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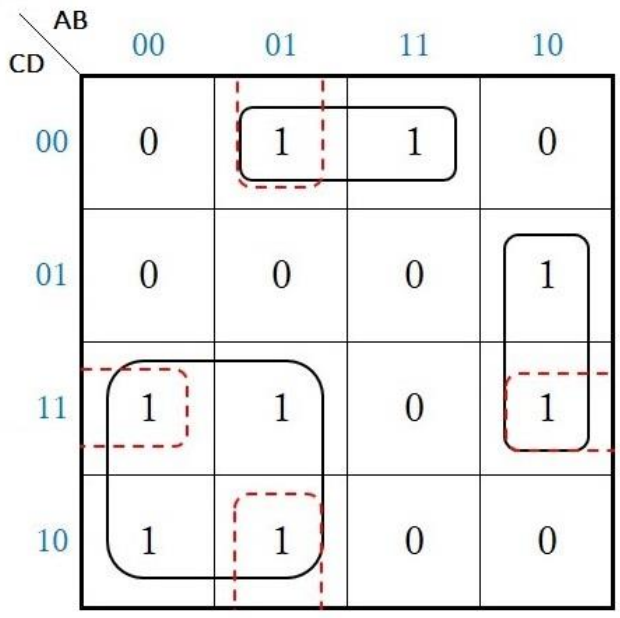
Logic design (Fall 2021)
Quiz # 8

Name:_____ID:_____

1. (100%) Given that $F = \prod M(0,1,5,8,10,13,14,15)$, / $F = \prod M(0,2,4,5,7,10,11,15)$,
   (a). (20%) Find a minimum AND-OR circuit for F. Note that you don't need to draw the AND-OR circuit. Listing the corresponding Boolean expression for the circuit would be enough.
   (b). (40%) Assuming that only one input signal can change each time, identify all pairs of input patterns that may result in static-1 hazards.
   (c). (40%) Find an AND-OR circuit for F which has no static-1 hazards. Note that you don't need to draw the AND-OR circuit. Listing the corresponding Boolean expression for the circuit would be enough.

Ans:

(a). $F = A'C + BC'D' + AB'D$

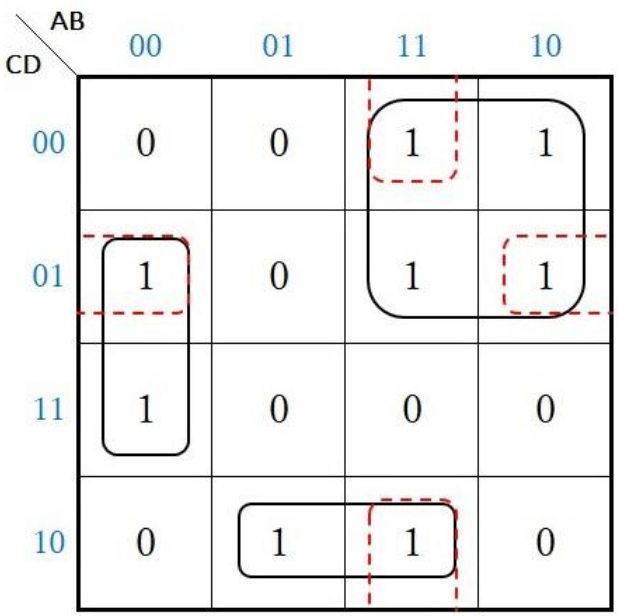


(b). $(A,B,C,D): (1,0,1,1) \rightarrow (0,0,1,1)$
$(A,B,C,D): (0,1,1,0) \rightarrow (0,1,0,0)$

(c). $F = A'C + BC'D' + AB'D + B'CD + A'BD'$

Ans:

(a). $F = AC' + A'B'D + BCD'$



(b). $(A, B, C, D): (1, 1, 1, 0) \rightarrow (1, 1, 0, 0)$

$(A, B, C, D): (1, 0, 0, 1) \rightarrow (0, 0, 0, 1)$

(c). $F = AC' + A'B'D + BCD' + ABD' + B'C'D$