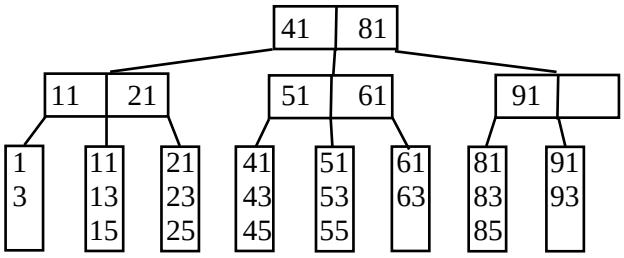
ECS 60 **Written Homework #3: Trees (to be continued)** **Fall 2015**

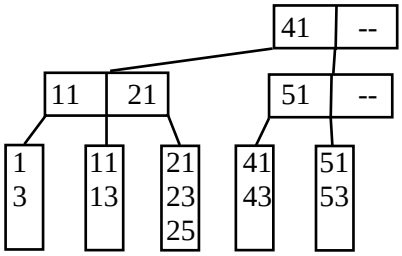
Due Wednesday, October 23rd, 4:00 pm in 2131 Kemper

1. (5 points, 1 point each) For the following M = 3 and L = 3 BTree as the starting point for each part, draw the BTree that would result after the specified insertion. Sean's Rule for Insertion: Give left, give right, else split.



a. 95
b. 84
c. 44
d. 54
e. 22

2. (5 points, 1 point each) For the following M = 3 and L = 3 BTree as the starting point for each part, draw the BTree that would result after the specified series of deletion. Sean's Rule for Deletion: Borrow left, merge left, borrow right, merge right.



a. 21
b. 43
c. 51
d. 3, 11
e. 3, 53

3. Describe a modification to the binary search tree data structure that would allow you to find the median entry, that is the entry with rank $\lfloor n/2 \rfloor$, in a binary search tree. Describe both the modification and the algorithm for finding the median assuming all keys are distinct. (Goodrich, p. 494).

Sources of questions:

Thomas H. Cormen, Charles E. Leiserson, and Ronald L. Rivest, *Introduction to Algorithms*, New York, New York, McGraw-Hill, 1990.

Adam Drozdek, *Data Structures and Algorithms in C++, Second Edition*, Pacific Grove, CA, Brooks/Cole, 2001.

Michael T. Goodrich, Roberto Tamassia, and David Mount, *Data Structures & Algorithms, Second Edition*, Hoboken, NJ, John Wiley & Sons, 2011.

Mark Weiss, *Data Structures and Algorithm Analysis in C++, Fourth Edition*, New York, NY, Pearson Education, 2014.