Cpr E 281 LAB3
ELECTRICAL AND COMPUTER ENGINEERING
IOWA STATE UNIVERSITY

Lab 3 Answer Sheet

Name and Student ID: Devin Amdahl 053855830 **Lab Section:** 1

Date: 2/8/22

PRELAB:

Q1. Read section 3.0 and fill in the truth table below for Design 1 (*the farmer's problem*). Then use it to construct the POS expression.

Cabbage	Goat	Wolf	Alarm
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

POS Logic Expression: $(C+\overline{G}+W)(\overline{C}+G+\overline{W})$

TA Initials: _____

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Q2. Read section 4.0 and fill in the truth table below for Design 2 (*adding the farmer*). Then use it to construct the SOP expressions.

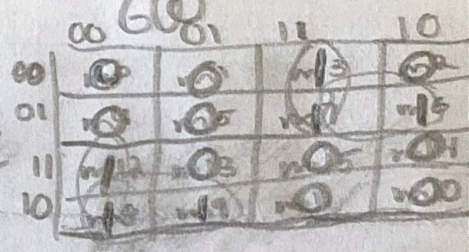
Farmer	Cabbage	Goat	Wolf	Alarm
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

$\bar{F}GW + F\bar{G}\bar{W} + FC\bar{G}W + FCG\bar{W}$

$\Rightarrow \bar{F}G(W+C\bar{W}) = \bar{F}G(W+C)$

$\Rightarrow F\bar{G}(\bar{W}+\bar{C}\cdot W) \Rightarrow F\bar{G}(\bar{W}+\bar{C})$

$\Rightarrow \bar{F}GW + \bar{F}GC + F\bar{G}\bar{W} + F\bar{G}\bar{C}$



$\Rightarrow F\bar{G}\bar{W} + FC\bar{G} + \bar{F}GW + \bar{F}CG$

Canonical SOP Logic Expression: $\bar{F}CGW + \bar{F}CG\bar{W} + FCGW + FC\bar{G}\bar{W} + FC\bar{G}W + FCGW$

Simplified SOP Logic Expression: $F\bar{G}\bar{W} + \bar{F}GW + FC\bar{G} + \bar{F}CG$

TA Initials: _____

LAB:

3.0 Simulation results demonstrate correct code. TA Initials:
Schematic (FPGA) M.K.S
Structural (ModelSim) M.K.S Behavioral (ModelSim) M.K.S

4.0 Simulation results demonstrate correct code. TA Initials: M.K.S