HW7

1. The memory units that follow are specified by the number of words times the number of bits per word. (1) How many address lines and input-output lines are needed in each case? (2) Give the number of bits stored in the memories in each case. (a) 2M x 16 (b) 2G x 8.

2. Design a 8x5 RAM.

3. A 12-bit Hamming code word containing 8 bits of data and 4 parity bits is read from the memory. What is the original 8-bit data word that was written into memory if the 12-bit word read out is as: (a) 011001000110 (b) 101110110100

4. Tabulate the truth table for an 8x4 ROM that implements the Boolean functions.

   (a) $A(X, Y, Z) = \Sigma m(1, 2, 4)$
   (b) $B(X, Y, Z) = \Sigma m(3, 5, 7)$
   (c) $C(X, Y, Z) = \Sigma m(1, 2, 6, 7)$
   (d) $D(X, Y, Z) = \Sigma m(2, 3, 5, 6, 7)$

5. FPGA: The logic cell has four inputs (A, B, C, D) and one output (Z).
   (a)Draw the logic diagram of a simple logic cell with 4-bit inputs and 1-bit outputs.
   (b)Explain how the logic cell can finish the sum function in a full adder. (Z=A+B+C)