

SEMINAR LESSON 8

Boolean Algebra

- 1) Find the values, if any, of the Boolean variables x and y that satisfy these equations.
 - a) $(\overline{x + y}) \downarrow (xy) = 1$
 - b) $(x|y) + (\bar{x}y) = 0$
- 2) Use a table to express the values of each of these Boolean functions.
 - a) $F(x, y, z) = (x + y)\bar{z} + (x|y)$
 - b) $F(x, y, z) = x\bar{y} + z + (x \downarrow y)$
- 3) Find the sum-of-products expansions and product-of-sums expansions of these Boolean functions.
 - a) $F(x, y) = x + \bar{y} + (x \downarrow y)$
 - b) $F(x, y, z) = xy + \bar{x}\bar{y}z(x|y)$
- 4) Find DNF and CNF of the Boolean function $F(x, y, z)$ that equals 1 if and only if $xy + \bar{z} = 0$.
- 5) Express each of these Boolean functions using the operators \cdot and $\bar{}$.
 - a) $(x|y) + xy$
 - b) $xy + (\overline{y + z})$
- 6) Show that $\{\downarrow\}$ is functionally complete.
- 7) Show that the set of operators $\{+, \cdot\}$ is not functionally complete.