Data, Logic, and Computing

ECS 17 (Winter 2026)
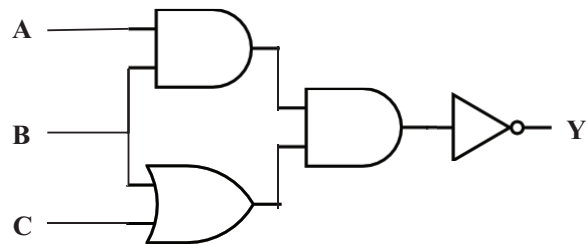
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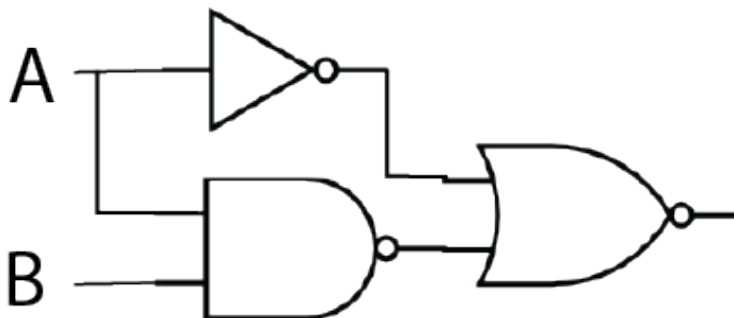January 23, 2026

Homework 4

Exercise 1

Find the output/ logic table for this logic gate circuit. Convert it into a Boolean expression

Exercise 2

Find the output/ truth table for this logic gate circuit. Can you find a simpler logic gate that would perform the same operation on A and B?

Exercise 3

Build the logic tables for the Boolean expressions:

a) $\bar{A}B$

b) $\overline{A\bar{B}}$

c) $A + \bar{B}$

d) $\overline{A + \bar{B}}$

Exercise 4

An engineer hands you a piece of paper with the following Boolean expression on it, and tells you to build a gate circuit to perform that function:
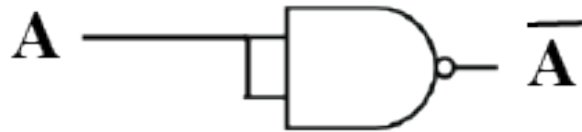
$$A\bar{B} + \bar{C}(A + B)$$

Draw a logic gate circuit for this function Represent its logic table.

Exercise 5

Suppose we wished to have an OR gate for some logic purpose, but did not have any OR gates on hand. Instead, we only had NAND gates in our parts collection. Draw a diagram whereby multiple NAND gates are connected together to form an OR gate.
   (Hint: the NOT gate can be formed using:)

Exercise 6

Design a circuit that implements majority voting for three individuals (i.e. the output of the circuit is 1 if two at least of the inputs are 1, and 0 otherwise). Build its logic table. (*Hint: consider the Boolean expression* $(A + B) \cdot C + (A + C) \cdot B$).