Computer Circuit Fundamentals (Lab 7)

K-Maps

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Experiment Performed on **1 November 2019**
Report Submitted on **8 November 2019**

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Computer Circuit Fundamentals
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OBJECTIVES

- Practice simplifying Boolean expressions.
- Practice using K-maps.
- Practice designing Logic circuits effectively.
- Practice simplifying Boolean expressions using K-maps.

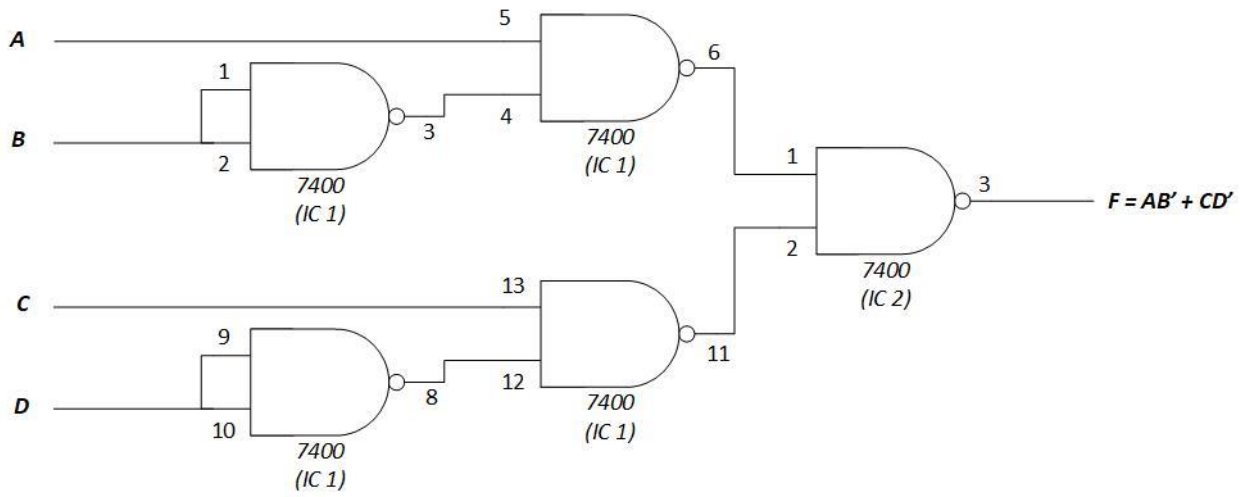
DESIGN

Experiment

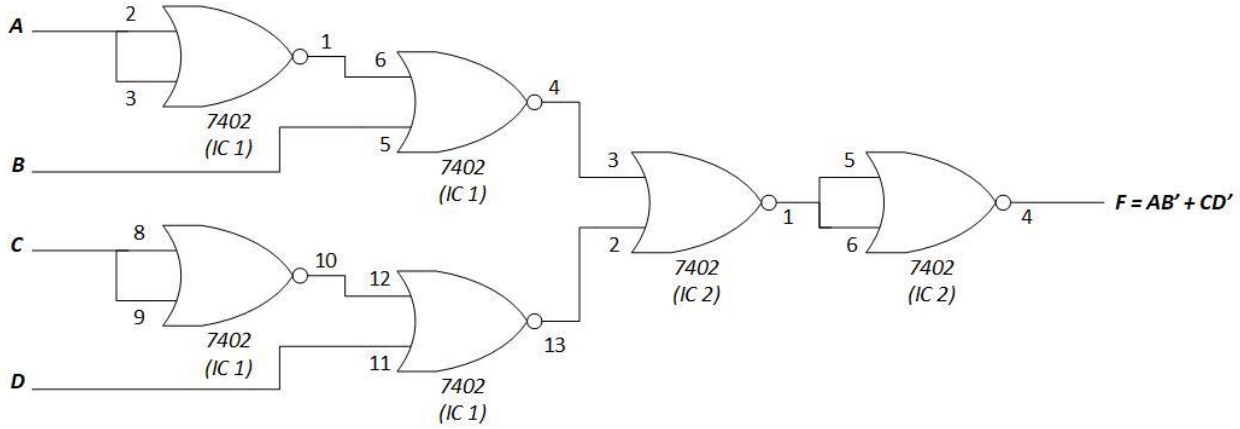
- This experiment consisted of simplifying a Boolean expression derived from a truth table using the K-map method. The simplified expression: ***AB'+CD'***, was then implemented into two separate Logic circuits. The first Logic circuit, using the Boolean expression simplified before, was implemented using only NAND gates *(7400 ICs)*. The second Logic circuit, using the same expression as before, was implemented using only NOR gates *(7402 ICs)*.

SCHEMATICS

F = AB' + CD' (Logic Diagram using NANDs)



F = AB' + CD' (Logic Diagram using NORs)



QUESTIONS

Questions from the Experiment

INPUTS				OUTPUT
A	B	C	D	F
0	0	0	0	0
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	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0

1) Simplification of the above truth table using K-maps:

00	01	11	10
0	0	0	1
0	0	0	1
0	0	0	1
1	1	1	1

2) Logical circuits

** The drawn logic diagram could be found above, under "Schematics".*

** The logic diagram was shown to the instructor.*

3) Verification

** The Logic circuit was tested during the lab session.*

** The Logic circuit was verified using the truth table above.*