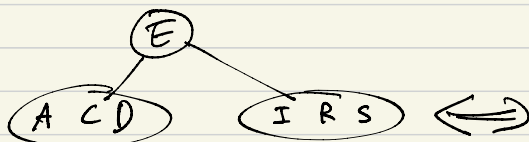


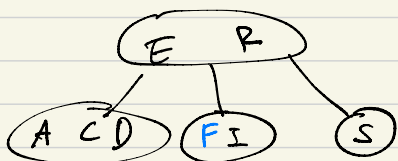

B-tree



insert F → split-child

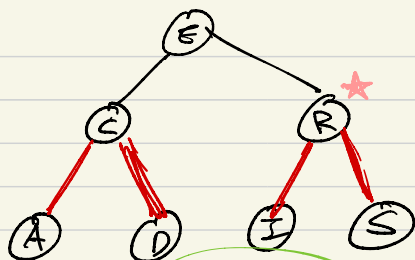


→ insert at bottom

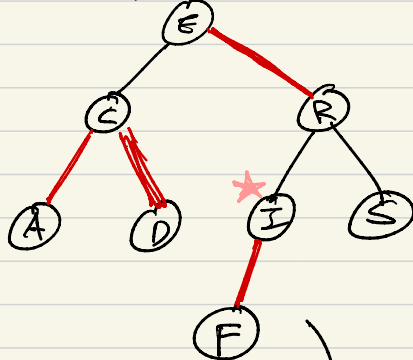


Split-child ~ Flip-color!

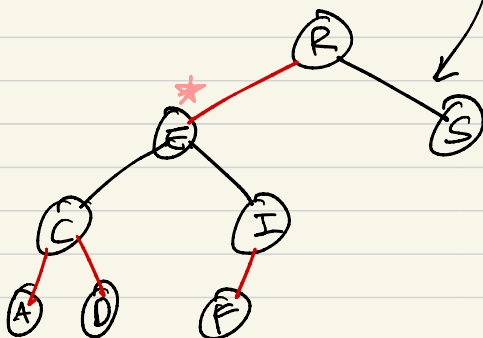
Red-black tree



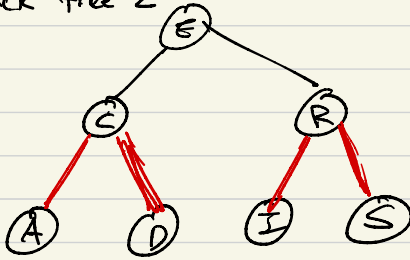
insert F → flip-color
→ insert at bottom



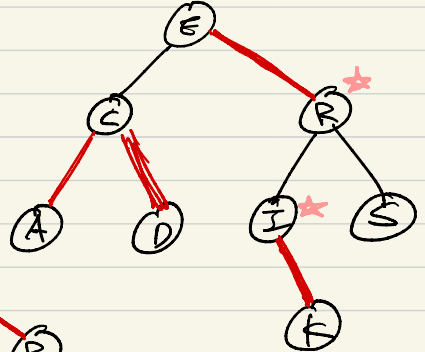
rotate-left



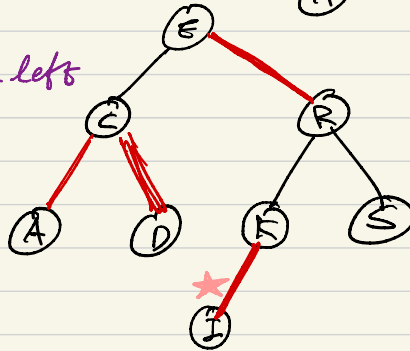
Red-black tree 2



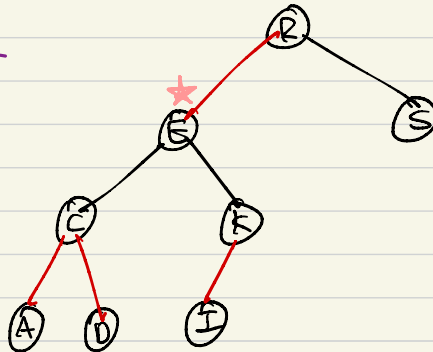
insert K \rightarrow flip-color
 \rightarrow insert at bottom



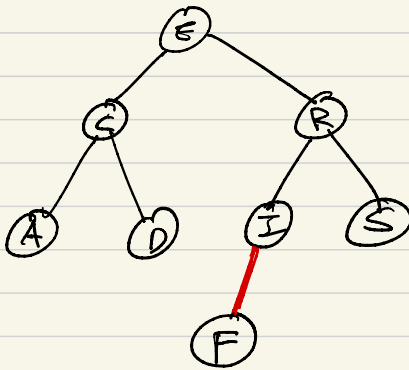
\rightarrow rotate-left



\rightarrow rotate-left

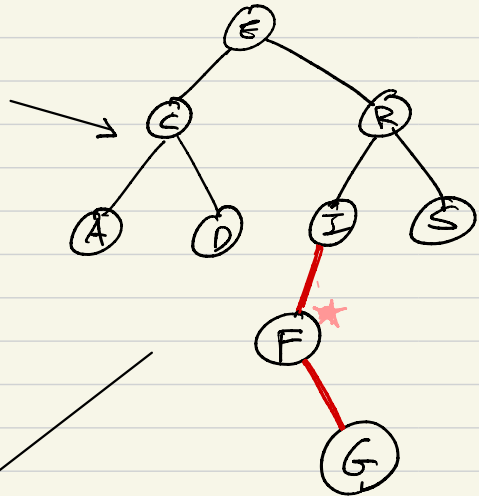


Red-black tree 3

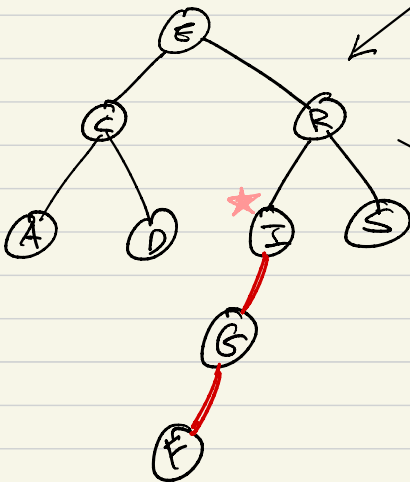


insert G

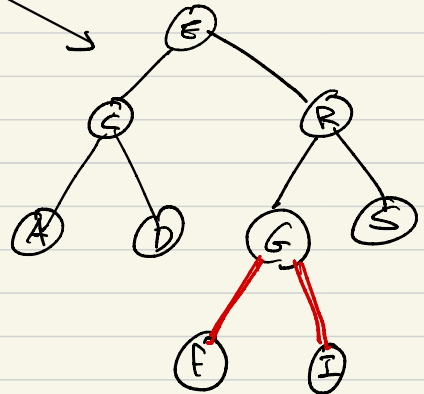
→ insert at bottom



rotate-left



rotate right



(B-tree) Rule : when inserting a value, if a child is full, then split.

(RB tree) Rule 1: when inserting a value, if both children are red, then flip.

(RB-tree) Rule 2: keep red left leaning and Black balance w/ rotation and flip