

Answer on Question #47373, Programming, Other

Task:

1) Add the following 8-bit binary numbers

i. $(01001110)_2 + (00111100)_2$

ii. $(10011101)_2 + (10001111)_2$

2) Simplify the following Boolean function:

$F = A'C + A'B + AB'C + BC$, using K-map?

Answer

1) Add the following 8-bit binary numbers

i. $(01001110)_2 + (00111100)_2 = (10001010)_2$

ii. $(10011101)_2 + (10001111)_2 = (100101100)_2$

2) Simplify the following Boolean function:

$F = A'C + A'B + AB'C + BC$, using K-map?

So, we must do for simplifying the following Boolean function:

1. Construct a K-map.
2. Find all groups of horizontal or vertical adjacent squares that contain 1.
 - a. Each group must be either rectangular or square with 2^n squares.
 - b. Each group should be as large as possible.
 - c. Each 1 on the K-map must be covered at least once. The same 1 can be included in several groups if necessary.
 - d. Nonessential groups are omitted. (A nonessential group does not contain a 1 that is not covered by any other group)
 - e. Adjacency applies to both vertical and horizontal borders.
3. Translate each group into a product term by eliminating any variable whose value changes from cell to cell.
4. Sum all the product terms.

		<i>B</i>			
<i>A</i>	0	$x'y'z'$	$x'y'z$	$x'yz$	$x'yz'$
	1	$xy'z'$	$xy'z$	xyz	xyz'
		<i>C</i>			

$F = A'C + A'B + AB'C + BC$:

		00	01	11	10
x	1		1	1	1
			1	1	

$F = C + A'B$