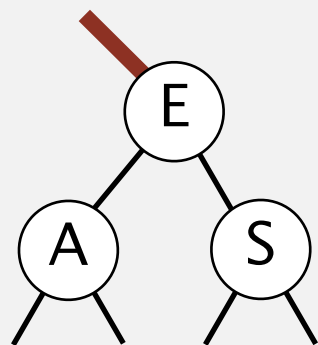


Insertion in a LLRB tree: overview

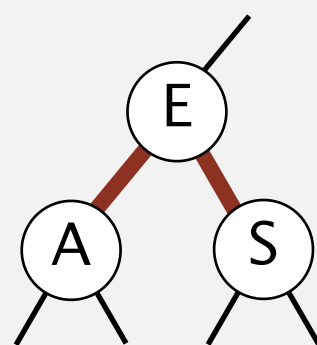
Basic strategy. Maintain 1-1 correspondence with 2-3 trees.

During internal operations, maintain:

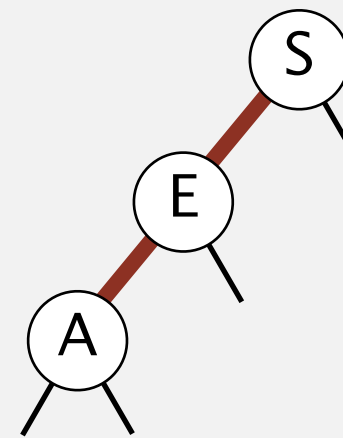
- Symmetric order.
 - Perfect black balance.
- [but not necessarily color invariants]



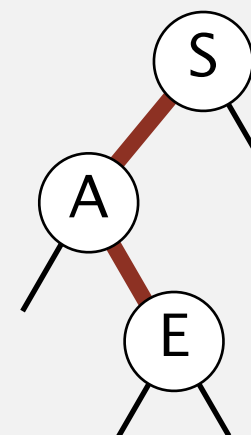
right-leaning
red link



two red children
(a temporary 4-node)



left-left red
(a temporary 4-node)



left-right red
(a temporary 4-node)

How? Apply elementary red-black BST operations: rotation and color flip.