22C:060: Computer Organization
Spring 2010
Assignment 3
Total points = 50
Assigned Feb 25, due March 9, 2010, 11:59:59 PM

Instructions to prepare and submit your homework

1. Explain the general plan of each program using a **readme** file

2. Be generous about using comments to improve readability.

3. To submit the program, *zip* (or *tar*) them into a single file, and submit it to ICON drop box

Question 1 (20 points)

Use the SPIM simulator to write a program that will count the occurrence of substring of characters in a given text. Thus, in a text "I do not like the spim simulator" the substring "im" occurs twice, and the substring "ike" occurs once, but the substring "x" does not appear even once, so the answers will be 2, 1, and 0 respectively.

 (a) Write a function **match** that will compare a string of length L with another string of the same length. If the strings are identical, then **match** will return 1, else match will return 0.

 (b) Now, write a program to scan the given text character by character, and use the function **match** to detect the match and count the number of matches.

Users should be able to enter a text of up to 50 characters, and a substring of up to 4 characters (using the prompts "Enter the text:" and "Enter the substring:" The result should be printed after the prompt "Count ="

Question 2 (30 points)

Part 1. Using the SPIM simulator, write a function ONETWO to simulate a 1-to-2 decoder (shown below) with one primary input X, one enable input E, and two outputs ZERO and ONE.
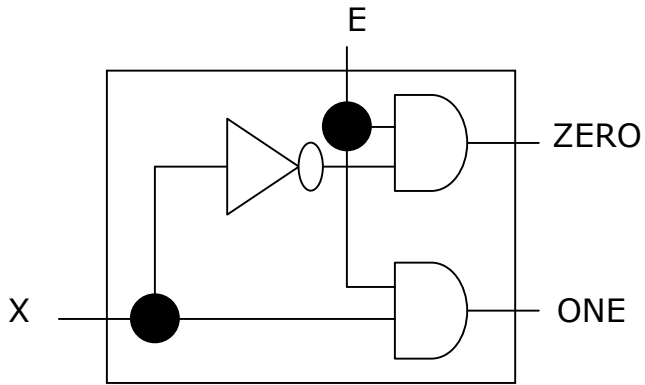
Part 2. Use ONETWO as a subroutine to compute the outputs D0-D7 of the following circuit for each value of ABC ranging from 000 to 111. Now, recognize the operation of the circuit that you simulated – what does it do?