Seung Jun Baek

1. Consider the combinational circuit shown in Fig. P4.1 . (HDLsee Problem 4.49.)
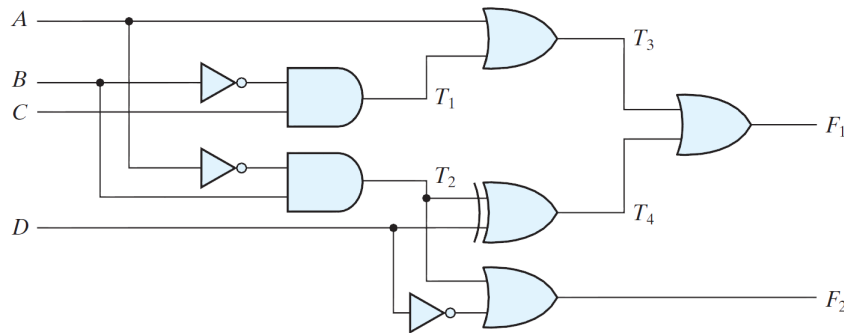

Figure 1: Figure P4.1

   (a) Derive the Boolean expressions for T_1 through T_4. Evaluate the outputs F_1 and F_2 as a function of the four inputs.

2. Obtain the simplified Boolean expressions for output F and G in terms of the input variables in the circuit of Fig. P4.2 .
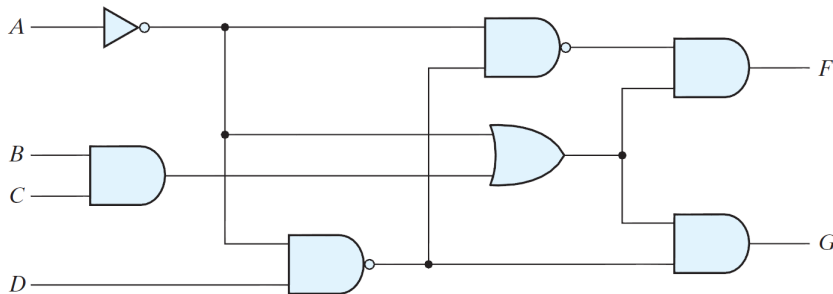

Figure 2: Figure P4.2

3. Design a combinational circuit with three inputs and one output. The output is 1 when the binary value of the inputs is less than 3. The output is 0 otherwise.

4. A majority circuit is a combinational circuit whose output is equal to 1 if the input variables have more 1s than 0s. The output is 0 otherwise. Design a 3-input majority circuit by finding the circuits truth table, Boolean equation, and a logic diagram.

5. Design a four-bit combinational circuit 2s complementer. (The output generates the 2s complement of the input binary number.) Show that the circuit can be constructed with exclusive-OR gates. Can you predict what the output functions are for a five-bit 2s complementer?

6. Consider the addersubtractor circuit learned in class has the following values for mode input M and data inputs A and B. Find the output for each input.

	M	A	B
(a)	0	0111	0110
(b)	0	1000	1001
(c)	1	1100	1000
(d)	1	0101	1010
(e)	1	0000	0001