Algorithms and Datastructures assignment 3

Thomas Broby Nielsen (xlq119)
Tobias Overgaard (vqg954)
Christian Buchter (zvc154)

28. maj 2015

Indhold

1 Task 1

```
get-kth-key(x,k)
1 if k < 0 or k > x.max
2    return NILL
3 else
4        if k > x.left.size
5           get-kth-key(x.right,k-x.left.size)
6        if k < x.left.size
7           get-kth-key(x.left,k)
8        if k = x.left.size
9           return x+1
```

2 task 3

```
sized-Left-Rotate(T,x)
1 y=x.right
2 x.right=y.right
3 if y.right=! T.nil
4    y.right.p=x
5 x.right.left=y.left
6 if y.left=! T.nil
7 y.left.p=x.right
--------
everything from here on is normal.
```

This way the size of x will not change when rotated.

3 Task 4

```
RB-INSERT(T, z)
1 y = T.nil
2 x= T.root
3 while x=! T.nil
4         y = x
5         if z.key < x.key
6            x.size=x.size+1
7            x=x.left
8         else x.size=x.size+1
9                x=x.right
-------
everything rom here on is normal.
```

4 Task 5

Da ændringerne på algortimen ikke påvirker køretiden er køretiden stadig O(lg n)