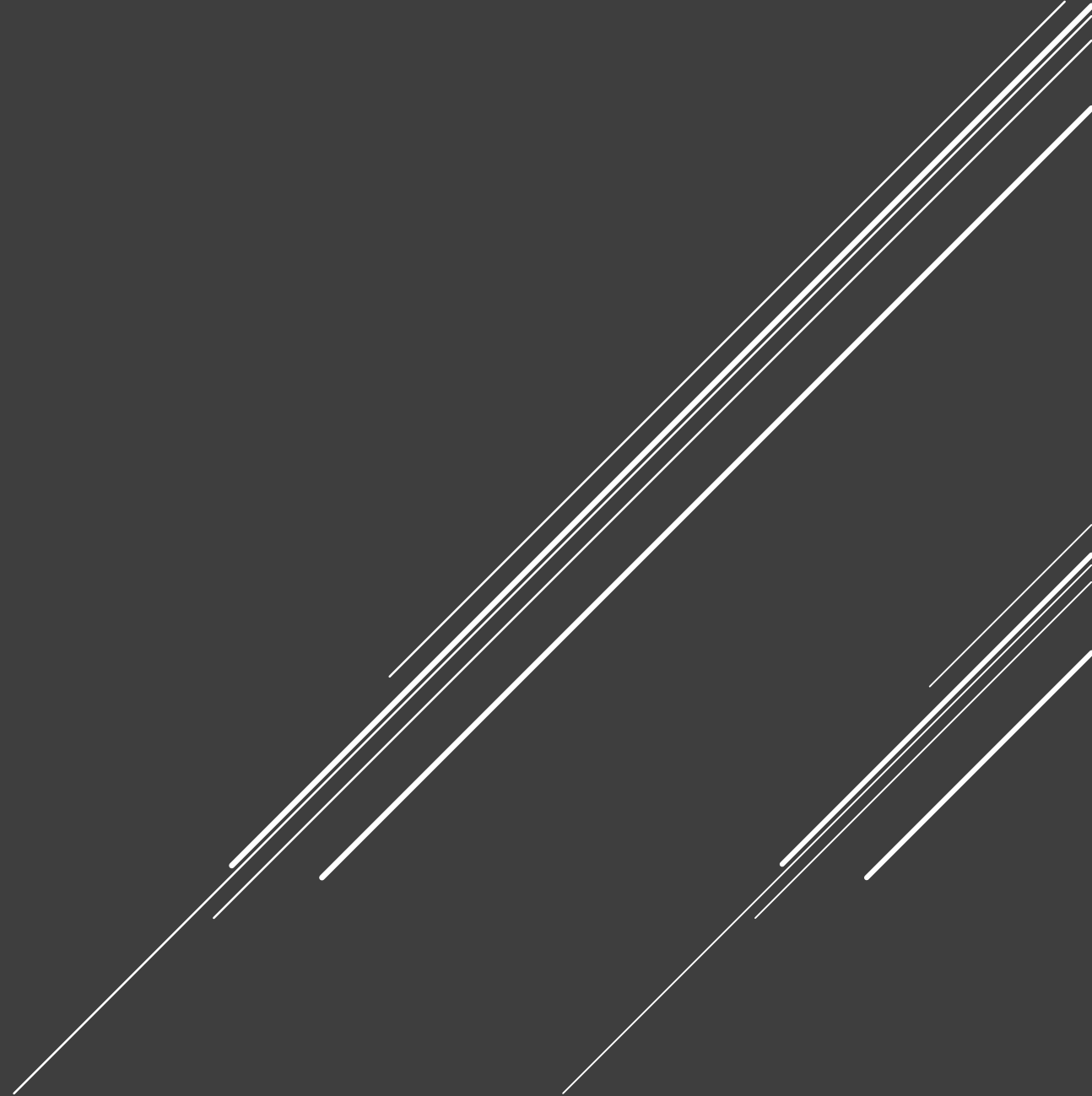
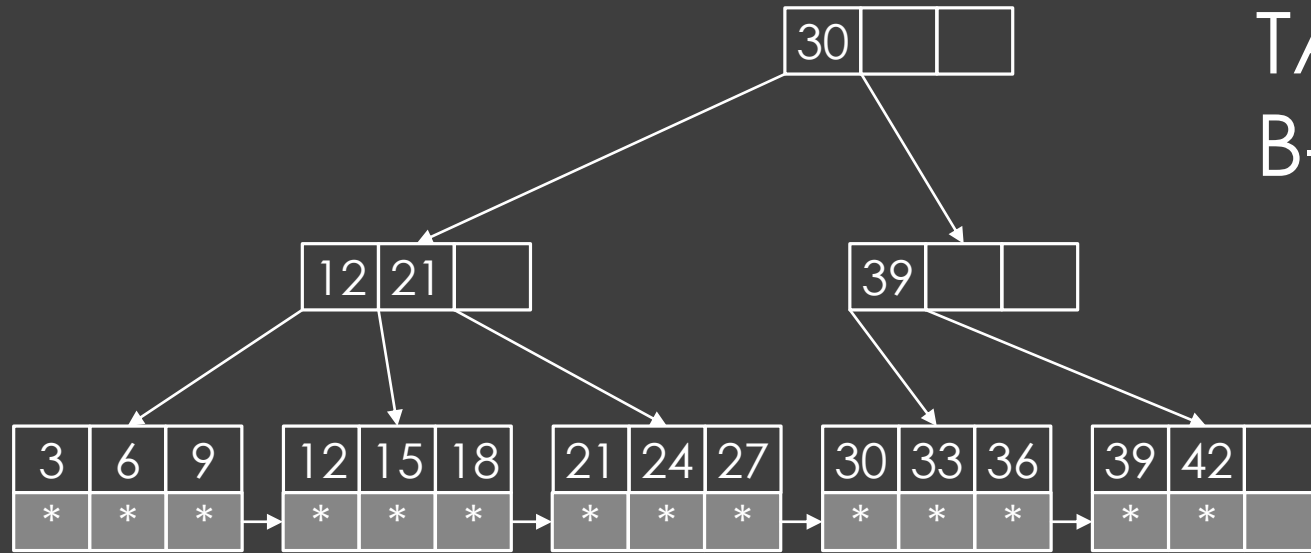


ONE DAY IN THE LIFE OF B-TREES

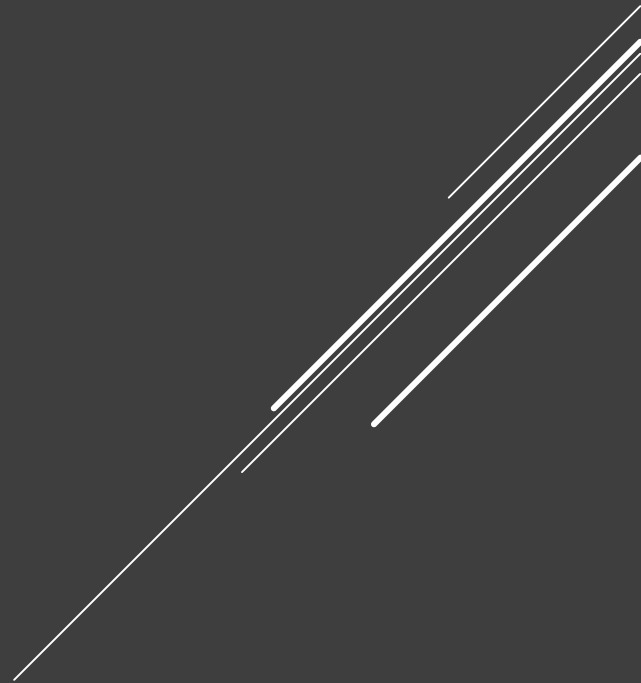
An action movie in 4 parts

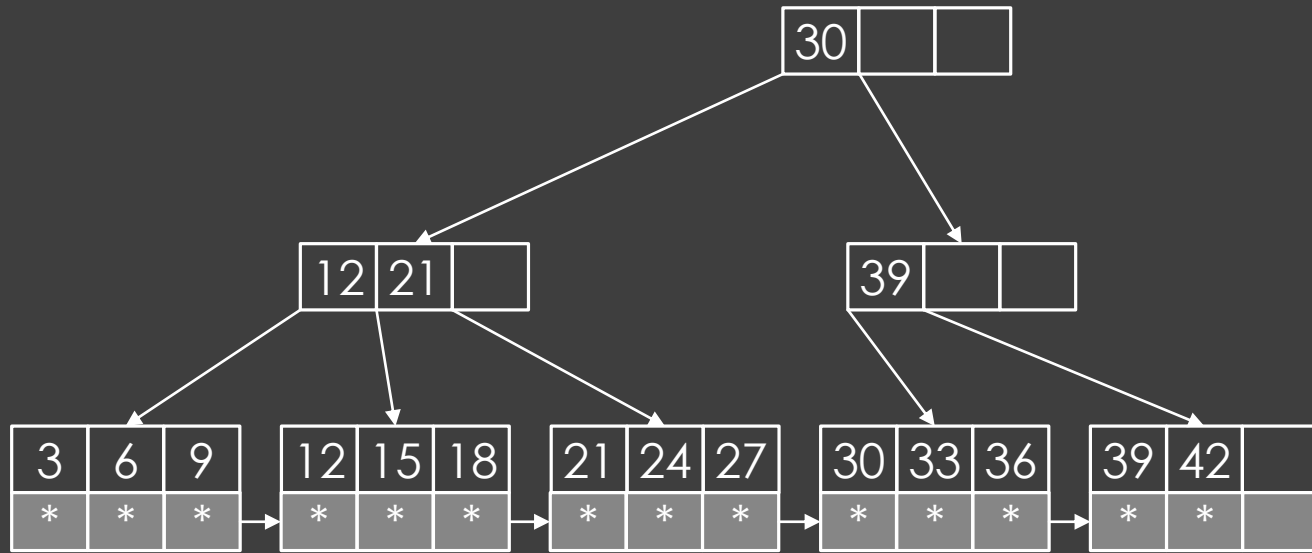


CANADA. TAXPAYERS DATABASE. B-TREE INDEX

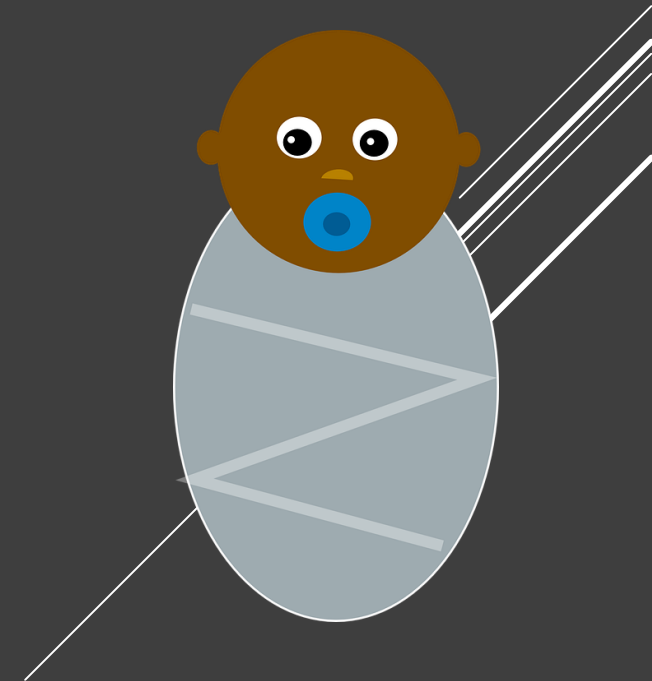


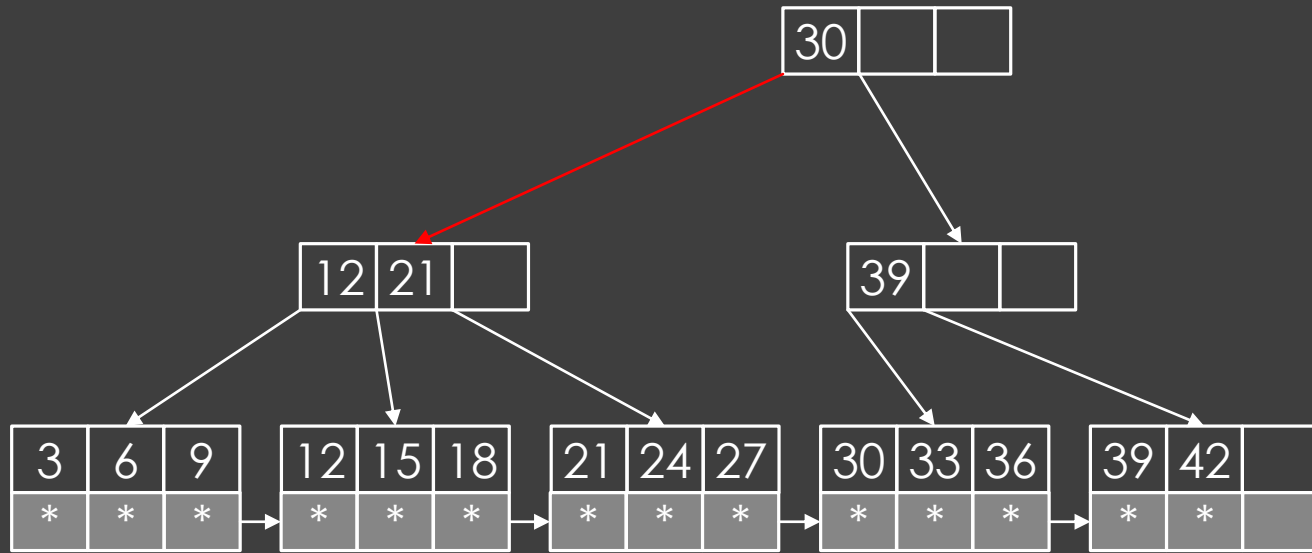
PART 1. JOHN



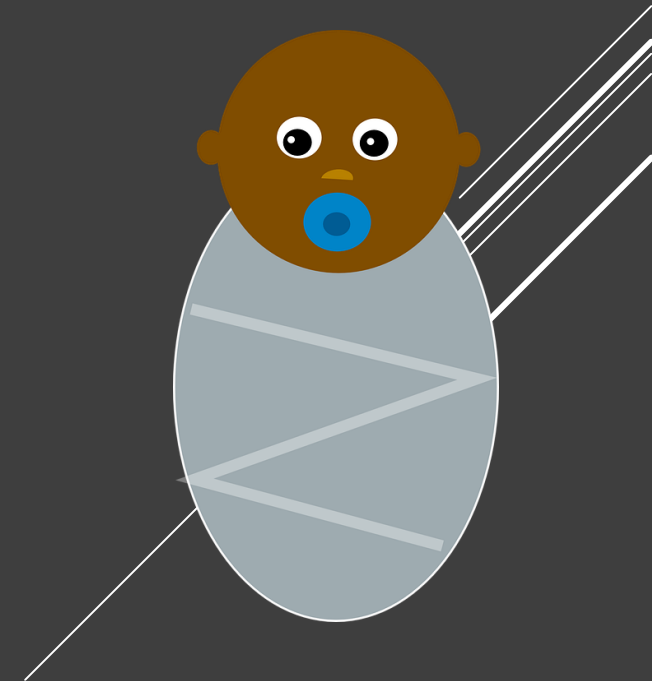


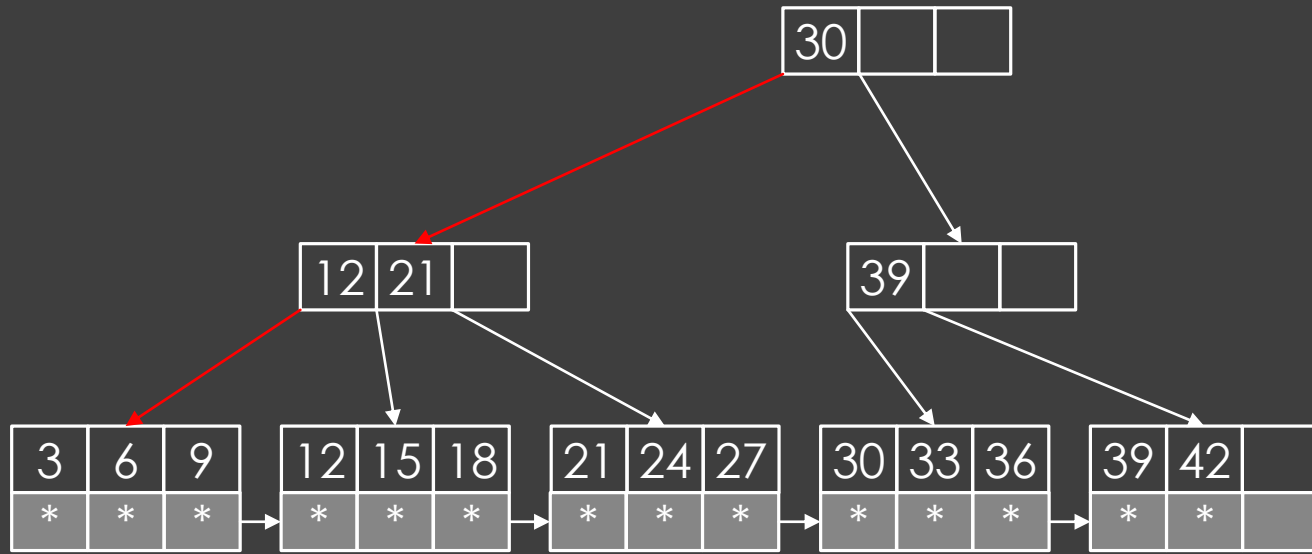
BABY JOHN. SIN = 1. INSERT R1



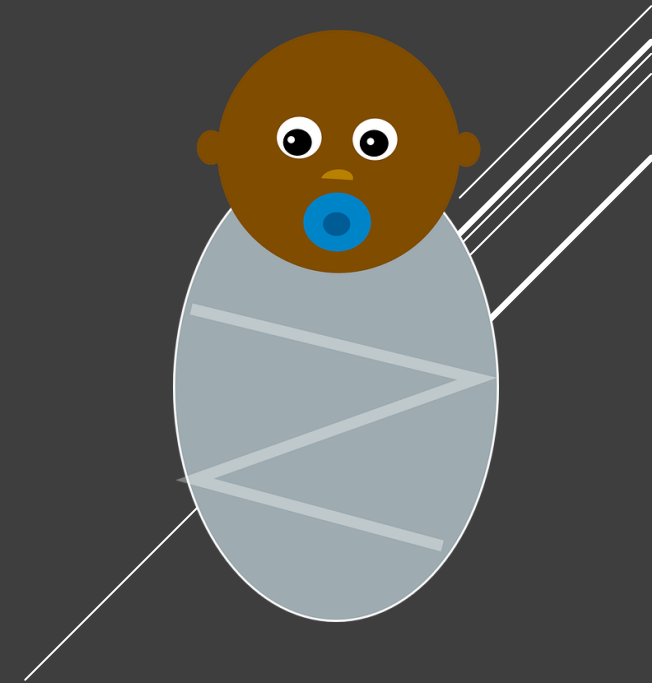


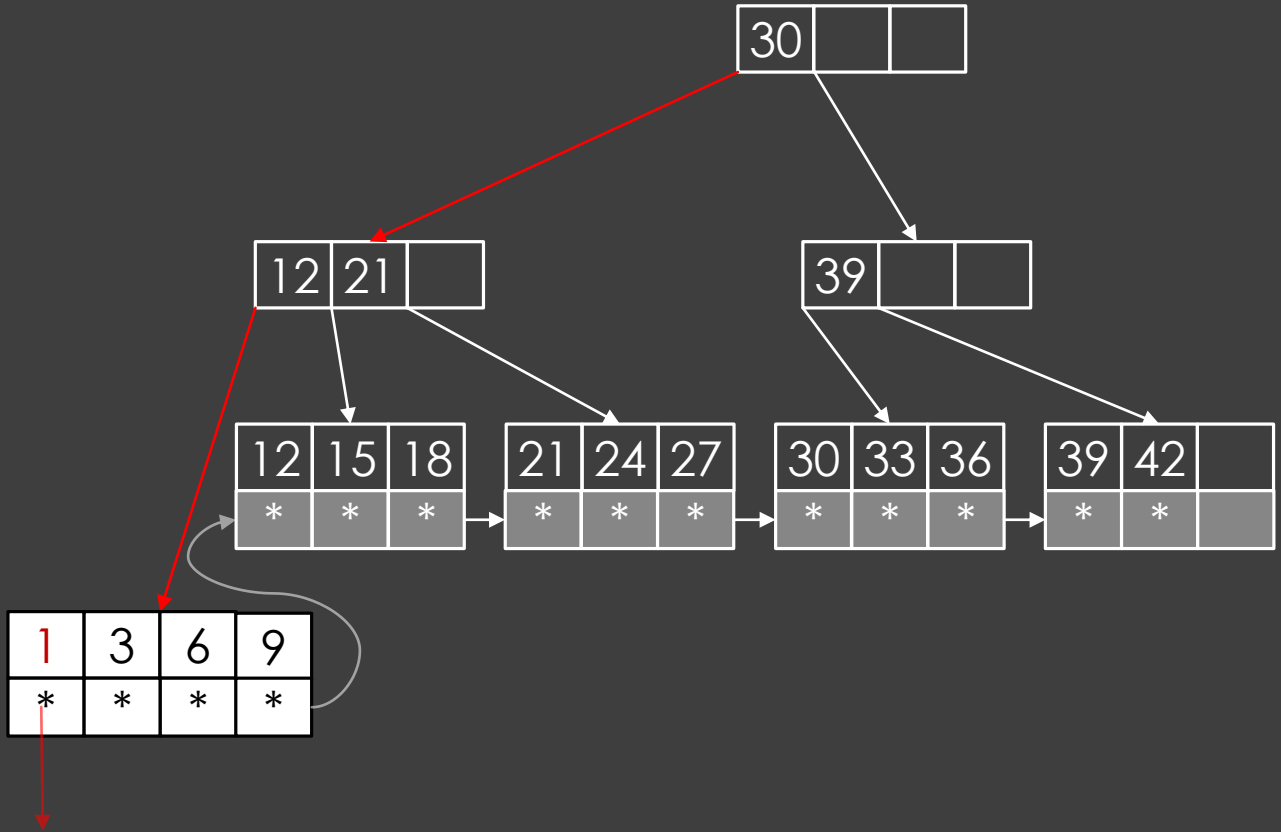
BABY JOHN. SIN = 1. INSERT R1



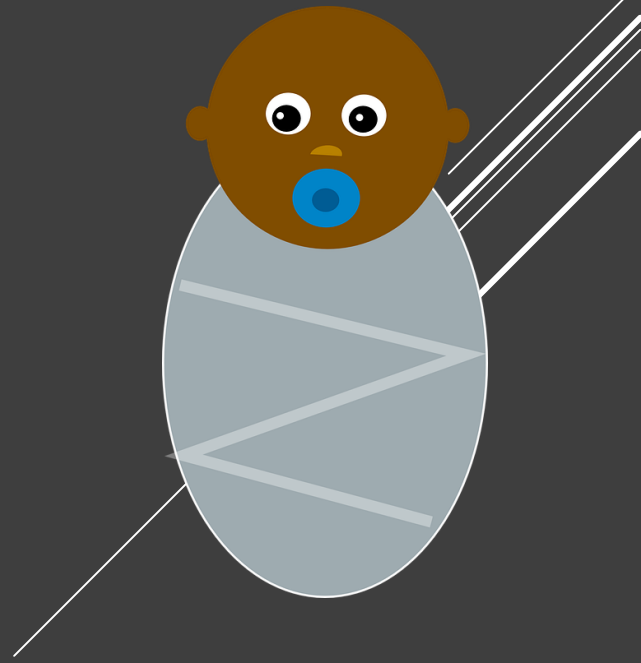


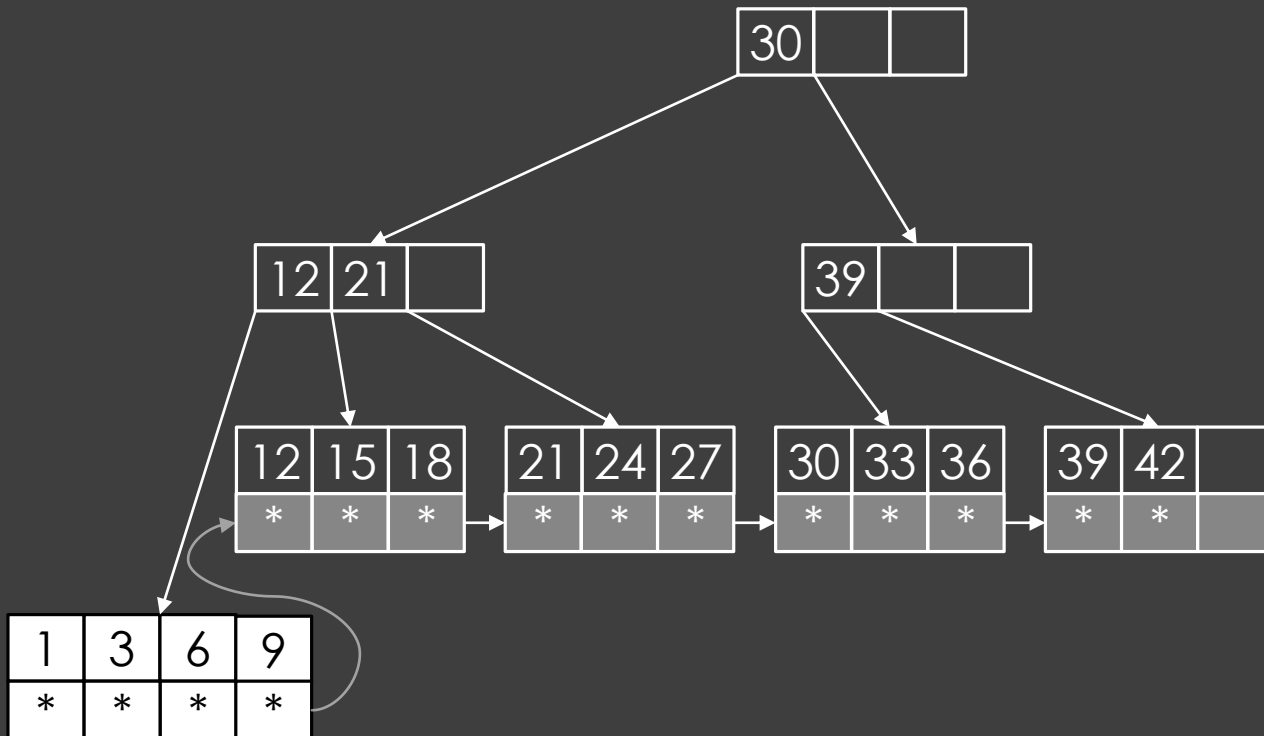
BABY JOHN. SIN = 1. INSERT R1



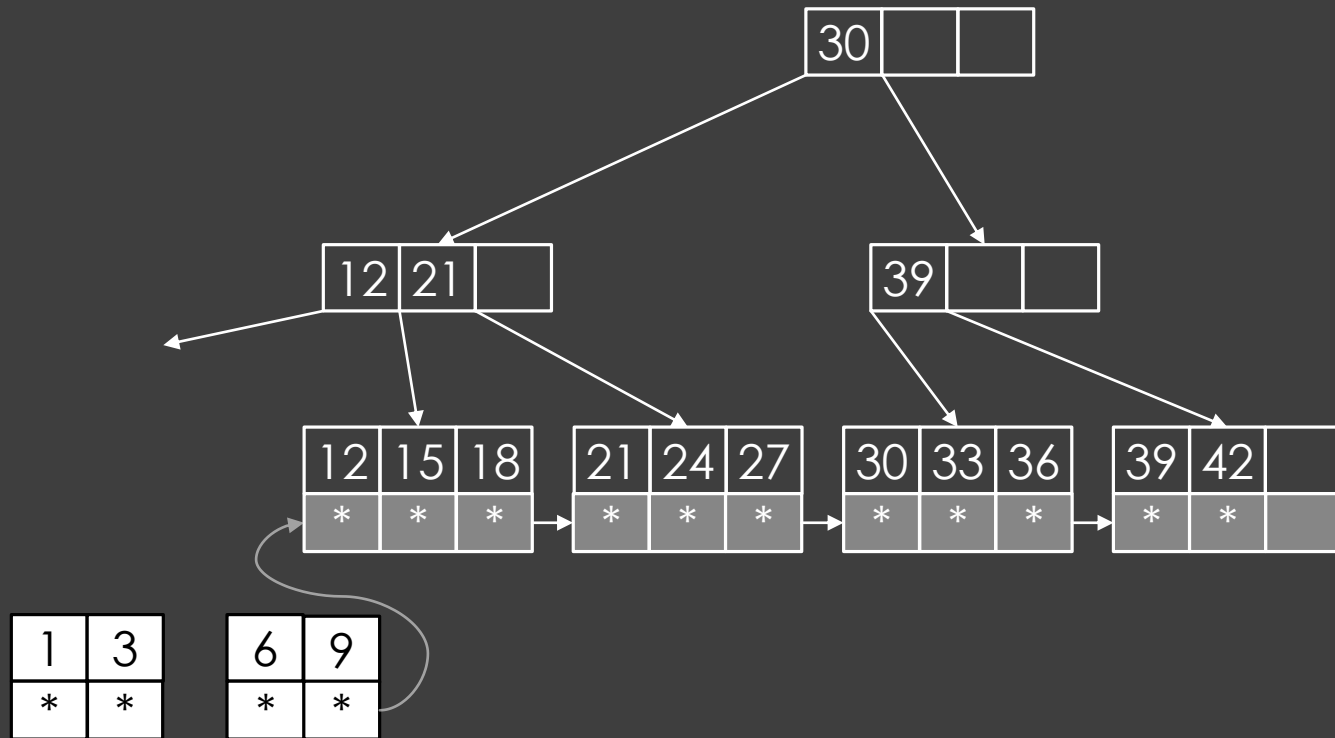


BABY JOHN. SIN = 1. INSERT R1

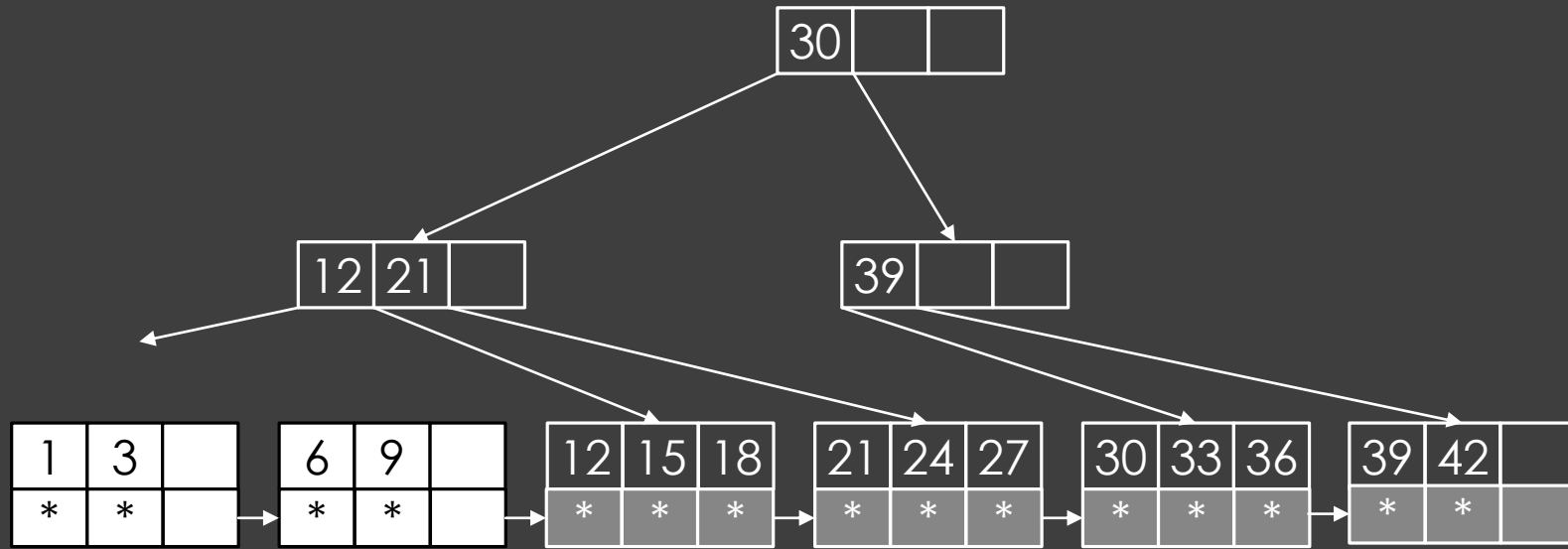




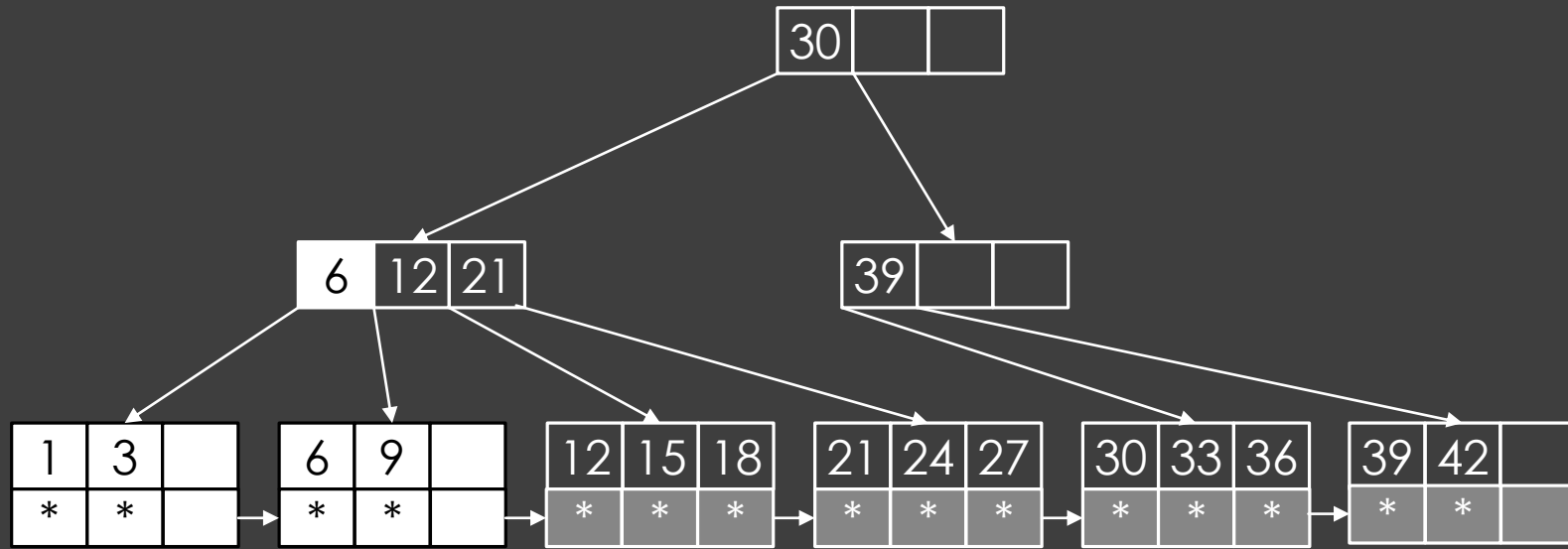
B-TREE: CANNOT HAVE 4 CHILD POINTERS
IN A LEAF!



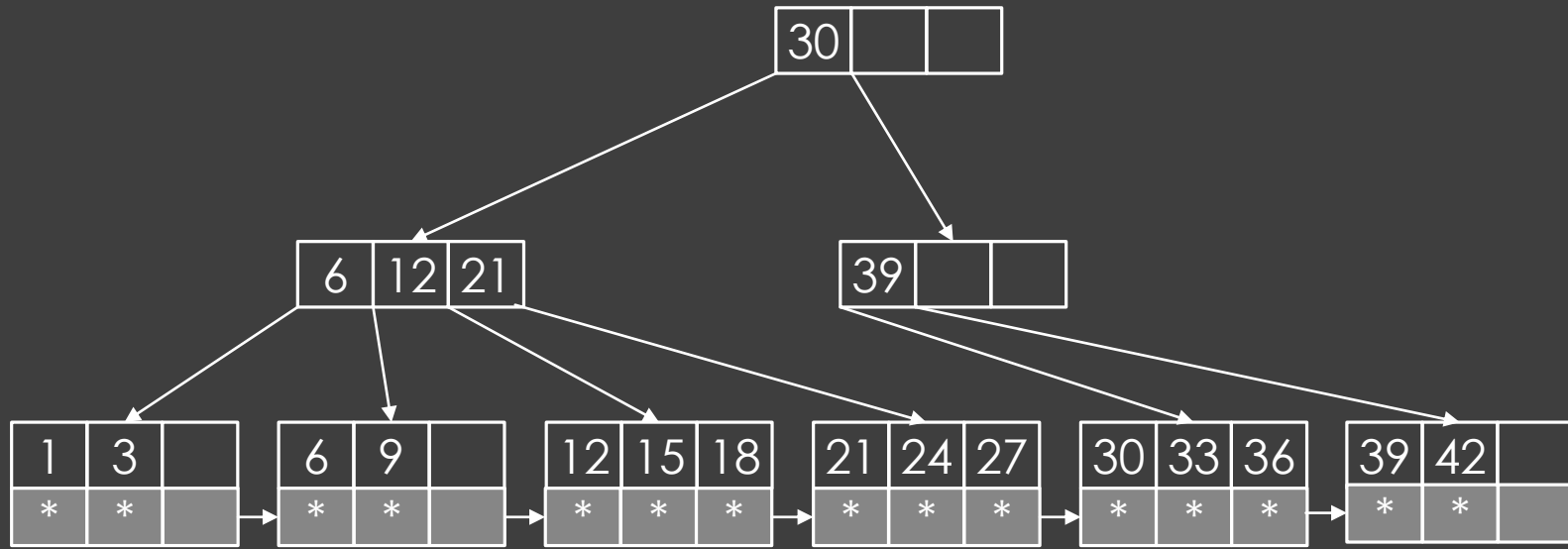
B-TREE: SPLITTING THE LEAF NODE



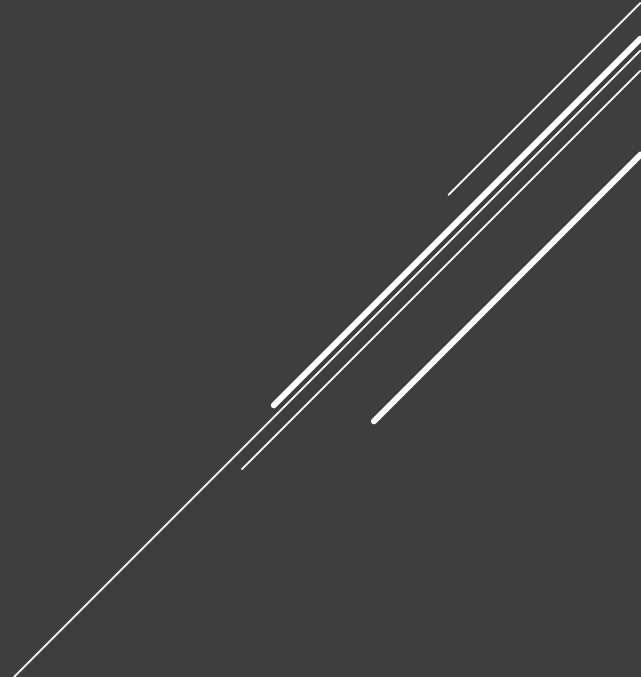
B-TREE: SPLITTING THE LEAF NODE



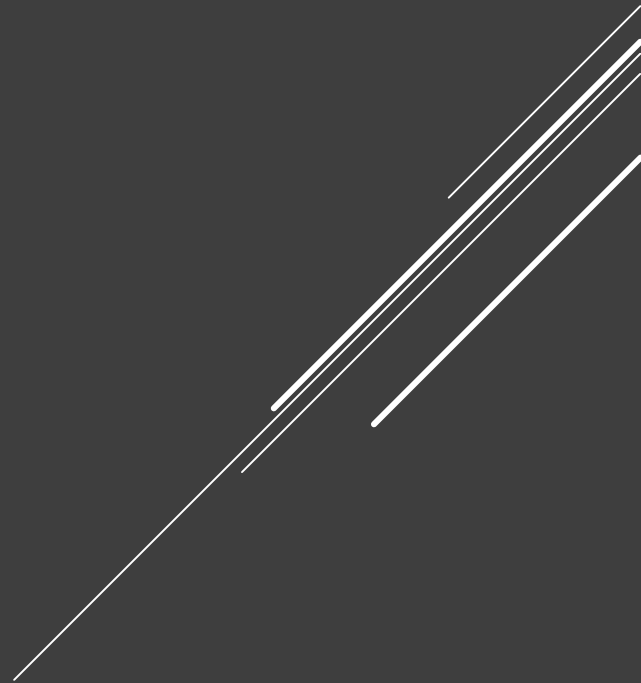
B-TREE: UPDATING NAVIGATION

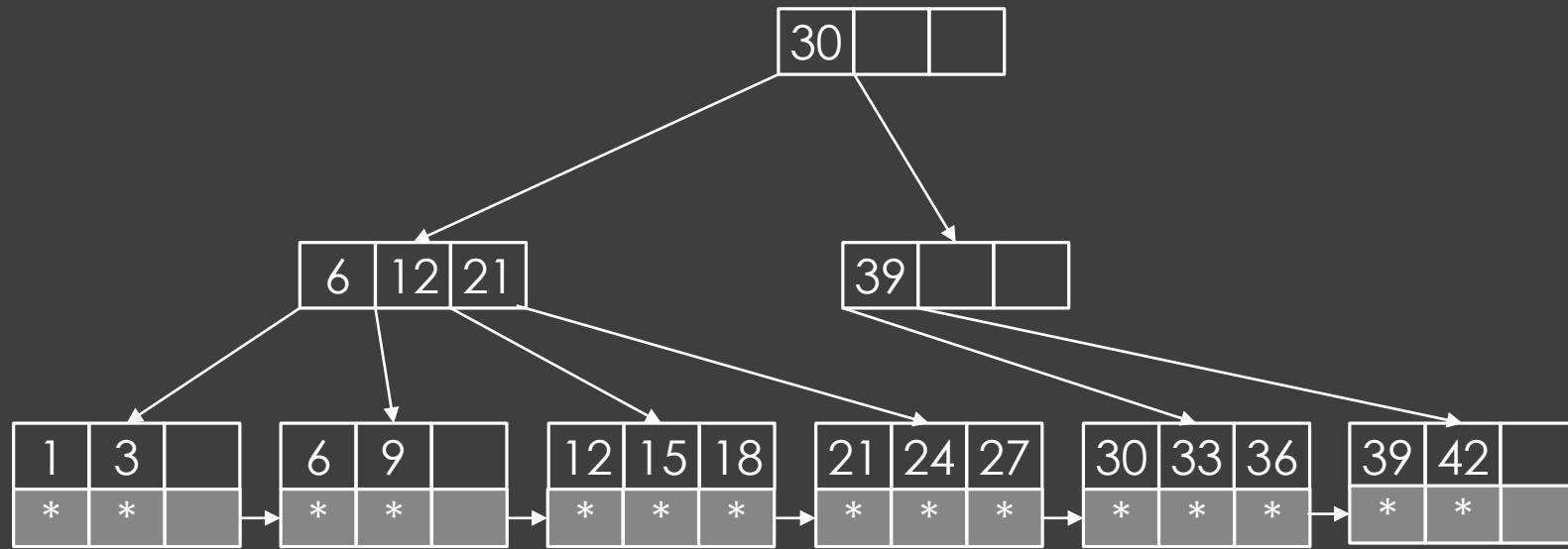


B-TREE: DONE FOR NOW

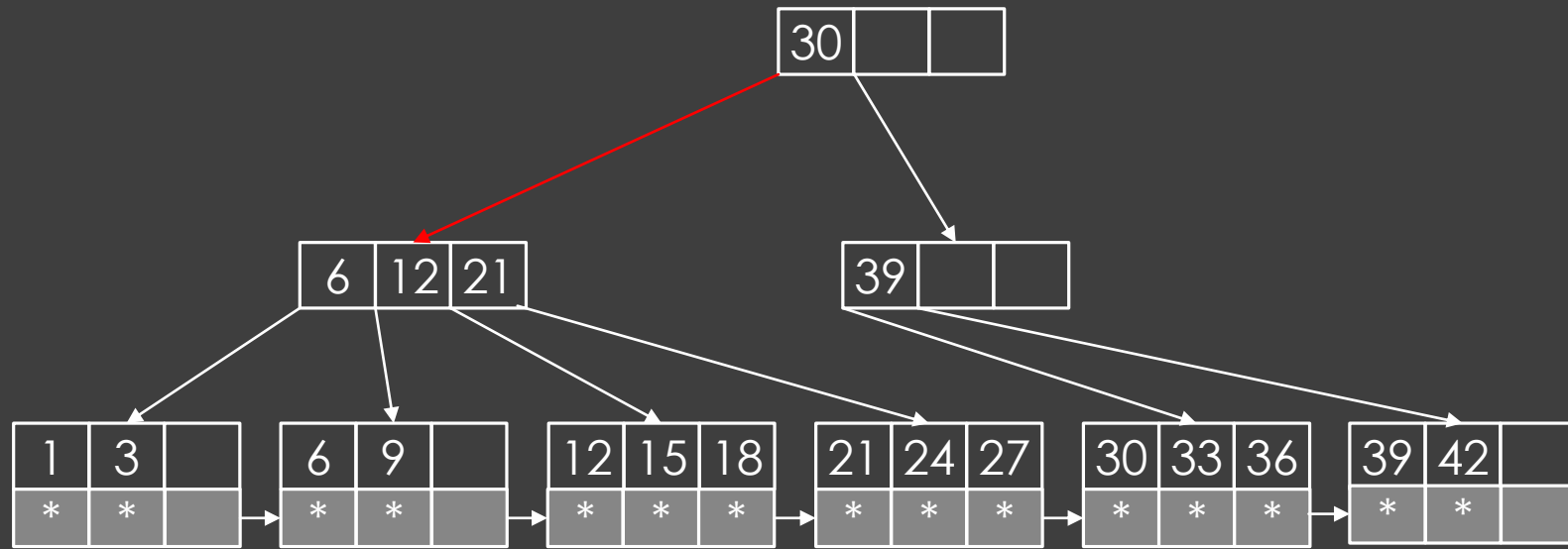


PART 2. MARIA

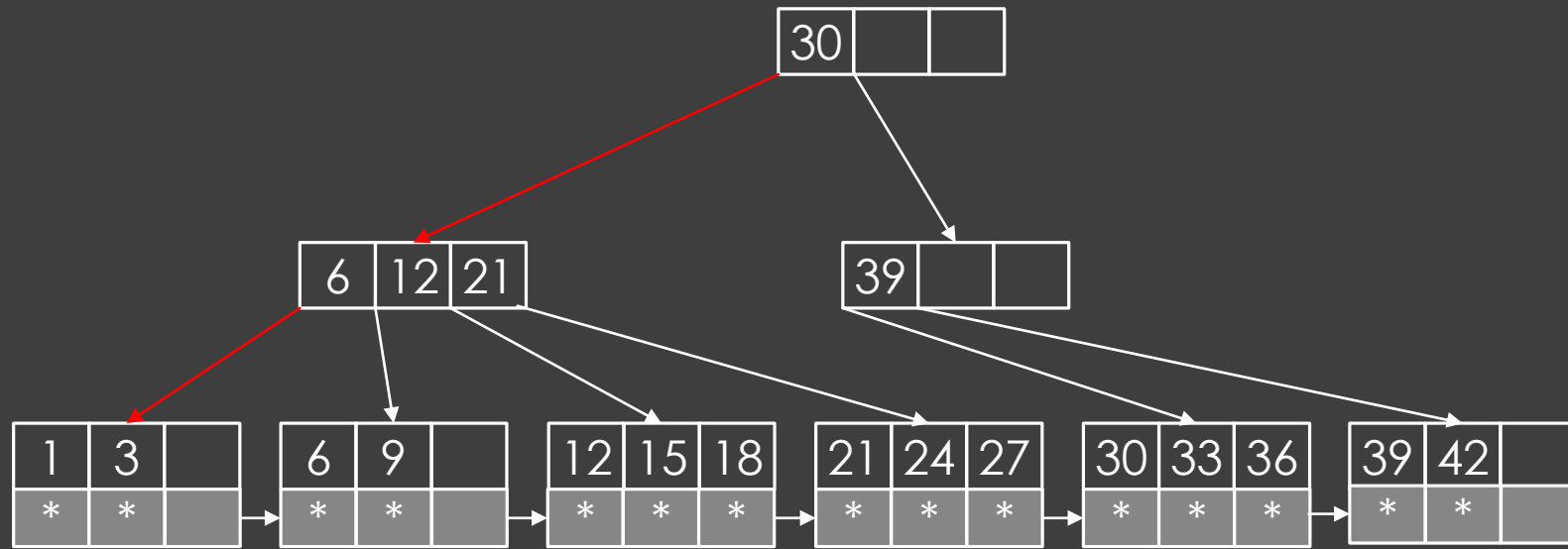




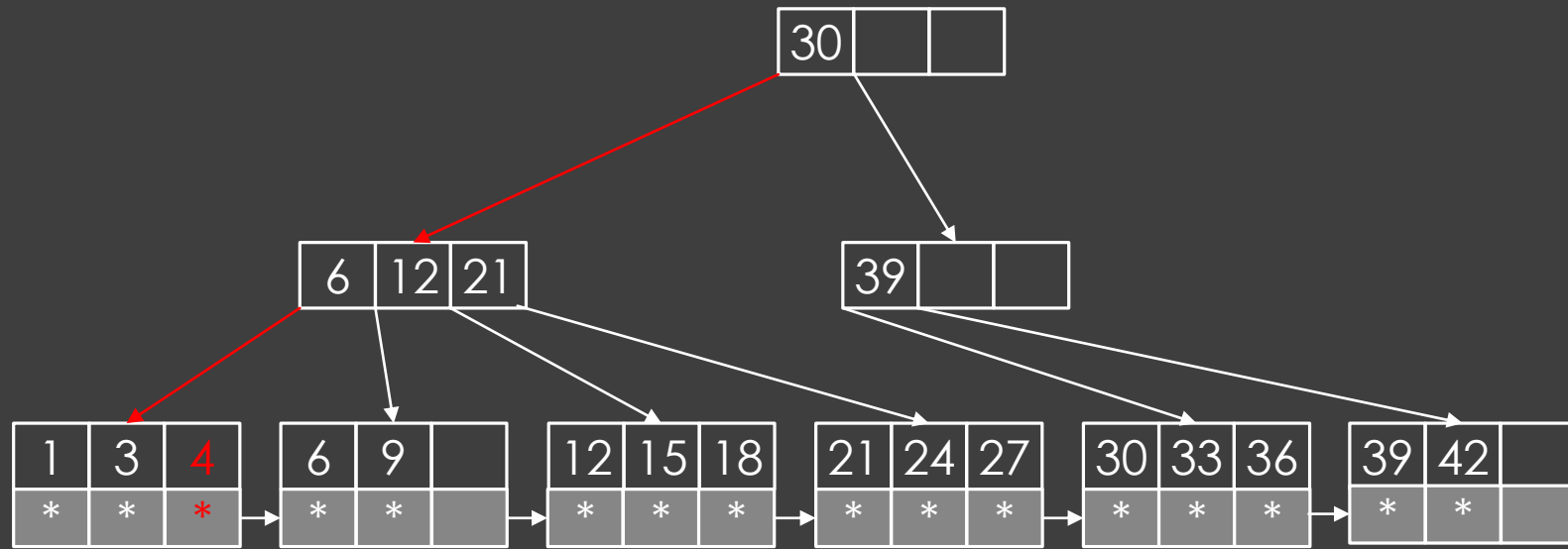
NEW ARRIVALS: MARIA. SIN = 4. INSERT R4



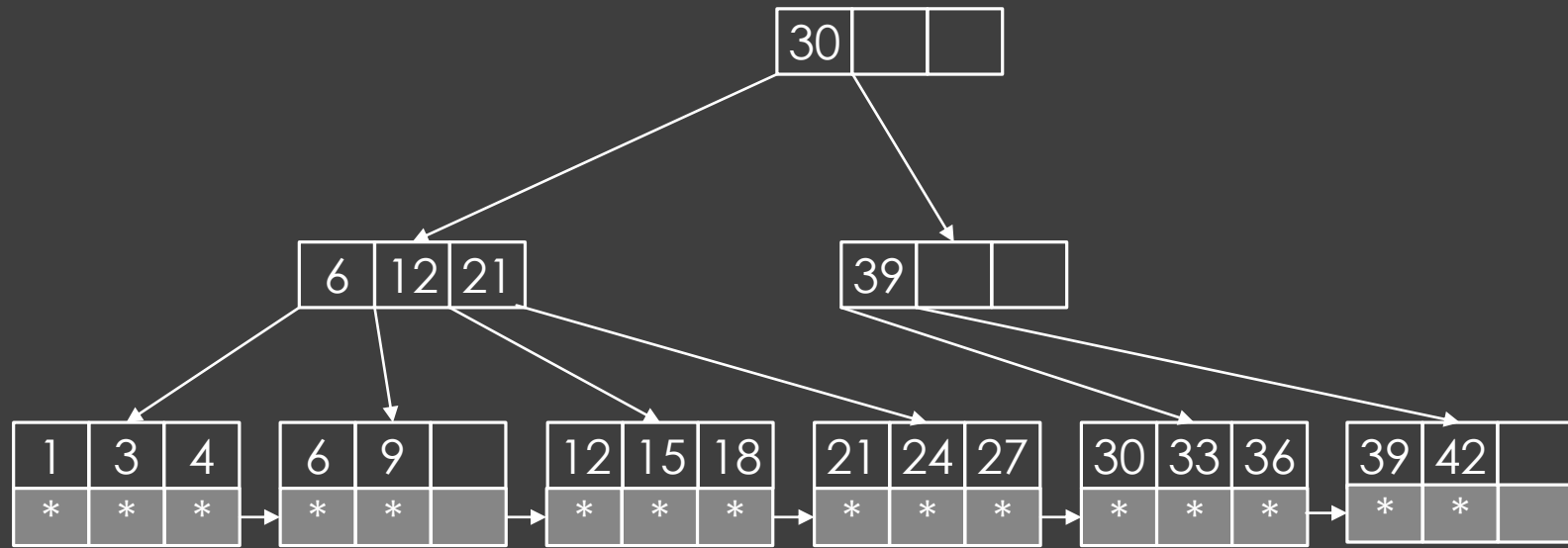
NEW ARRIVALS: MARIA. SIN = 4. INSERT R4



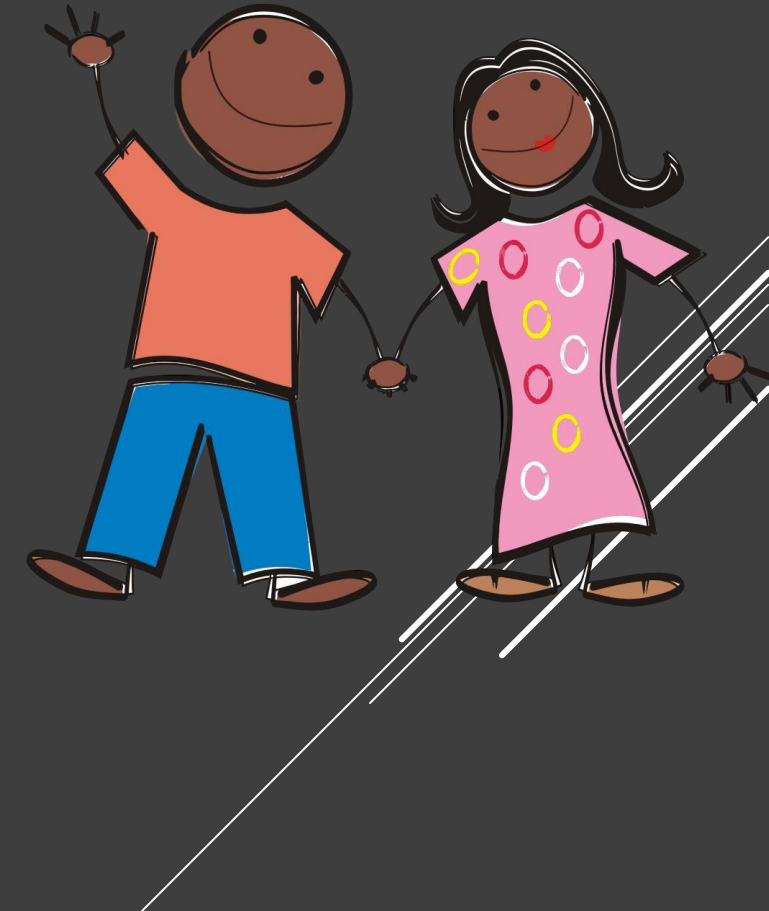
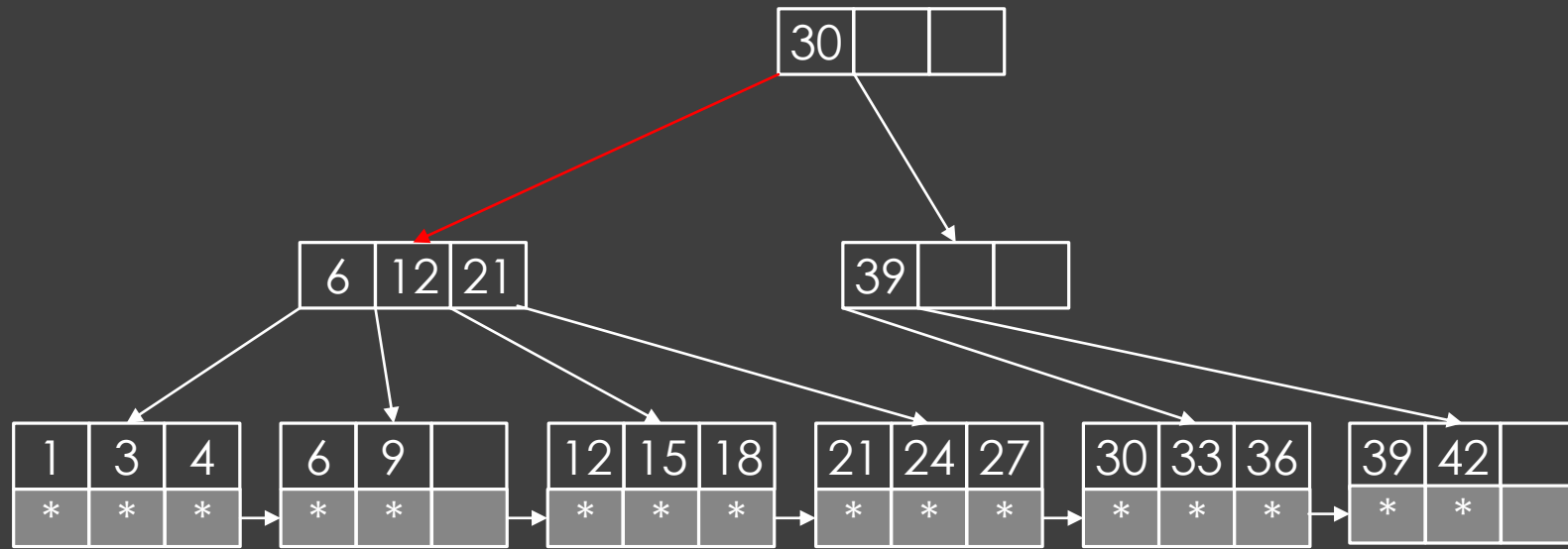
NEW ARRIVALS: MARIA. SIN = 4. INSERT R4



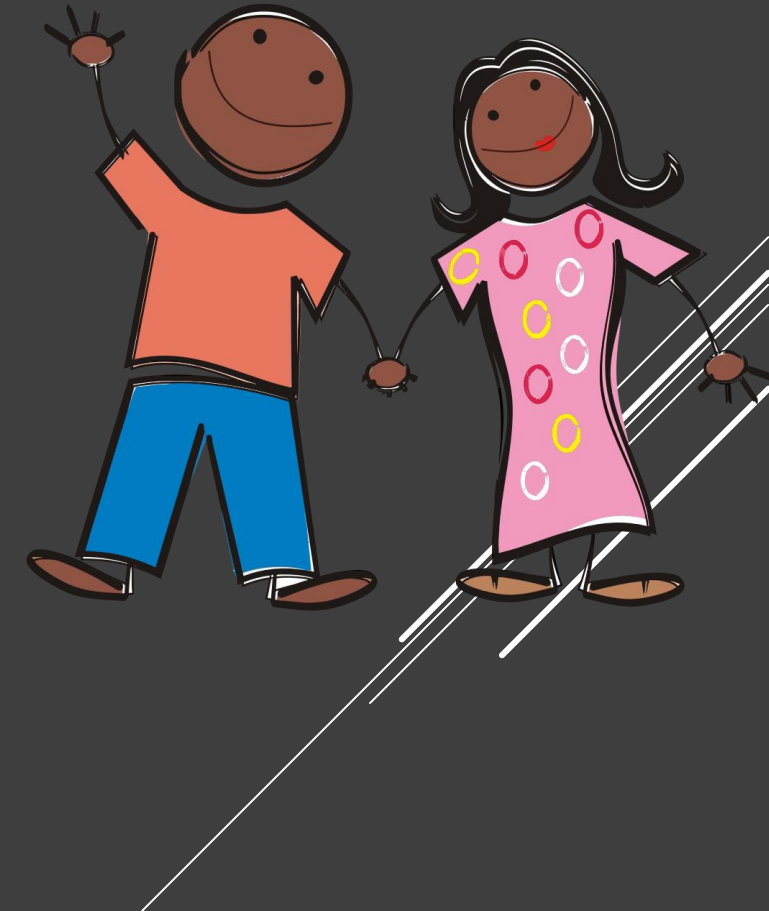
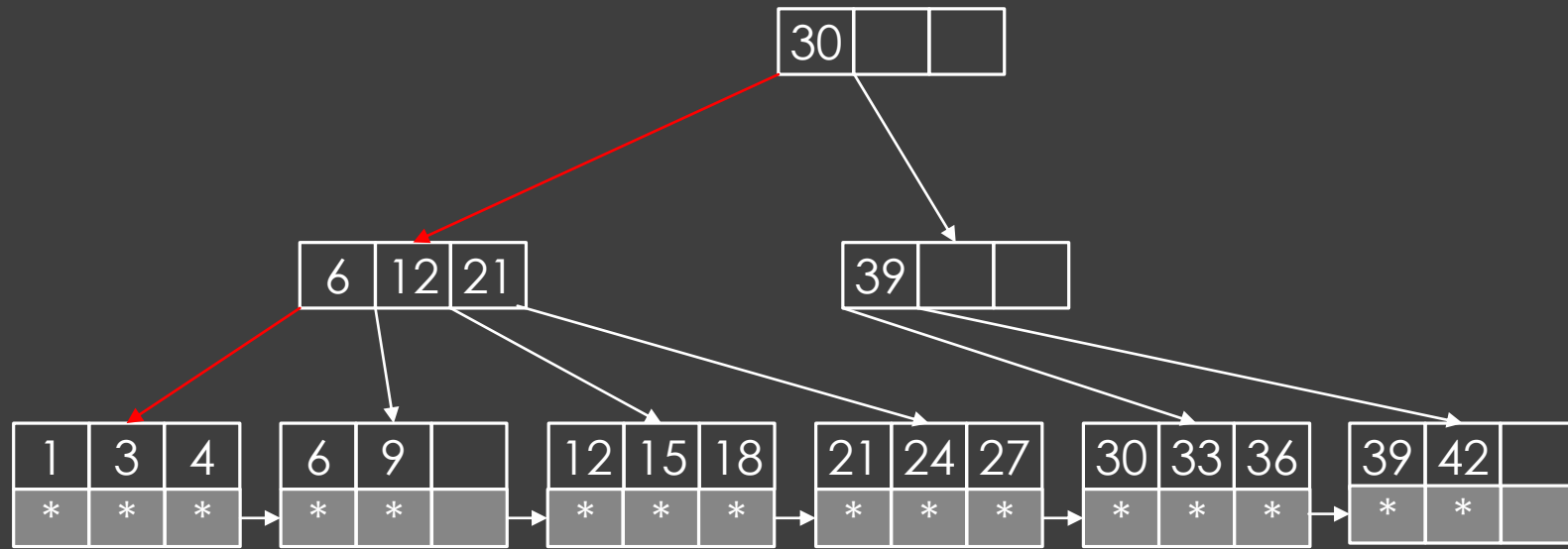
R4: MARIA. SIN = 4. NOTHING TO DO.



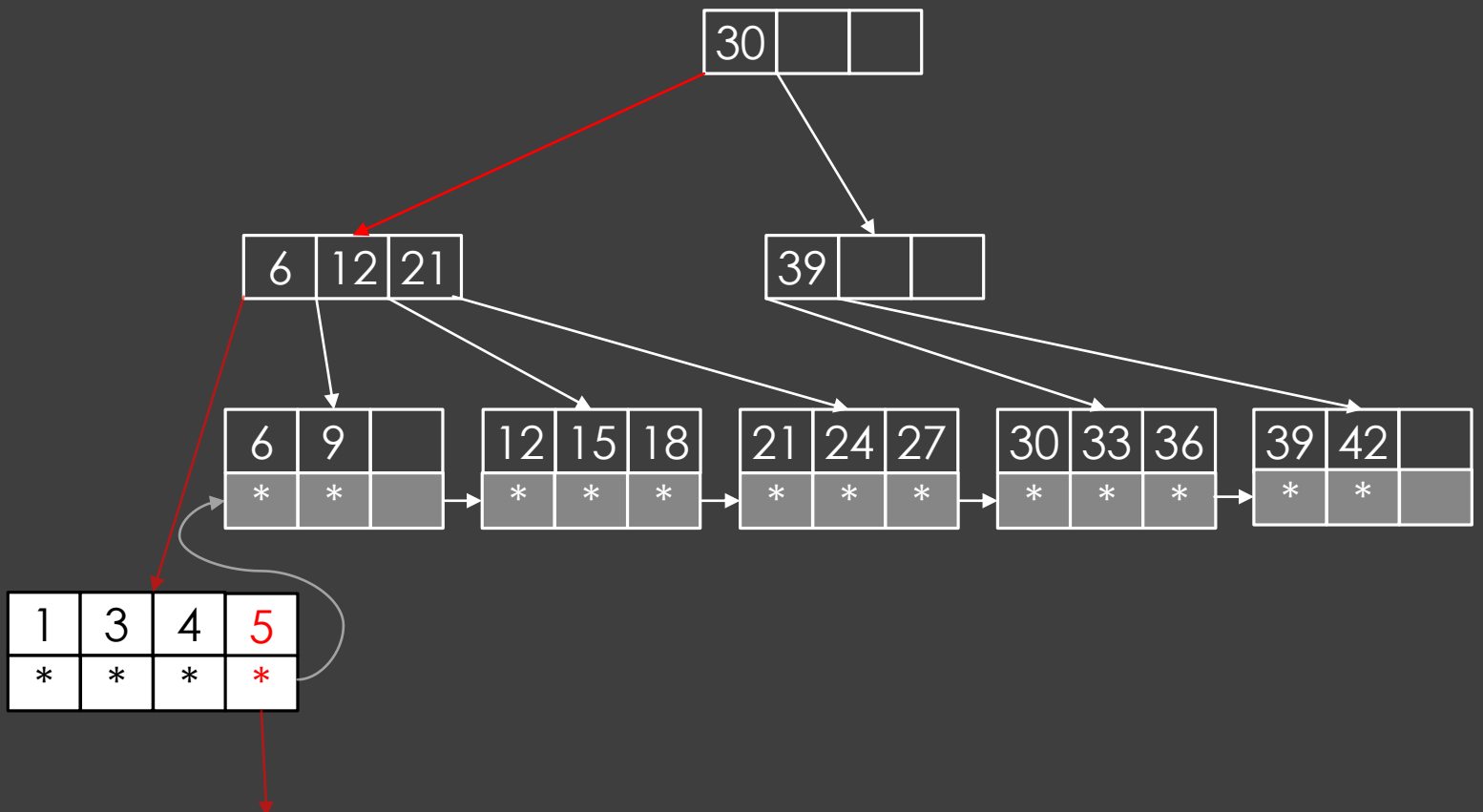
NEW ARRIVALS: MARIA ... AND PABLO



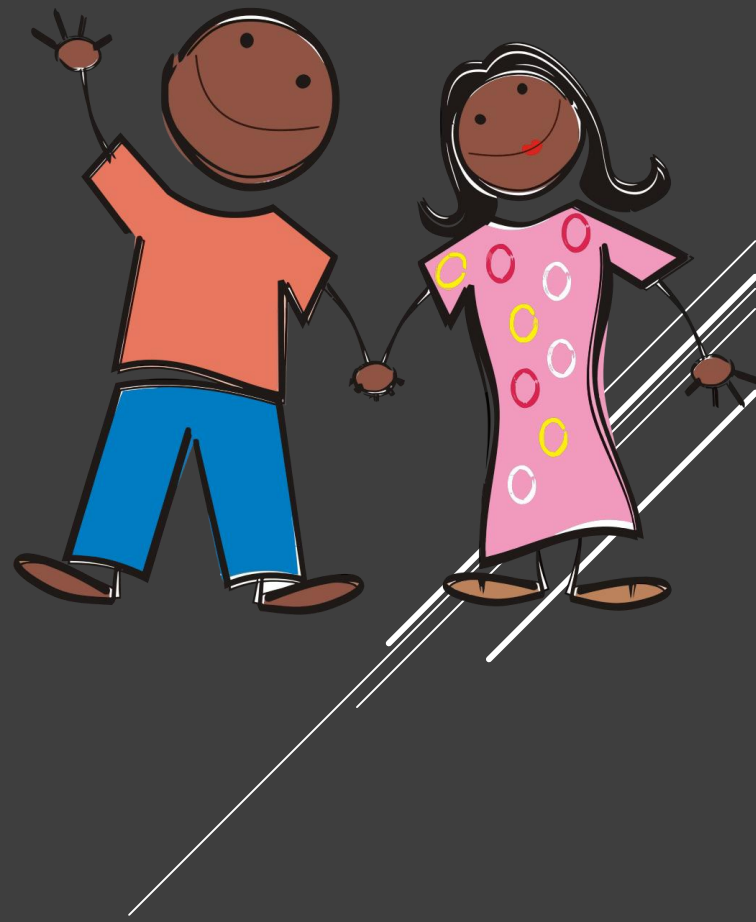
PABLO. SIN = 5. INSERT R5

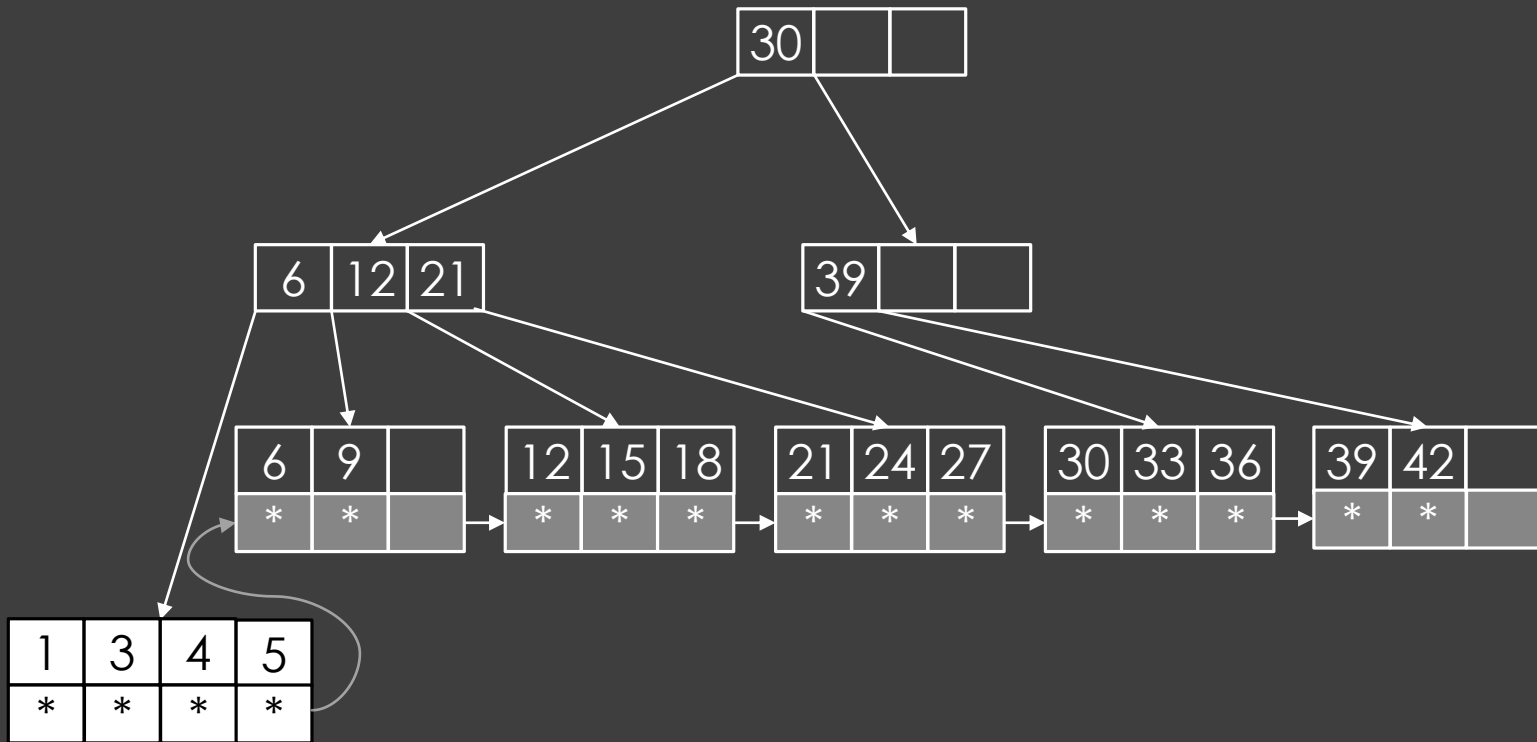


PABLO. SIN = 5. INSERT R5

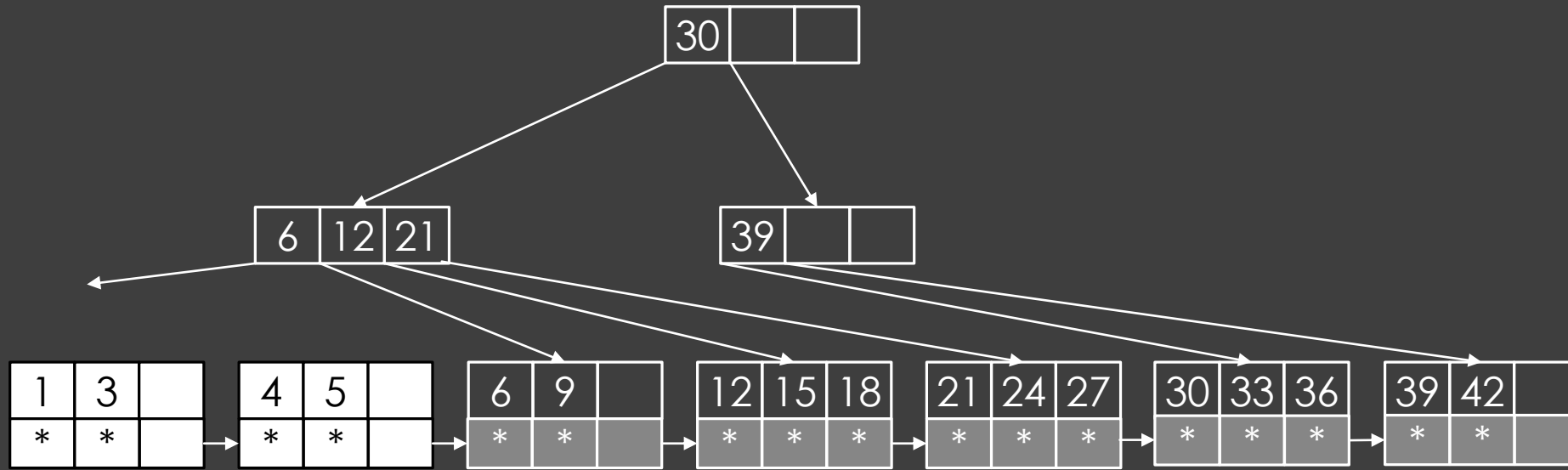


R5. PABLO. SIN = 5

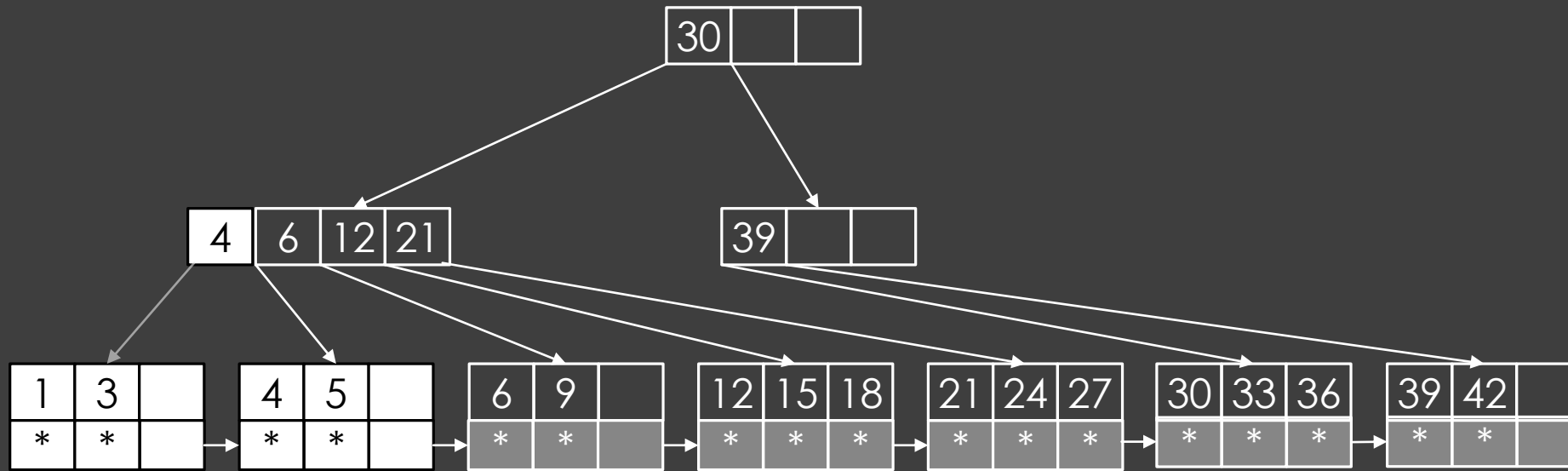




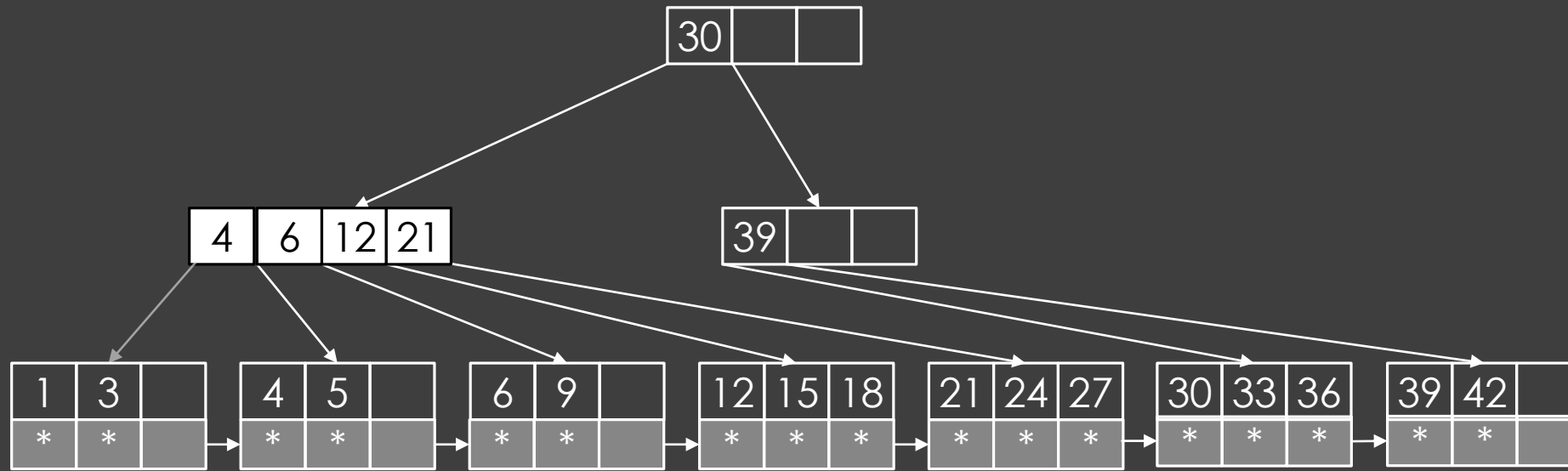
B-TREE: CANNOT HAVE 4 CHILD POINTERS
IN A LEAF!



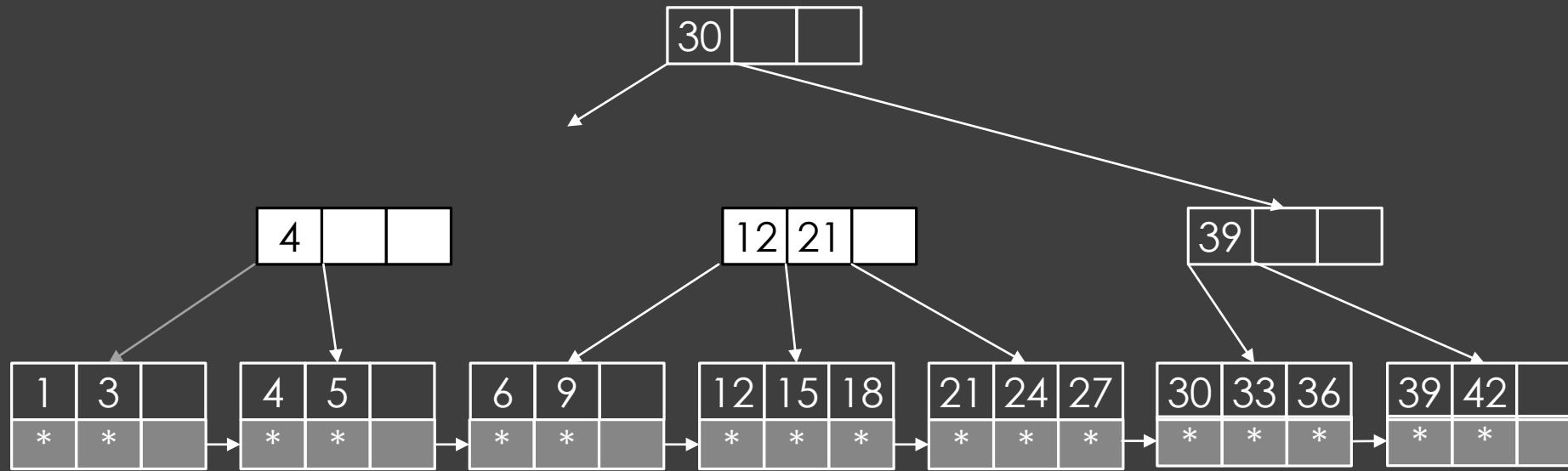
B-TREE: SPLITTING LEAF NODE



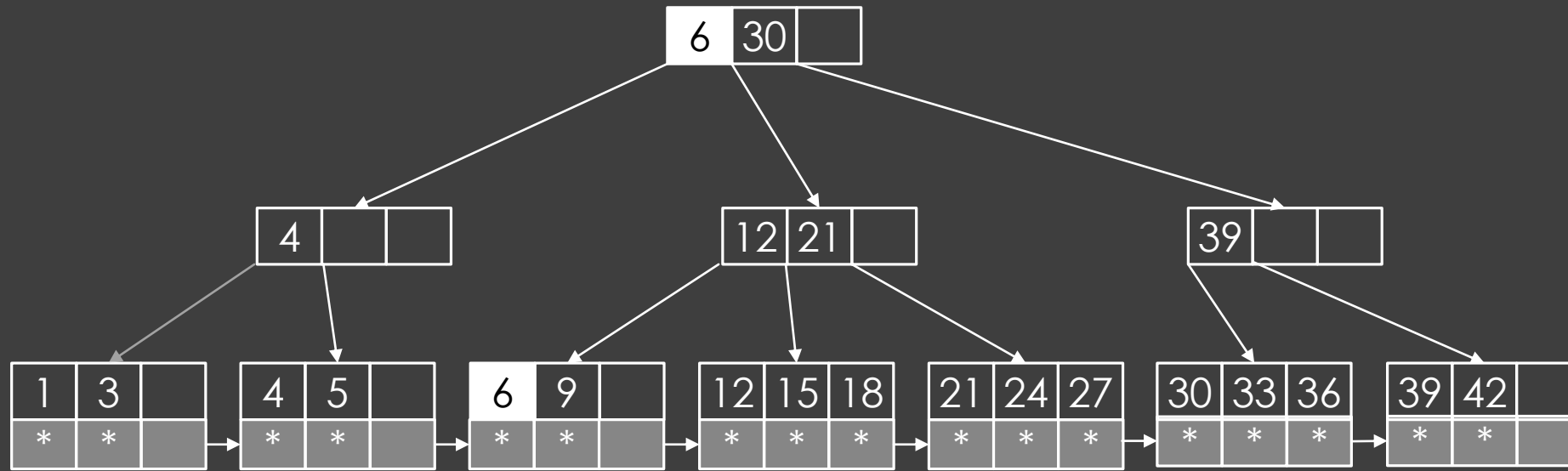
B-TREE: UPDATING NAVIGATION



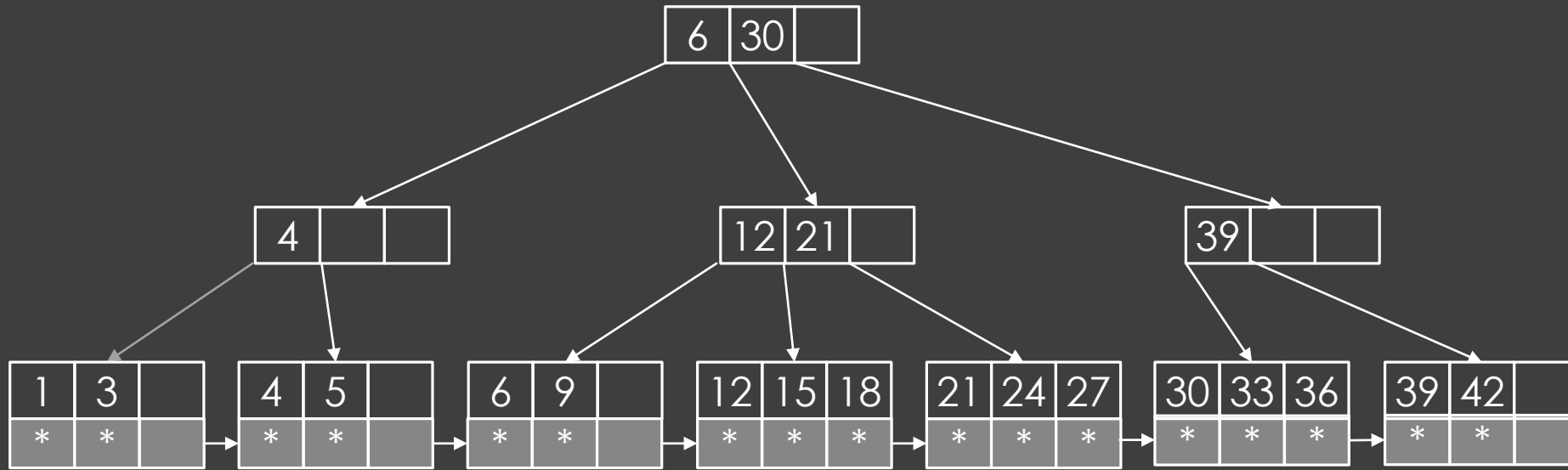
B-TREE: CANNOT HAVE 5 CHILD POINTERS
IN ONE INTERNAL NODE!



B-TREE: SPLITTING INTERNAL NODE:
WITH 2 AND 3 CHILDREN

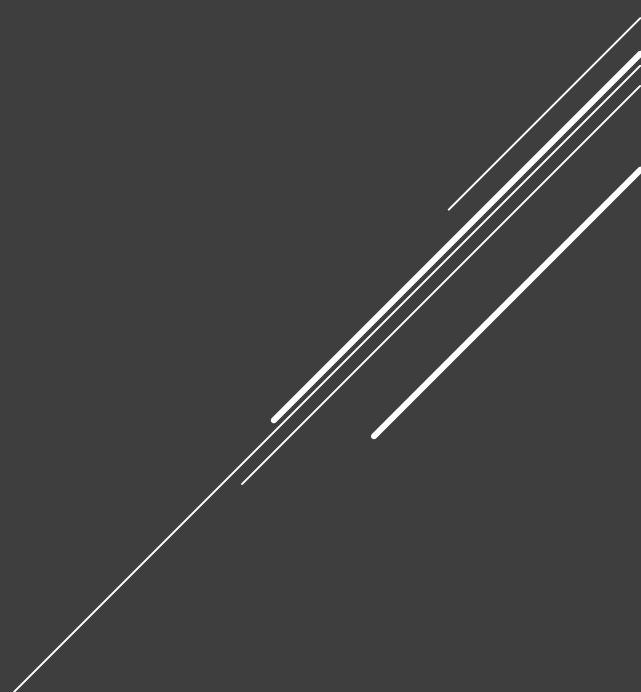


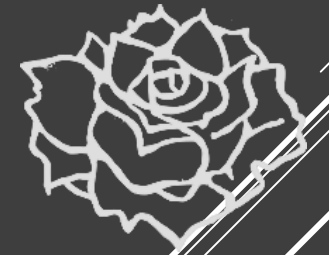
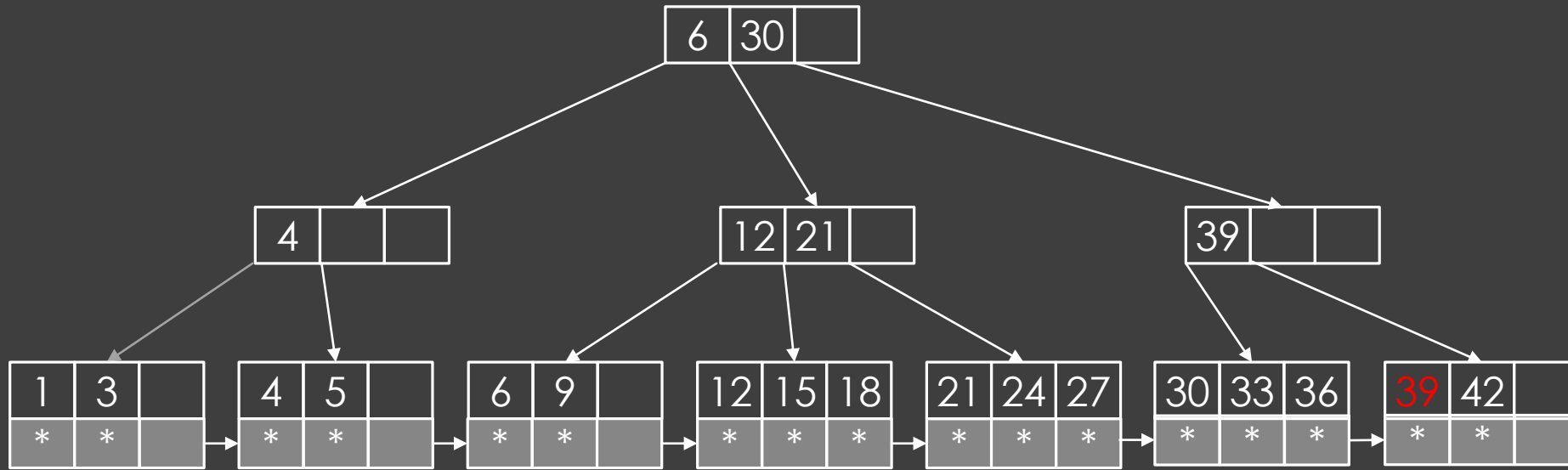
B-TREE: UPDATING PARENT NAVIGATION



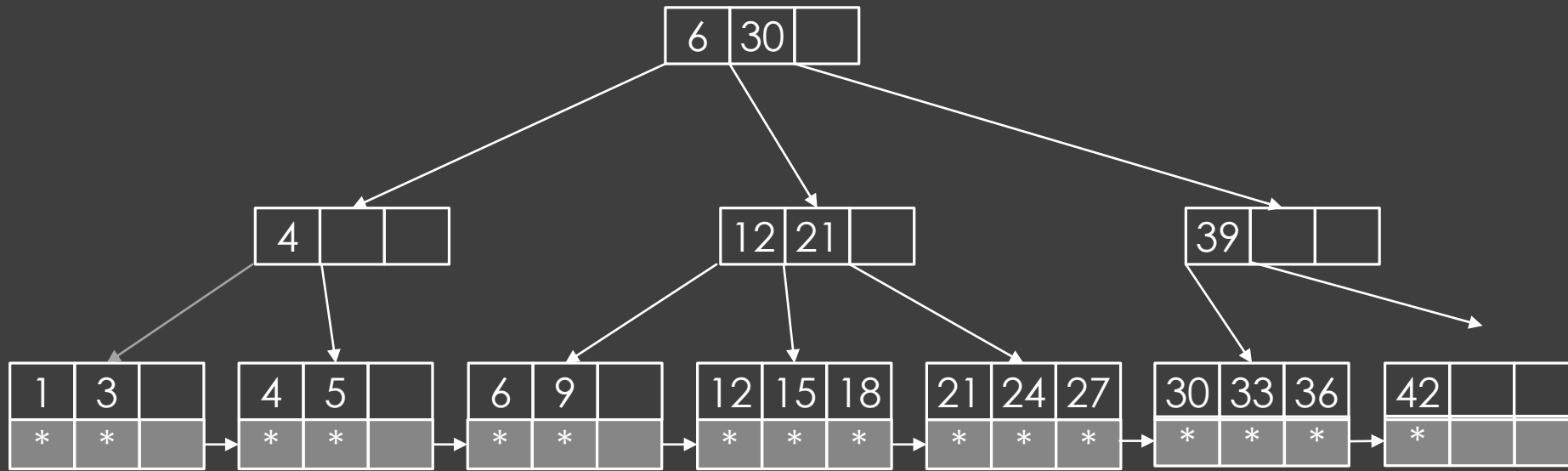
B-TREE: DONE FOR NOW

PART 3. DECEASE

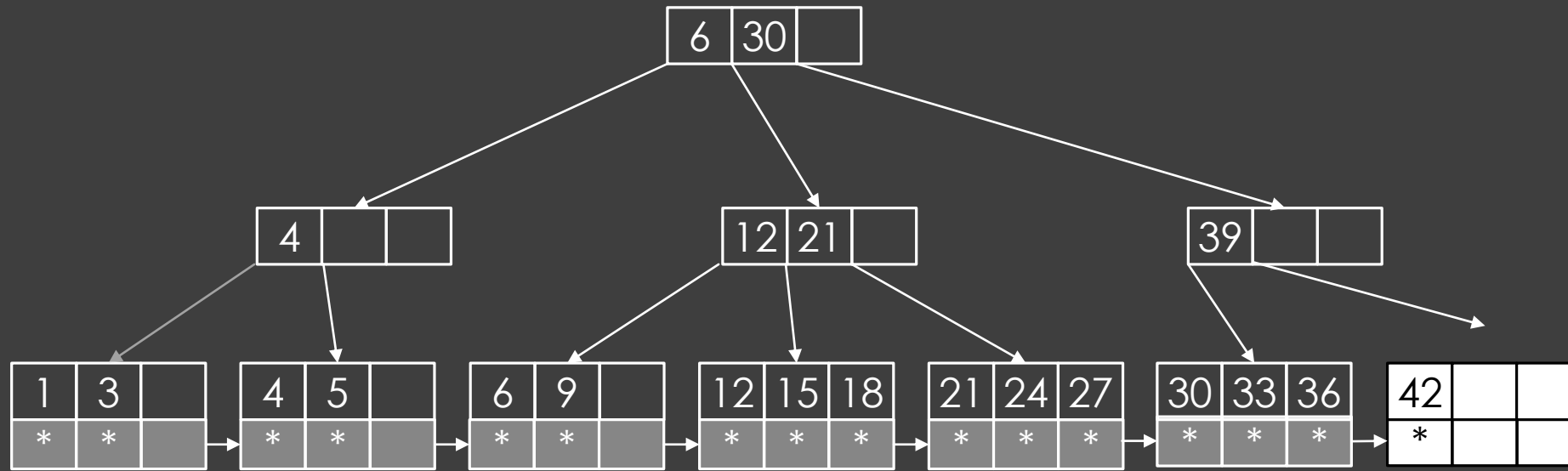




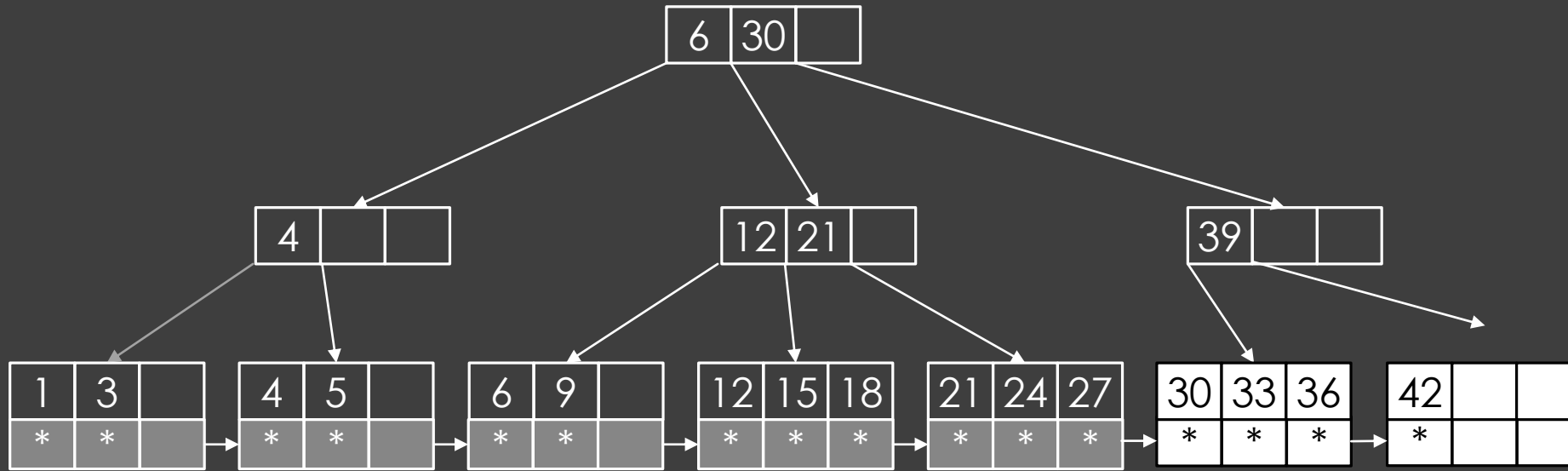
SAD NEWS: ONE TAXPAYER LESS. REMOVE 39



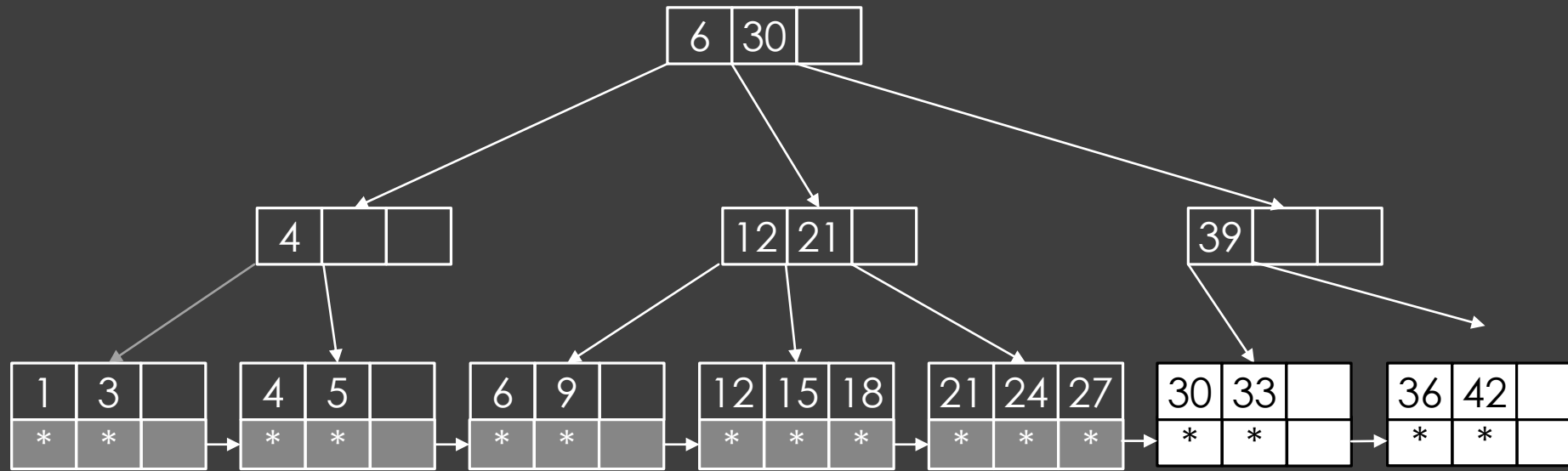
B-TREE: REMOVED 39



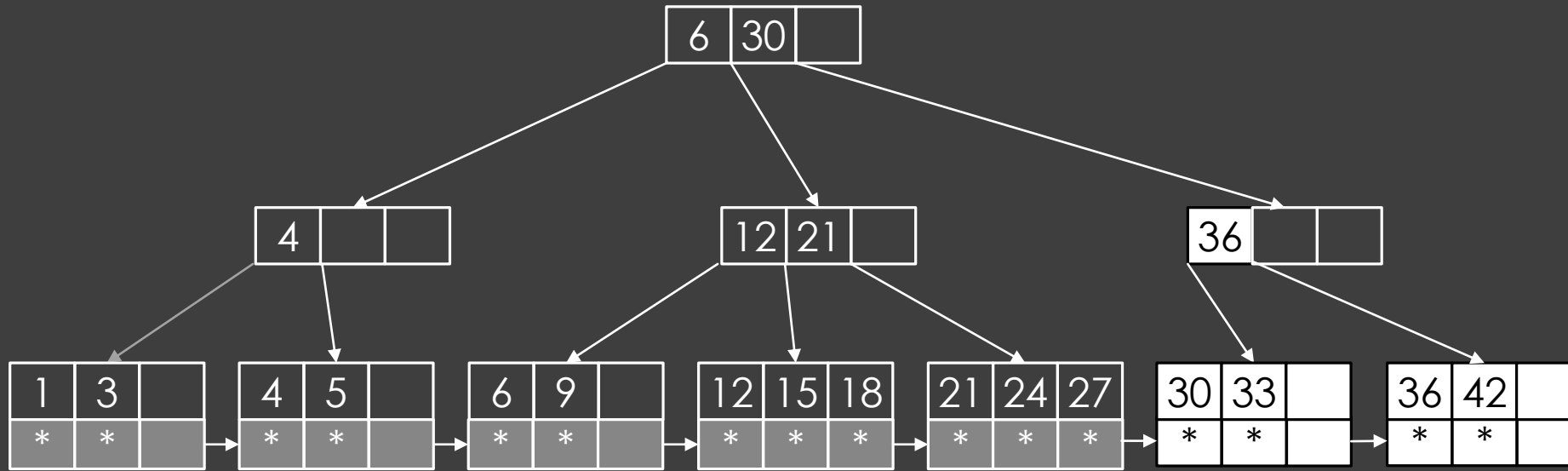
B-TREE: CANNOT HAVE
ONE CHILD POINTER PER LEAF NODE!



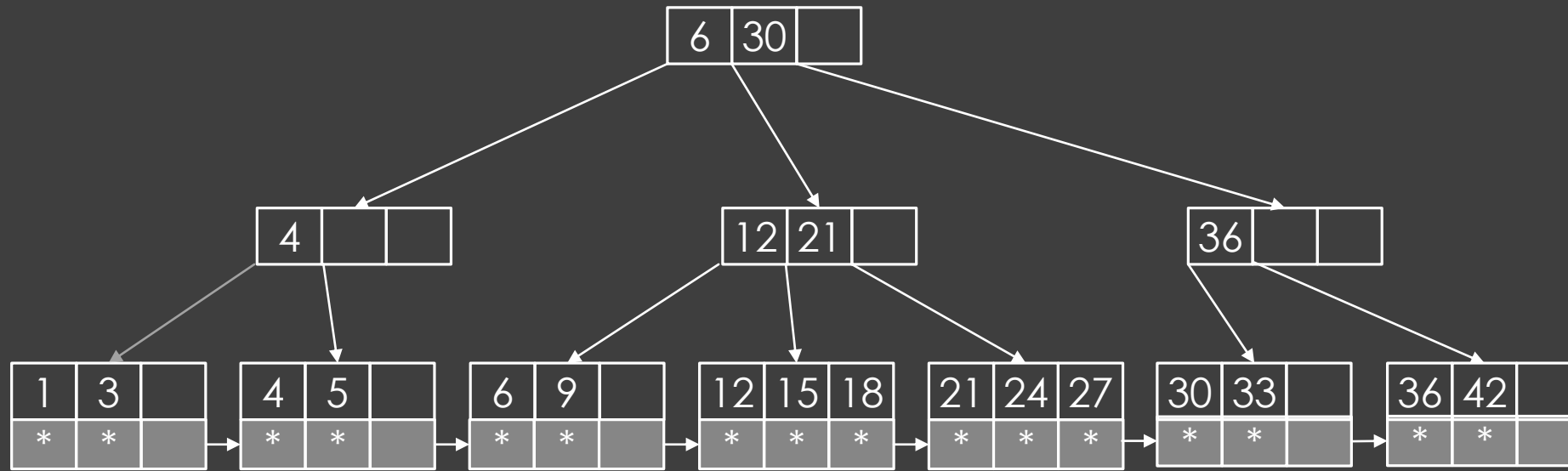
NODE! BORROW A KEY FROM A SIBLING



B-TREE: BORROWING A KEY FROM A SIBLING

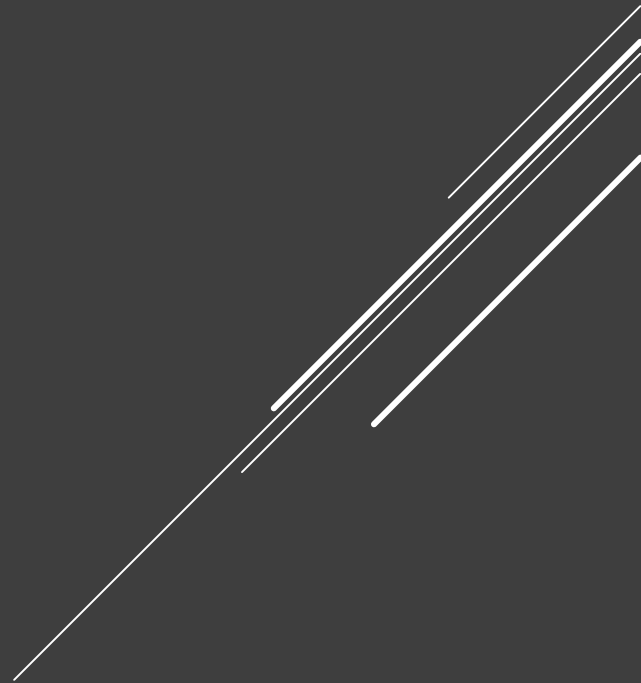


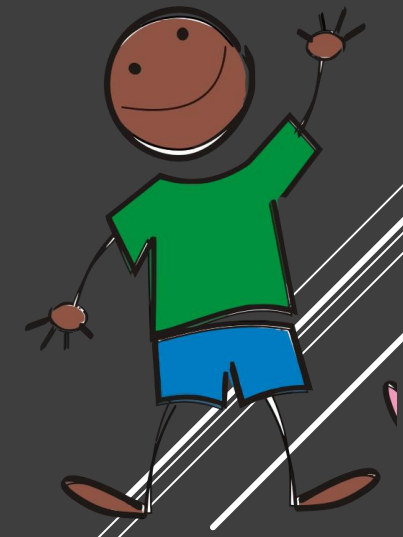
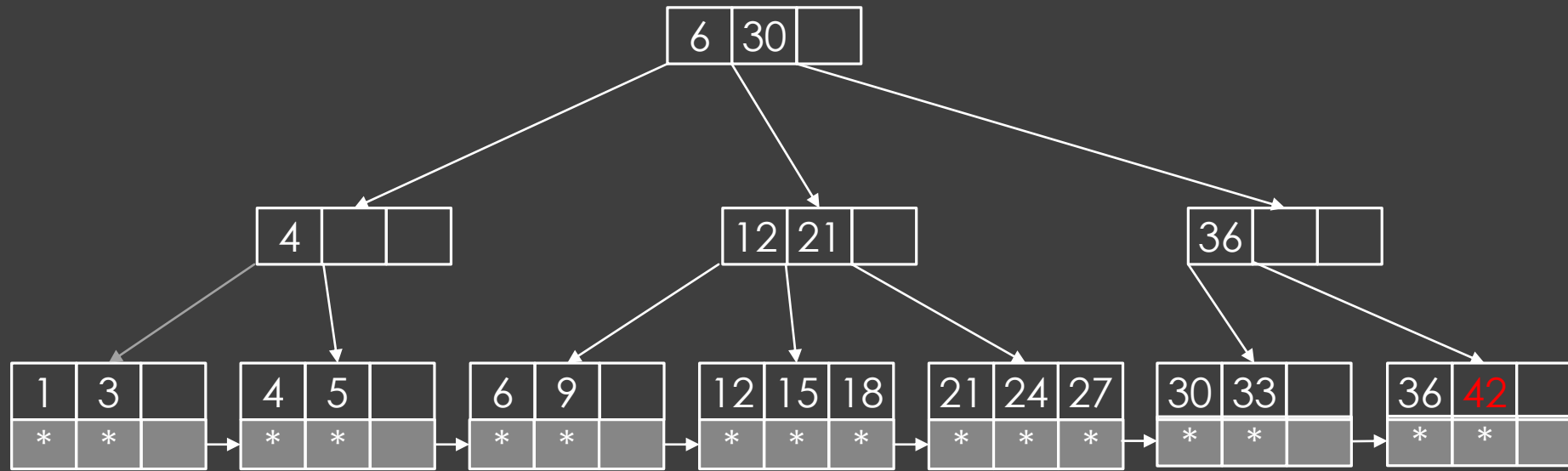
B-TREE: UPDATING PARENT NAVIGATION



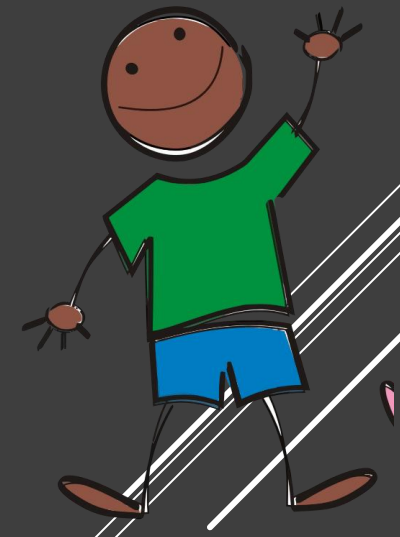
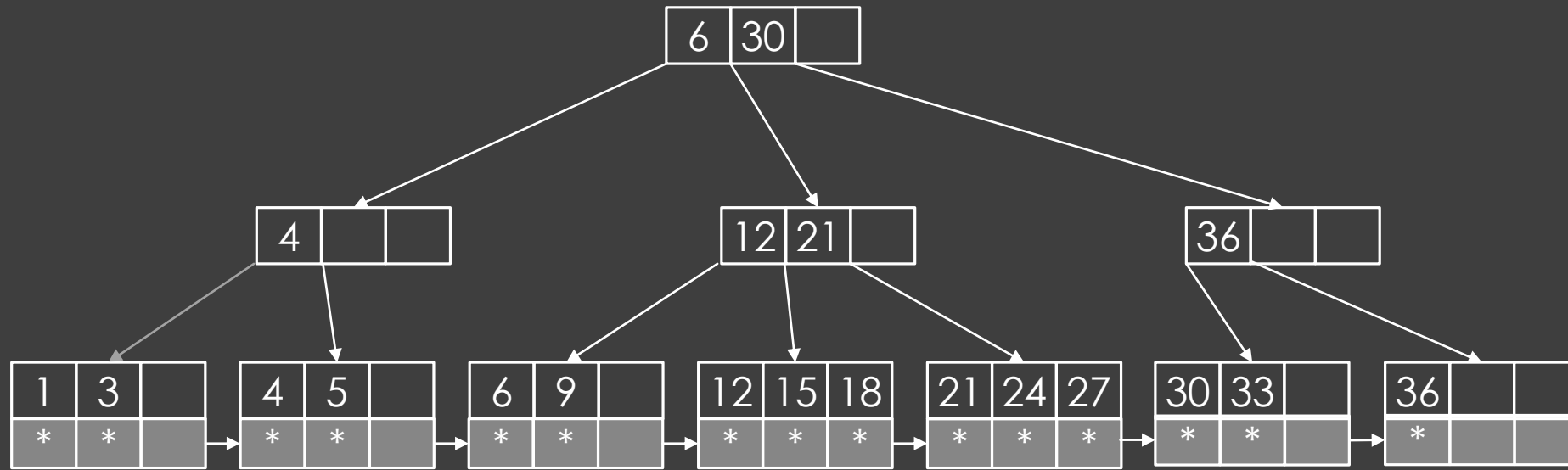
B-TREE: DONE FOR NOW

PART 4. ANDREW

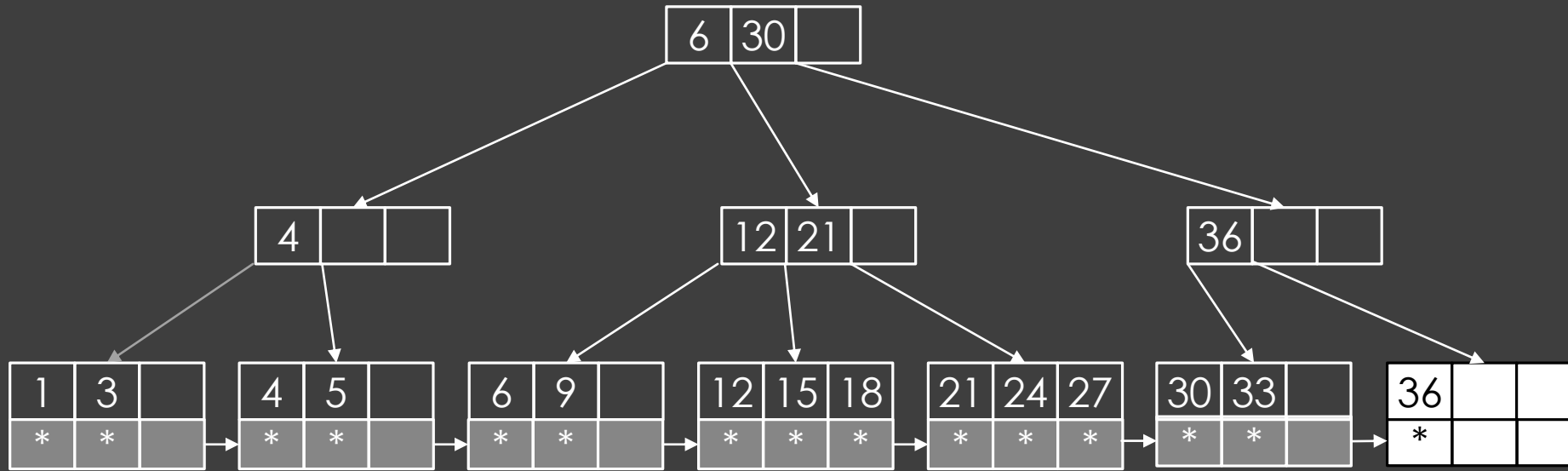




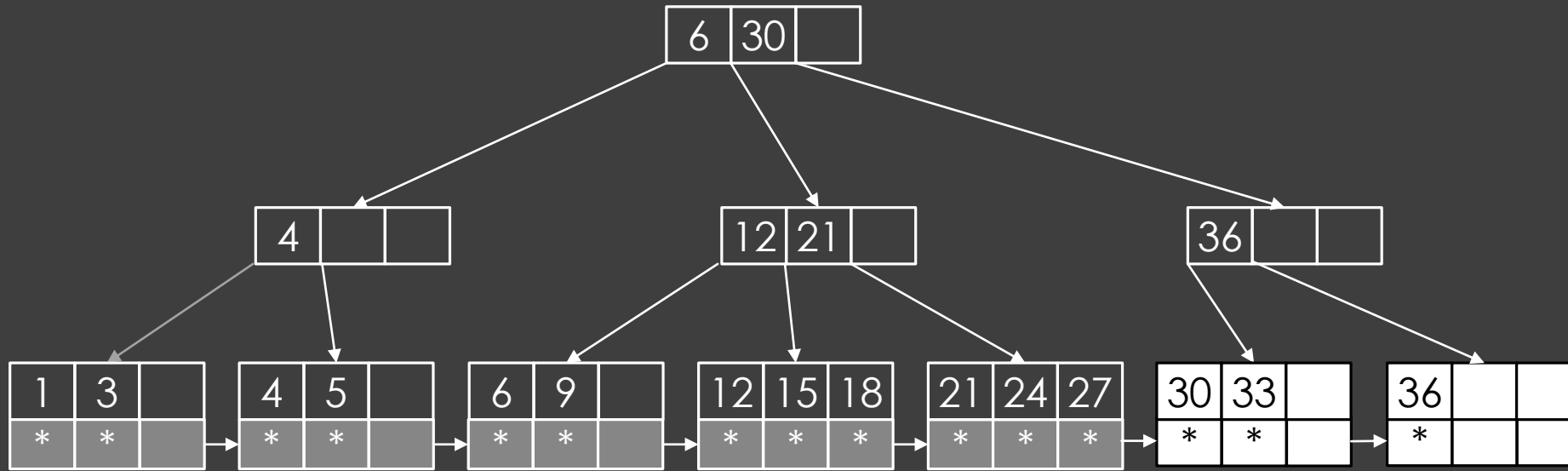
ANDREW IS LEAVING PERMANENTLY
FOR VIRGIN ISLANDS. REMOVE 42



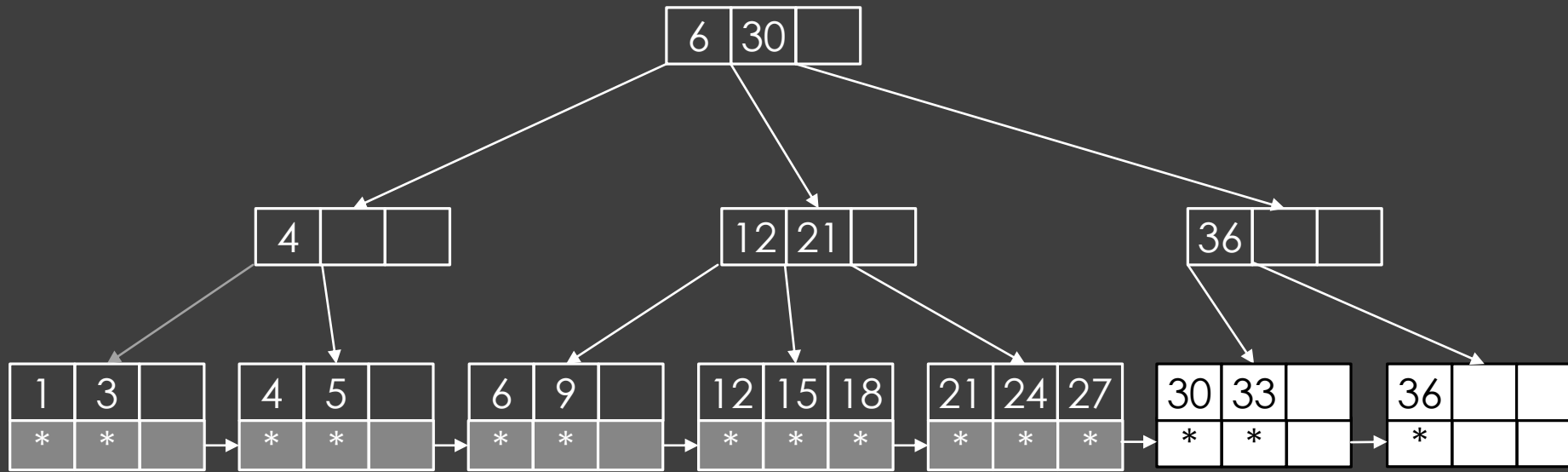
B-TREE: REMOVED 42



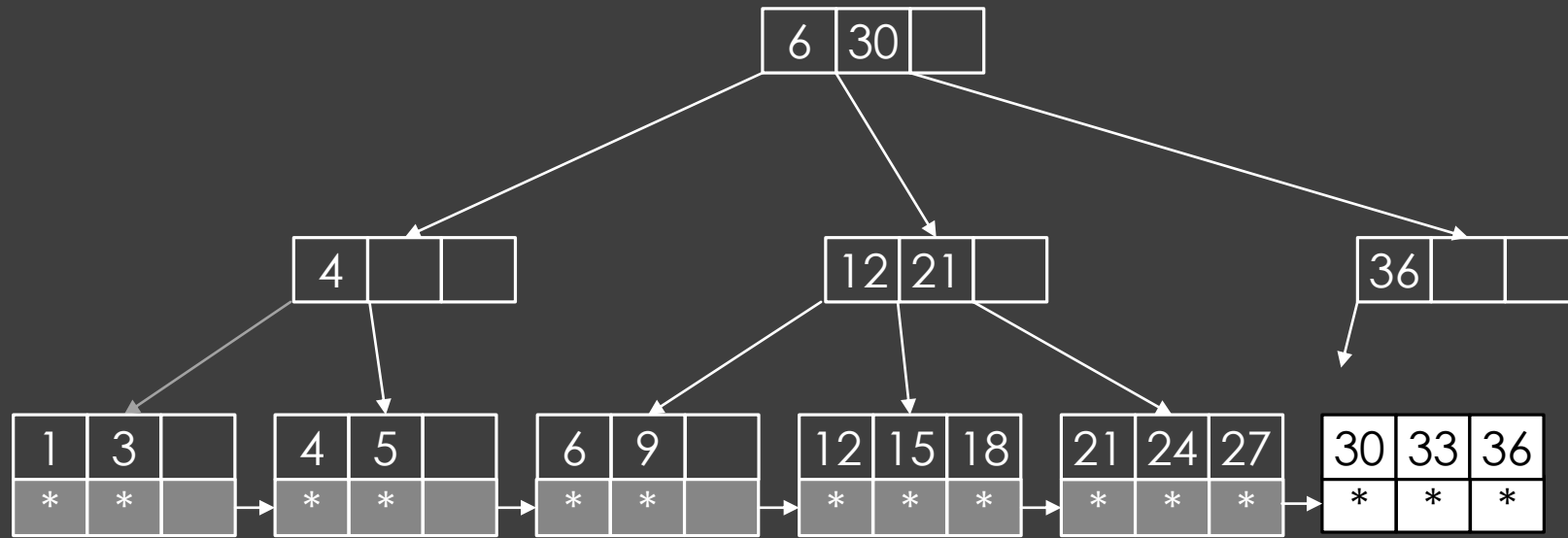
B-TREE: CANNOT HAVE
ONE CHILD POINTER PER LEAF NODE!



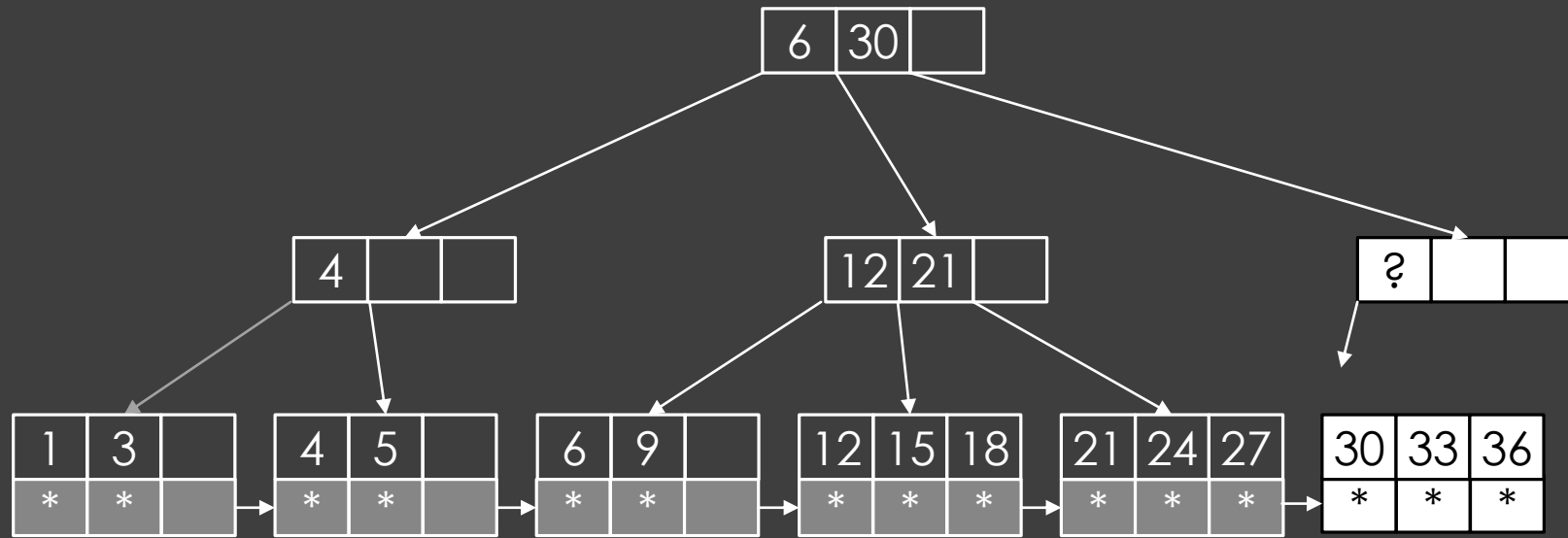
NODE! BORROW A KEY FROM A SIBLING.



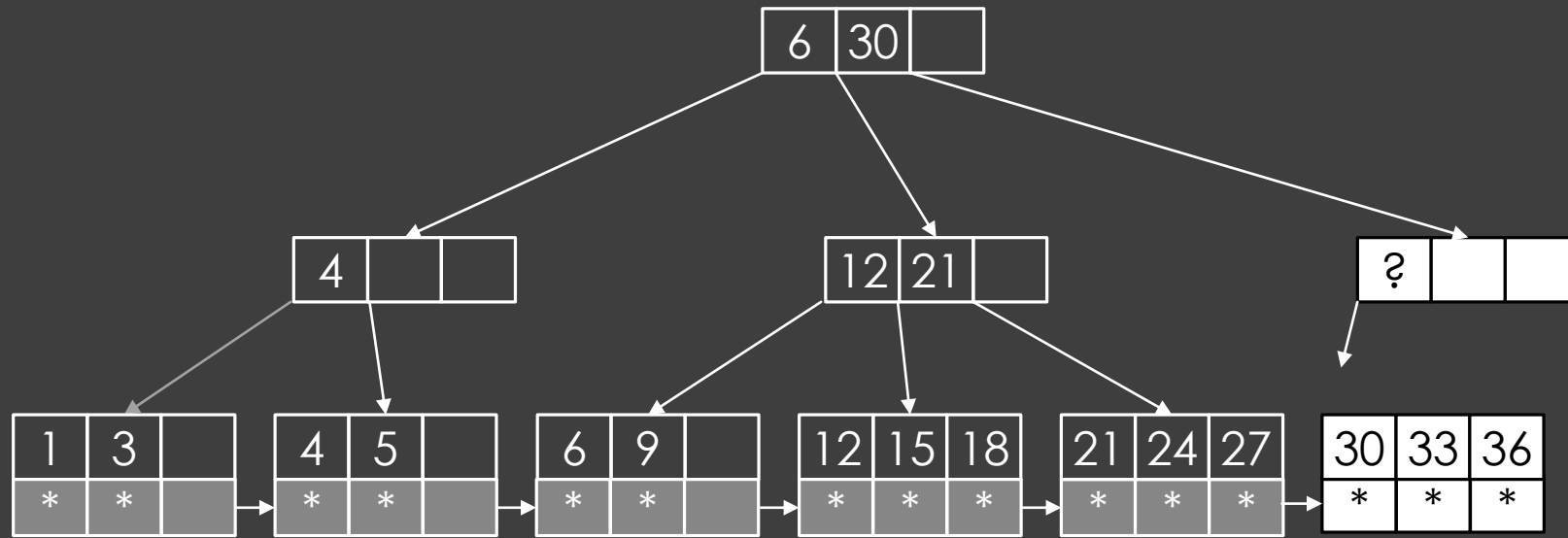
B-TREE: NO SIBLINGS WITH KEYS TO BORROW!



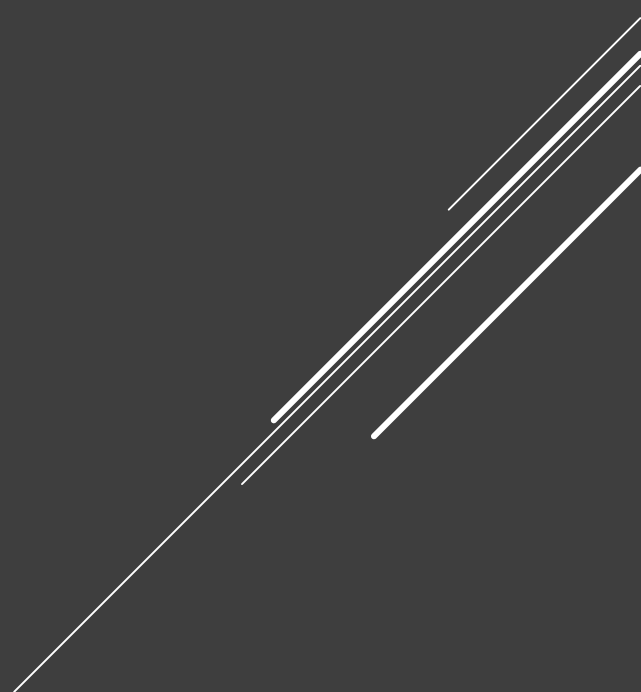
B-TREE NODE: MERGING WITH A HALF-EMPTY SIBLING

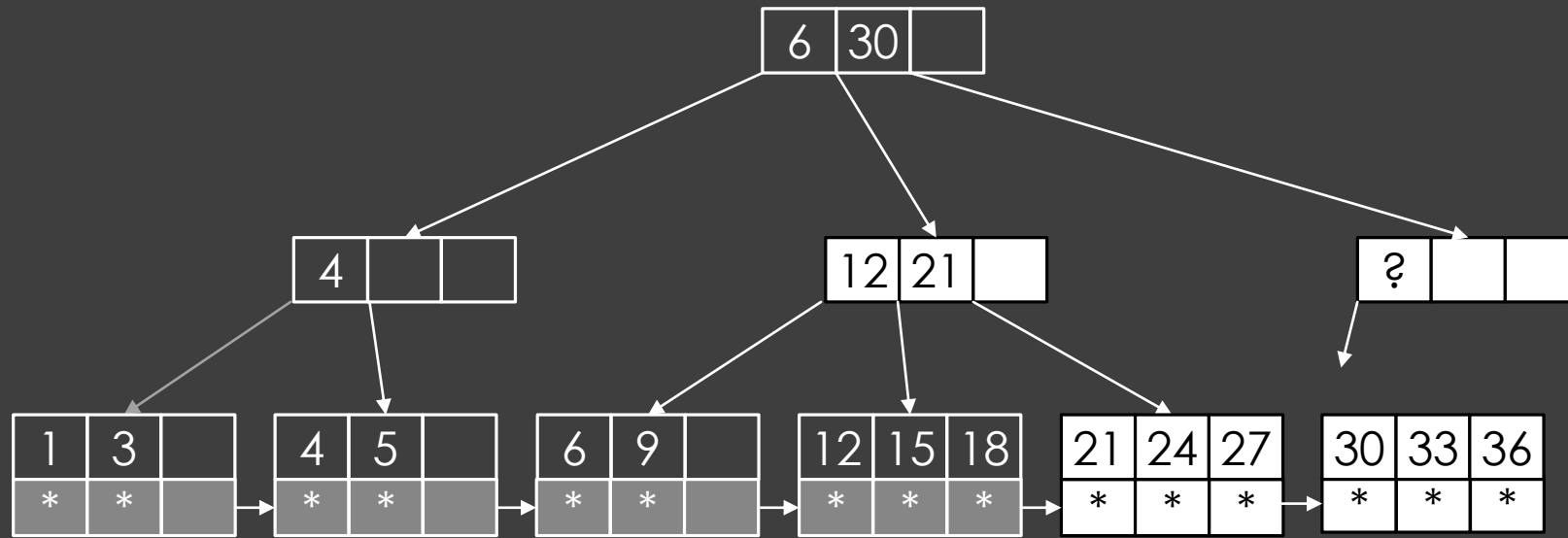


B-TREE: UPDATING PARENT NAVIGATION.

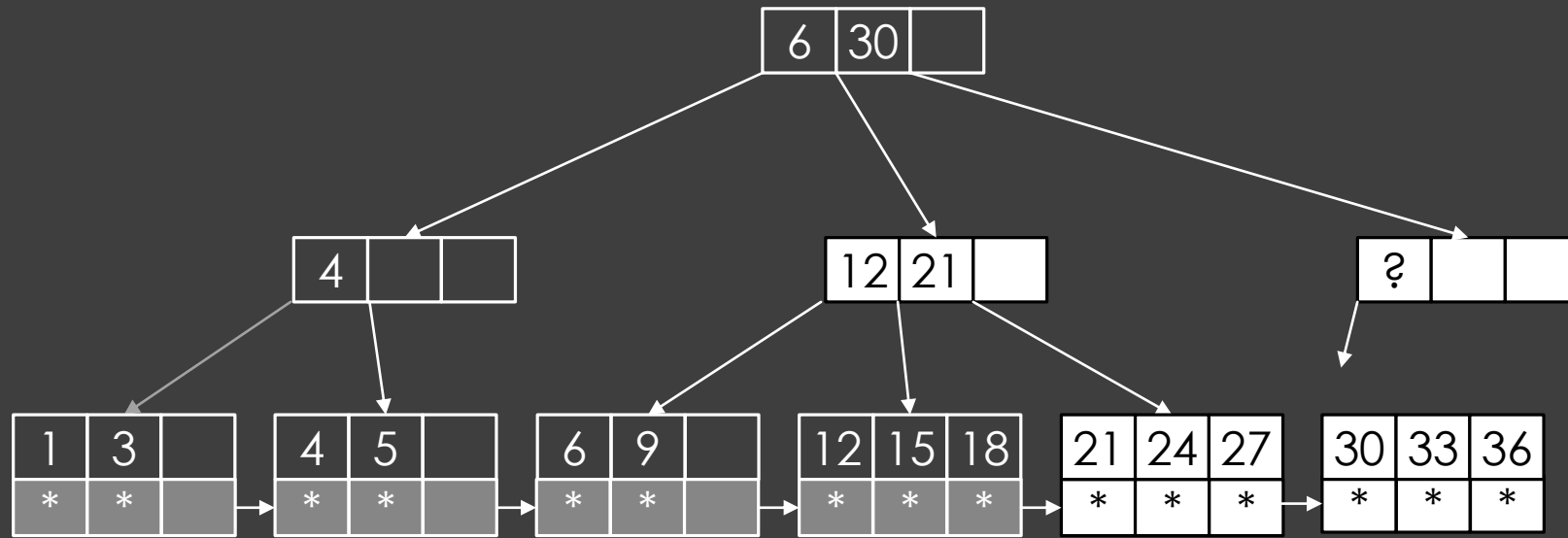


B-TREE: BUT PARENT NODE HAS ONLY ONE CHILD POINTER!

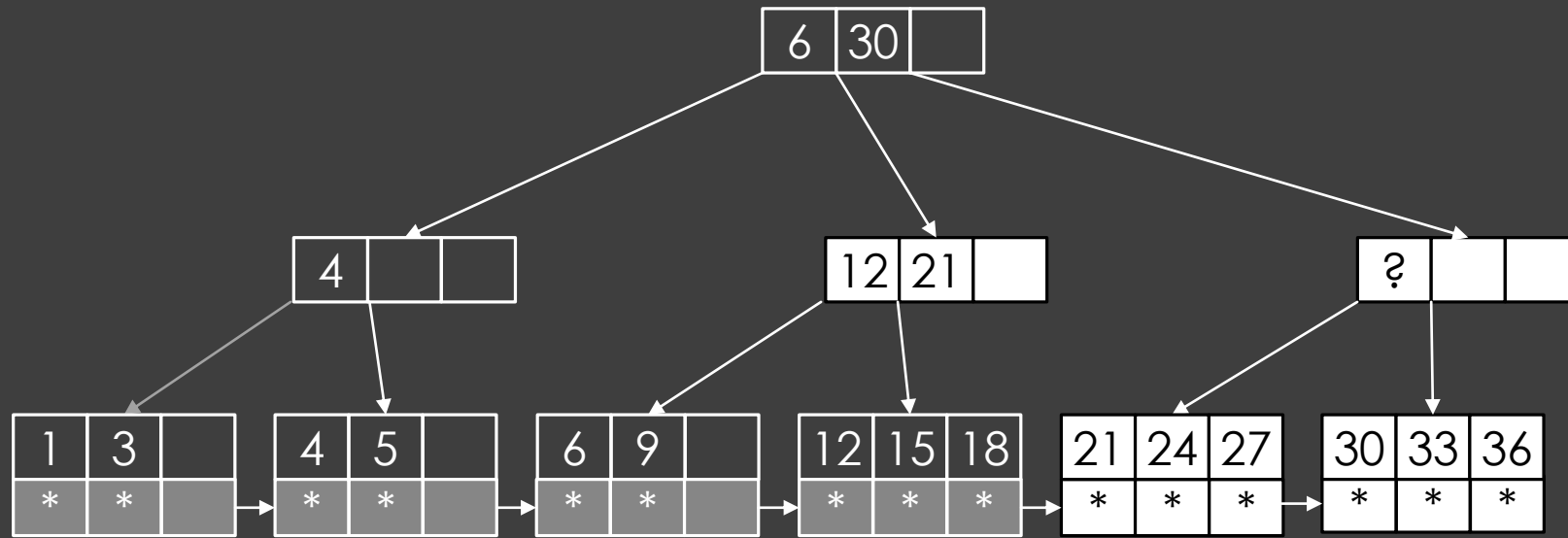




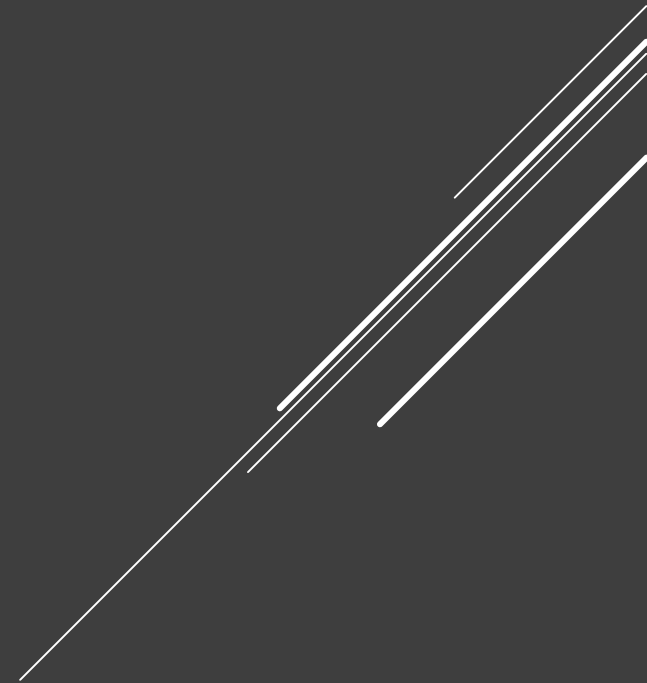
PARENT! BORROW FROM YOUR SIBLING!

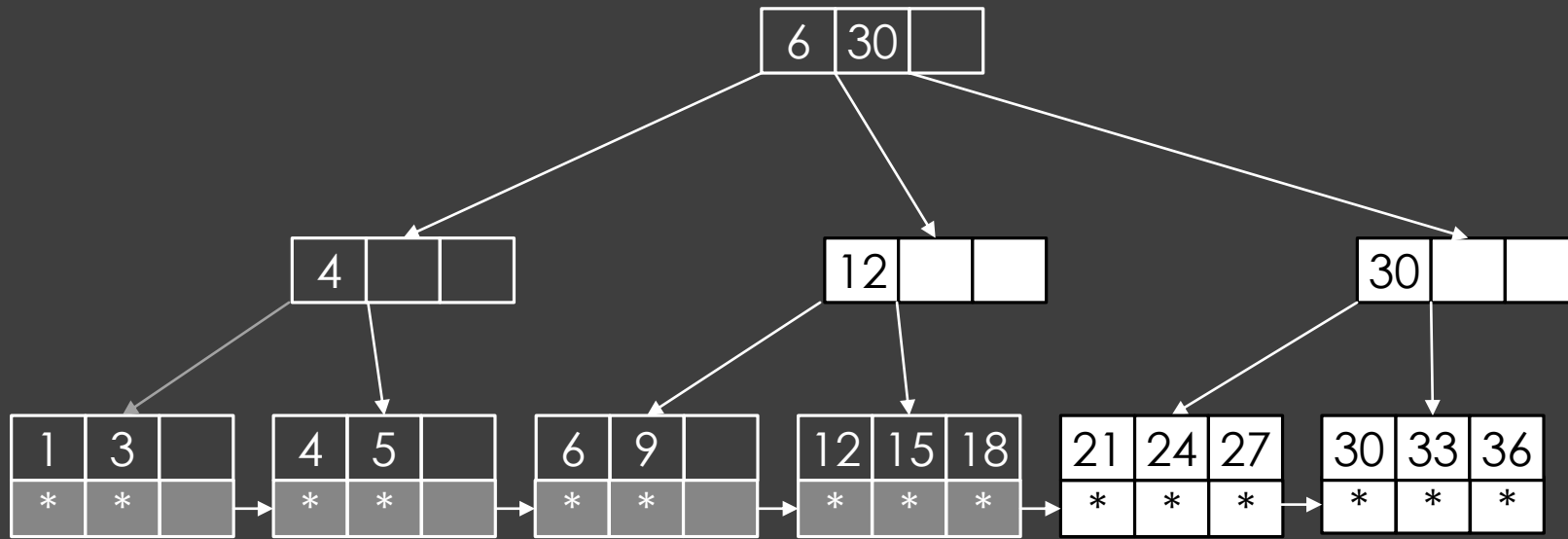


B-TREE: NEED AT LEAST TWO CHILDREN
 – BORROWING ONE CHILD

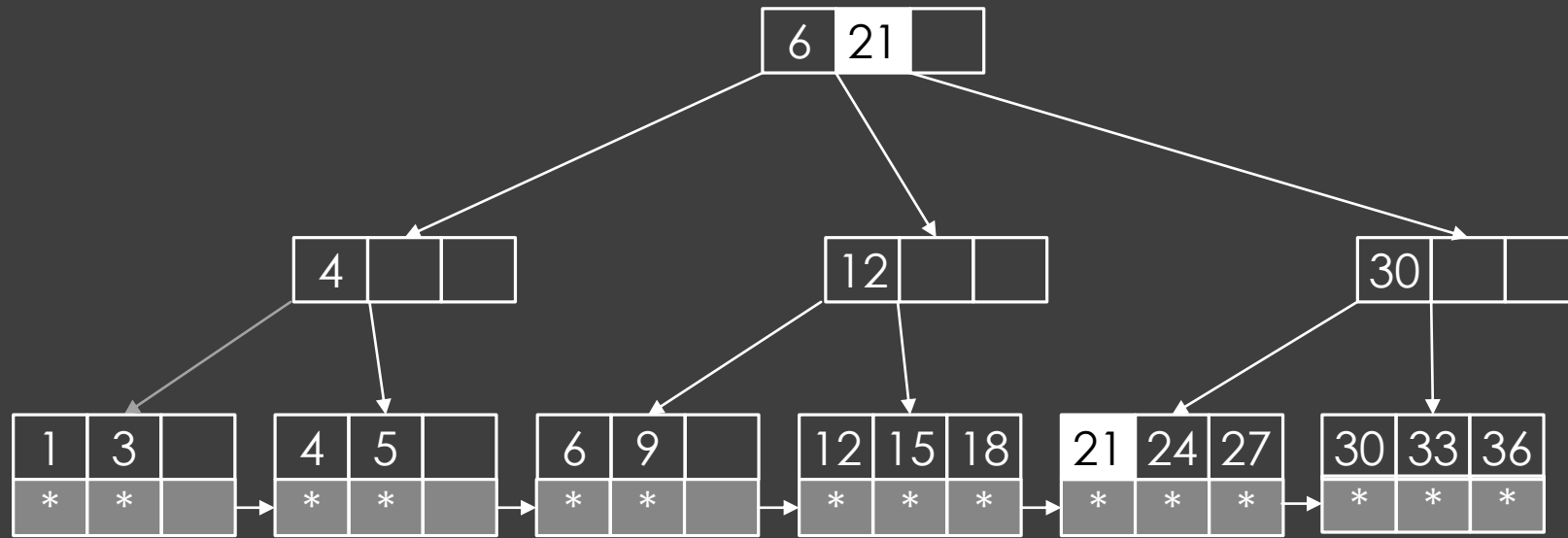


B-TREE: RE-ATTACHING CHILDREN

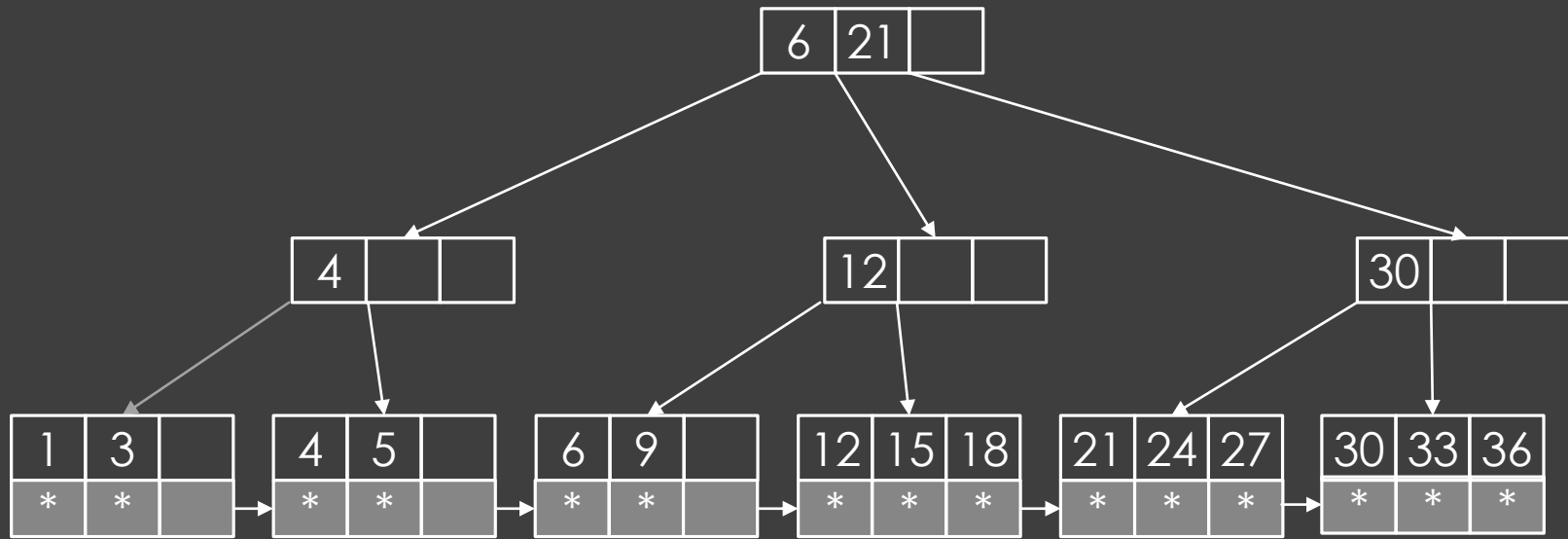




B-TREE: UPDATING NAVIGATION KEYS



B-TREE: UPDATING ROOT NAVIGATION KEYS



B-TREE: DONE FOR TODAY

THE END

