Nick McCullough - ID 950337388 - Lab Section F

CprE 281 QUIZ 1

ELECTRICAL AND COMPUTER ENGINEERING
IOWA STATE UNIVERSITY

Initial Stuff and Basics
Assigned Date: First Week
Finish by Friday

Instructions

Complete the question below to the best of your ability. Once complete, upload a PDF of your work to canvas.

Questions

P1. (10 points) Convert 132_8 to Decimal

$1\ 3\ 2$ (base 8) $= (2\times8^0) + (3\times8^1) + (1\times8^2) = 2 + 24 + 64 = 90_{10}$

P2. (10 points) Convert 432_{10} to Binary

P2	remainder
432/2	0
216/2	0
108/2	0
54/2	0
27/2	1
13/2	1
6/2	0
3/2	1
1/2	1

110110000_2

P3. (10 points) Convert 42_7 to Binary

$42_7 = (4\times7^1) + (2\times7^0) = 28 + 2 = 30_{10}$

$30/2 = 15$ r 0, $15/2 = 7$ r 1, $7/2 = 3$ r 1, $3/2 = 1$ r 1

11110_2

P4. (10 points) Convert ACE_{16} to Octal

$ACE_{16} = (10\times16^2) + (12\times16^1) + (14\times16^0) = 2560 + 192 + 14 = 2766_{10}$

	remainder
2766/8 = 345	6
345/8 = 43	1
43/8 = 5	3
5/8 = 0	5

5316_8

P5. (30 points) Use the following truth table

A	B	C	F
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

$\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + A\bar{B}C$

$\bar{A}+\bar{B}+\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + A\bar{B}C$
$\bar{A}+\bar{B}+\bar{C} + (\bar{A}+\bar{B})C + A\bar{B}\bar{C} + A\bar{B}C$
$\bar{A}+\bar{B}+\bar{C} + (\bar{A}+\bar{B})C + A(\bar{B}+\bar{C}) + A\bar{B}C$
$\bar{A}+\bar{B}+\bar{C} + (\bar{A}+\bar{B})C + A(\bar{B}+\bar{C})$
$\bar{A}+\bar{B}+\bar{C} + (\bar{A}+\bar{B})C + \bar{B} + \bar{C}$
$\bar{A}+\bar{B}+\bar{C} + (\bar{A}+\bar{B})C + \bar{C}$
$\bar{A}+\bar{B}+\bar{C} + (\bar{A}+\bar{B})C$
$\bar{A}+\bar{B}+\bar{C} + \bar{A}+\bar{B}$
$\bar{A}+\bar{B}+\bar{C} + \bar{B}$
$\bar{A}+\bar{B}+\bar{C}$

$\bar{A} + \bar{B} + \bar{C}$

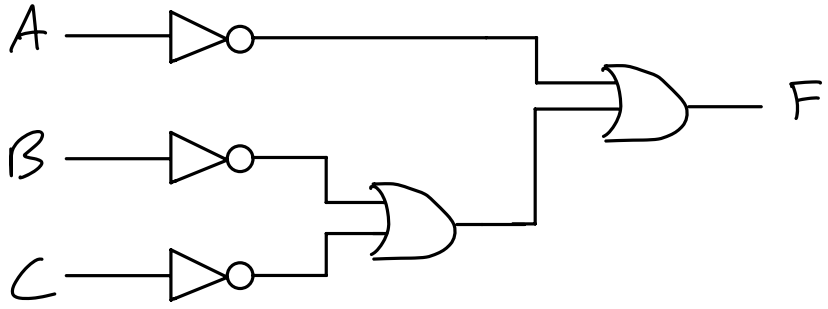
a) Derive the output (F) Boolean expression using the Canonical Sum-Of-Products (SOP).

$F(A,B,C) = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + \bar{A}\bar{B}C$

b) Simplify F from part (a) using the Boolean algebra and draw the logic circuit.

$\bar{A} + \bar{B} + \bar{C}$

c) Derive the output (F) Boolean expression using the Canonical Product-Of-Sums (POS). [no need to simplify and draw the circuit]



POS is just the opposite of SOP

POS

$F(A,B,C) =$

$ABC + AB\bar{C} + \bar{A}BC + A\bar{B}C$