**TRUTH TABLE**

**DECIMAL TO BCD**

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**SIMPLIFY SUM OF PRODUCT (SOP):**

**LED0 = ABCDEFG + ABCDE'FG**

= ABCDFG (E + E’)

***LED0 = ABCDFG***

**LED1 = A'BCD'E’FG + AB'CDE'FG + AB'CDEFG + ABCD'E'FG'**

= A′BCD′E’FG + (AB′CDE′FG + AB′CDEFG) + ABCD′E′FG′

= A′BCD′E’FG + (AB′CDFG (E′ + E)) + ABCD′E′FG′

= A’BCD’E’FG + AB’CDFG + ABCD’E’FG’

= AB’CDFG + BCD’E’F (A’G + AG’)

= AB’CDFG + BCD’E’F (A ⊕G)

***LED1 = AB’CDFG + BCD’E’F (A ⊕G)***

**LED2 = ABC'DEF'G + ABCDE'F'G + AB'CDEFG + ABCD'E'FG'**

= (ABC′DEF′G + ABCDE′F′G) + AB′CDEFG + ABCD′E′FG′

= (ABDF′G (C′E + CE′)) + AB′CDEFG + ABCD′E′FG′

= (ABDF′G (C⊕E)) + AB′CDEFG + ABCD′E′FG′

***LED2 = ABDF′G (C*⊕E*) + AB′CDEFG + ABCD′E′FG′***

**LED3 = A'BCD'E'F'G' + ABCDE'F'G + AB'CDE'FG + ABCD'E'FG' + ABCDE'FG**

= A′BCD′E′F′G′ + (ABCDE′F′G + ABCDE′FG) + AB′CDE′FG + ABCD′E′FG′

= A′BCD′E′F′G′ + (ACDE′G (BF′ + B’F)) + AB′CDE′FG + ABCD′E′FG′

= A′BCD′E′F′G′ + (ACDE′G (B⊕F)) + AB′CDE′FG + ABCD′E′FG′

***LED3 = A′BCD′E′F′G′ + ACDE′G(*B⊕F*) + AB′CDE′FG + ABCD′E′FG′***