(5 pts) Exercise B-1

- **Show the truth table for NAND and NOR gates**

NAND

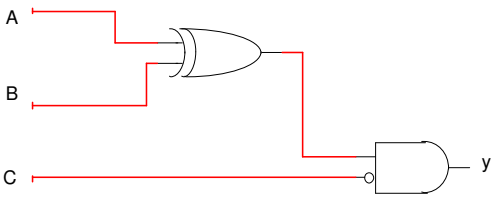
A	B	x
0	0	
0	1	
1	0	
1	1	

NOR

A	B	x
0	0	
0	1	
1	0	
1	1	

(5 pts) Exercise B-2

- **A.) Show the truth table for the following logic circuit**



A	B	C	y

- **B.) Write the Boolean equation for this circuit.**

(5 pts) Exercise B-3

- **Draw a circuit for the following formula:**
  $F = \overline{((A + B) \bullet C)} + D$

(2 pts EXTRA CREDIT) Exercise B-4

- **Recall – how many entries are in a truth table for a function with n inputs?**
- **Consider – how many different truth tables are <u>possible</u> for a function with n inputs?**

(5 pts) Exercise B-11

- **Show the sum of products for the following truth table.**

A	B	C	f
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

(5 pts) Exercise B-12

- **Simplify the following equations (use Boolean laws discussed earlier)**

$B(A+0) =$

$B(A\overline{A}) =$

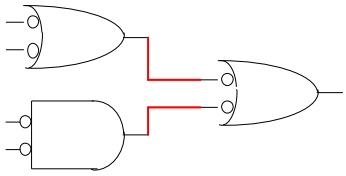
$(A+\overline{B})(\overline{A}+B) =$

$\overline{(A+B)} \bullet (A+B+C) =$

Is $\overline{A}\,\overline{B}$ the same as $\overline{AB}$ **?**

(5 pts) Exercise B-13

- **Use bubble pushing to simplify this circuit**



(10 pts) Exercise B-14

- **A) Show the sum of products for the following truth table.**

A	B	C	f
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

- **B) Simplify this equation**

(8 pts) Exercise B-15

- **Simplify the following equations**

$C(A+1) =$

$AB(A+C) =$

$(A+\overline{B})(\overline{A}+C) =$

$(B+0)(C+D+1)$

(5 pts) Exercise B-21

- **1. Fill in the following K-Map based on the truth table at right**
- **2. Minimize the function using the K-map**

A	B	C	f
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

(5 pts) Exercise B-22

- **Draw the two-level circuit for the function from Exercise B-21**

(5 pts) Exercise B-23

- **Suppose we already have this k-Map. Minimize the function.**

	$\overline{C}\,\overline{D}$	$\overline{C}D$	CD	$C\overline{D}$
$\overline{A}\,\overline{B}$	1	0	0	1
$\overline{A}B$	1	1	1	1
AB	1	1	0	0
$A\overline{B}$	0	0	0	1

(3 pts) Exercise B-24

- **Consider your answer to Exercise B-23. Using a K-map, you found some particular two-level, minimal circuit. However, is it unique? (e.g. is there only one possible two-level circuit for that K-Map that is minimal?) Will this always be the case, or could a different K-map change your answer?**

(10 pts) Exercise B-25

- **Suppose we already have this k-Map. Minimize the function.**

	$\overline{C}\,\overline{D}$	$\overline{C}D$	CD	$C\overline{D}$
$\overline{A}\,\overline{B}$	1	0	1	1
$\overline{A}B$	0	1	1	1
$A\overline{B}$	1	1	1	0
$A\overline{B}$	1	0	1	0