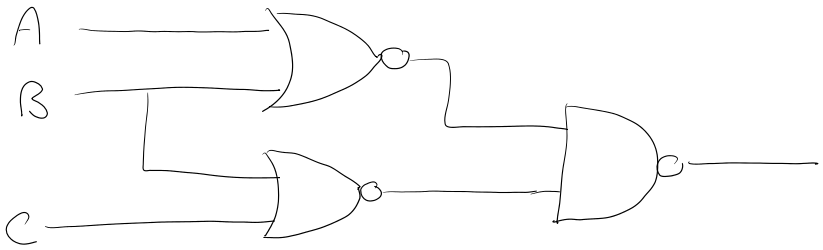
Chapter 2 Review Questions

Thursday, October 05, 2023 4:32 PM

Consider the following logic circuit



a) Write the Boolean expression that is the output of this circuit

$$\overline{\overline{A+B}\ \overline{B+C}}$$

b) Simplify this expression using the laws of logic.

method #1

$$\overline{\overline{A+B}\ \overline{B+C}}$$

$$\overline{\bar{A}\bar{B}\ \bar{B}\bar{C}} \quad \text{DeMorgan's}$$

$$\overline{\bar{A}\bar{B}\bar{C}} \quad \text{idempotent}$$

$$\overline{(\bar{A}\bar{B})\bar{C}} \quad \text{associative}$$

$$\overline{\bar{A}\bar{B}}+C \quad \text{DeMorgan's}$$

$$A+B+C$$

method #2

$$\overline{\overline{A+B}\ \overline{B+C}}$$

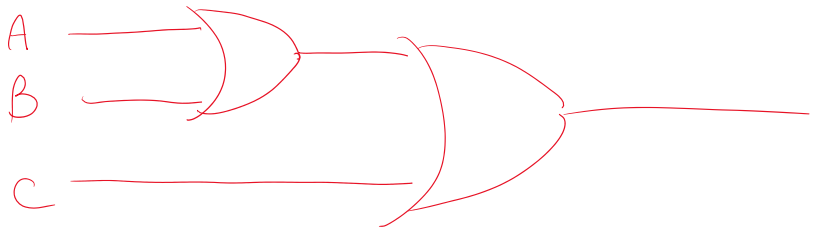
$$A+B+B+C \quad \text{DeMorgan's}$$

$$A+B+C \quad \text{idempotent}$$

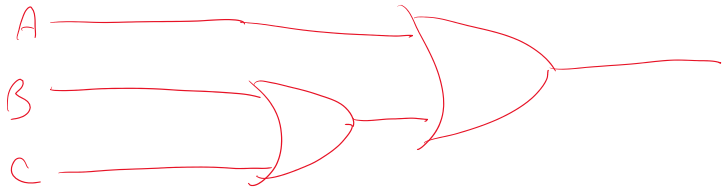
c) Draw a logic circuit that has this simplified

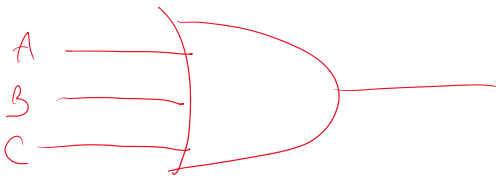
c) Draw a logic circuit that has this simplified expression as a result.

$A + B + C$



or





Simplify using the LOL.

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

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

$C \cdot 0 + A\bar{C}B + A \cdot 0 + A\bar{B}\bar{C}$ complement

$0 + A\bar{C}B + 0 + A\bar{B}\bar{C}$ identity

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

$ACB + A\bar{B}C$

$AC(B + \bar{B})$ distrib

$AC \cdot 1$ complement

AC identity