

Questions for Wednesday test?

At most 5 variable k-p

$$f = \overline{(x_1 + x_3 + x_4)} + (x_1 + x_3)x_4 + \bar{x}_1\bar{x}_2x_3 + x_1x_2\bar{x}_3\bar{x}_4$$

$$= \underbrace{\bar{x}_1\bar{x}_3\bar{x}_4}_{\text{red}} + \underbrace{x_1x_4}_{\text{blue}} + \underbrace{x_3x_4}_{\text{orange}} + \underbrace{\bar{x}_1\bar{x}_2x_3}_{\text{yellow}} + \underbrace{x_1x_2\bar{x}_3\bar{x}_4}_{\text{purple}}$$

$$g = x_1x_2\bar{x}_3\bar{x}_4 + \bar{x}_2x_4 + x_3(\bar{x}_1 + \bar{x}_4) + \overline{(x_1 + x_4)}$$

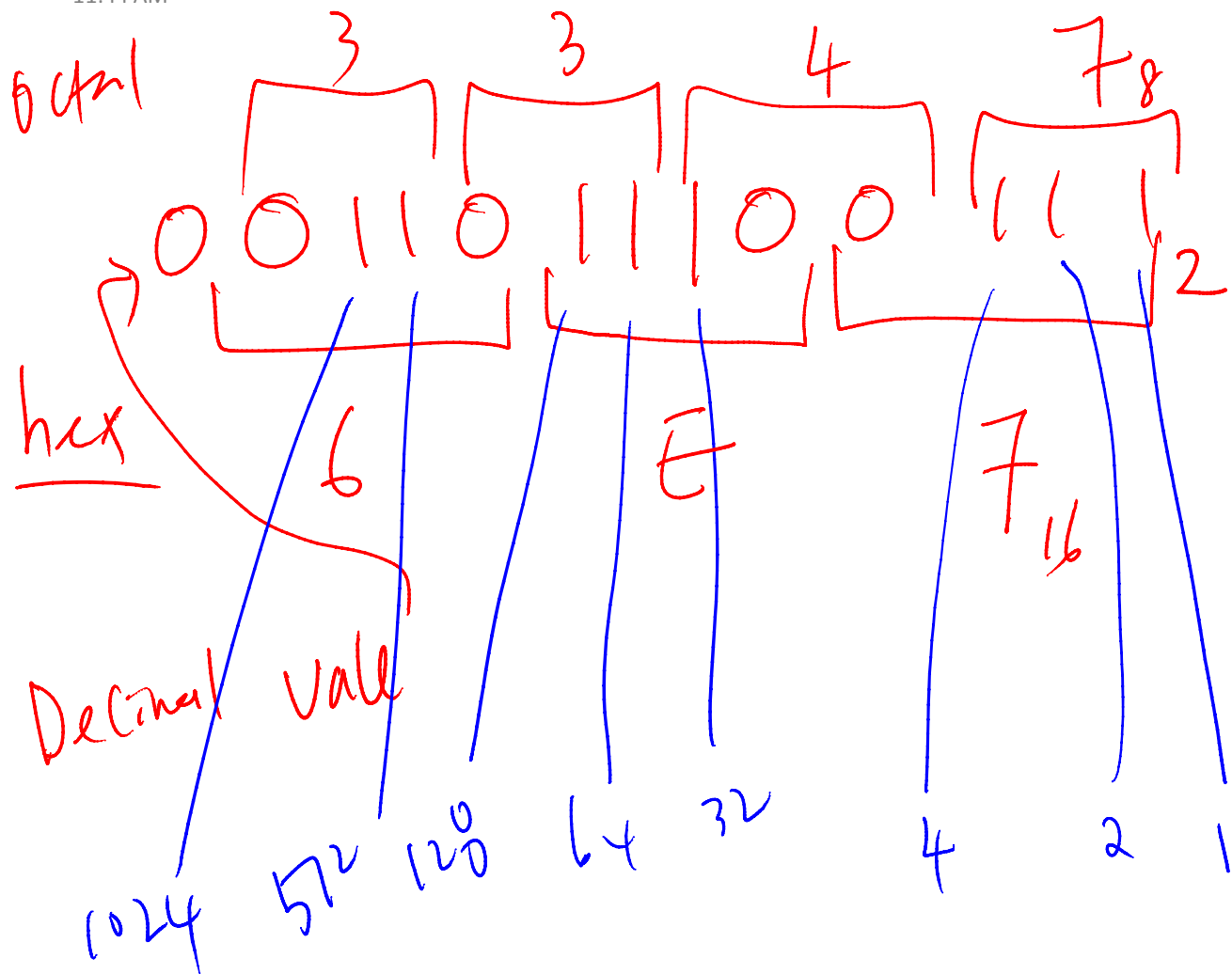
$$= \underbrace{x_1x_2\bar{x}_3\bar{x}_4}_{\text{purple}} + \bar{x}_2x_4 + \bar{x}_1x_3 + x_3\bar{x}_4 + \bar{x}_1\bar{x}_4$$

Truth table for function  $f$ :

$x_1x_2$	$x_3x_4$	00	01	11	10
00	1	1	1	1	1
01				1	1
11	1	1	1	1	1
10	1				

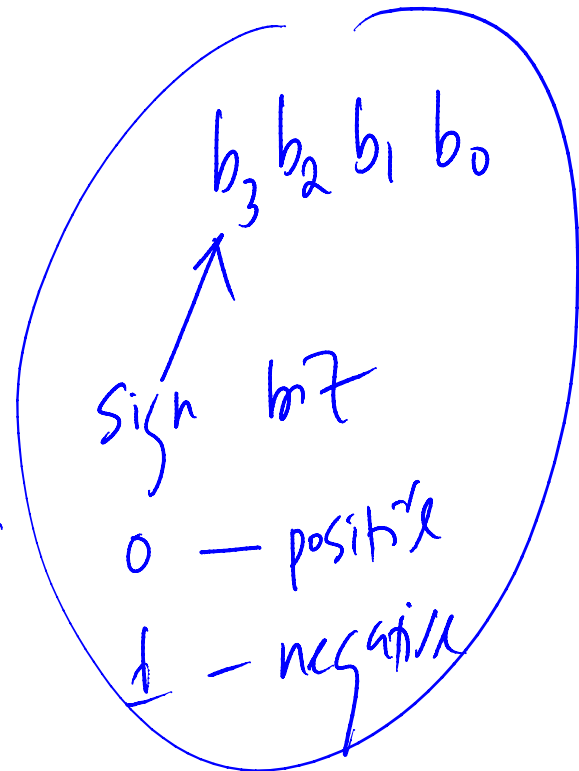
Truth table for function  $g$ :

$x_1x_2$	$x_3x_4$	00	01	11	10
00	1	1	1	1	1
01	1				1
11	1	1	1	1	1
10	1	1	1	1	1



negative # representation?

$-f$   
↑



$1010_2$  → -2

0000	→ 0
0001	→ 1
0010	→ 2
0011	→ 3
0100	→ 4
0101	→ 5
0110	→ 6
0111	→ 7

1000	→ -0
1001	→ -1
1010	→ -2
1011	→ -3
1100	→ -4
1101	→ -5
1110	→ -6
1111	→ -7



1's complement (4-bit)

-2

0010

1's complement  
↓

1101

1111

0000

2's complement

-2

take 1's complement + 1

0010

↓ 1's comp

1101

+  
1110

0010

↓ 2's comp

1110

2's comp

$$\begin{array}{rcl}
 2_{10} & \rightarrow & 0010 \\
 -2_{10} & \rightarrow & \begin{array}{c} 8 \quad 4 \quad 2 \quad 1 \\ 1 \quad 1 \quad 1 \quad 0 \end{array}
 \end{array}$$

↑  
sign bit

$$-8 + 4 + 2 = \boxed{-2}$$

$$(-6)_{10}$$

$$(0110)_6$$

2's comp

$$(1010)_6$$

$$-8 + 2 = (-6)$$