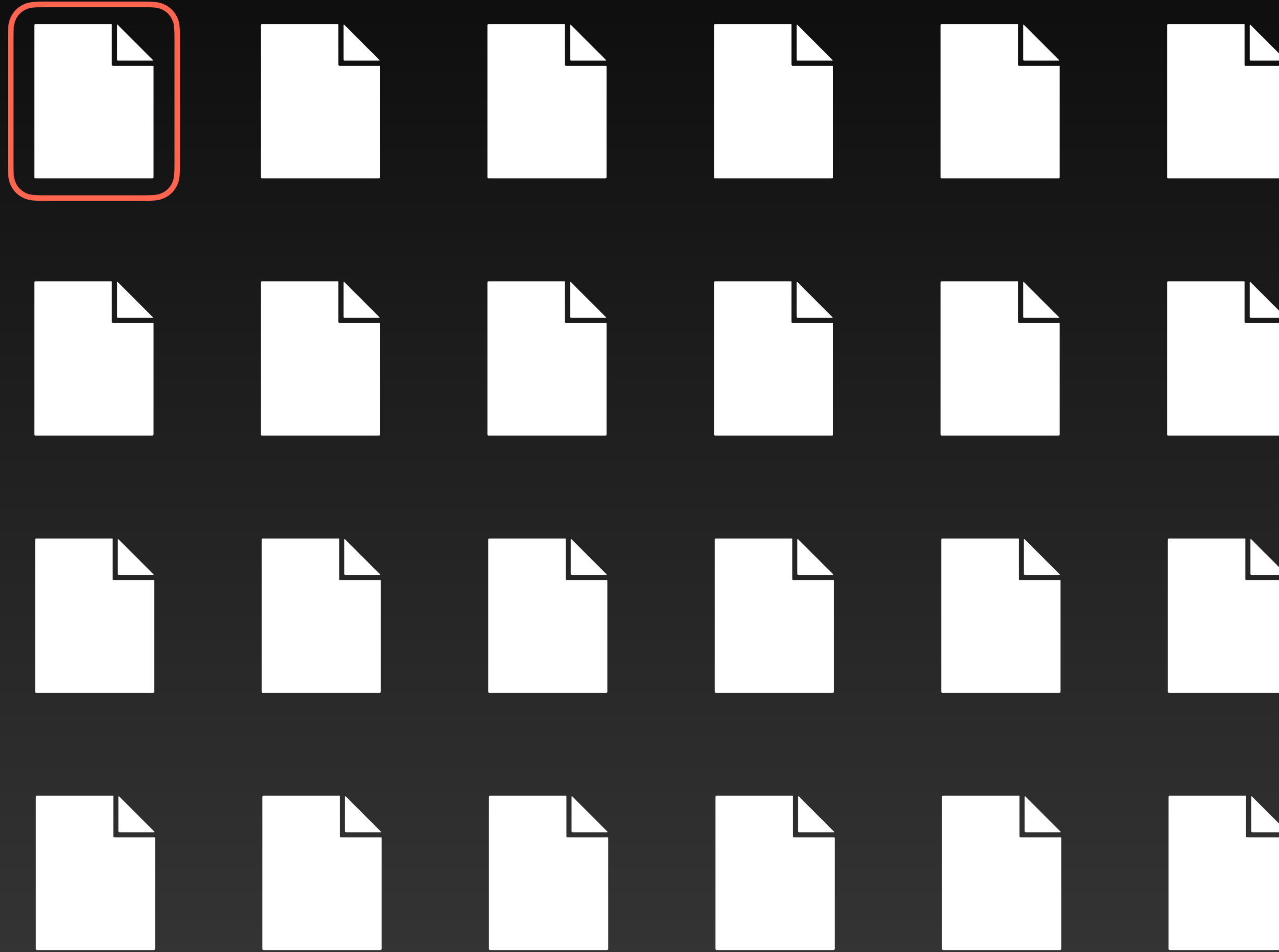


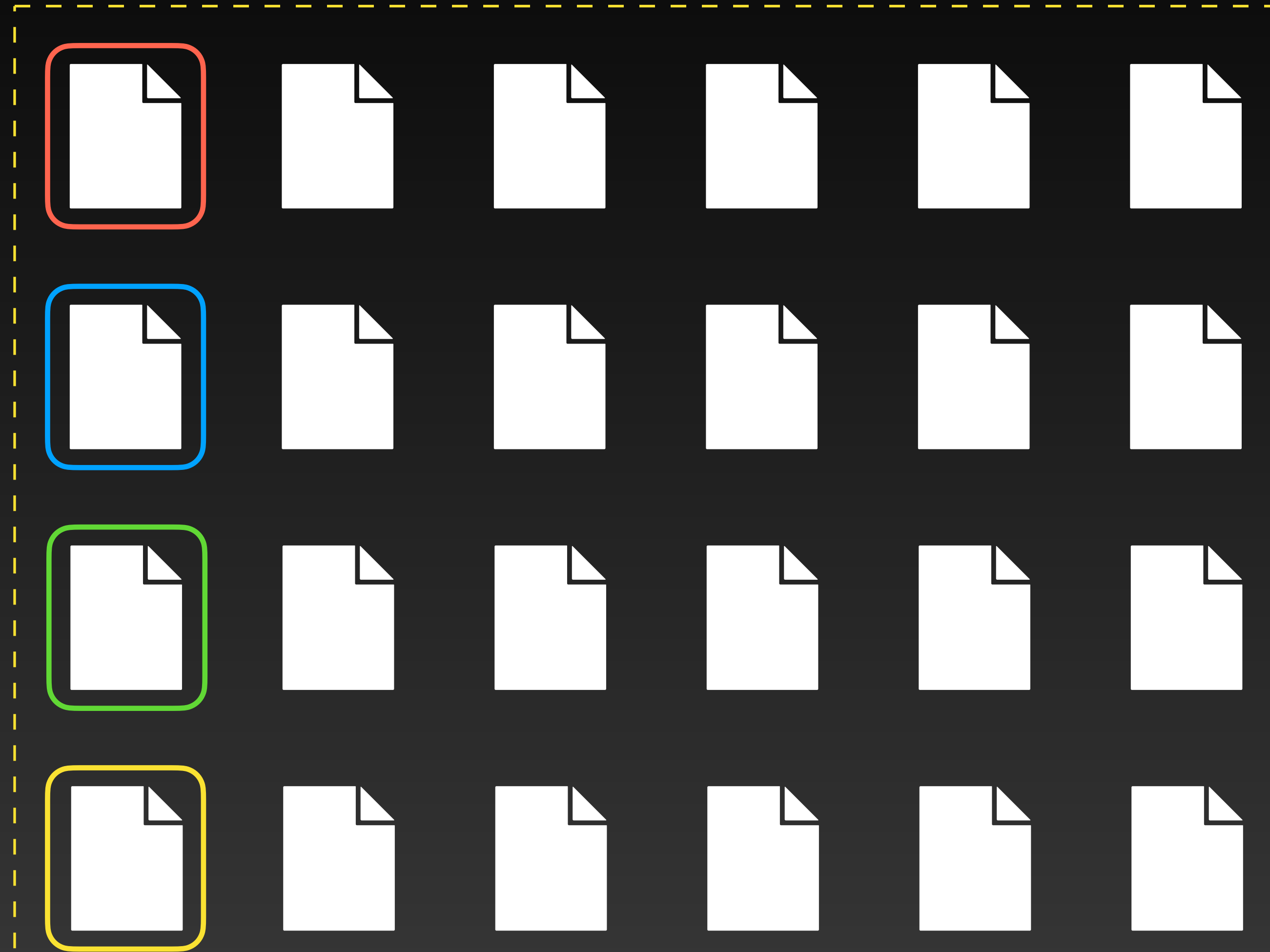
Find rows with $x=25$

All pages
for table T



Parallel Scanning

All pages
for table **T**



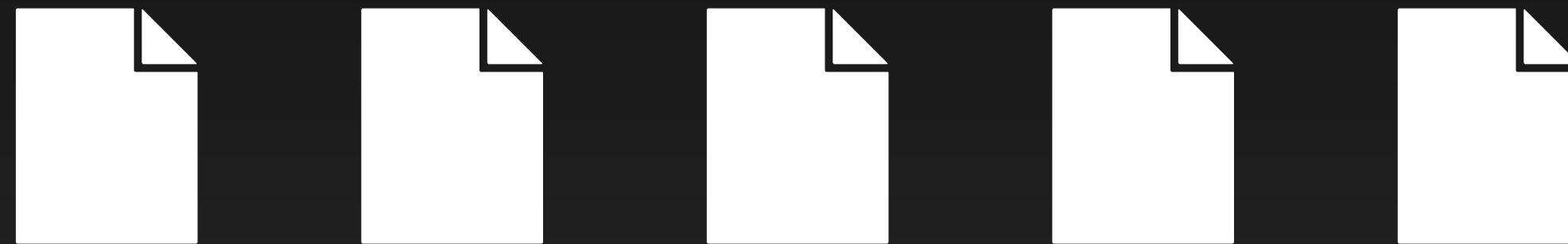
Partitioning

$x = 25$?

$0 \leq x < 10$



$10 \leq x < 20$



$20 \leq x < 30$



$30 \leq x < 40$

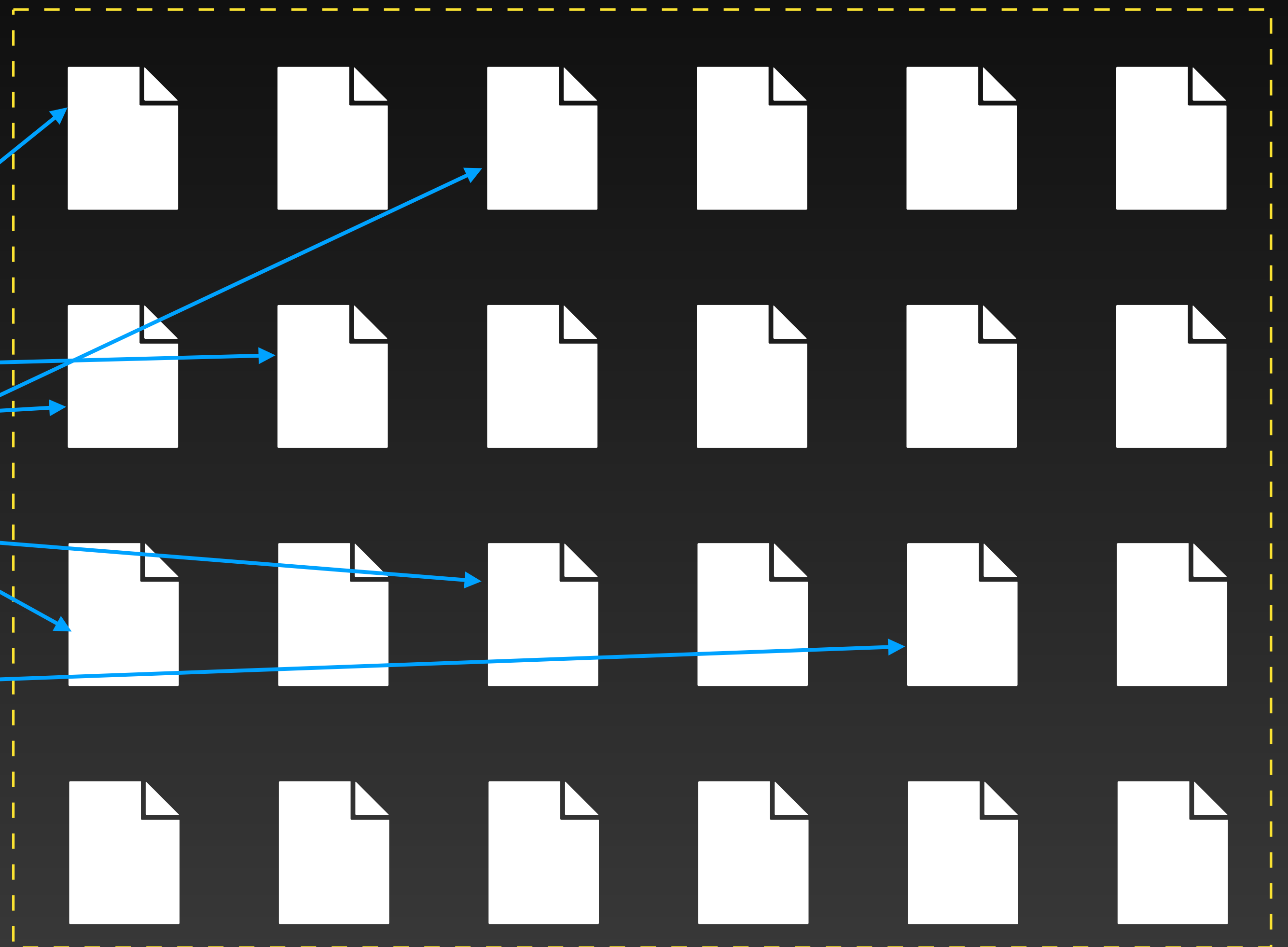


Index

Table T

Index on
attribute **x**

Key	Loc
3	•
10	•
17	•
22	•
25	•
31	•
55	•



Naive Approach - List

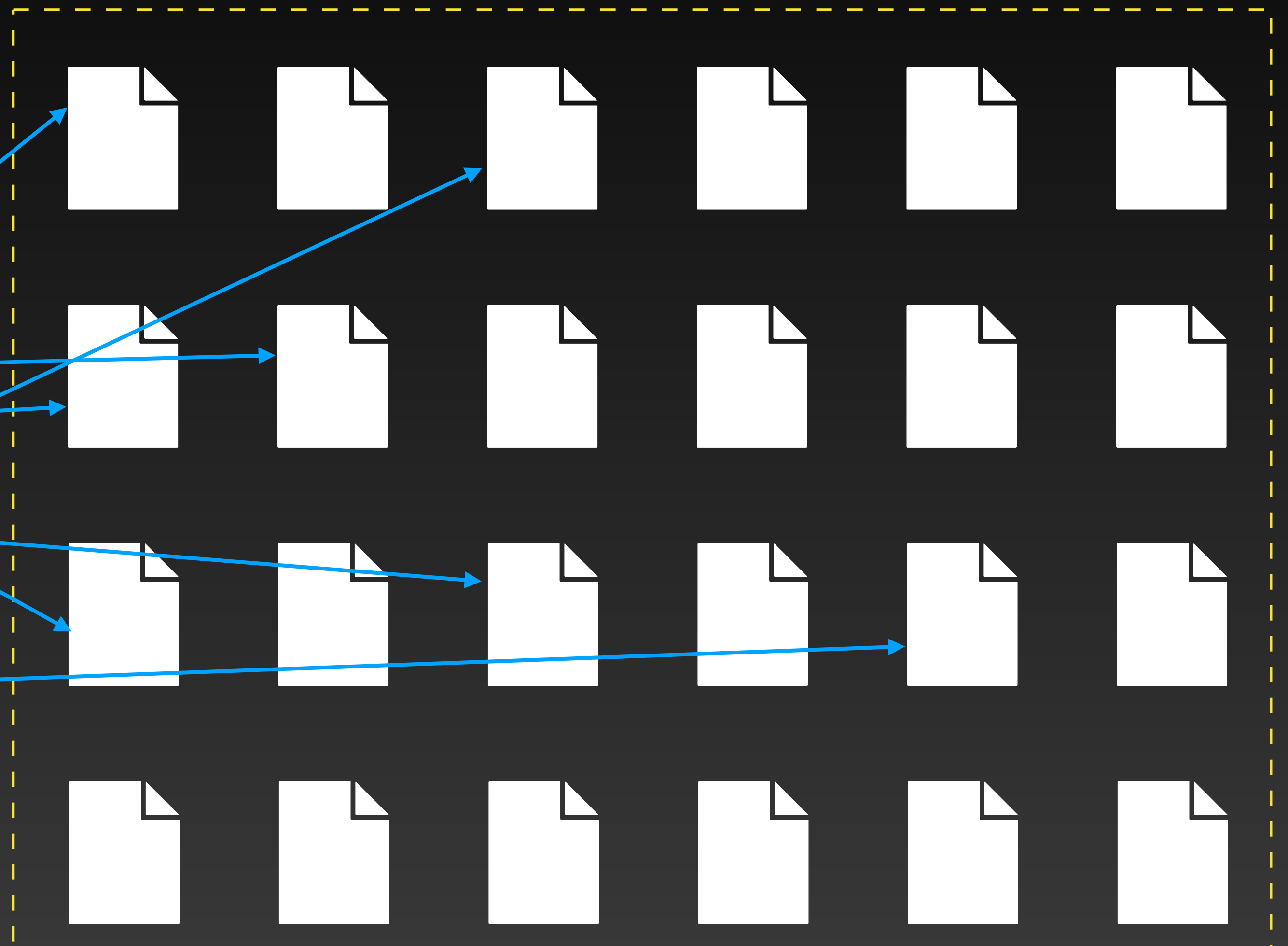
$x = 25$?

Index on
attribute x

Key	Loc
3	•
10	•
17	•
22	•
25	•
31	•
55	•

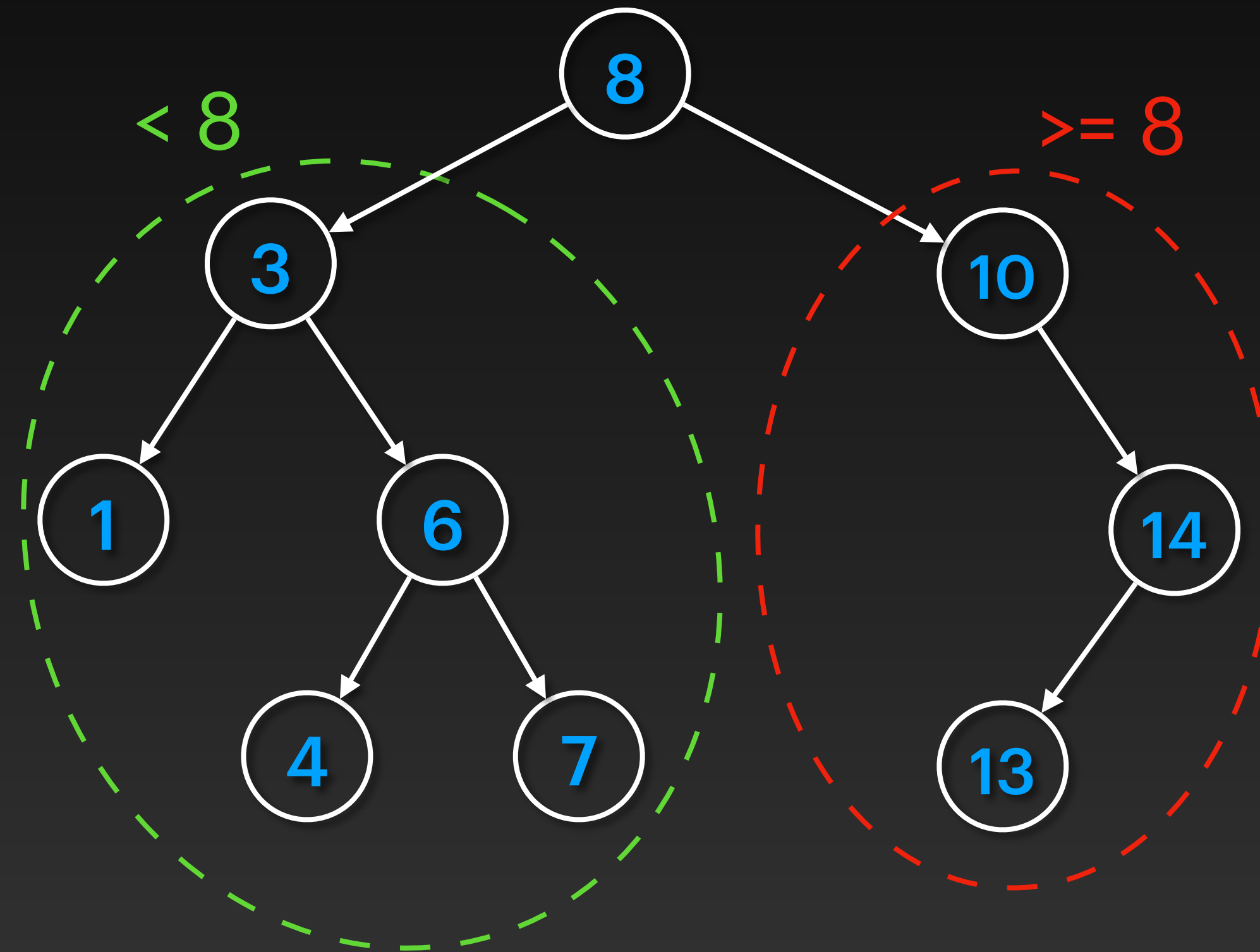


Table T



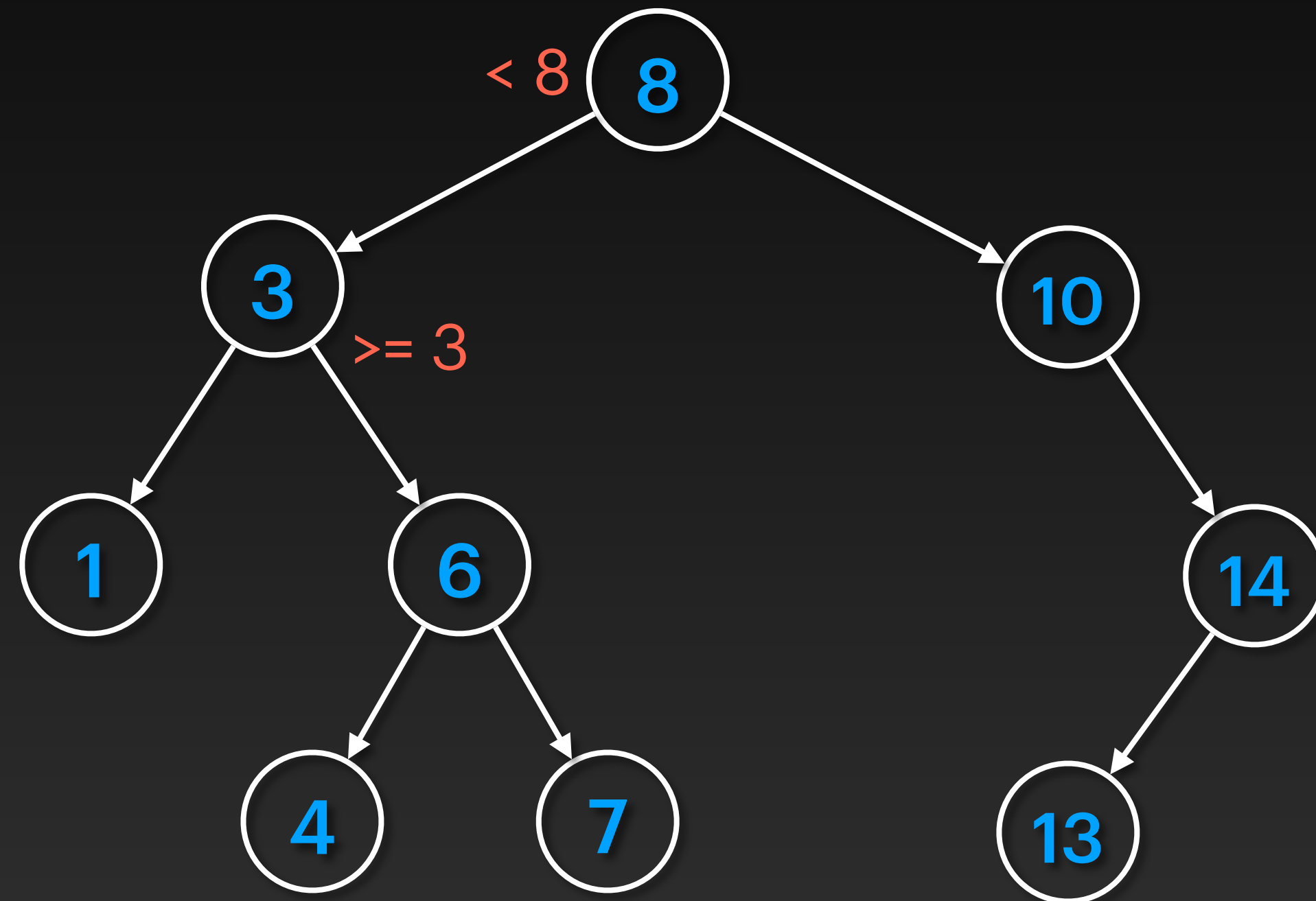
Search: $O(n)$

Binary Search Tree (BST)

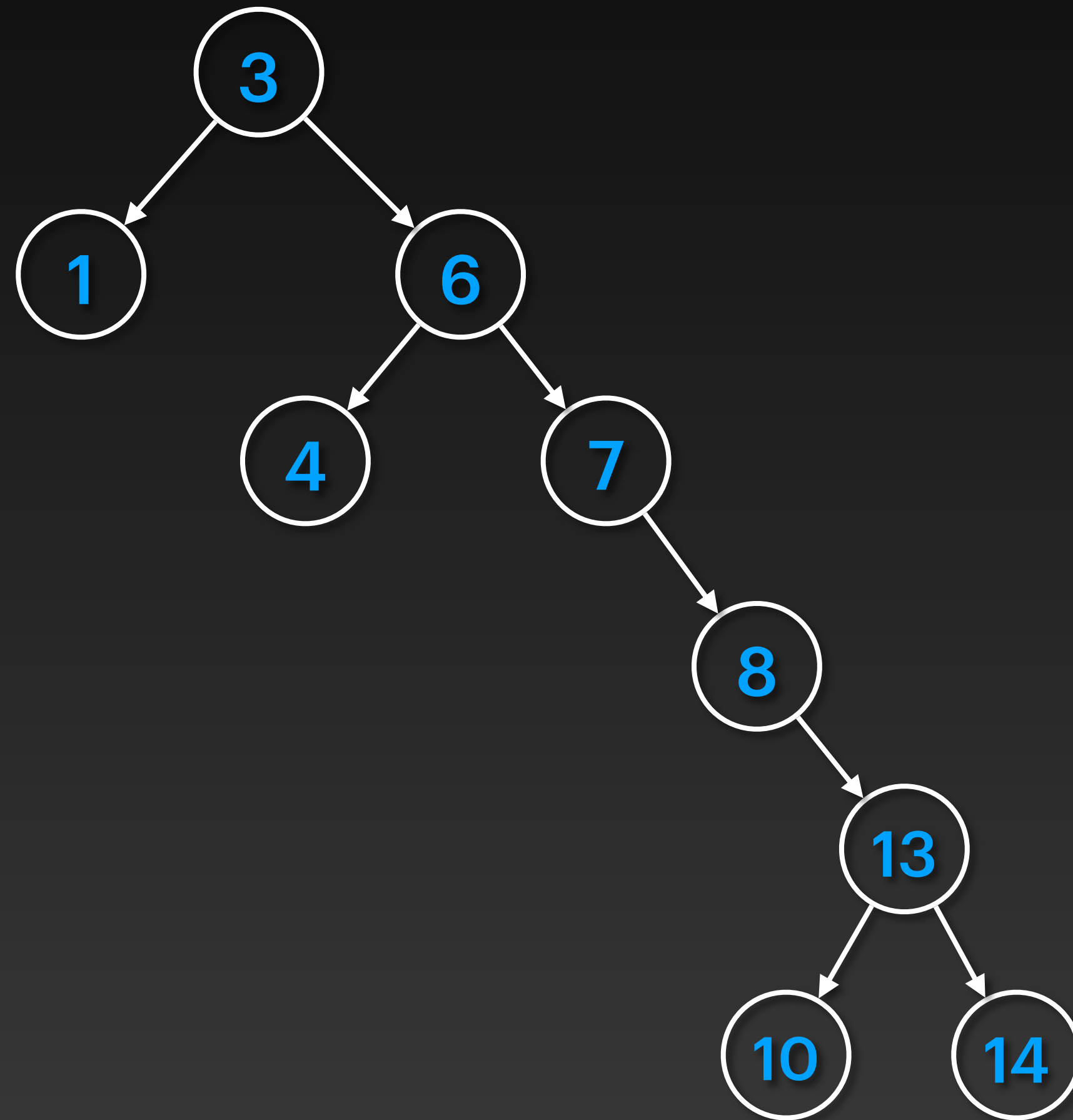


Binary Search Tree (BST)

x = 6 ?



Binary Search Tree (BST)

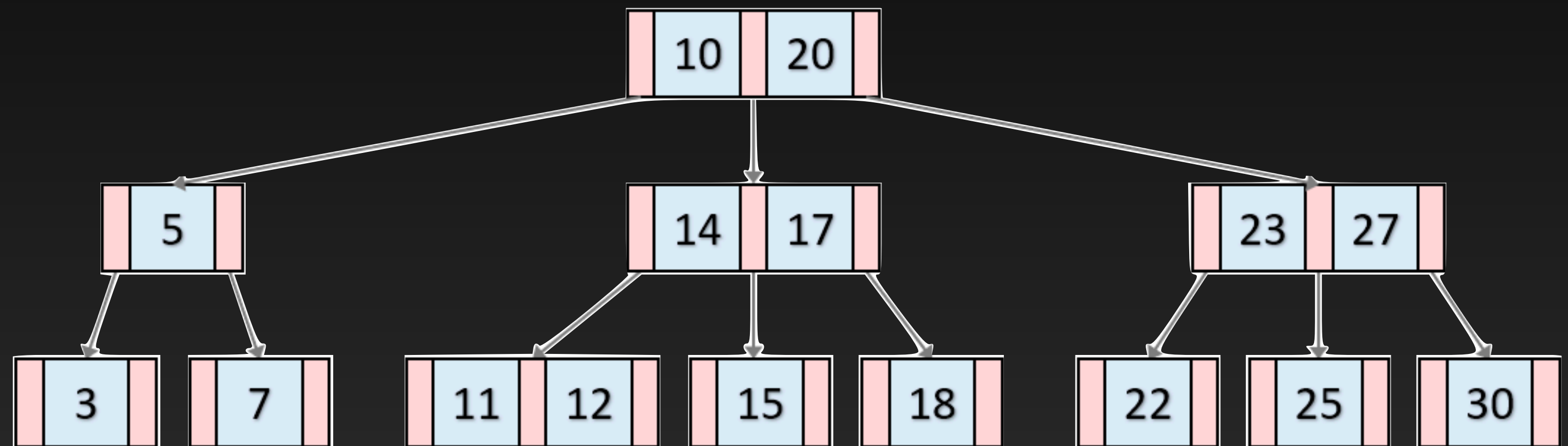


Search: $O(n)$

B-tree

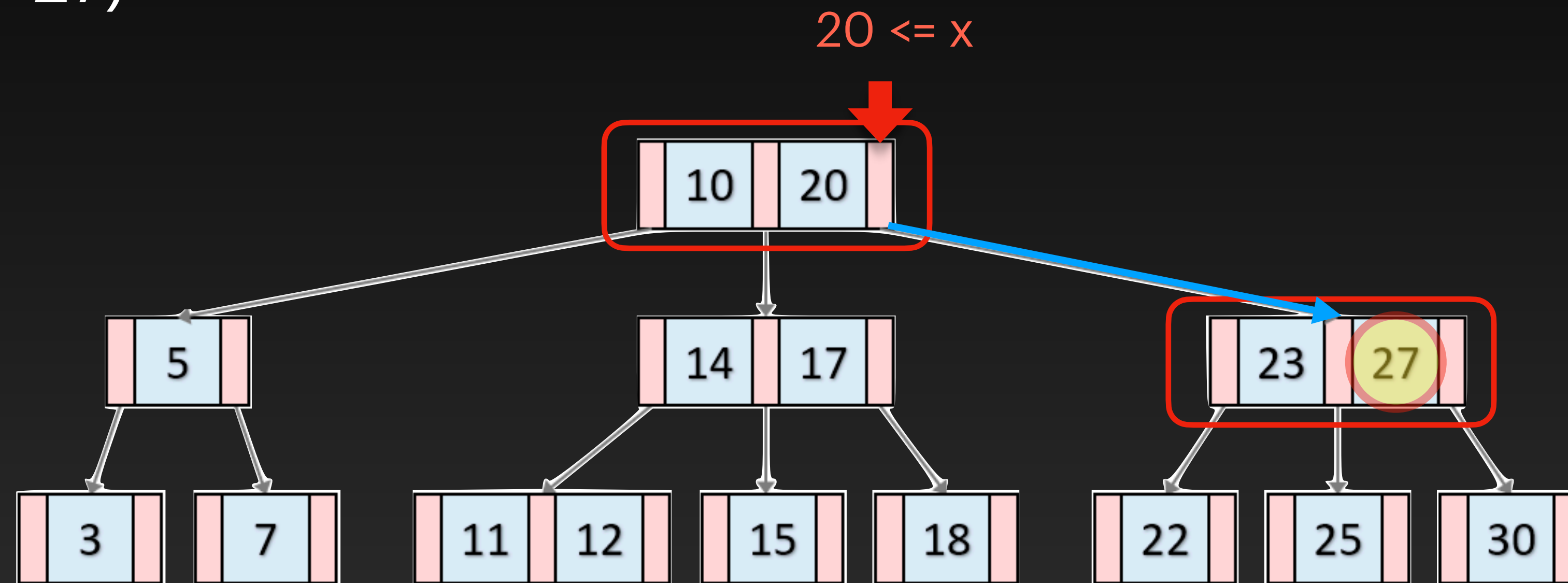
$$k = 3$$

- 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



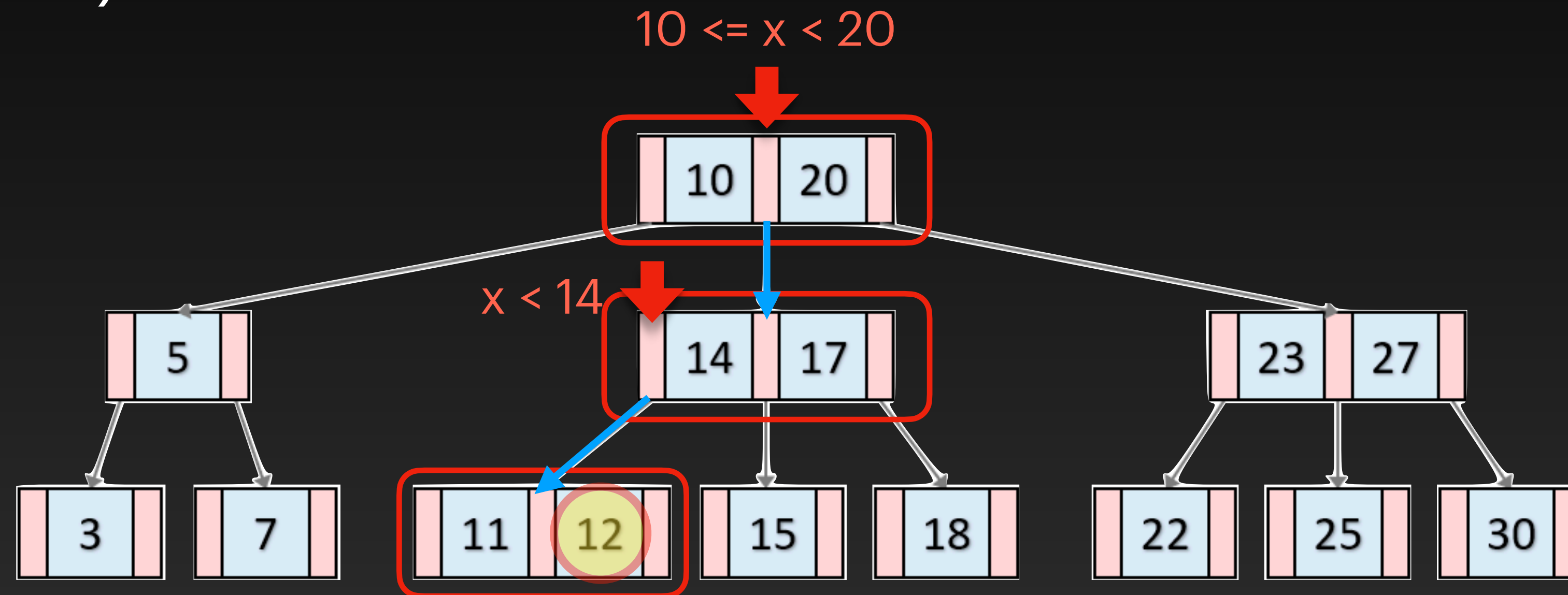
B-tree

Look for ($x = 27$)



B-tree

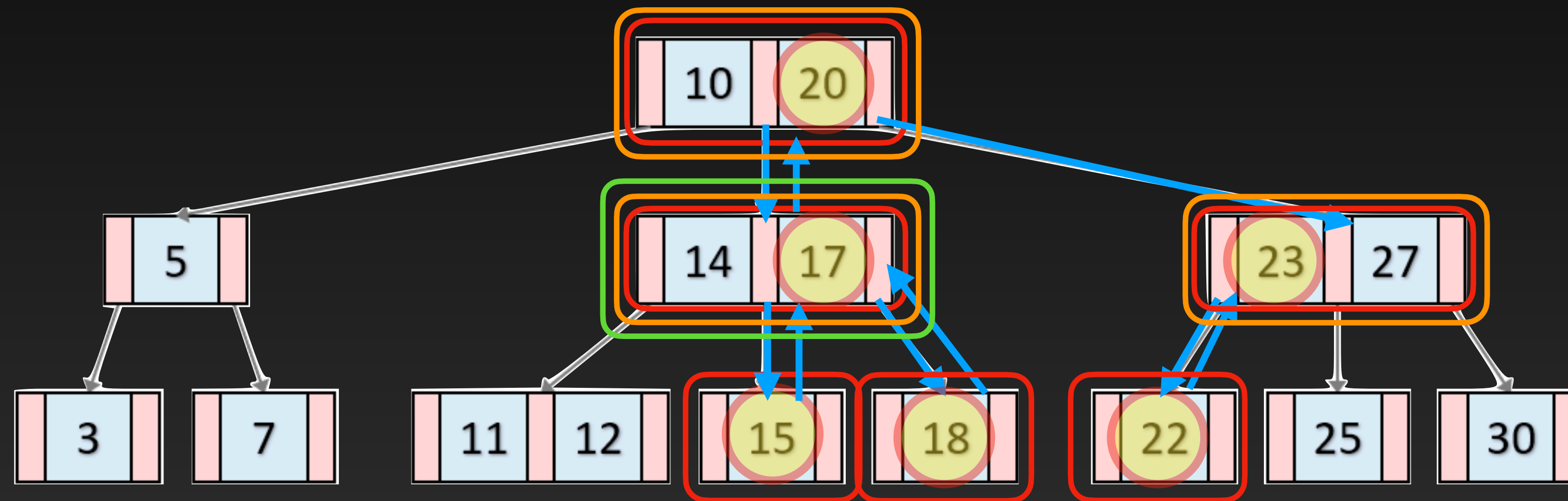
Look for ($x = 12$)



Search: $O(\log n)$

B-tree

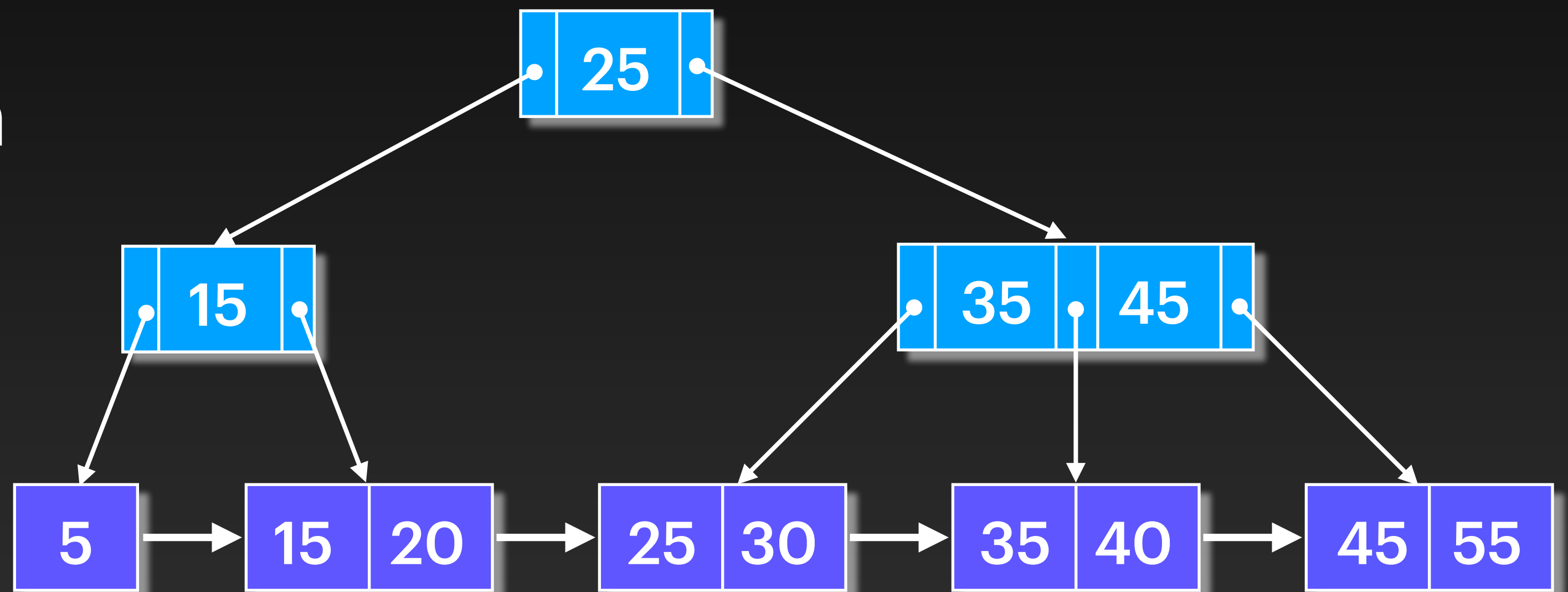
Look for $(15 \leq x < 24)$



B+ tree

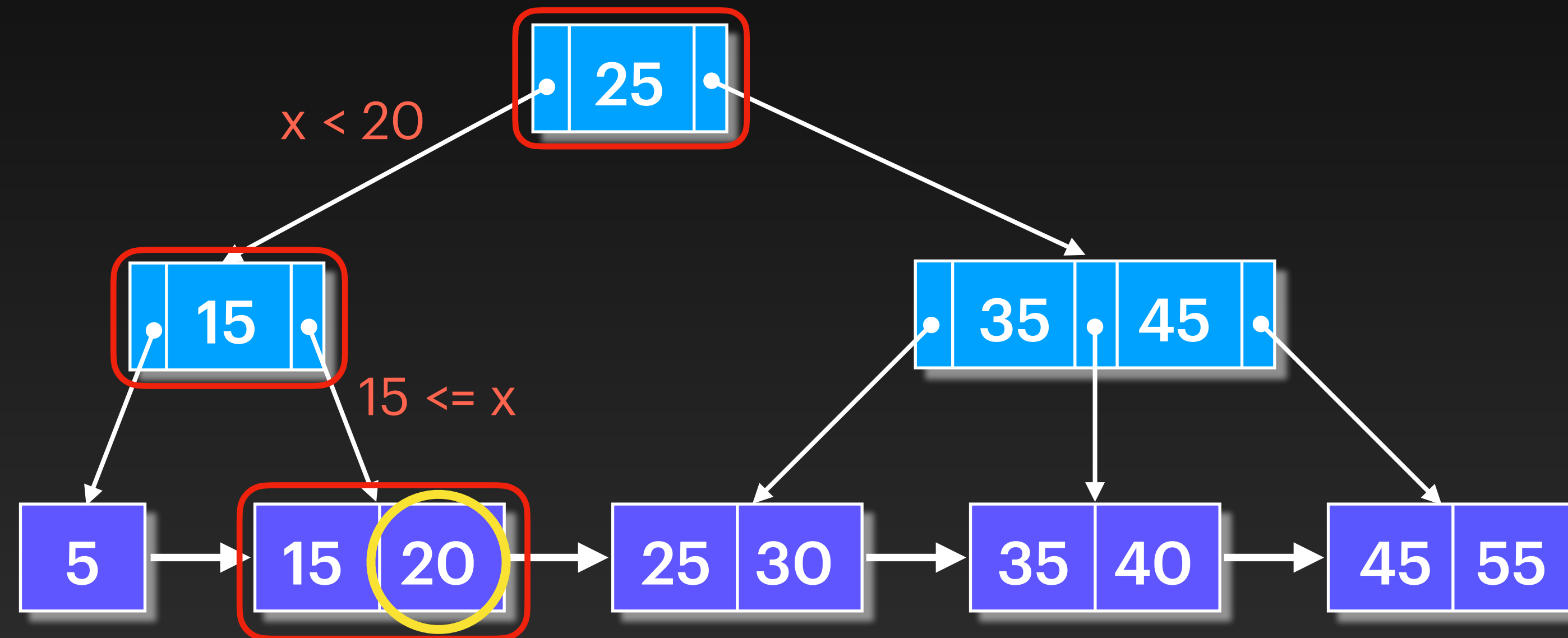
$k = 3$

- 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 $(20 \leq x \leq 35)$

