CMSC 341 Data Structures

Splay Tree Review

These questions will help test your understanding of the splay tree material presented in class. Note that the splay tree presented in class is a "bottom-up" splay tree. These questions are only a study guide. Questions found here may be found on your exam, although perhaps in a different format. Questions NOT found here may also be on your exam. The splay tree rules *may* be provided with your exam. Check with your instructor. Please refer to the Splay tree class definitions in the text.

1. Define *splay tree.*

2. Describe the splay operation.

3. Show the result of inserting the values **2, 1, 4, 5, 9, 3, 6, 7** into an empty splay tree. Show the tree at the end of each insertion. Show each rotation.

4. Explain, in English, how to insert a new element into a splay tree. Be sure to discuss the case in which a duplicate element is inserted.

5. Explain, in English, how to find an element in a splay tree. Bu sure to discuss the case in which the element is not found.

6. Explain, in English, how to remove an element from a splay tree. Be sure to discuss the case in which the element to be removed is not in the tree.

7. What does the following statement mean? In particular, what does "*m*" represent?

   "A splay tree has $O(m \lg n)$ amoritized performance over a sequence of insert, remove and find operations."

8. For splay tree operations, we use amortized analysis rather than asymptotic analysis.
   a. What is amortized analysis?
   b. How is amortized analysis different than asymptotic analysis?
   c. Why must amortized analysis be used for splay trees?