Solutions for Data Structures and Algorithms Spring 2023 — Problem Sets

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March 15, 2023

Week 8. Problem set
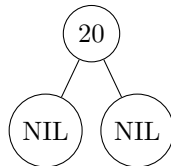
1. Insert the following keys into an initially empty red-black tree [Cormen, Chapter 13]:
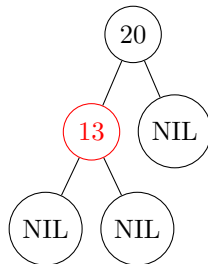
$$20, 13, 10, 7, 9, 1$$

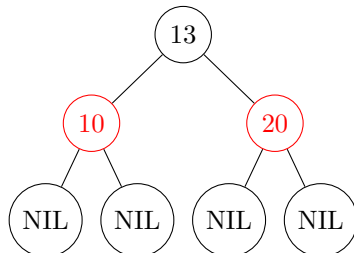Show the state of the tree after each insertion (your answer must contain 6 trees).

Answer.

(a) After inserting 20:
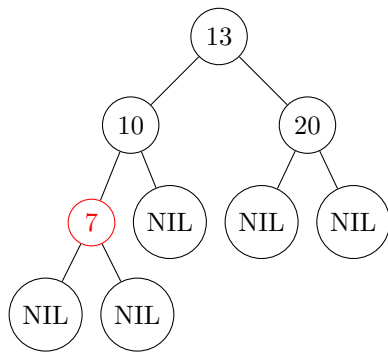

(b) After inserting 13:
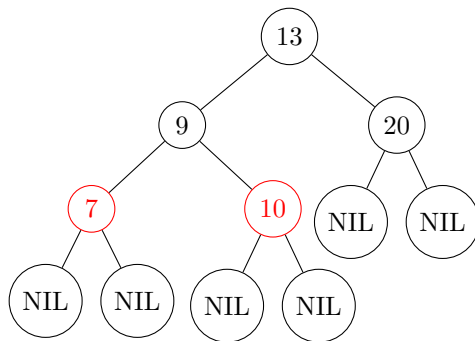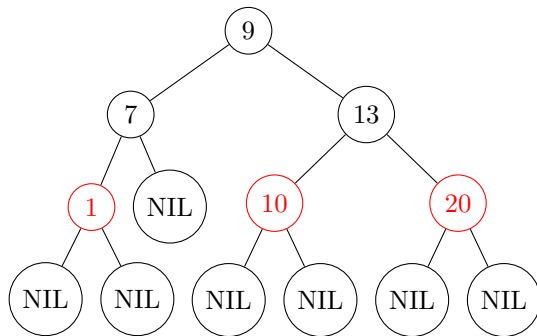

(c) After inserting 10:

(d) After inserting 7:

(e) After inserting 9:
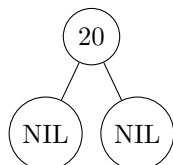
(f) After inserting 1:

2. Insert the following keys into an initially empty AVL tree [Goodrich, Section 11.3]:
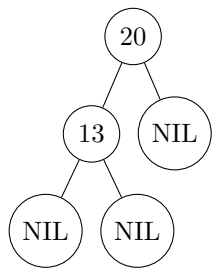
$$20, 13, 10, 7, 9, 1$$

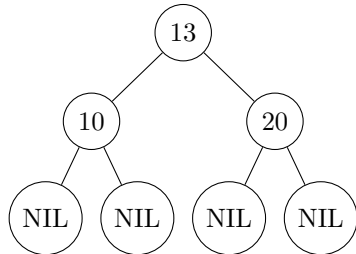Show the state of the tree after each insertion (your answer must contain 6 trees).
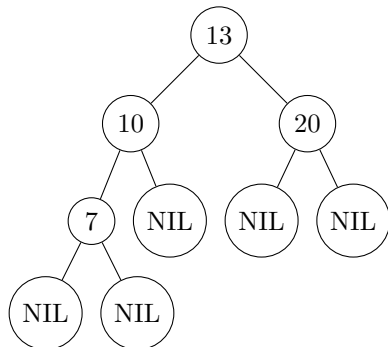
Answer.

(a) After inserting 20:
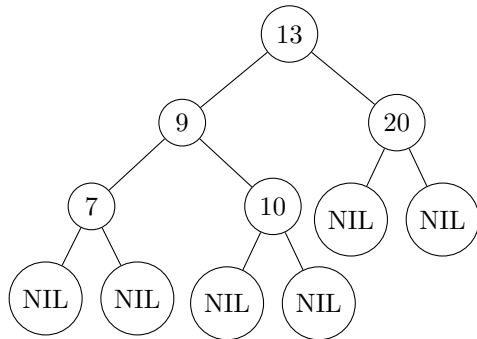
(b) After inserting 13:
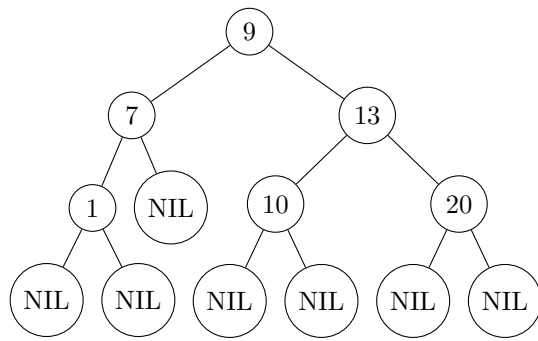
(c) After inserting 10:

(d) After inserting 7:

(e) After inserting 9:

(f) After inserting 1:

References

[1] T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein. *Introduction to Algorithms, Fourth Edition.* The MIT Press 2022.

[2] M. T. Goodrich, R. Tamassia, and M. H. Goldwasser. *Data Structures and Algorithms in Java.* WILEY 2014.