

**King Fahd University of Petroleum & Minerals**  
**Department of Electrical Engineering**

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EE200-03            (051)

Homework # 4

1. Design a combinational circuit with three inputs and one output. The output is 1 when the binary value of the inputs is greater than 3. The output is 0 otherwise.
2. Design a combinational circuit that converts a 4-bit Gray code (Table 1-6 of the textbook) to a 4-bit binary number. Implement the circuit with exclusive-OR gates.
3. Construct a 4-to-16 line decoder with five 2-to-4 line decoders with enable inputs.
4. A combinational circuit is specified by the following three Boolean functions:

$$F_1(a,b,c) = \sum(2,4,7)$$

$$F_2(a,b,c) = \sum(0,1,5)$$

$$F_3(a,b,c) = \sum(0,2,3,4,6)$$

Implement the circuit with a decoder constructed with NAND gates, similar to Fig. 4.19 of the textbook, and NAND or AND gates connected to the decoder outputs. Use a block diagram for the decoder. Minimize the number of inputs to the external gates.