

Sheet #3

Multiplexers & decoders

Exercise #1

Design a multiplexer 8-to-1 using multiplexers 4-to-1 and 2-to-1.

Exercise #2

1. Design a circuit based on a decoder (with inverted outputs) to obtain two functions: $X = \bar{A}.\bar{B}.\bar{C}.D + \bar{A}.B.\bar{C}.\bar{D} + \bar{A}.\bar{B}.C.\bar{D}$ and $Y = \bar{A}.B.\bar{C}.\bar{D} + A.\bar{B}.\bar{C}.D + \bar{A}.B.C.D$
2. Design a circuit based on a decoder to obtain the function:
 $F = A.B + \bar{A}.B.C$

Exercise #3

Design a demultiplexer 1-to-8 using demultiplexers 1-to-4 and 1-to-2.

Transform a demultiplexers 1-to-4 to a 2-to-4 line decoder.

Transform a 2-to-4 line decoder to a demultiplexers 1-to-4.

Exercise #4

Design a 4-to-16 line decoder using a 2-to-4 line decoder and some demultiplexers 1-to-4.