

HW6

Use predicates (vii) and (ix) to answer the following questions.

vii. $p = (a \vee b) \wedge (c \vee d)$ **ix.** $p = a \vee b \vee (c \wedge d)$

- (a) List the clauses that go with predicate p .
- (b) Compute (and simplify) the conditions under which each clause determines predicate p .
- (c) Write the complete truth table for the predicate. Label your rows starting from 1. Use the format in the example underneath the definition of Combinatorial Coverage in Section 8.1.1. That is, row 1 should be all clauses true. You should include columns for the conditions under which each clause determines the predicate, and also a column for the value of the predicate itself.
- (d) List **all** pairs of rows from your table that satisfy General Active Clause Coverage (GACC) with respect to each clause.
- (e) List **all** pairs of rows from your table that satisfy Correlated Active Clause Coverage (CACC) with respect to each clause.
- (f) List **all** pairs of rows from your table that satisfy Restricted Active Clause Coverage (RACC) with respect to each clause.

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Solution for (vii), $p = (a \vee b) \wedge (c \vee d)$

Note: Blank cells represent values of 'F'.

(a) *Clauses are a, b, c, d .*

(b) $p_a = \neg b \wedge (c \vee d)$
 $p_b = \neg a \wedge (c \vee d)$
 $p_c = \neg d \wedge (a \vee b)$
 $p_d = \neg c \wedge (a \vee b)$

(d) *GACC pairs for clause a are: $\{5, 6, 7\} \times \{13, 14, 15\}$.
 GACC pairs for clause b are: $\{9, 10, 11\} \times \{13, 14, 15\}$.
 GACC pairs for clause c are: $\{2, 6, 10\} \times \{4, 8, 12\}$.
 GACC pairs for clause d are: $\{3, 7, 11\} \times \{4, 8, 12\}$.*

(e) *CACC pairs for clauses a, b, c , and d are the same as GACC pairs.*

(f) *RACC pairs for clause a , $(5, 13), (6, 14), (7, 15)$.
 RACC pairs for clause b , $(9, 13), (10, 14), (11, 15)$.
 RACC pairs for clause c , $(2, 4), (6, 8), (10, 12)$.
 RACC pairs for clause d , $(3, 4), (7, 8), (11, 12)$.*

(c)

	a	b	c	d	p	p_a	p_b	p_c	p_d
1	T	T	T	T	T				
2	T	T	T	F	T			T	
3	T	T	F	T	T				T
4	T	T	F	F				T	T
5	T	F	T	T	T	T			
6	T	F	T	F	T	T		T	
7	T	F	F	T	T	T			T
8	T	F	F	F				T	T
9	F	T	T	T	T		T		
10	F	T	T	F	T		T	T	
11	F	T	F	T	T		T		T
12	F	T	F	F				T	T
13	F	F	T	T		T	T		
14	F	F	T	F		T	T		
15	F	F	F	T		T	T		
16	F	F	F	F					

Solution for (ix), $p = a \vee b \vee (c \wedge d)$

(a) *Clauses are a, b, c, d .*

(b) $p_a = \neg b \wedge (\neg c \vee \neg d)$
 $p_b = \neg a \wedge (\neg c \vee \neg d)$
 $p_c = \neg a \wedge \neg b \wedge d$
 $p_d = \neg a \wedge \neg b \wedge c$

(d) *GACC pairs for clause a are: $\{6, 7, 8\} \times \{14, 15, 16\}$.
 GACC pairs for clause b are: $\{10, 11, 12\} \times \{14, 15, 16\}$.
 GACC pair for clause c is: $(13, 15)$.
 GACC pair for clause d is: $(13, 14)$.*

(e) *CACC pairs for clauses a, b, c , and d are the same as GACC pairs.*

(f) *RACC pairs for clause b are: $(6, 14), (7, 15), (8, 16)$.
 RACC pairs for clause b are: $(10, 14), (11, 15), (12, 16)$.
 RACC pairs for clauses c and d are the same as CACC pairs.*

(c)

	a	b	c	d	p	p_a	p_b	p_c	p_d
1	T	T	T	T	T				
2	T	T	T	F	T				
3	T	T	F	T	T				
4	T	T	F	F					
5	T	F	T	T	T				
6	T	F	T	F	T	T			
7	T	F	F	T	T	T			
8	T	F	F	F	T	T			
9	F	T	T	T	T				
10	F	T	T	F	T		T		
11	F	T	F	T	T		T		
12	F	T	F	F	T		T		
13	F	F	T	T	T			T	T
14	F	F	T	F		T	T		T
15	F	F	F	T		T	T	T	
16	F	F	F	F		T	T		