Faculty of Engineering
School of Electrical Engineering
and Computer Science
CEG2136 Computer Architecture I

uOttawa
L'Université canadienne
Canada's university

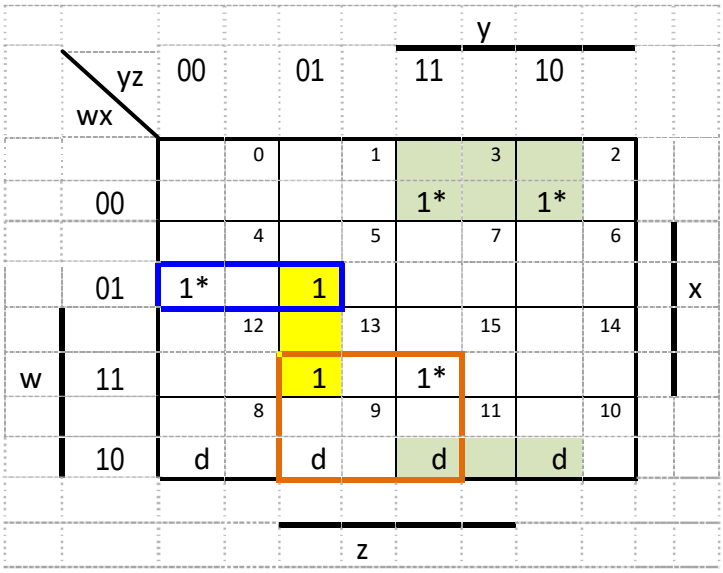
NAME / Student ID#

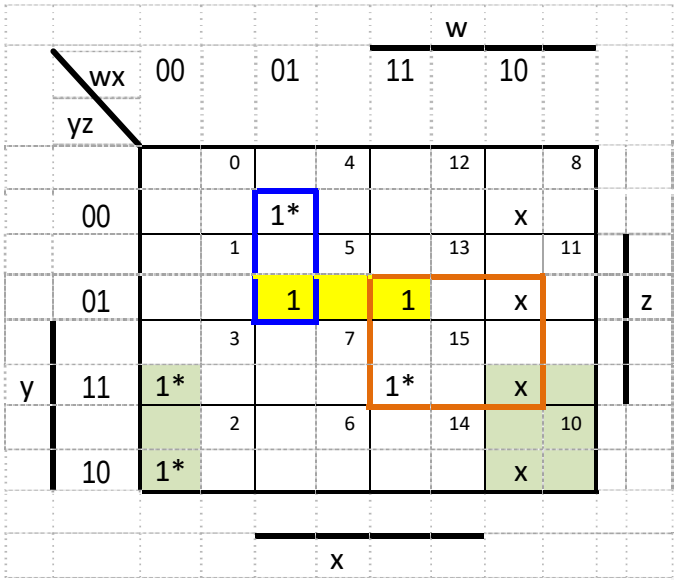
Quiz 1
2017
Even

Question 1 25 points

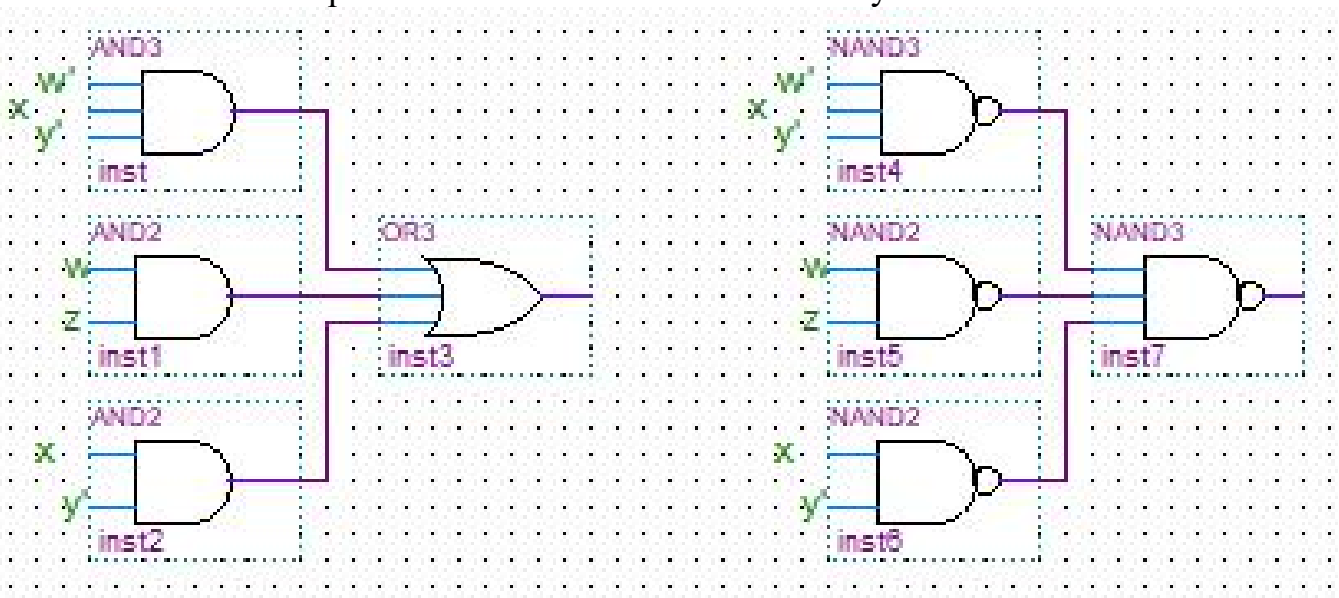
Given logic function: F(w, x, y, z) = Σm(2, 3, 4, 5, 13, 15) + dc(8, 9, 10, 11)

1. Use a 4 variable K-map to find its minimum SoP
2. Find the lists of the prime implicants and essential prime implicants.
3. Is your solution unique? Justify your answer.
4. Draw the logic diagram using AND-OR gates.
5. Redraw the logic diagram using NAND gates





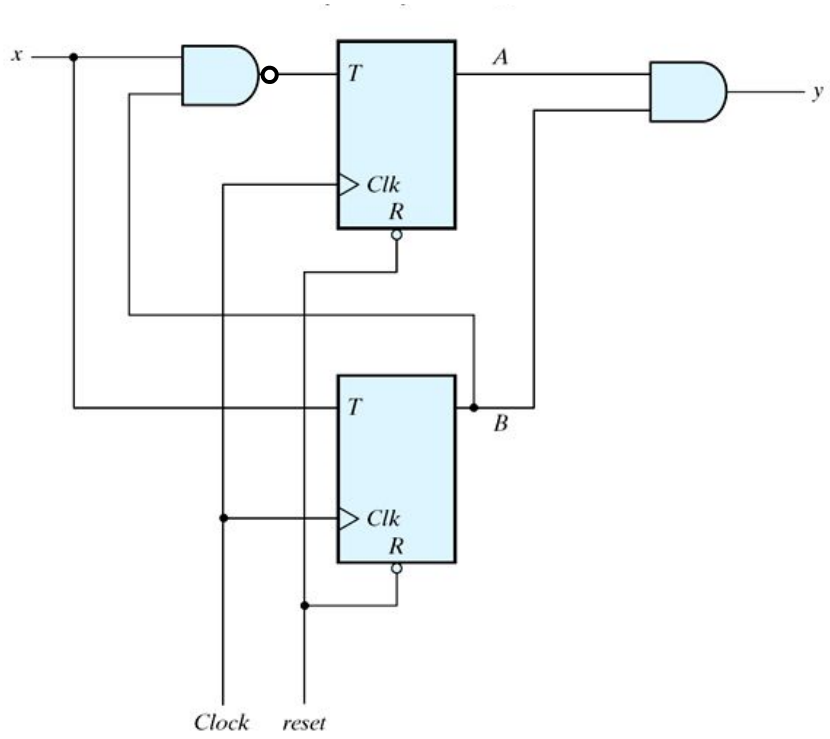
1. F_{min} = w'xy' + wz + x'y
2. PIs = w'xy' , wz , x'y , wy'z EPIs = w'xy' , wz , x'y
3. The solution is unique since it is formed from EPI's only



4. 5.

Q2. 25 points Analyze the following sequential circuit through following steps:

a) Find the equations of the T inputs of the two flip-flops A and B.
b) Find the state table of the circuit.
c) Draw the state diagram of the circuit.



a) Equations of the T inputs of the flip-flops

$T_A = (X\ B)'$
$T_B = X$

Y equation is usefull in the state table: y=AB

b) Derivation of the state table of the circuit

A^n	B^n	x	T_A	T_B	A^{n+1}	B^{n+1}	y
0	0	0	0	0	1	0	0
0	0	1	0	1	1	1	0
0	1	0	0	0	1	1	0
0	1	1	1	1	0	0	0
1	0	0	0	0	0	0	0
1	0	1	0	1	0	1	0
1	1	0	0	0	0	1	1
1	1	1	1	1	1	0	1

c) The state diagram of the circuit