

Homework 7

This homework is **NOT** a programming homework. The submission **MUST** be in PDF or JPEG format. You can use software like PowerPoint or Visio to plot figures. But your submission must be in PDF or JPEG.

Q1. Consider the following sequence of numbers: 15, 20, 24, 10, 13, 7, 30, 36, and 25. Insert these numbers one by one into an initially empty red-black tree, and illustrate the tree after each insertion. If rotation is needed, present the status before and after the rotation and indicate which rotation is applied. For each node, indicate the color for each node like 15(RED) or 30(BLACK), Ensure that the tree maintains its red-black properties throughout the process.

Q2. Given the following sets: $A = \{2, 4, 6, 8, 10\}$, $B = \{1, 3, 5, 7, 9\}$, $C = \{1, 2, 3, 4, 5\}$, and $D = \{5, 6, 7, 8, 9\}$. Calculate the following set operations and provide the resulting sets: $A \cup B$, $A \cap C$, and $(C \cap D) \Delta (A \cap B)$. (\cup stands for union, \cap stands for intersection, Δ stands for difference)

1. [5%] The Following identification information must be included at the beginning of your pdf file.

//Name: XXXXXXXX

//Email: XXXX@csueastbay.edu

2. [5%] The image is clear to read
3. [45%] Question 1
4. [45%] Question 2