Episode 6.04 - Four-Variable Karnaugh Map Example

(Transcript URL: https://intermation.com/episode-6-04-four-variable-karnaugh-map-example/)

Show Description: Many digital designs begin with a truth table. In this episode, we do just that, and then create the simplified sum-of-products expression by way of the Karnaugh map.

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Example truth table for a security system. Inputs identifiers are:

- A = 1, system is armed; A = 0, system is disarmed
- G = 1, glass break has been detected; G = 0, no glass break detected
- M = 1, motion has been detected; M = 0, no motion detected
- D = 1, door is open; D = 0, door is closed
- X = 1, alarm is sounding; X = 0, alarm is silent

A	G	M	D	X		
0	0	0	0	0	←	System disarmed → no points tripped
0	0	0	1	0	}	System disarmed → motion sensed or door open, but no alarm
0	0	1	0	0		
0	0	1	1	0		
0	1	0	0	1	}	System disarmed → glass broken so alarm should sound
0	1	0	1	1		
0	1	1	0	1		
0	1	1	1	1		
1	0	0	0	0	←	System armed → no points tripped
1	0	0	1	1	}	System armed → any tripped point should sound alarm
1	0	1	0	1		
1	0	1	1	1		
1	1	0	0	1		
1	1	0	1	1		
1	1	1	0	1		
1	1	1	1	1		

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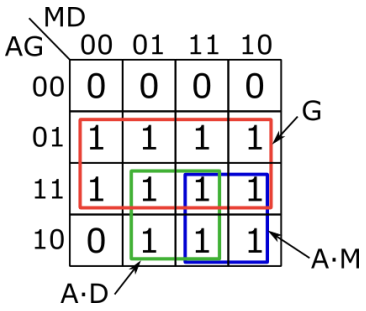
5:40	 Solution: $X = G + A \cdot D + A \cdot M$