ECE451 Homework #8

4.9 (Multiplexer Logic) Implement the function:

$$F(A,B,C,D,E) = A + \bar{C}D + B\bar{D} + \bar{B}D + \bar{B}CE$$

using a multiplexer and no other logic. The constants logic 1, logic 0, and the variable (but not their complements) are available. Try to use the smallest possible multiplexer.

4.11 (Multiplexer Logic) Implement the 2-bit adder function (i.e., 2-bit binary number AB plus 2-bit binary number CD yields 3-bit result XYZ) using three 8:1 multiplexers. Show your truth table and how you derived the inputs to the multiplexers.

4.18 (Regular Logic Implementation Methods) Given the following function in sum of products form (not necessarily minimized):

$$F(A,B,C,D) = A\bar{B}C + AD + AC$$

Implement the function F using

a. An 8:1 multiplexer
b. A 4:16 decoder with a 16-input OR gate
c. A 16-word ROM
d. A PLA-like structure using the notation of Section 4.2
e. A 4-input look-up table
f. A multiplexer-based logic module, such as that of Figure 4.41