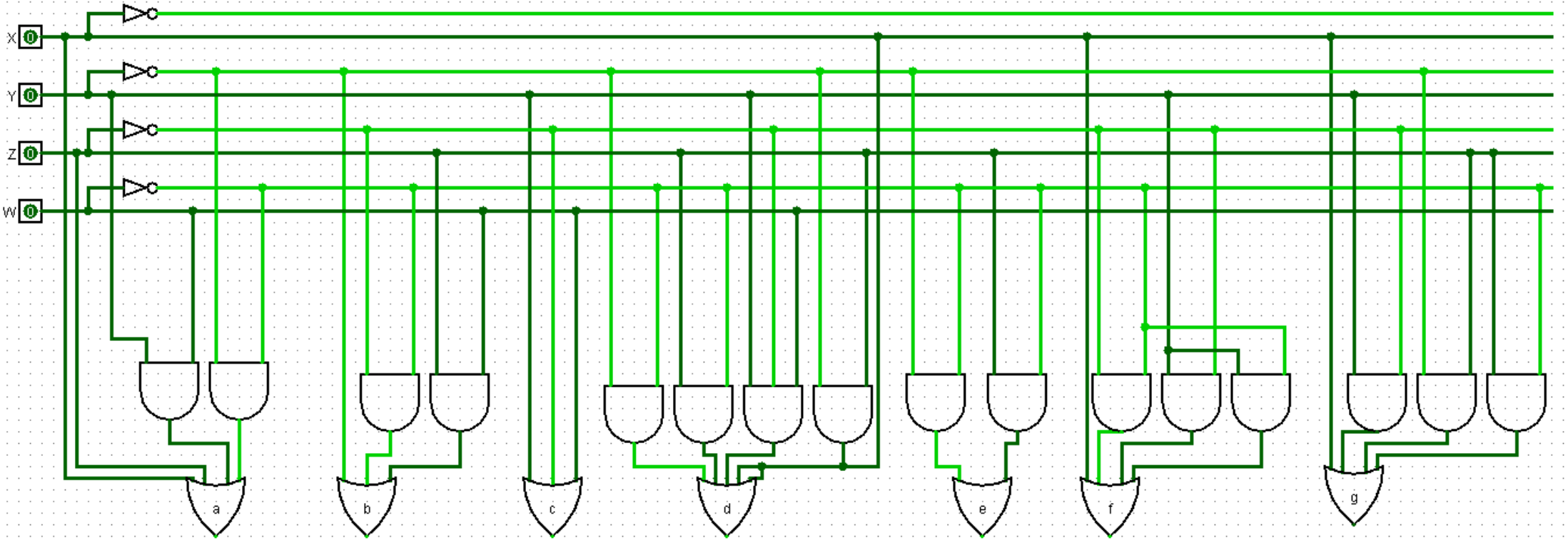
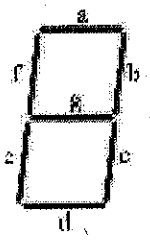

X
Y
Z
W
a
b
c
d
e
f
g

UNIVERSITY OF MINNESOTA DULUTH

CS2521 Lab 7

Draw the logic of one 7-segment display from binary coded decimal format (Conversion from 4 bit input [X,Y,Z,W] to 7 output bits [a,b,c,d,e,f,g] assuming each of the segment is illuminated upon 0 in output) using the given truth table. Write equations of Boolean Expressions and draw logic circuit over Logism, attach screenshot with this worksheet.



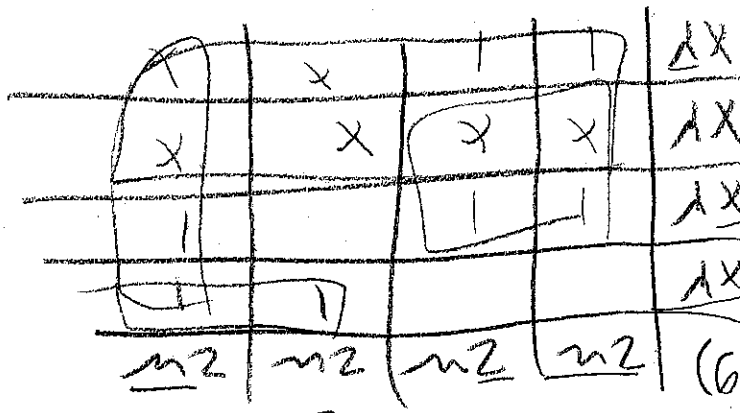
$a = \Sigma(0,2,3,5,7,8,9)$
$b = \Sigma(0,1,2,3,4,7,8,9)$
$c = \Sigma(0,1,3,4,5,6,7,8,9)$
$d = \Sigma(0,2,3,5,6,8)$
$e = \Sigma(0,2,6,8)$
$f = \Sigma(0,4,5,6,8,9)$
$g = \Sigma(2,3,4,5,6,8,9)$

$a = X + Z + YW + Y\overline{W}$
$b = \overline{Y} + Z\overline{W} + ZW$
$c = Y + \overline{Z} + W$
$d = \overline{Y}W + Z\overline{W} + Y\overline{Z}W + \overline{Y}\overline{Z} + X$
$e = \overline{Y}W + Z\overline{W}$
$f = X + \overline{Z}\overline{W} + Y\overline{Z} + Y\overline{W}$
$g = X + Y\overline{Z} + \overline{Y}Z + Z\overline{W}$

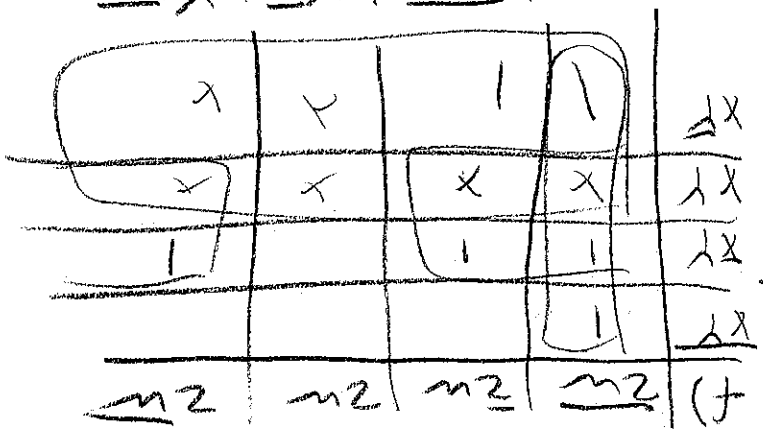
Truth Table:

Digit	X	Y	Z	W	a	b	c	d	e	f	g
0	0	0	0	0	0	0	0	0	0	0	1
1	0	0	0	1	1	0	0	1	1	1	1
2	0	0	1	0	0	0	1	0	0	1	0
3	0	0	1	1	0	0	0	0	1	1	0
4	0	1	0	0	1	0	0	1	1	0	0
5	0	1	0	1	0	1	0	0	1	0	0
6	0	1	1	0	0	1	0	0	0	0	0
7	0	1	1	1	0	0	0	1	1	1	1
8	1	0	0	0	0	0	0	0	0	0	0
9	1	0	0	1	0	0	0	0	1	0	0

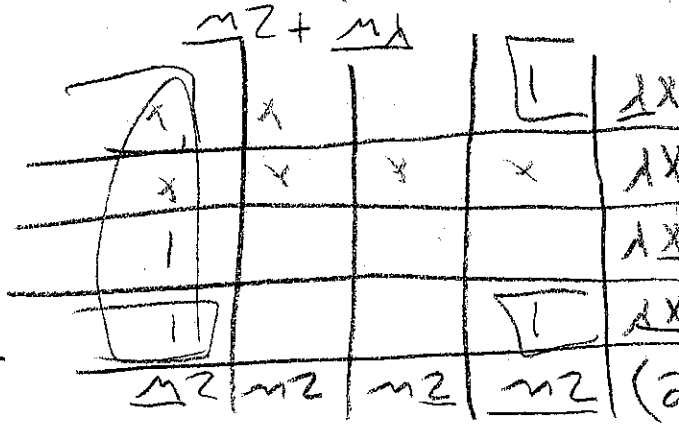
$\overline{m}2 + 2\overline{\lambda} + \overline{2}\lambda + x$



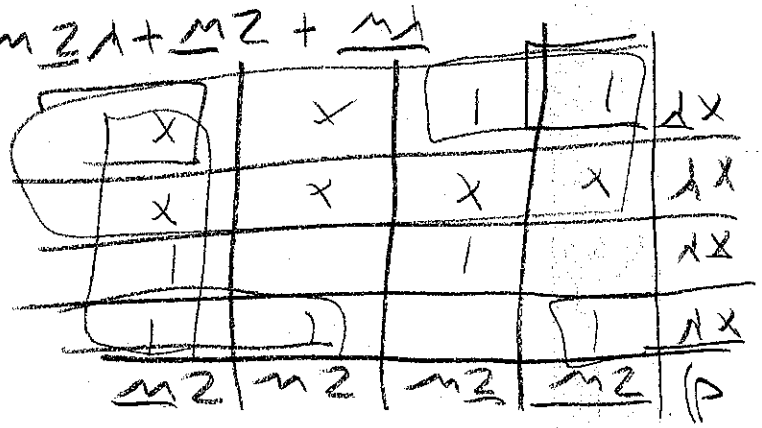
$\overline{m}\lambda + 2\lambda + \overline{m}2 + x$



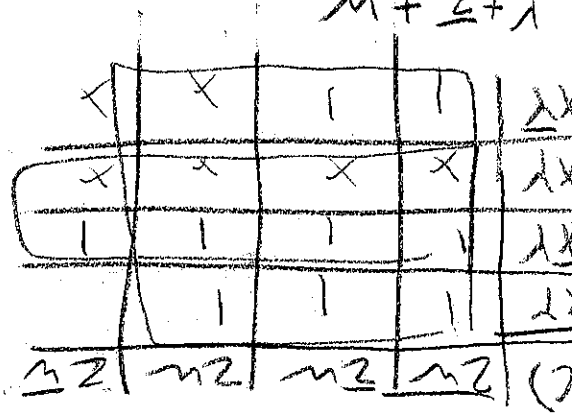
$\overline{m}2 + \overline{m}\overline{\lambda}$



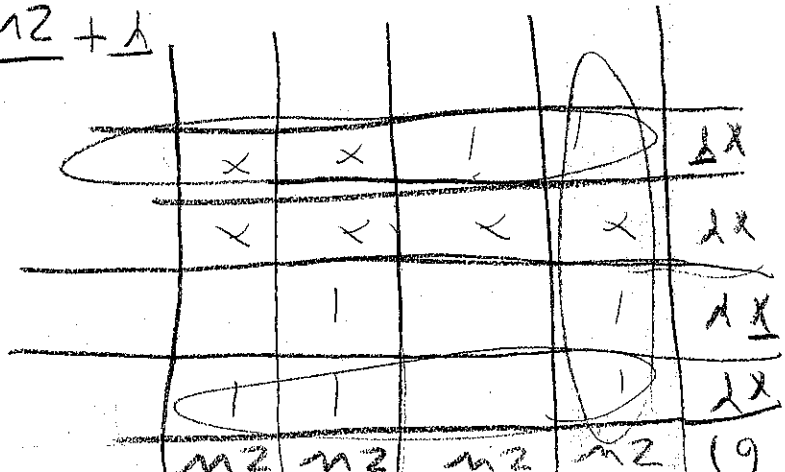
$x + 2\overline{\lambda} + m\overline{2}\lambda + \overline{m}2 + \overline{m}\lambda$



$m + \overline{2} + \lambda$



$m2 + \overline{m}2 + \overline{\lambda}$



$\overline{m}\lambda + m\lambda + 2 + x$