Software Assignment 1 - Karnaugh Maps

Approach

In this assignment we were supposed to do the following:

1. Find the region corresponding to a particular term in a k-map
2. Find if the region is legal

For 1, we approached the problem by taking all rows and columns as part of the output region. Now, for each variable, we checked it's form in the term and did the following:

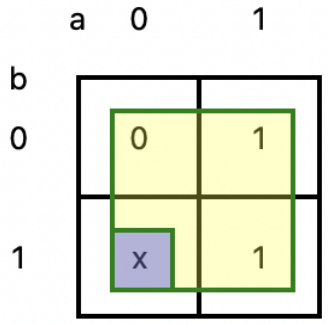
1. If it did not appear in the term(None) - no action was taken
2. If it appeared in complemented form(0) - Then we removed all rows/columns(based on which dimension affected the variable) in which that variable appeared in uncomplemented form.
3. If it appeared in uncomplemented form(1) - Then we removed all rows/columns(based on which dimension affected the variable) in which that variable appeared in complemented form.

As soon as we were done with all variables, we were left with all rows and columns which would be part of the region. We then extracted the top left and bottom right coordinate of this region.

For part 2, with the region we found in the previous part, we simply iterated over all the cells in that region and if any of them was 0, we reported the region as illegal. Otherwise it was deemed legal.

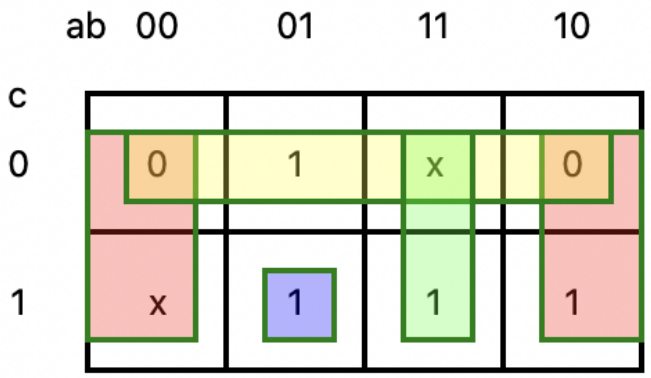
Testing

2 Variable



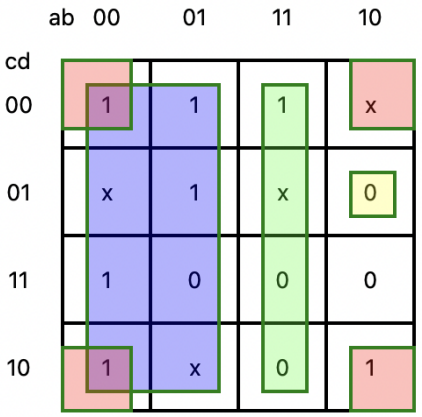
Term	Color	Coordinates	Legal	Output
1	Yellow	(0, 0), (1, 1)	No	((0, 0), (1, 1), False)
a'b	Blue	(1, 0), (1, 0)	Yes	((1, 0), (1, 0), True)

3 Variable



Term	Color	Coordinates	Legal	Output
b’	Red	(0, 3), (1, 0)	No	((0, 3), (1, 0), False)
a’bc	Blue	(1, 1), (1, 1)	Yes	((1, 1), (1, 1), True)
c’	Yellow	(0, 0), (0, 3)	No	((0, 0), (0, 3), False)
ab	Green	(0, 2), (1, 2)	Yes	((0, 2), (1, 2), True)

4 Variable



Term	Color	Coordinates	Legal	Output
a’	Blue	(0, 0), (3, 1)	No	((0, 0), (3, 1), False)
ab	Green	(0, 2), (3, 2)	No	((0, 2), (3, 2), False)
b’d’	Red	(3, 3), (0, 0)	Yes	((3, 3), (0, 0), True)
ab’c’d	Yellow	(1, 3), (1, 3)	No	((1, 3), (1, 3), False)