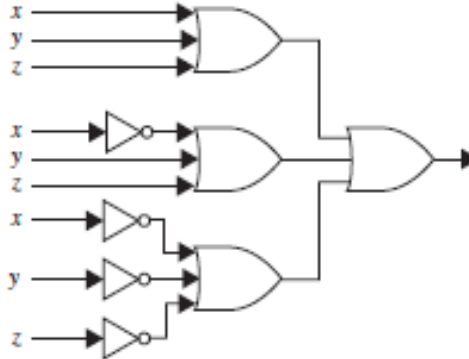


## SEMINAR LESSON 9

### Boolean Algebra

- 1) Find the output of the given circuit.



- 2) Construct circuits from inverters, AND gates, and OR gates to produce these outputs.
- $\bar{x}y + y\bar{z}$
  - $(x \downarrow y)(xy + \bar{z})$
- 3) Find the sum-of-products expansions represented by each of these K-maps.
- 

	$y$	$\bar{y}$
$x$	1	1
$\bar{x}$	1	

- b)

	$yz$	$y\bar{z}$	$\bar{y}\bar{z}$	$\bar{y}z$
$x$	1		1	1
$\bar{x}$		1	1	

- 4) Use a K-map to find a minimal expansion as a Boolean sum of Boolean products of each of these functions.
- $x + \bar{y}(y|z) + xy\bar{z}$
  - $x \downarrow (y + x\bar{z}) + x\bar{y}z$
- 5) Use a K-map to find a minimal expansion as a Boolean sum of Boolean products of the function  $f$ . After, use the Quine-McCluskey method to find a minimal expansion as the sum-of-products of the function  $f$ .

$$f(w, x, y, z) = \bar{w}xy\bar{z} + wxyz + wx\bar{y}z + \bar{w}\bar{x}\bar{y}z + wx\bar{y}\bar{z}$$