CSE 320 Spring 2013

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

Assignment Overview:

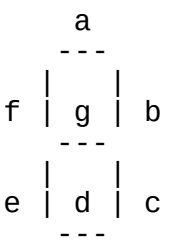
This assignment develops familiarity with combinational circuits. You will design the combinational circuits specified below.

It is worth 30 points (3% of course grade), and must be completed no later than 11:59 PM on Thursday, January 31.

Assignment Specifications:

Consider your nine-character MSU PID as a sequence of hexadecimal digits. You will design combinational circuits which recognize those digits and map them to the appropriate segments in a seven-segment display.

A seven-segment display uses seven LEDs to represent hexadecimal digits. Assuming the seven segments are labeled as shown below, then each digit can be displayed by lighting a subset of the segments.



For example, the hexadecimal digit ’9’ can be displayed by lighting all of the segments except segment e.

Similarly, the hexadecimal digit ’A’ can be displayed by lighting all of the segments except segment d.

Your circuits will accept four inputs (the four bits in a hexadecimal digit) and will produce eight outputs (a "Present" indicator and the seven values associated with the seven-segment display).

For each hexadecimal digit which appears in your MSU PID, the circuits will assert the "Present" signal and will produce the correct value for each of the display signals. Otherwise, the "Present" signal will be deasserted and the value of each display signal is irrelevant.

Your design will be formalized by completing the requested information in the file "~cse320/Projects/project02.design".

Assignment Deliverables:

The deliverable for this assignment is:

proj02.design -- the text file for your design

Be sure to use the specified file name, and to submit your file for grading via the "handin" program.

Assignment Notes:

1) The following chart indicates which segments are used for a given hexadecimal digit.

0	a, b, c, d, e, f
1	b, c
2	a, b, d, e, g
3	a, b, c, d, g
4	b, c, f, g
5	a, c, d, f, g
6	a, c, d, e, f, g
7	a, b, c
8	a, b, c, d, e, f, g
9	a, b, c, d, f, g
A	a, b, c, e, f, g
B	c, d, e, f, g
C	a, d, e, f
D	b, c, d, e, g
E	a, d, e, f, g
F	a, e, f, g

2) The minimized expressions for your eight functions must be given in sum of products form. That is, each function must be expressed using one or more products (AND terms), and at most one sum (OR term).

3) In Part II of this assignment, you will implement and test the circuits which you designed.