Homework 10: Algorithms and Data Structure

Blen Daniel

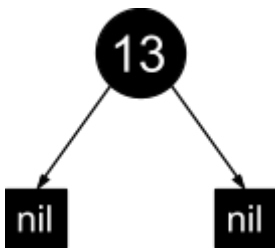**Problem 10.1** *Understanding Red-Black Trees*

a) Using Preorder transversal (Root, Left, Right)

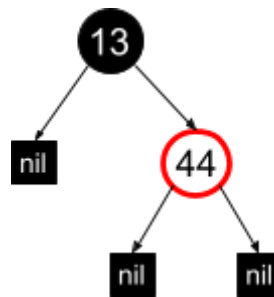**array = [13, 44, 37, 7, 22, 16]**
Insertions from left to right

Normal Insertion:
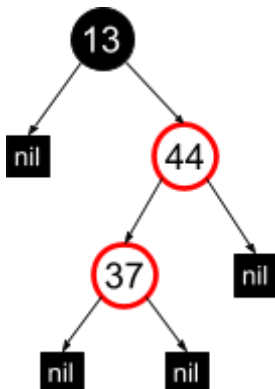
1st insertion: array[0] = 13

Preorder (Root, Left, Right) :
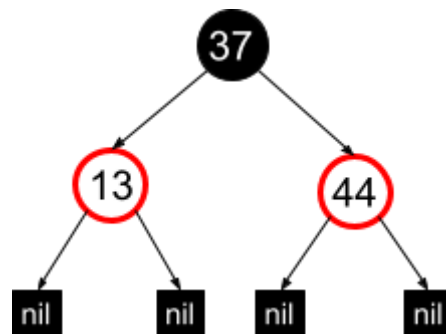**[13]**

2nd insertion: array[1] = 44

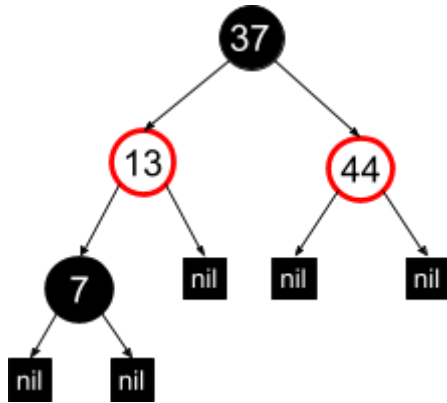Preorder (Root, Left, Right):
[13, 44]

3rd insertion: array[2] = 37

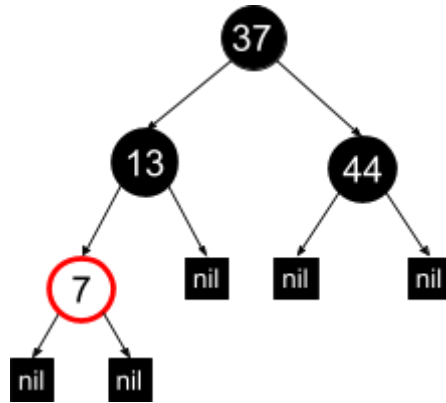
Preorder (Root, Left, Right):
[13, 44, 37]

After fix:

Preorder (Root, Left, Right) :
[37, 13, 44]
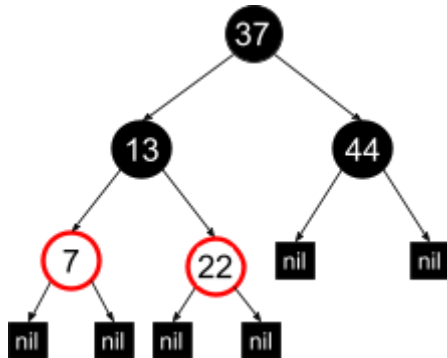
4th insertion: array[3] =7

After fix:

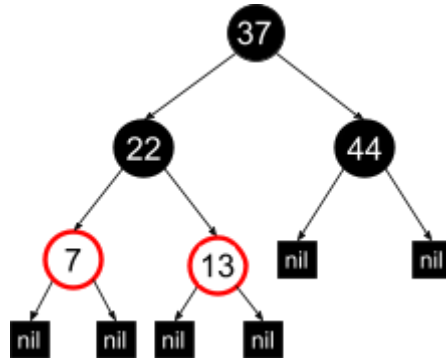Preorder (Root, Left, Right) :
[37,13, 7, 44]

Preorder (Root, Left, Right) :
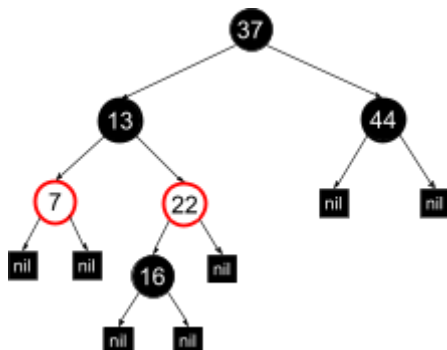**[37,13,7, 44]**

5th insertion: array[4] = 22

After fix:
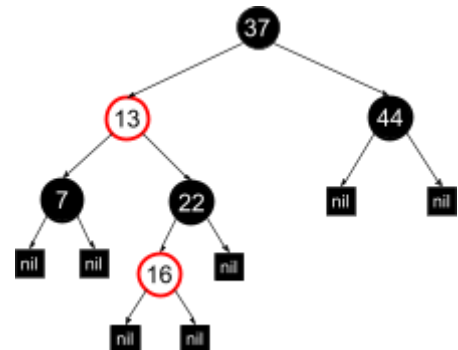

Preorder (Root, Left, Right) :
[37,13,7, 22, 44]

Preorder (Root, Left, Right) :
[37, 22, 7, 13, 44]

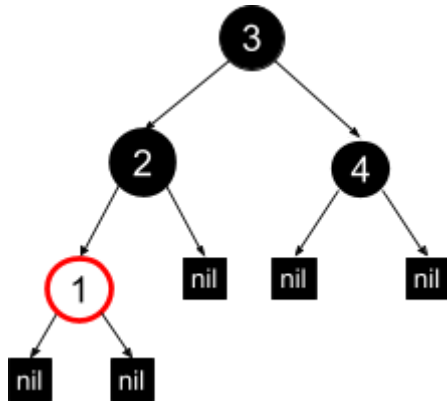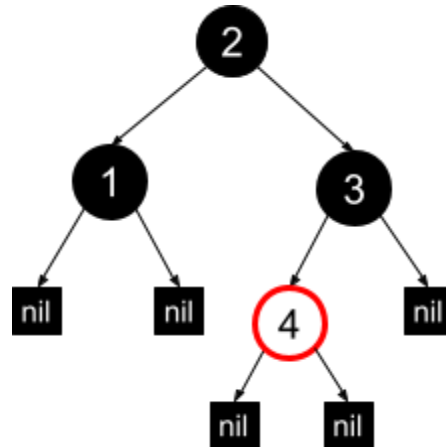6th insertion: array[5] = 16

After fix:

Preorder (Root, Left, Right) :
[37,13,7, 22, 16, 44]

Preorder (Root, Left, Right) :
[37,13,7, 22, 16, 44]

b) There are only two cases for {1, 2, 3, 4}

Preorder (Root, Left, Right) :
[3,2,1, 4]

Preorder (Root, Left, Right) :
[2,1,3, 4]

Problem 10.2 *Implementing Red Black Trees*

Implementation can be found in the RBT folder.