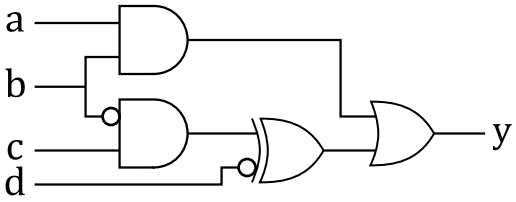
Multiplexer and Demultiplexer

Exercises Digital Design

1 | MUX - Multiplexer

1.1 Creating a function with the help of Multiplexers

Using inverters and multiplexers from 8 to 1, draw a circuit that realizes the same function as the circuit in the adjacent figure.
Give the complete schematic of the circuit.



mux/mux-01

1.2 Creating a function with the help of Multiplexers

Using only multiplexers from 2 to 1, draw the complete schematic of a circuit that generates the exclusive-OR function of 4 inputs.
Enter the complete schematic of the circuit.

mux/mux-02

1.3 Creating a function with the help of Multiplexers

A programmable logic circuit consists exclusively of multiplexers from 2 to 1. Using a minimum number of these blocks, draw the schematic of a circuit that generates the function given in the adjacent truth table.
Give the complete schematic of the circuit.

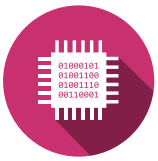
d	c	b	a	y	z
0	0	0	0	-	-
0	0	0	1	1	0
0	0	1	0	1	0
0	0	1	1	1	1
0	1	0	0	1	1
0	1	0	1	0	0
0	1	1	0	0	0
0	1	1	1	0	1
1	0	0	0	0	0
1	0	0	1	0	1
1	0	1	0	0	1
1	0	1	1	-	-
1	1	0	0	-	-
1	1	0	1	-	-
1	1	1	0	-	-
1	1	1	1	-	-

mux/mux-03

1.4 Creating a function with the help of Multiplexers

Using inverters, multiplexers from 2 to 1 and multiplexers from 4 to 1, create the schematic of the circuit that generates the function given in the adjacent truth table.

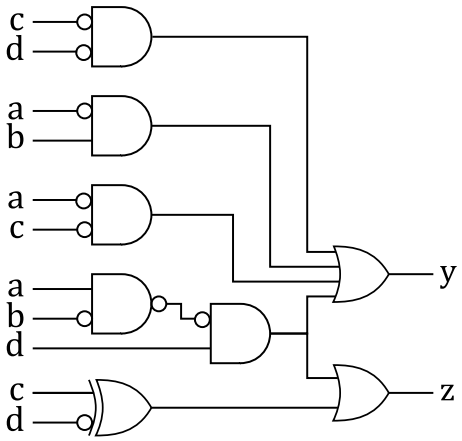
d	c	b	a	s	t	u	v	w	x	y	z
0	0	0	0	-	-	-	-	-	-	-	-
0	0	0	1	-	-	-	-	-	-	-	-
0	0	1	0	-	-	-	-	-	-	-	-
0	0	1	1	1	-	1	-	-	1	-	0
0	1	0	0	0	-	-	1	1	-	1	-
0	1	0	1	0	-	-	0	0	-	-	1
0	1	1	0	0	-	-	0	-	1	1	-
0	1	1	1	0	-	-	0	-	0	-	1
1	0	0	0	-	1	1	-	1	-	1	-
1	0	0	1	-	0	0	-	0	-	-	1
1	0	1	0	-	0	0	-	-	1	1	-
1	0	1	1	-	0	0	-	-	0	-	1
1	1	0	0	-	0	-	1	1	-	1	-
1	1	0	1	-	0	-	0	0	-	-	1
1	1	1	0	-	-	-	-	-	-	-	-
1	1	1	1	-	-	-	-	-	-	-	-



mux/mux-04

1.5 Creating a function with the help of Multiplexers

A programmable logic circuit consists exclusively of multiplexers from 2 to 1. Using a minimum number of these blocks, draw the schematic of a circuit that generates the same function as the circuit in the adjacent figure. Give the complete schematic of the circuit.



mux/mux-05

2 | MUX - Demultiplexer

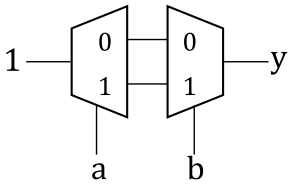
2.1 Demultiplexer from 1 to 8

Use inverters, AND and OR gates to draw the inner schema of a demultiplexer from 1 to 8.

mux/demux-01

2.2 Logic Circuit

Determine the logic function of the circuit in the adjacent figure.



mux/demux-02

2.3 Complete Operators

Determine whether the multiplexer from 2 to 1 is a complete operator. Do the same with the demultiplexer from 2 to 1.

mux/demux-03