

Computer Project #2 -- Seven-segment Display (Part I)

a) Give your name and MSU PID:

Name:

MSU PID:

b) Complete the following truth tables to describe the Boolean functions which form the basis for your combinational circuit. For each function, replace the hyphens with the appropriate entry (0, 1 or X), where X represents the "don't care" condition.

w	x	y	z	P()	a()	b()	c()	d()	e()	f()	g()
0	0	0	0	-	-	-	-	-	-	-	-
0	0	0	1	-	-	-	-	-	-	-	-
0	0	1	0	-	-	-	-	-	-	-	-
0	0	1	1	-	-	-	-	-	-	-	-
0	1	0	0	-	-	-	-	-	-	-	-
0	1	0	1	-	-	-	-	-	-	-	-
0	1	1	0	-	-	-	-	-	-	-	-
0	1	1	1	-	-	-	-	-	-	-	-
1	0	0	0	-	-	-	-	-	-	-	-
1	0	0	1	-	-	-	-	-	-	-	-
1	0	1	0	-	-	-	-	-	-	-	-
1	0	1	1	-	-	-	-	-	-	-	-
1	1	0	0	-	-	-	-	-	-	-	-
1	1	0	1	-	-	-	-	-	-	-	-
1	1	1	0	-	-	-	-	-	-	-	-
1	1	1	1	-	-	-	-	-	-	-	-

Note: in the truth table, "P()" represents the "Present" indicator, "a()" represents the LED segment labeled "a", and so on.

c) Complete the following Karnaugh maps for your Boolean functions. For each input combination, replace the hyphen with the appropriate entry (0, 1 or X).

P()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

a()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

b()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

c()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

d()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

e()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

f()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

g()	y'z'	y'z	yz	yz'
w'x'	-	-	-	-
w'x	-	-	-	-
wx	-	-	-	-
wx'	-	-	-	-

d) For each Boolean function, give the minimized sum of products expression.

P() =

a() =

b() =

c() =

d() =

e() =

f() =

g() =