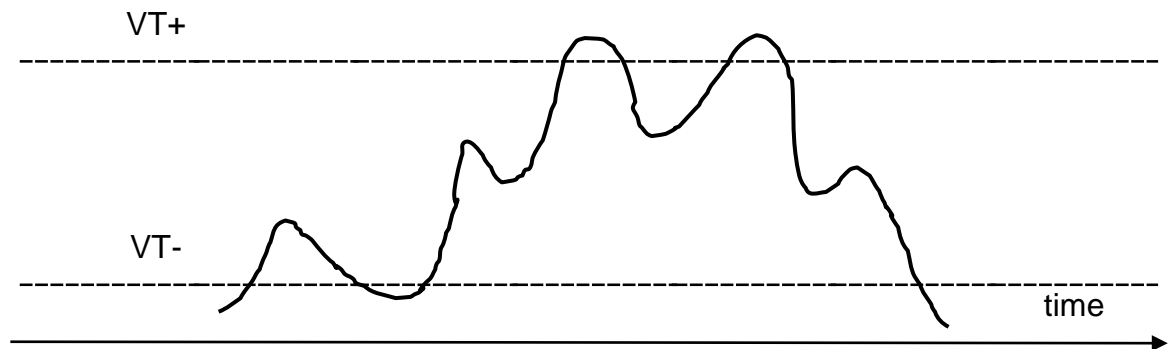


L12 practice problems

1. Given the following input waveform and threshold voltages V_{T+} and V_{T-} , sketch the output waveforms of the Schmitt-Trigger device in each case.
 - (a) buffer
 - (b) inverter



2. Implement the given truth table using the following programmable logic device. Indicate the inputs, outputs and programmed connections clearly on the PLA diagram.

(Hint: use Karnaugh map to first obtain a minimum-cost SOP Boolean expression for x and for y)

Inputs				Outputs	
a	b	c	d	x	y
0	0	0	0	1	1
0	0	0	1	1	0
0	0	1	0	1	1
0	0	1	1	0	1
0	1	0	0	1	0
0	1	0	1	1	0
0	1	1	0	0	1
0	1	1	1	0	1
1	0	0	0	1	1
1	0	0	1	0	1
1	0	1	0	1	1
1	0	1	1	1	0
1	1	0	0	0	1
1	1	0	1	0	1
1	1	1	0	1	0
1	1	1	1	1	0

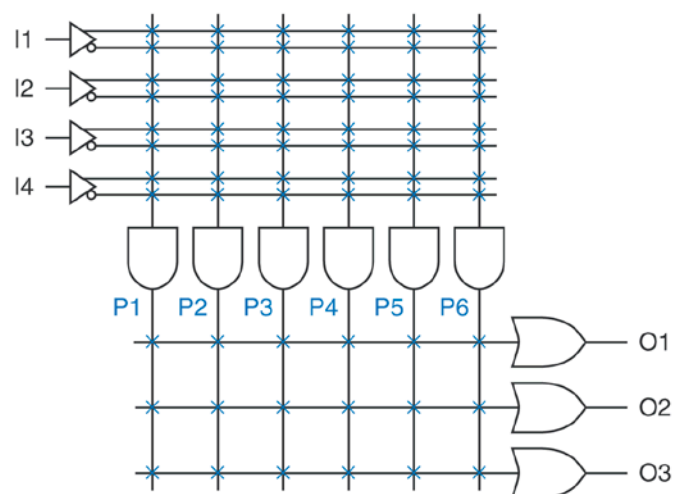


Figure 6-22

Compact representation of a 4×3 PLA with six product terms.

Optional (for students who like to go beyond the course requirement)

3. A digital system uses this 8-bit floating-point representation for signed numbers:

s x x x **y y y y**

where

s is the sign-bit of the significand (0: positive, 1: negative);

x x x is the 3-bit signed exponent in 2's complement representation;

y y y y is the 4-bit unsigned magnitude of the significand such that the binary value represented is 1.yyyy. (e.g. if yyyy=**1010**, then the significand is 1.**1010**)

- (a) Determine the smallest non-zero positive decimal value that can be represented in this system.
- (b) Determine the largest positive decimal value that can be represented in this system.
- (c) Determine the value (both in binary and decimal) represented by these 8 bits:

1 1 1 1 **1** 0 0 1