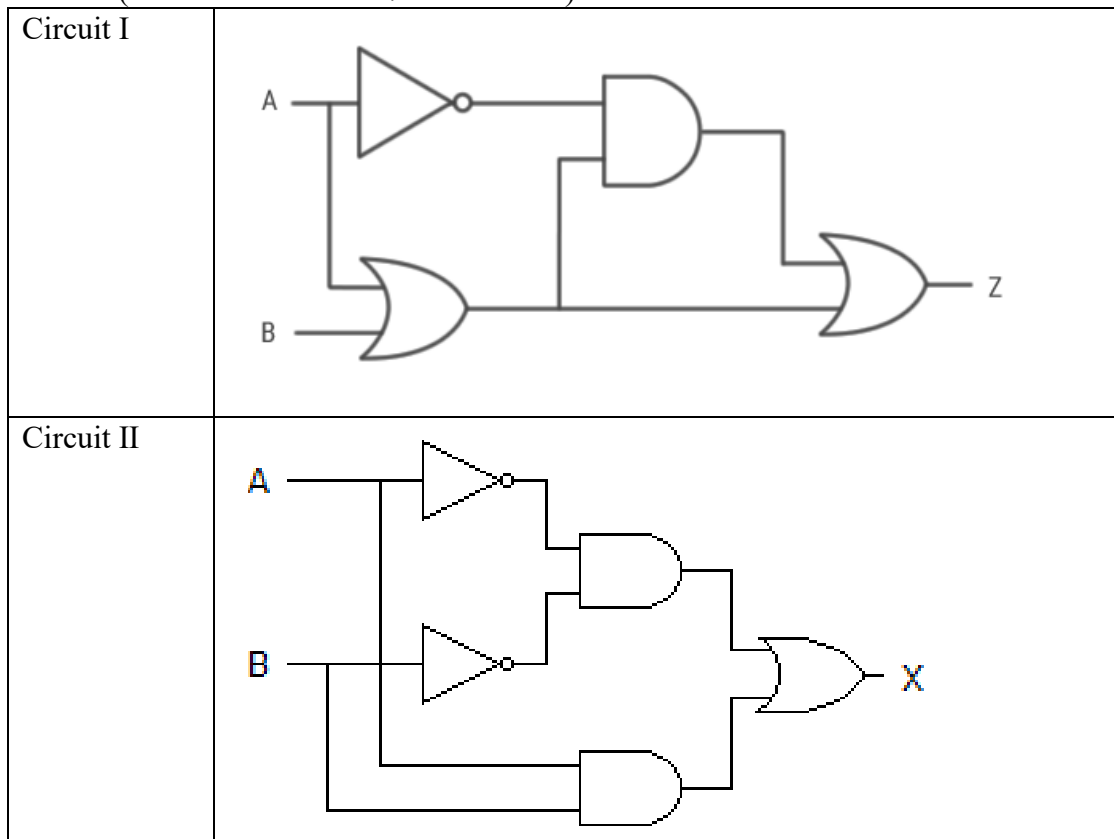# Homework 1

ELEN 21/COEN 21
Instructor: Maria Kyrarini

1. Convert the following binary numbers to their decimal equivalents. Explain your solutions.
   (a) 001100
   (b) 11100
   (c) 000111100
   (d) 101010

2. (a) Draw the logic symbol for a 7-input AND gate. Label the inputs A, B, C, D, E, F, and G and the output Y.
   (b) Draw the logic symbol for a 5-input OR gate. Label the inputs A, B, C, D, and E, and the output Y.

3. Analyze the following circuits by writing the truth table and the timing diagram (hint: Look at slide 27 of Lecture 1):

Circuit I	
Circuit II	

4. Synthesize a simplified circuit for the following truth table by:

a) Using only properties of Boolean Expressions,
b) Using K-maps.
Use only AND, OR, and NOT gates.

Truth table

Inputs			Output
C	B	A	Y
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

5. Synthesize a simplified circuit for the following truth table by:
   c) Using only properties of Boolean Expressions,
   d) Using K-maps.
   Use only AND, OR, and NOT gates.

Truth table

Inputs				Output
D	C	B	A	Y
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1