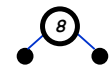
Pop Quiz-5

- Insert 8,6,9,11,4,5,12,7 to form a RBTree

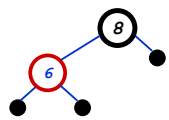
8,6,9,11,4,5,12,7



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.2

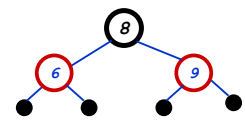
8,6,9,11,4,5,12,7



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.3

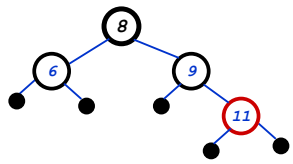
8,6,9,11,4,5,12,7



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.4

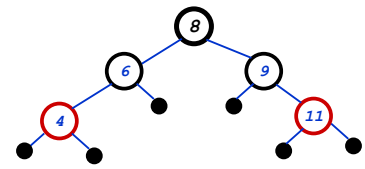
8,6,9,11,4,5,12,7



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.5

8,6,9,11,4,5,12,7

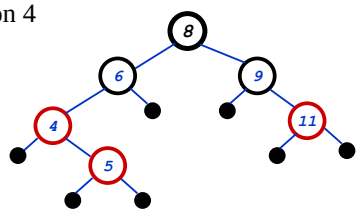


Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.6

8,6,9,11,4,5,12,7

- Rotate-left on 4

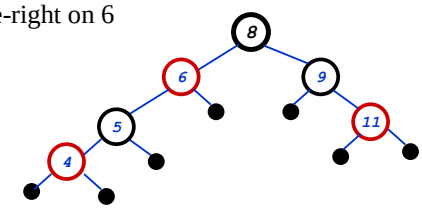


Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.7

8,6,9,11,4,5,12,7

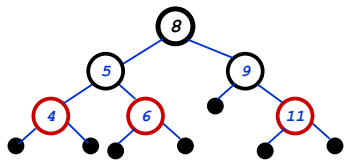
- Rotate-right on 6



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.8

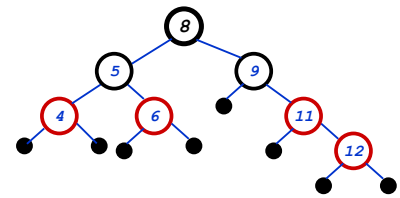
8,6,9,11,4,5,12,7



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.9

8,6,9,11,4,5,12,7

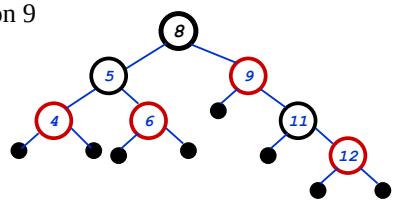


Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.10

8,6,9,11,4,5,12,7

- Left-Rotate on 9

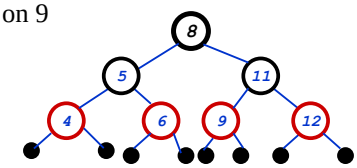


Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.11

8,6,9,11,4,5,12,7

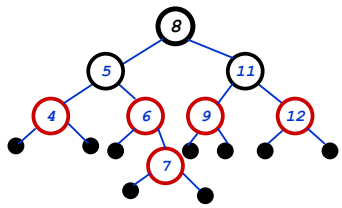
- Left-Rotate on 9



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

L13.12

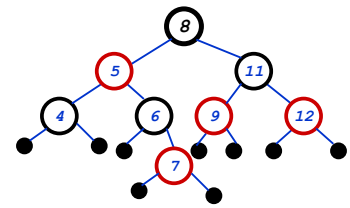
8,6,9,11,4,5,12,7



Red-black properties:
1. Every node is either red or black
2. The root is always black
3. Every leaf (NIL pointer) is black
4. If a node is red, both children are black
5. Every path from node to descendent leaf contains the same number of black nodes

8,6,9,11,4,5,12,7

- Done



Red-black properties:
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RB Tree Visualization

- https://www.cs.usfca.edu/~galles/visualization/RedBlack.html