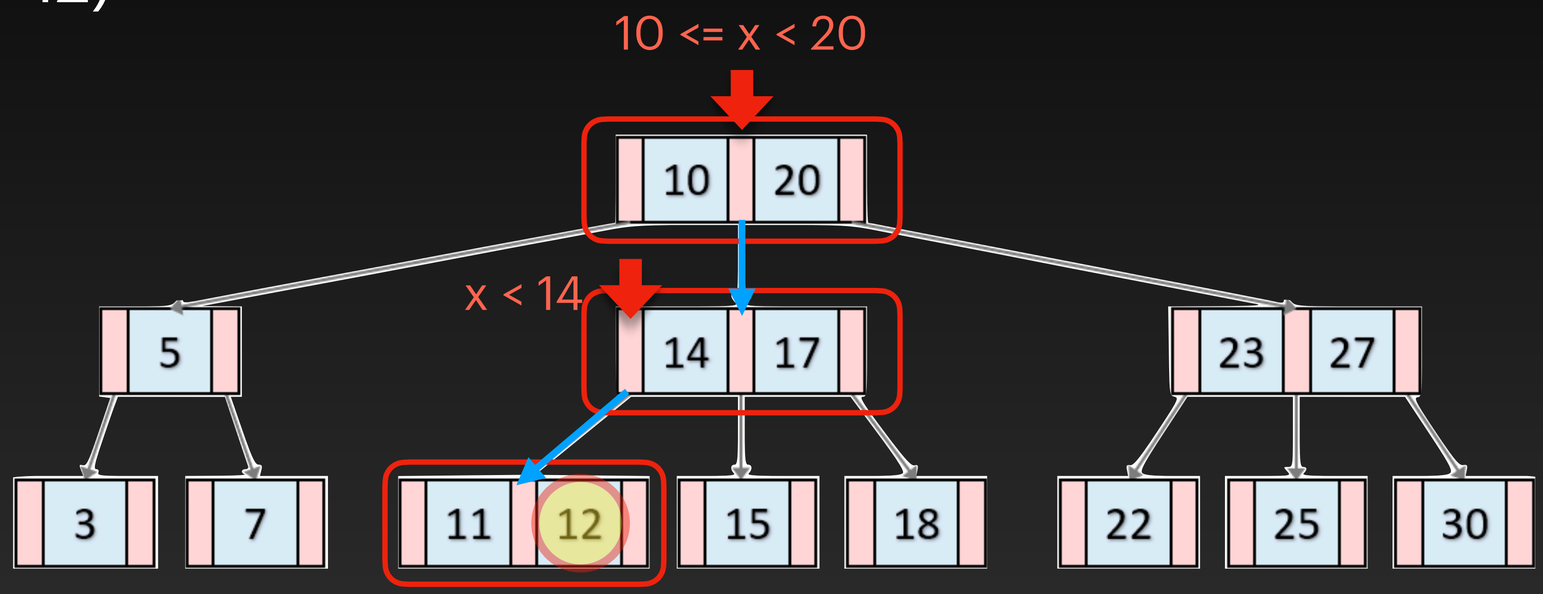
B-tree

Look for (x = 27)



B-tree

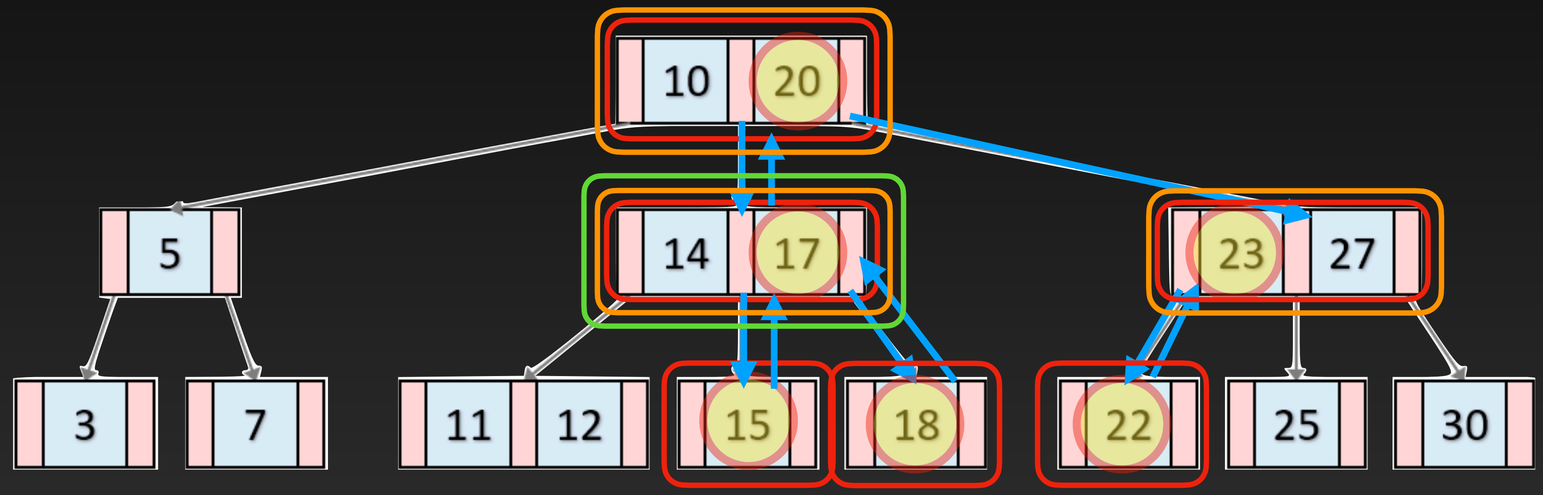
Look for (x = 12)



Search: O(log n)

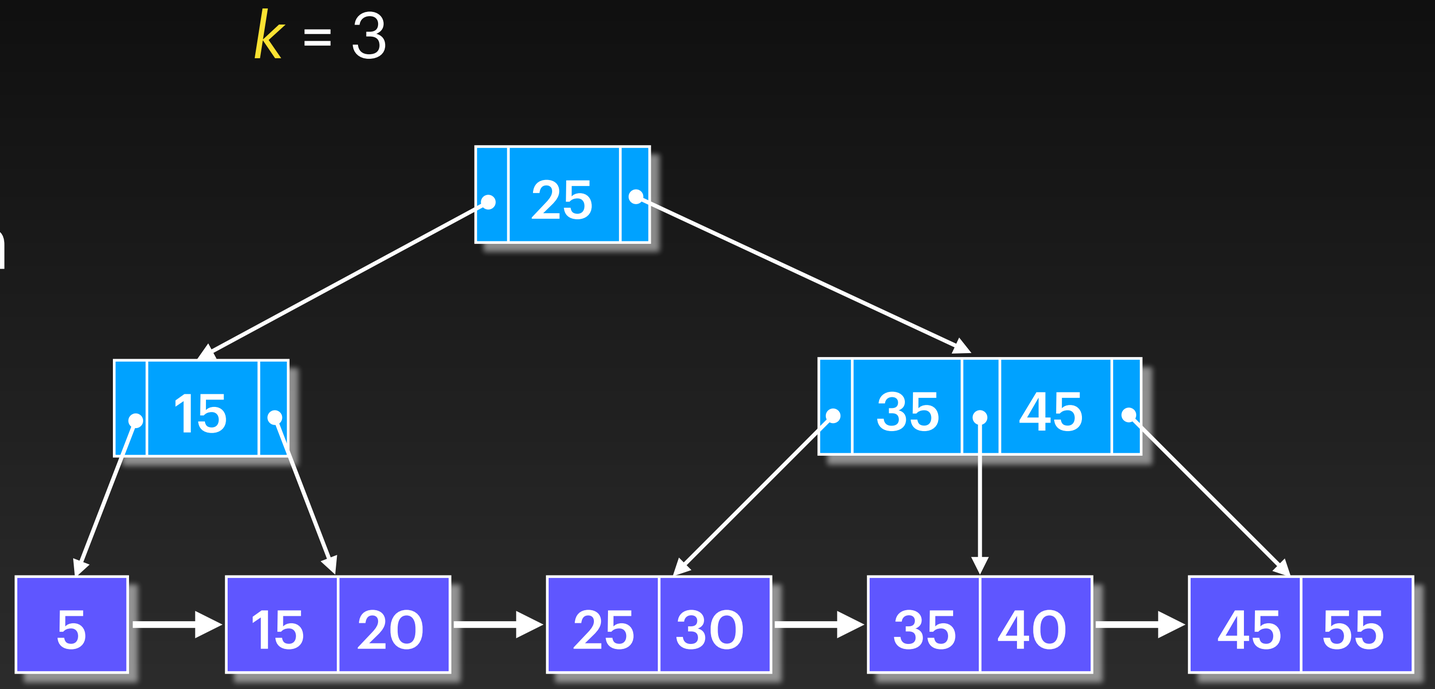
B-tree

Look for (15 <= x < 24)



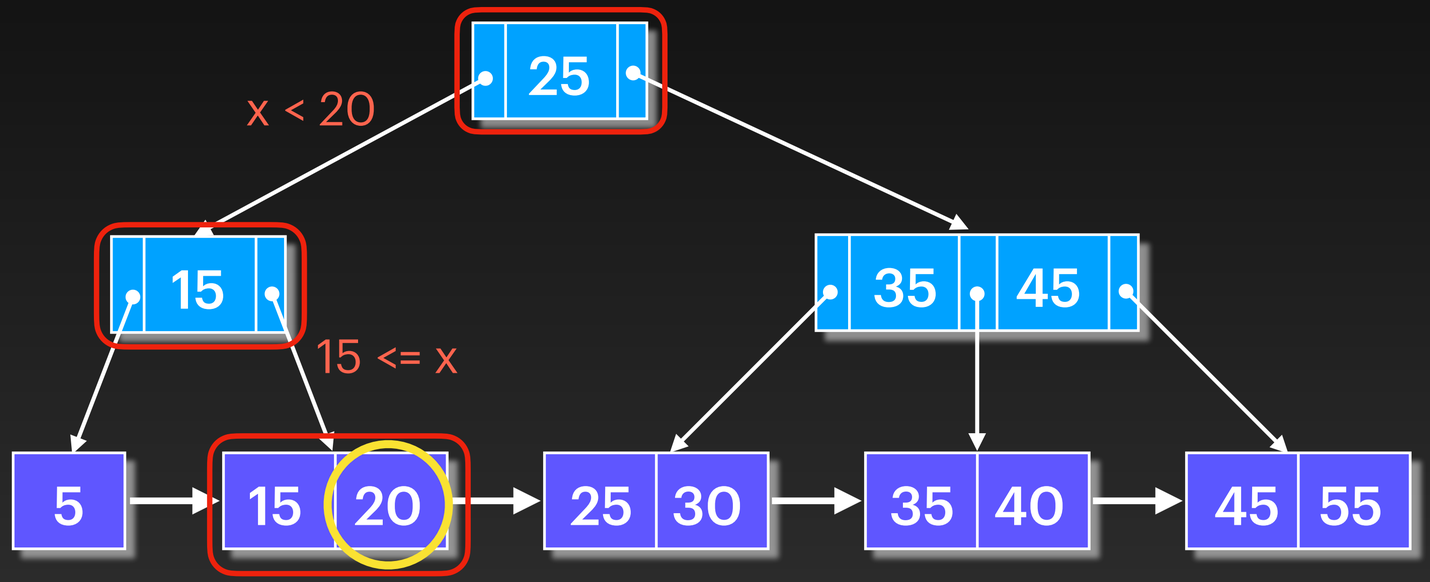
B+ tree

- Data pointers in the leaf nodes only
- Leaf nodes link to each other (possibly in both directions



B+ tree

Look for (x = 20)



B+ tree

Look for (20 <= x <= 35)