

## Homework 8 Solutions

1 d.

	a b				
		00	01	11	10
c d					
00					1*
01		1*	1	1*	
11		1	1	1	1*
10		1	1*		

$$f = \underline{a b' c' d'} + \underline{c d} + \underline{a' c} + \underline{a' d} + \underline{b d}$$

1 h.

	w x				
		00	01	11	10
y z					
00				1	1
01			1		
11		1	1	1	1
10		1	1*		1

	w x				
		00	01	11	10
y z					
00			1	1	
01			1		
11		1	1	1	1
10		1	1*		1

$$g = \underline{w' y} + \underline{y z} + \underline{w x y'} + \underline{w x' z'}$$

$$g = \underline{w' y} + \underline{x' y} + \underline{w x z} + \underline{w y' z'}$$

After choosing the essential prime implicant, the remaining 1's can only be covered two at a time. Each of the solutions uses one of the groups of four, plus two groups of two. It would require another term if we used both groups of four.

## Homework 8 Solutions

1 m.

After choosing the one essential prime implicant,  $X'Z'$ , there is a chain of five 1's. We started at one end, choosing two ways to cover  $m_3$ . In the first, there are four 1's left and we must choose the terms shown. With the second choice, we have only three 1's. Continuing, by choosing each of the ways to cover the next 1,  $m_5$ , we produce the remaining solutions.

		WX			
		00	01	11	10
YZ	00	1*		1	1
	01		1	1	
	11	1	1		
	10	1			1*

		WX			
		00	01	11	10
YZ	00	1		1	1
	01		1	1	
	11	1	1		
	10	1			1

$$H = \underline{X'Z'} + \underline{W'X'Y} + \underline{W'XZ} + \underline{WXY'}$$

$$H = \underline{X'Z'} + \underline{W'YZ} + \underline{W'XZ} + \underline{WXY'}$$

		WX			
		00	01	11	10
YZ	00	1		1	1
	01		1	1	
	11	1	1		
	10	1			1

		WX			
		00	01	11	10
YZ	00	1		1	1
	01		1	1	
	11	1	1		
	10	1			1

$$H = \underline{X'Z'} + \underline{W'YZ} + \underline{XY'Z} + \underline{WXY'}$$

$$H = \underline{X'Z'} + \underline{W'YZ} + \underline{XY'Z} + \underline{WY'Z'}$$

# Homework 8 Solutions

2 a.

c d \ a b	00	01	11	10
00	1*	1	1	1*
01		1*	1	
11	1*		1	1
10			1*	

c d \ a b	00	01	11	10
00	1*	1	1	1*
01		1*	1	
11	1*		1	1
10			1*	

Prime Implicants:

$$\begin{array}{ll} \underline{b' c d} & \underline{c' d'} \\ \underline{a b} & \underline{a c d} \\ \underline{b c'} & \end{array}$$

Minimum:

$$f = \underline{b' c d} + \underline{a b} + \underline{b c'} + \underline{c' d'}$$