King Saud University
College of Computer and Information Sciences
Department of Computer Science

CSC 220: Computer Organization

Tutorial 6: MUX, DeMUX, Encoder, Decoder

1. Multiplexer
   a. What is a multiplexer? Give the abbreviated truth table of a 4 × 1 multiplexer.
   b. Design the circuit with basic logic gates.
   c. Implement the following Boolean function with a multiplexer:
   $F(A, B, C, D) = \sum m (0, 1, 3, 4, 8, 9, 15)$

2. Implement four-bit even parity generator using a demultiplexer 1-16

3. Designing a decoder
   a. Give the truth table for a 2-to-4 decoder with enable
   b. Design the circuit.

4. Construct a 4-to-16-line decoder with five 2-to-4 line decoders with enable.

5. Design a decimal to BCD **encoder**.

Home Works

Text book problems: 3-28 to 3-30, 3-44, 3-46, 3-47

Additional Problems

1. Implement the following function using a multiplexer 8/1
   $F(x,y,z) = xy'z + x'y'z + xyz$

2. Implement the following Boolean function with a decoder.
   $F(A, B, C, D) = \sum m (0, 1, 3, 4, 8, 9, 15)$