Boolean Algebra: (Switching Algebra)

Three main operators: \NoT: (), (), ~()

AND:

OR: +

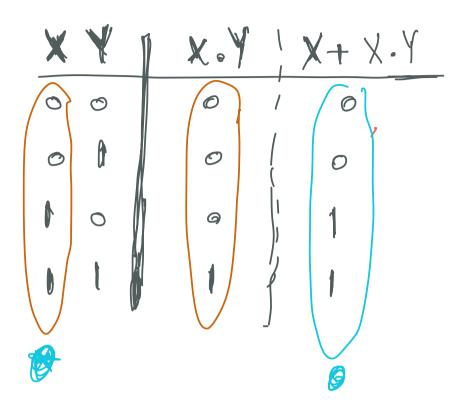
Precedence: ()
NOT
AND
OR

Azions: A set of basic definitions that we assume to be true. I use Azions to develop theorems.

$$(73): X+X=X$$

Perfect induction: The theorem needs to be Checked to be true for all input Combinations (truth Table)

$$(T9): X + X.Y = X$$



For theorems involving more than 3 variables we can use "finite induction" approach to prove them:

-> n variables

(1) n=2, use perfect induction or other cupproaches to prove the theorem is valid.

(2) Assume the theorem is valid for "n" variables, then show it is going to be valid for "n+1" variables.

Use Bodean Azian and Theorems above T9, to preve Tq.

$$X + X \cdot Y = X$$

$$= X$$

$$78: X.Y + X.2 = X.(Y+Z)$$

Finite induction to preve DeMorgan's Theorems. (T13)

$$[A \cdot (B \cdot C' + B \cdot C)] = ((x+y) = x \cdot y')$$

$$= A' + (B \cdot C' + B \cdot C)'$$

$$= A' + (B \cdot C') \cdot (B \cdot C)'$$

$$= A' + (B + C) \cdot (B' + C')$$

$$B \cdot B' + B \cdot C' + C \cdot B' + C \cdot C'$$

$$= A' + B \cdot C' + C \cdot B'$$

$$F(x, y, z) = X.Y + X.Y + X.Z'$$

$$X.Y = X.Y.1 = X.Y.2 = X.Y.2 = X.Y.2'$$

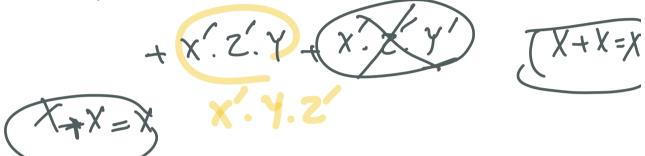
$$(Z+2') = X.Y.2 + X.Y.2'$$

$$X'.Y' = X.Y.' = X.Y.'(2+2')$$

= $X'.Y'.2+X.Y.'2'$

$$X.Z' = X.Z.I = X.Z.Y + X.Z.Y'$$

F(x, 4, 2) = x. 4. 7. 7 + x. 4. 2 + x 1. 2 + x 1. 2



 $=\sum_{X,Y,Z} (m_{7}, m_{6}, m_{1}, m_{6}, m_{2})$

- (1) Expand the function into Sum of Products.
- 2) In each product, if there is a literal missing, AND the product with " and replace" is with (missing literal + it's pend)

$$= (X+Y') \cdot (X+7+Y') \cdot (X+Y+7')$$

maxtern

maxtern

$$(X+Y') = (X+Y+D) = (X+Y+Z.Z')$$

$$7 = (X+Y+Z) \cdot (X+Y+Z')$$

$$= (X+Y+Z) \cdot (X+Y+Z')$$

$$F(x,y,z) = (x+y+z) \cdot (x+y+z') \cdot (x'+y+z')$$

$$= T((M_2, M_3, M_5))$$

$$x,y,z$$

$$\chi. \chi + \chi'. z + \chi. z = \chi. \chi + \chi'. z$$

$$= X - Y + X' - Z + X - Y - Z + X' - Y - Z$$

$$= x.4 [1+2] + x.2 [1+4]$$