

1) b) Derive the DNF

DNF = (7ANTB) V (7ANC) V (7BNC)

Truth Table:

Y	A	В	Cin	S	Cout	P
Se no	0	0 (8)	A 0	0	0	-
The same of the sa	0	0	1	1	0	
	0	1	0	1	0	
13.10.	0	1	1	0	1	
10000	1	0	Q.	1	0	
	1	0	1	0	1	
	1	1	0	0	1	Don't lo
	1	1	1	1.	1	

a) Both functions as a disjunction of product terms

(DO(BAA)) TA(STAAF)) T = V

We know:

1 - AD - 2) × 8 × 8) ^ ((8 2 A - ^ a)) / A × A) = 1

5 = AVBVCin Write as:

= (((1A ~ 7B) ~ (B ~ A)) ~ (in) ~ (((A ~ 7B) ~ (7A ~ B)) ~ 7 (in) = (7A ~ 7B ~ (in) ~ (A ~ B ~ (in) ~ (A ~ 7B ~ 7 (in) ~ (7A ~ B ~ (in))

(out = (A \ B) \ (Cin \ (A \ B))

= (A \ B) \ (Cin \ ((A \ B)) \ (\ Cin \ (A \ B)) \ (Cin \ A \ B))

= (A \ B) \ \ ((Cin \ A \ B) \ (Cin \ A \ B))

= (A \ B) \ \ ((Cin \ A \ B) \ (Cin \ A \ B))

= (Av ((CinnAnzB)v (CinnZANB))) ~ (Bv ((CinnAnzB)v ((in ~7A ~B))) = (Av(Cin nAniB) vAv(Cin niAnB)) n(Bv (Cin nAniB) VBV (Cin N7ANB) = [A VAV (Cin A 7 A A B)] ~ (BVB V (Cin A A 1B)] = (Av (Cin 17A 18)) 1 (Bv (Cin 1A 17B)) = ((Av (in) 1 (Av 7A) 1 (Av B)) 1 ((Bv (in) 1 (Bv A) 1 (Bv 7B)) = (Av Cin) n (AvB) n (BvCin) n (BvA) = (A v Cin) ~ (A vB) ~ (Bv Cin) = (A n B) v (Cin n A) v (Cin n B)

b) Both functions as a conjunction of sum terms

· Construct CNF by looking at the table:

S = A vB v Cin = (TANTBUCin) ~ (AVBUCin) ~ (AVTBUTCin) ~ (7AVBV7 Cin)

Cout = (A B) v (Cin N (A VB)) = (A NB) v (Cin N ((A NB) V (7A NB)))

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= (AnB) v ((Cin n (AnzB)) v (Cin n (7AnB)))
= (AnB) ~ ((Cin ~A ~ 1B) ~ (Cin ~ 7A ~ B))
= (ANB) v ((Cin MANTB) v (Cin MTANB))
= (Av((Cin nAn 18) v (Cin n 7 A nB))) ~ (Bv ((Cin nA n 18)) ~
                          (Cin N 7A NB)))
= (Av(CinnAnyB) VAv(CinnyAnB)) ~ (Bv(CinnAnyB)
            VBV (Cin N7A AB)
= (AVAV (CinnaAnB)) ~ (BVBV (CinnAnB))
= [Av(CinnTANB)) N(Bv(CinnANTB))
= ((AvCin) ~ (Av7A) ~ (AvB)) ~ (BvCin) ~ (BvA) ~ (Bv7B))
= (AvCin) ~ (AvB) ~ (BvCin) ~ BvA)
= (AvCin) n (AvB) n (BvCin)
Sboth functions using only not (7) and not- and
(1) operations.
                           60 V8 VA=2 V
S=AVBVCin
 S=TAN BNCin) V(ANBNCin) V(ANTBNTCin) V(TANBNTCin)
= 77 ((TANTBNCin) V(ANBNCin) V(ANTBNTCin) V
                              (7AABAZ (in))
 = 7 (7 (7A N 2B N Cin) N7 (ANB N Cin) N7 (AN 1BN7 (in)
                                  N7 (7A NB N7 Cin))
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$$= (7(7A \wedge 7B \wedge Cin) \uparrow 7(A \wedge B \wedge Cin) \uparrow 7(A \wedge 7B \wedge 7Cin))$$

$$= (7A \wedge 7B \uparrow Cin) \uparrow (A \uparrow B \uparrow Cin) \uparrow (A \uparrow 7B \uparrow 7Cin) \uparrow$$

$$= (7A \wedge 7B \uparrow Cin) \uparrow (A \uparrow B \uparrow Cin) \uparrow (7A \uparrow B \uparrow 7Cin) \uparrow$$

$$= (7A \wedge B) \lor (Cin \land (A \lor B))$$

$$= (A \wedge B) \lor (Cin \land A) \lor (Cin \land B)$$

$$= 77((A \wedge B) \lor (Cin \land A) \lor (Cin \land B))$$

$$= 77((A \wedge B) \land (Cin \uparrow A) \land (Cin \uparrow B))$$

$$= 77((A \wedge B) \land (Cin \uparrow A) \land (Cin \uparrow B))$$

$$= (A \uparrow B) \uparrow (Cin \uparrow A) \uparrow (Cin \uparrow B)$$

$$= (A \uparrow B) \uparrow (Cin \uparrow A) \uparrow (Cin \uparrow B)$$

$$= (A \uparrow B) \uparrow (Cin \uparrow A) \uparrow (Cin \uparrow B)$$

