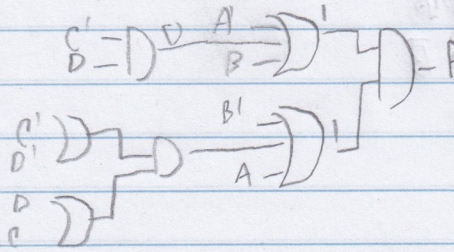
CSC 355

A1

Q9.



convert to not and NAND.

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

a) the network is correct

b) $F(0,0,1,1) = 1$

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

$= (\bar{A}+B+\bar{C}D)(A+\bar{B}+\cancel{\bar{C}C}+\bar{C}D+DC+D\cancel{D})$ distribute

$= (\bar{A}+B+\bar{C}D)(A+\bar{B}+\cancel{DC+\bar{C}}+D)$ involution, idempotent

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

$= \bar{A}A+\bar{A}\bar{B}+\bar{A}D+BA+\bar{B}B+BD+\bar{C}DA+\bar{C}D\bar{B}+\bar{C}DD$ distribute

$= \bar{A}\bar{B}+\bar{A}D+AB+\cancel{\bar{B}B}+\bar{C}D$ involution, idempotent, absorbtion

$= \bar{A}\bar{B}+\bar{A}D+AB+\bar{C}D$ Consensus

$= \bar{A}(\bar{B}+D)+AB+\bar{C}D$ distributive