

EXAMPLE 3.20 Task: Design a logic circuit to determine the time to plant a garden.

We employ three variables to make the determination.

1. Time (t): 0 represents day. 1 represents evening.
2. Moon phase (m): 0 represents not full. 1 represents full.
3. Temperature (f): 0 represents $45^\circ F$ and below. 1 represents above $45^\circ F$.
4. Plant (p): is a Boolean function of t , m , and f .

The time to plant a garden is

- during the evening
- with a full moon
- and independent of temperature

Derive the following truth table. $p(t, m, f) = tm$

	Time	Moon	Temperature	Plant
m_i	t	m	f	p
m_0	0	0	0	0
m_1	0	0	1	0
m_2	0	1	0	0
m_3	0	1	1	0
m_4	1	0	0	0
m_5	1	0	1	0
m_6	1	1	0	1
m_7	1	1	1	1



EXAMPLE 3.21 Task: Design a logic circuit to determine whether or not to close campus due to adverse weather conditions.

We employ three variables to make the determination.

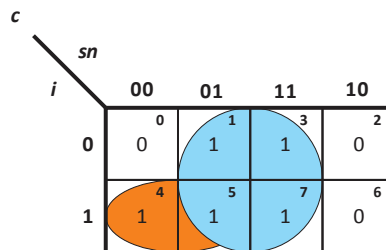
1. Ice (i): 0 no ice on the roads. 1 represents icy roads.
2. Salt (s): 0 represents that the roads are not salted. 1 represents that the roads have been salted.
3. Snow (n): 0 represents less than eight (8) inches of snow have accumulated on the roads. 1 represents eight or more inches have accumulated on the roads.
4. Close (c): is a Boolean function of i , s , and n . 0 represents that no determination to close the school has been made. 1 represents that the determination to close the school has been made

If the highway department has not salted the roads, and there is ice on the roads, the campus should be closed. $c = is'$

Regardless of whether there is ice or salt on the roads, if there is more than eight inches of snow, the campus should be closed. $c(i, s, n) = n + is'$.

Derive the following truth table. $c(i, s, n) = n + is'$

	Ice	Salt	Snow	Close
m_i	i	s	n	c
m_0	0	0	0	0
m_1	0	0	1	1
m_2	0	1	0	0
m_3	0	1	1	1
m_4	1	0	0	1
m_5	1	0	1	1
m_6	1	1	0	0
m_7	1	1	1	1



$$c(i, s, n) = n + is'$$

The text derives the foregoing expression for $c(i, s, n) = n + is'$ algebraically. I suggest that you employ a Kmap that finds a minimized expression more directly.

