

CoE/EE 460
Spring 2001 : Lockwood

Homework #2: Due Wednesday February 14, 2001
at 5:00pm, in EE homework box

Name:	
-------	--

1. Consider this partial order:

$$\mathfrak{R} = \{(a, a), (b, b), (a, b), (c, c), (a, c), (d, d), (e, e), (a, d), (b, e), (c, e), (d, e), (a, e)\}$$

(a) Draw the Hasse diagram for this partial order.

(b) Is this a lattice?

(c) Is this a Boolean algebra?

(d) Find \mathfrak{R}^{-1} .

(e) Draw the Hasse diagram for \mathfrak{R}^{-1} .

(f) Is \mathfrak{R}^{-1} a lattice?

(g) Is \mathfrak{R}^{-1} a Boolean algebra?

2. Draw the Hasse diagram for the following partial order:

$$R = \{(a, a), (b, b), (c, c), (d, d), (a, b), (a, c), (b, c), (d, c)\}.$$

(a) Is this a lattice?

(b) It is a Boolean algebra?

3. Attending class can be helpful. Techniques of solving problems are given in much greater detail than the notes that are on-line. What was the solution to the HW2 problem announced in class?

4. Recursively apply Boole's expansion to find the minterms for the following function:

(a) $f(x, y) = x + y$

(b) $f(x, y, z) = (x + y) \cdot (x + z)$

(c) $f(x_1, x_2, x_3, x_4) = x_1 \cdot (x_2 + x_3) + x_4 \cdot (x_1 + x_3)$

5. Recursively apply Boole's expansion to find the maxterms for the following functions:

(a) $f(x, y) = xy$

(b) $f(x, y, z) = xy'z + x'y'z'$

(c) $f(x_1, x_2, x_3, x_4) = x_1x_2x'_3 + x_1x'_2x_3x_4$

6. Consider a boolean function, $f(x_1, x_2, x_3)$ over $B = \{0, 1\}$

(a) How many elements are there at each level? Show your work.

(b) How many elements are there in total ?

7. For $B = \{0, 1\}$, Consider the following incompletely specified switching function in the interval:

$$I = [L, U] = [0, x + yz].$$

(a) Find f :

(b) Find d :

(c) Find r :

8. For $B = \{0, 1\}$, Consider the following incompletely specified switching function in the interval:

$$I = [L, U] = [x'y, x + y].$$

(a) Find f :

(b) Find d :

(c) Find r :