

**CSC 212: Data Structures and Abstractions**  
**Fall 2018**  
**University of Rhode Island**  
**Weekly Problem Set #10**

Due Thursday 11/15 before class. Please turn in neat, and organized, answers hand-written on standard-sized paper **without any fringe**. At the top of each sheet you hand in, please write your name, and ID.

**1 2-3 Trees**

1. Draw a 2-3 tree after inserting the following elements: [6, 2, 8, 5, 10, 3, 1, 7, 9, 4]
2. What steps does a 2-3 tree search algorithm take when searching the drawn tree for 5? Assume that the lesser element of a 2-node is checked first.

**2 Left Leaning Red-Black Trees**

1. Draw a Red-Black tree after inserting the following elements: [1, 2, 3, 4, 5]
2. Can Red-Black Trees be represented as 2-3 trees? If so, how?
3. Why is it advantageous to have balanced trees?
4. True or False: as you insert nodes into a Red-Black Tree, the height is non-decreasing.