

$$X\bar{Y} + Y = X + Y$$

$$\bar{X}Y + \bar{Y} = \bar{X} + \bar{Y}$$

2c. $F = \bar{A}BC + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + \bar{A}BC + ABC$

$$= \bar{A}BC + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + \bar{A}BC + ABC$$

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

$$= \bar{A}BC + A\bar{B}(1) + \bar{A}\bar{B}\bar{C} + ABC$$

$$= \bar{A}BC + A\bar{B} + \bar{A}\bar{B}\bar{C} + ABC$$

$$= \bar{A}BC + ABC + A\bar{B} + \bar{A}\bar{B}\bar{C}$$

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

$$= BC(1) + A\bar{B} + \bar{A}\bar{B}\bar{C}$$

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

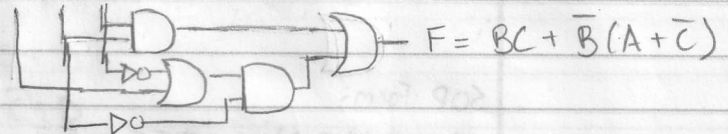
$$= BC + \bar{B}(A + \bar{A}\bar{C})$$

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

$$AC + BC + \bar{B}\bar{C}$$

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

A B C



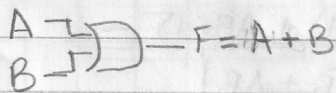
3. $F = AB + (A + B)$

$$= (AB + A) + B \text{ associative } 00 \ 0$$

$$= (A + AB) + B \text{ commutative } 01 \ 1$$

$$= A + B \text{ absorption } 10 \ 1$$

$$11 \ 1$$



$$F = AB + A(B + C) + B(B + C)$$

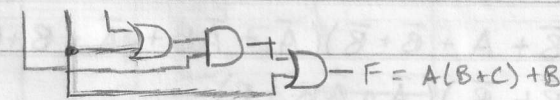
$$= AB + AB + AC + BB + BC$$

$$= A(B + B + C) + B + BC$$

$$= A(B + C) + B + BC$$

$$= A(B + C) + B$$

A B C



A B C F

0 0 0 0

0 0 1 0

0 1 0 1

0 1 1 1

1 0 0 0

1 0 1 1

1 1 0 1

1 1 1 1