Minimization

Karnaugh Maps $f = \sum 0, 3, 5, 7, 8, 9, 11$

\[ \overline{B} \overline{C} \overline{D} + \overline{A} \overline{B} \overline{D} + \overline{A} \overline{C} \overline{D} + \overline{A} \overline{B} \overline{D} \]
\[ f = \sum 0, 2, 4, 6, 8, 10, 11, 12, 13, 14 \]

\[ = \overline{D} + \overline{ABC} + \overline{ABC} \]
Don’t care states

EEL201: Digital Electronic Circuits

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July-December 2009

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0 - 9 \rightarrow 4 bits

\{ 
  \begin{align*}
    &0000 \\
    &0001 \\
    &\vdots \\
    &1001 \\
    &1010 \\
    &1011 \\
    &\vdots \\
    &1111 \\
  \end{align*}
\}

don't care states

\sum_{0, 1, 2, 3, 4, 7, 8, 9} + \sum_{10, 11, 12, 13, 14, 15}

\overline{B} + \overline{CD} + CD
Product of max-terms form

\[
\Sigma 0,1,2,3,4,
7,8,9
+ d \Sigma 10,11,12,13,
14,15
\]

\[
= \prod 5,6 \cdot d \prod 10,11,
12,13,14,15
\]

\[
f = \overline{B} + \overline{C} \overline{D} + CD
\]

\[
f = (\overline{B} + C + \overline{D}) (\overline{B} + \overline{C} + D)
\]
<table>
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The diagram on the right shows:
- A square with the letter 'E' in the top left and bottom right corners.
- Another square with the letter 'E' in the top left and bottom right corners.
- The letter 'F' in the middle of the top row.
- The letter 'F' in the middle of the bottom row.
- The letter 'F' in the middle of the left column.
- The letter 'F' in the middle of the right column.

These elements are aligned with the corresponding entries in the table.