



Faculty of Engineering and Technology
Department of Electrical and Computer Engineering

ENCS 2110

EXP 1 Post-Lab: Combinational Logic Circuits

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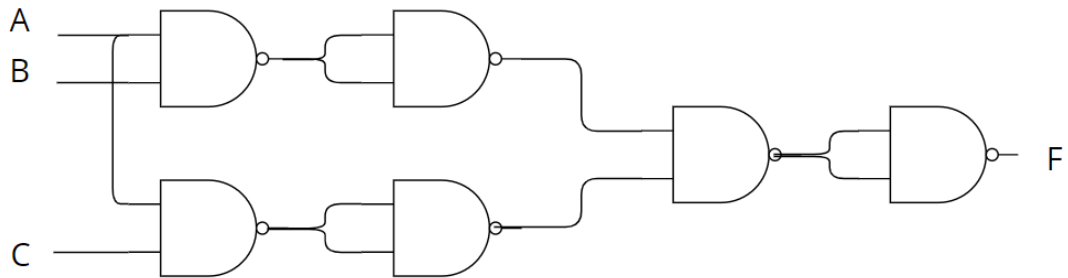
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Section: 10

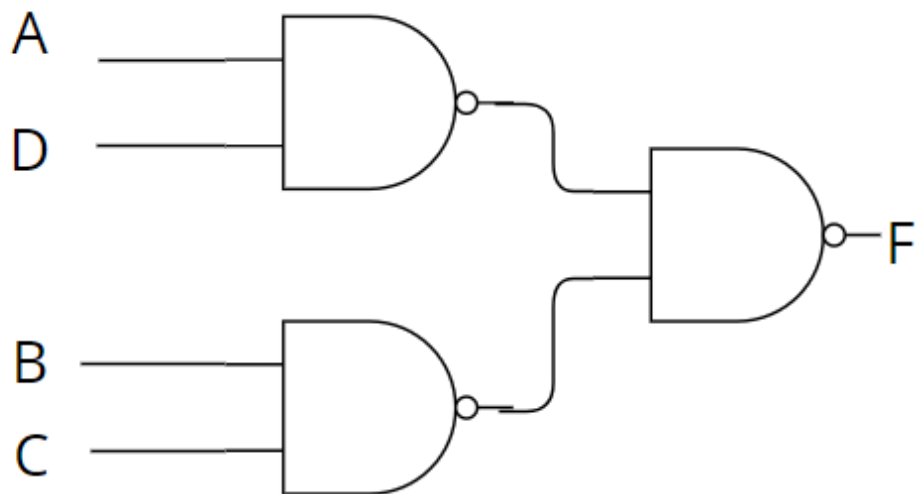
Instructor: Hanya Radwan

- ✓ Draw the logic diagram showing the implementation of the following Boolean equation using “NAND” gates

a) $F = AB(CA)$

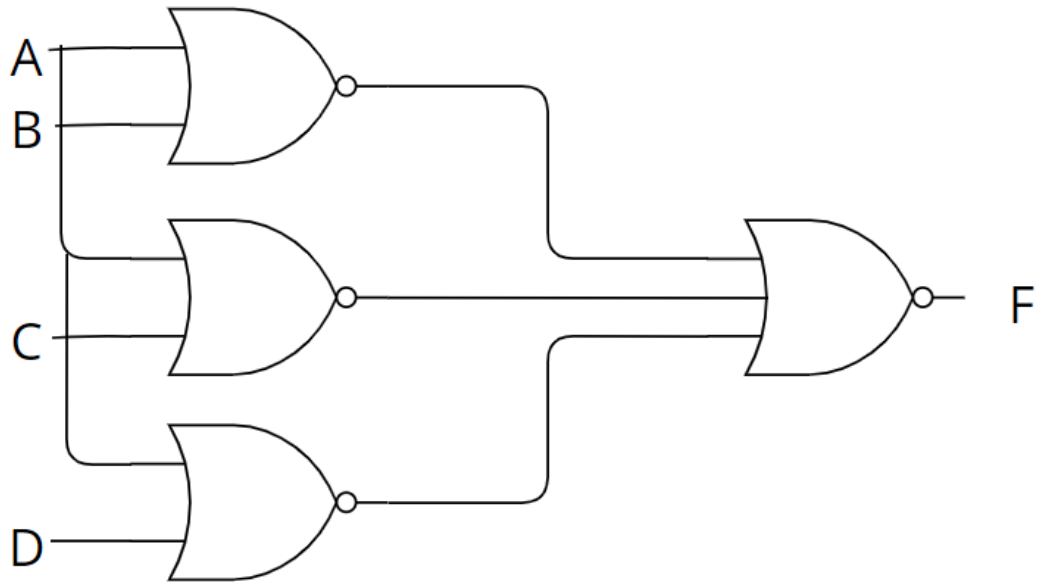


b) $F = (D.A) + (C.B)$

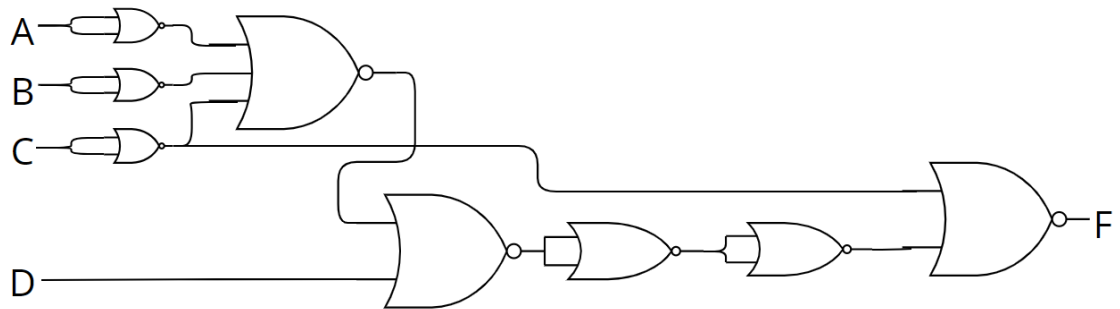


✓ Draw the logic diagram of the following Boolean equations using NOR gates.

a) $F = (A+B)(CD+A)$
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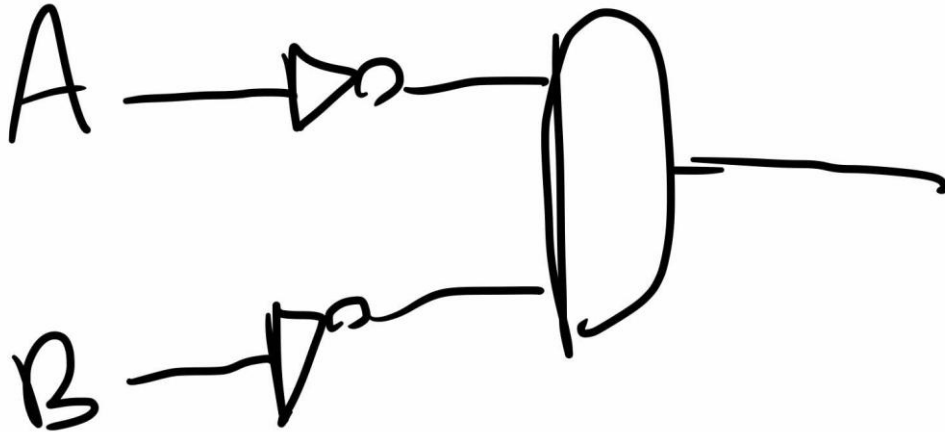


b) $F = (ABC+D)C$



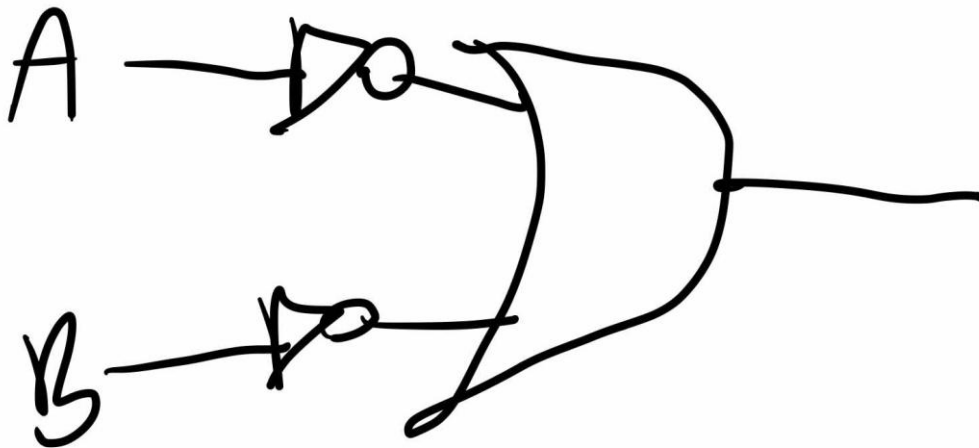
- ✓ Implement the OR operation using AND, NOT gate. Draw the logic diagram and write the Boolean equation.

$$A + B = A' \cdot B'$$



- ✓ Implement the AND gate using OR, NOT gate. Draw the logic diagram and write the Boolean equation.

$$A \cdot B = A' + B'$$



- ✓ Prove that the equality operation $F1 = AB + A'B'$ is the inverse of exclusive OR operation $F2 = AB' + A'B$ (use Demerger's theorem).

$$F1 = AB + A'B'$$

$$F1' = (A' + B')(A + B)$$

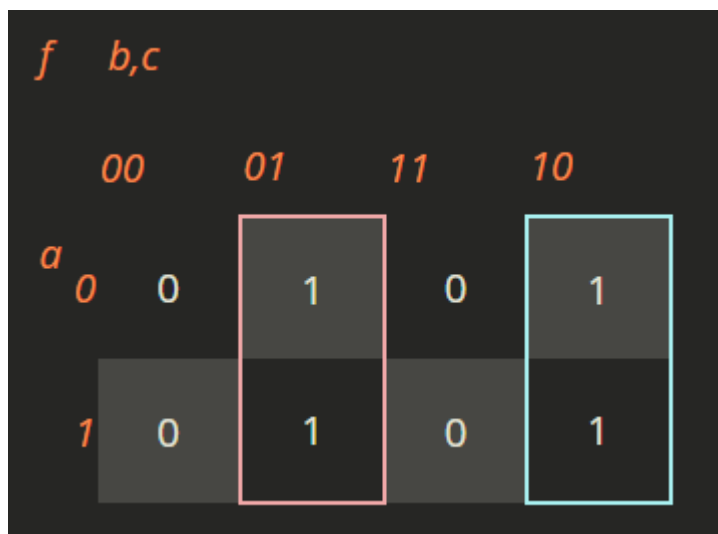
$$= A'A + A'B + B'A + B'B$$

$$= 0 + A'B + AB' + 0$$

$$= AB' + A'B = F2$$

- ✓ Show how is it possible to reduce Boolean expressions using the Karnaugh map:

a) $F1 = A'B'C + ABC' + A'BC' + AB'C$



❖ $F1 = B'C + BC'$

b) $F2 = A'D + A'C + BD + AB'D'$



❖ $F2 = A'D + A'C + AB'D' + BD$