Dr. Chell CPRE 281: Quiz 2

1)

a) $\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + AB\bar{C}$

=> 12a. Distributive

=> $\bar{A}\bar{B}(\bar{C}+C) + A\bar{B}(\bar{C}+C)$

=> $\bar{A}\bar{B}(1) + A\bar{B}(1)$ 8b.

=> $\bar{A}\bar{B} + A\bar{B}$ 6a.

=> $\bar{B}\bar{A} + \bar{B}A$ 14a. combining

=> $\bar{B}$

b) $\bar{B}$

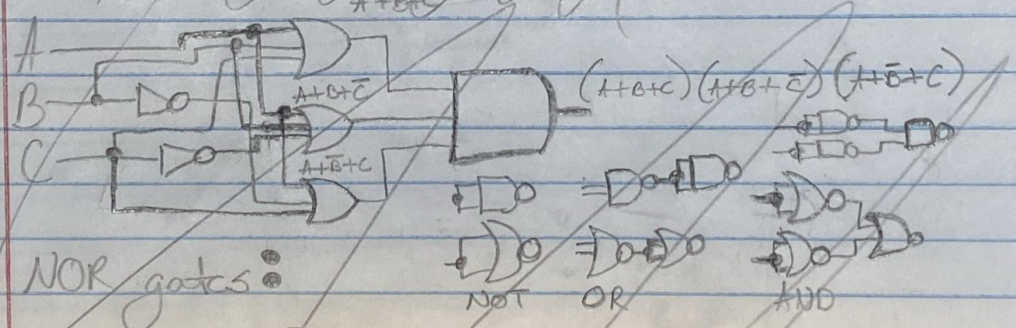
c) B —▷o—

c) $(A+\bar{B}+C)(A+\bar{B}+\bar{C})(\bar{A}+\bar{B}+C)(\bar{A}+\bar{B}+\bar{C})$

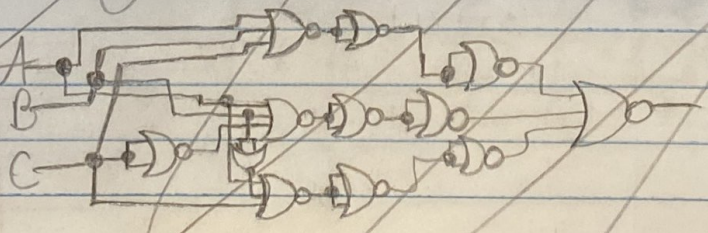
2) $F(x_1, x_2, x_3) = \prod M(0,1,2)$

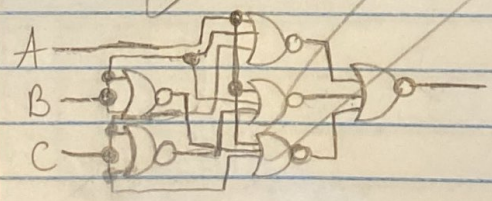
=> $(A+B+C)(A+B+\bar{C})(A+\bar{B}+C)$

$A+B+C$



NOR gates:



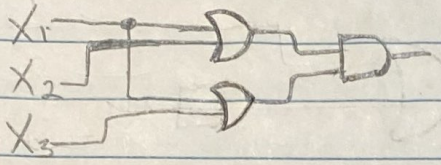


$\Rightarrow (X_1+X_2+\bar{X}_3)(X_1+X_2+\bar{X}_3)(X_1+\bar{X}_2+X_3)$

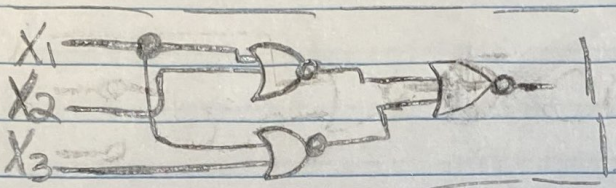
↳ $(X_1+X_2+\bar{X}_3)(X_1+X_2+\bar{X}_3) \Rightarrow (X_1+X_2)$ 14b. Combining

$\Rightarrow (X_1+X_2)(X_1+\bar{X}_2+X_3) \Rightarrow (X_1+X_2)(X_1+X_3)$

$\Rightarrow (X_1+X_2)(X_1+X_3)$



NOW w/ NOR gates: (POS)



3) $f(x_1,x_2,x_3) = \prod M(0,1,5,6,7)$

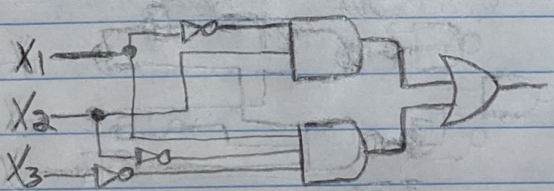
$\Rightarrow \sum m(2,3,4)$

$\Rightarrow \bar{X}_1X_2\bar{X}_3 + \bar{X}_1X_2X_3 + X_1\bar{X}_2\bar{X}_3$ (SOP)

$= \bar{X}_1X_2(\bar{X}_3+X_3) + X_1\bar{X}_2\bar{X}_3 \Rightarrow \bar{X}_1X_2(1) + X_1\bar{X}_2\bar{X}_3$

$\Rightarrow \bar{X}_1X_2 + X_1\bar{X}_2\bar{X}_3$

* Don't know how to simplify farther.



NOW w/ NAND gates: