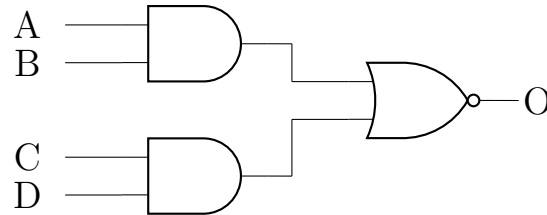


(4) 1. Implement the following using only NAND gates:

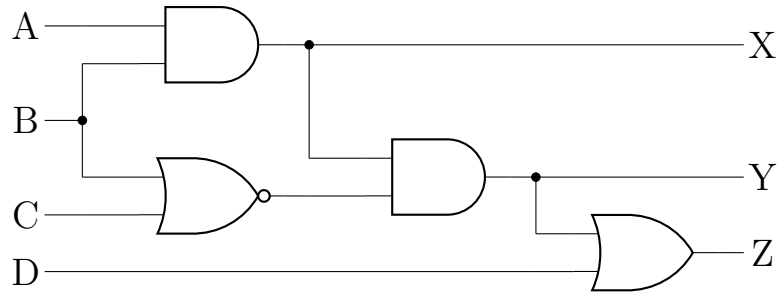
$$AB + \bar{A}B + A\bar{B} + \bar{A}\bar{B}, \quad (AB + C)(AB + D), \quad (\bar{A}B)(AB) + AB, \quad (1 + B)(ABC)$$

(3) 2. Implement operations AND, OR, NAND using only NOR gates.

(2) 3. This is the so-called AND-or-Invert gate (AOI). Develop its truth table.



(3) 4. Derive Boolean expressions to describe the operation of this circuit. Minimize these expressions by algebraic manipulation and hence simplify the circuit.



(3) 5. Be sure to complete all of the exercises in Chapter 5 of the textbook. A TA will verify this during the labs.