

CS 4341: Digital Logic and Computer Architecture

Homework 3 Guide

Notes

Throughout this guide the exclamation mark (!) is a unary operator negating the argument on its right hand side, so “!A” would be read “not A” and “!(AB)” would be read “A nand B.”

Throughout this guide the carat (^) character is a binary operator for the “exclusive or” function of its arguments, so “A ^B” would be read “A exclusive or B.”

You may be familiar with similar conventions from popular programming languages.

If you would like to see the K-maps for the functions in question 2.8 please review the guide for homework 1 and 2.

Chapter 2

2.4.A

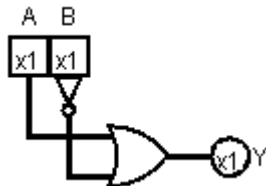
K-Map

		B	
		0	1
A	0	1	0
	1	1	1

Minimized Expression

$A + !B$

Implementation



2.4.B

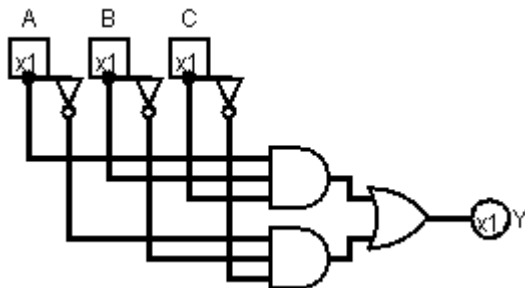
K-Map

		B,C			
		00	01	11	10
A	0	1	0	0	0
	1	0	0	1	0

Minimized Expression

$A B C + !A !B !C$

Implementation



2.4.C

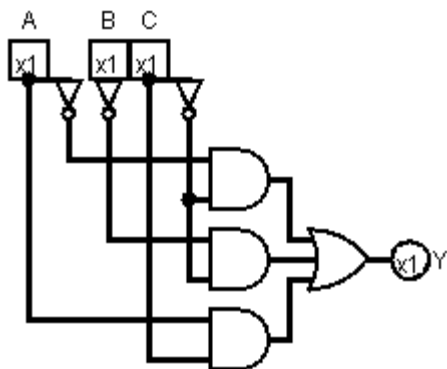
K-Map

		B,C			
		00	01	11	10
A	0	1	0	0	1
	1	1	1	1	0

Minimized Expression

$!A !C + !B !C + A C$

Implementation



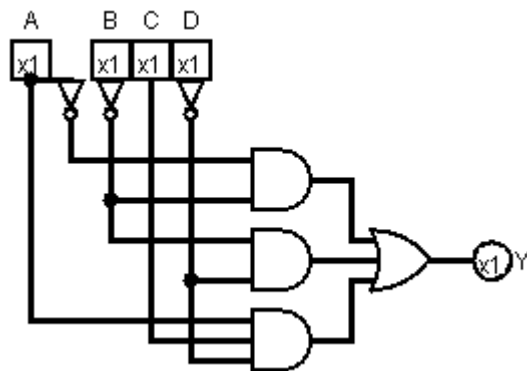
2.4.D

K-Map

		C,D			
		00	01	11	10
A,B	00	1	1	1	1
	01	0	0	0	0
	11	0	0	0	1
	10	1	0	0	1

Minimized Expression

$\bar{A} \bar{B} + \bar{B} \bar{D} + A C \bar{D}$



2.4.E

K-Map

		C,D			
		00	01	11	10
A,B	00	1	0	1	0
	01	0	1	0	1
	11	1	0	1	0
	10	0	1	0	1

Minimized Expression

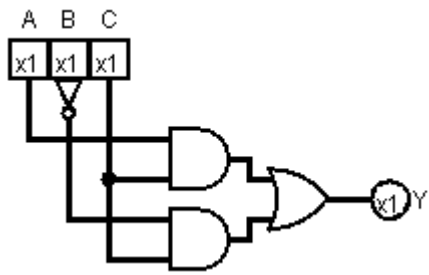
$\bar{A} \bar{B} \bar{C} \bar{D} + \bar{A} \bar{B} C D + \bar{A} B \bar{C} D + \bar{A} B C \bar{D} + A \bar{B} \bar{C} D + A \bar{B} C \bar{D} + A B \bar{C} \bar{D} + A B C D$

$\bar{(A \wedge B \wedge C \wedge D)}$

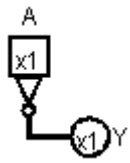
Implementation



2.8.A



2.8.B



2.8.C

