

RED-BLACK TREE ALGORITHM

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Red-Black tree is a self-balancing binary search tree in which each node contains an extra bit for denoting the color the node, either red or black. A red-black tree satisfies the following properties:

- **Red/Black Property:** Every node is colored, either red or black.
- **Root Property:** The root is black.
- **Leaf Property:** Every Leaf (NIL) is black.
- **Red Property:** If a red node has children, then the children are always black.
- **Depth Property:** For each node, any simple path from this node to any of its descendent leaf has the same black-depth (the number of black nodes).

