

CS-230 Data Structures
Test 3
Part III (Programming Question)
2 Points

Important Instructions:

1. Answer either Question 1 or Question 2 to fulfill the requirements of this exam.
2. Answer both questions for a bonus of 2 points.
3. It is your responsibility to identify which question should be graded for the fulfillment of the requirements of this exam and which question should be graded as the bonus.
 - Identify the question that you choose to be graded for the fulfillment of the requirements of this exam and submit the zip file containing all files in the solution to that problem in the drop box labeled as **Part III** on Angel.
 - Identify the question that you choose to be graded for the bonus points and submit the zip file containing all files in the solution to that problem in the drop box labeled as **Bonus** on Angel.
4. It is your responsibility to submit the correct zip files containing ALL components. If for whatever reason I cannot open the form file or code file within a project, your score on that project will be zero (0). Please ask and seek help if you are not sure how to zip a file.

1. Converting a Number from Binary to Decimal.

Write a program that converts binary numbers into decimal numbers. Your program must use standard I/O and must allow the user to choose when to stop. You may assume that given binary numbers represent nonnegative integers only. Test your program for the following values:

11000101

0000

01

10101010

111111

10000000

1111100000

2. Adding Functions to Binary Search Tree Class

Add the following two functions to the `class BST` developed in class. Test your functions.

- Function `swapSubtrees` that swaps all of the left and right subtrees of a binary tree.
- Function `singleParentNodes` that returns the number of nodes in a binary tree that have only one child.