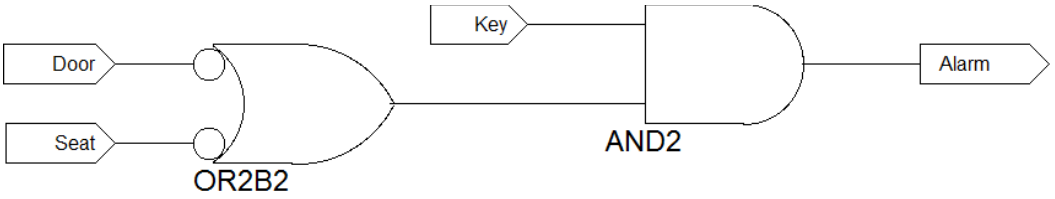
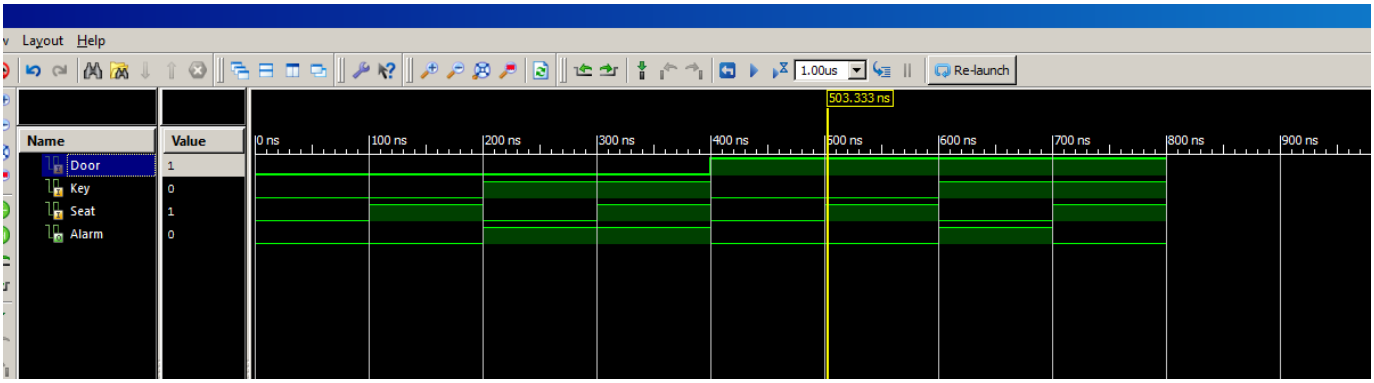
Jae Lee
ECEN 220
Lab #2 – CAD: Schematic Entry and Simulation
09/17/2013

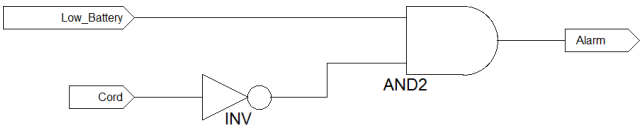
Car Alarm Schematic

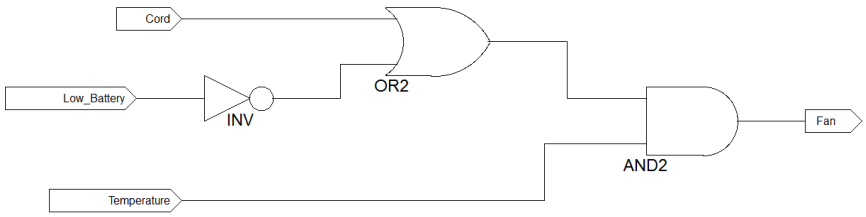


Car Alarm simulation waveform

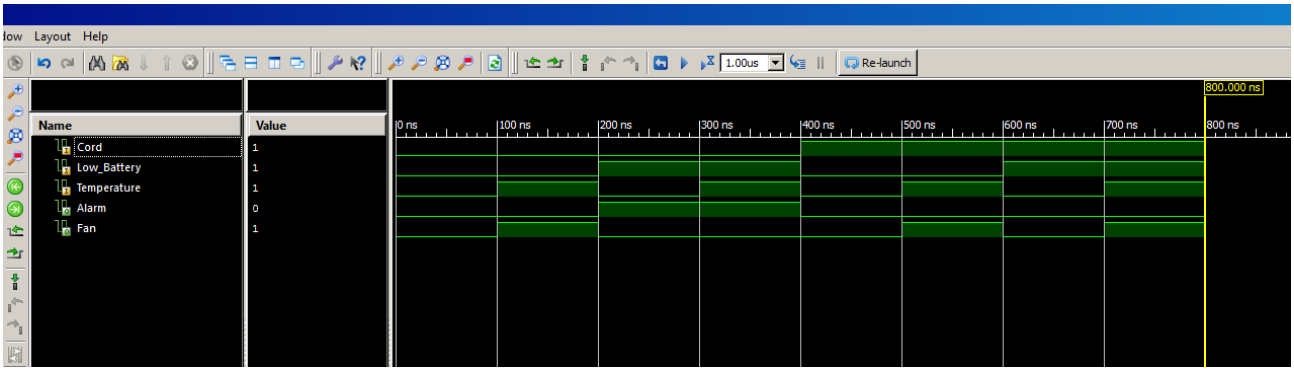


Alarm Fan schematic



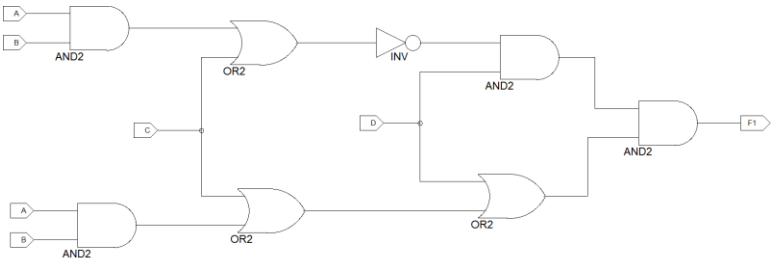


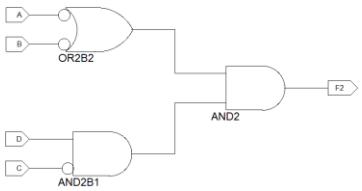
Alarm Fan Simulation waveform



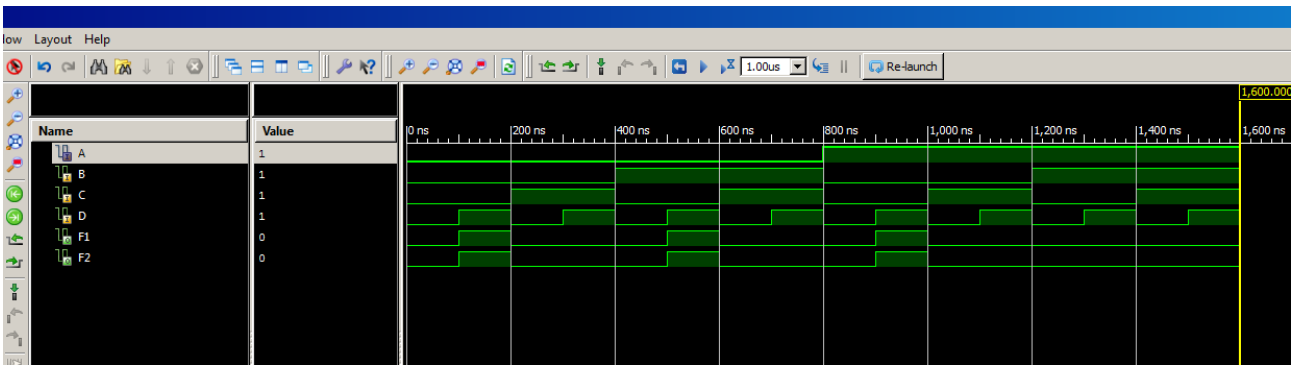
Problem 2.1

Original schematic (Top) & Simplified schematic (Bottom)





Original Wave form (F1) & Simplified Wave form (F2)



Truth table

A	B	C	D	A'+B'	C'D	(A'+B')C'D
0	0	0	0	1	0	0
0	0	0	1	1	1	1
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	1	0	0
0	1	0	1	1	1	1
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	1	0	0
1	0	0	1	1	1	1
1	0	1	0	1	0	0
1	0	1	1	1	0	0
1	1	0	0	0	0	0
1	1	0	1	0	1	0
1	1	1	0	0	0	0
1	1	1	1	0	0	0

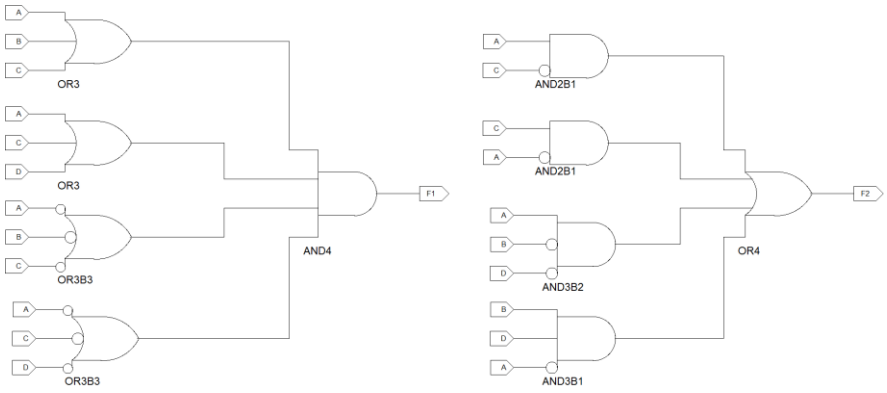
Minimization work

F1 = (AB+C)'D(AB+C+D) = (A'+B')C'D(AB+C+D) = (A'+B')C'(ABD+CD+D) = (A'+B')(ABC'D+C'D)

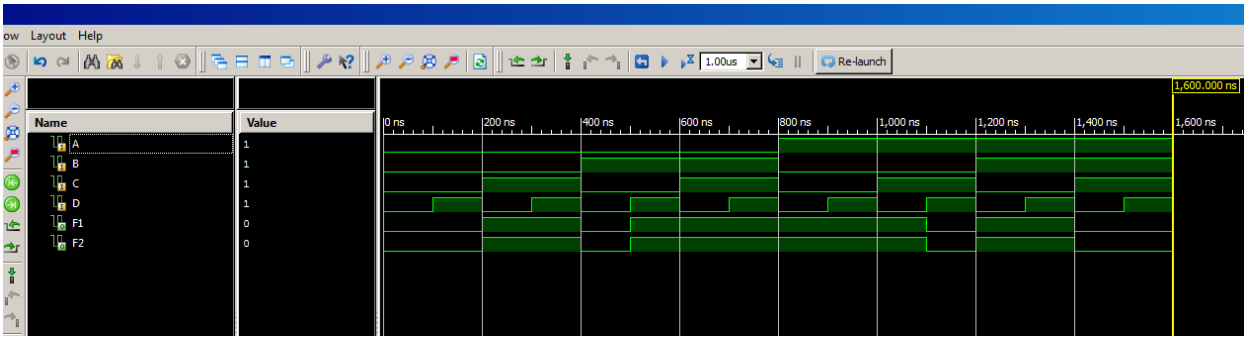
= (A'+B')(C'D)

Problem 2.2

Original schematic (Left) & Simplified schematic (Right)



Original Wave form (F1) & Simplified Wave form (F2)



Truth Table

A	B	C	D	AC’	A’C	AB’D’	A’BD	F
0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0
0	0	1	0	0	1	0	0	1
0	0	1	1	0	1	0	0	1
0	1	0	0	0	0	0	0	0
0	1	0	1	0	0	0	1	1
0	1	1	0	0	1	0	0	1
0	1	1	1	0	1	0	1	1
1	0	0	0	1	0	1	0	1
1	0	0	1	1	0	0	0	1
1	0	1	0	0	0	1	0	1
1	0	1	1	0	0	0	0	0
1	1	0	0	1	0	0	0	1
1	1	0	1	1	0	0	0	1
1	1	1	0	0	0	0	0	0
1	1	1	1	0	0	0	0	0

Minimization work

F = (A+B+C)(A+C+D)(A’+B’+C’)(A’+C’+D’) = (A+(B+C)(C+D))(A’+(B’+C’)(C’+D’))

= (A+C+BD)(A’+C’+B’D’) = AC’+A’C+AB’D’+A’BD+B’CD’+BC’D (the last two terms are redundant)

Anomalies

Things went pretty smooth. I just had a hard time to simplify problem 2.2. Using CAD was cool thing to do. I really enjoyed doing this lab.