Cpr E 281 HW01

ELECTRICAL AND COMPUTER ENGINEERING
IOWA STATE UNIVERSITY

Initial Stuff and Basics
Assigned Date: First Week
Not Graded, Finish by Aug. 29, 2016

P1. (12 points) Define the following terms in no more than 2 sentences each.

A. CAD
B. PCB
C. PLD
D. FPGA

P2. (12 points) In the development process initial design-simulation-verification is one loop and prototype implementation-testing-verification is another loop. Answer the following in 4-5 sentences.

A. Which loop is relatively more expensive, and why?
B. Can any of these loops be avoided? If not, why not? If yes, what is the penalty?

P3. (8 points) Convert the following numbers to decimal:

a) 1101001_2
b) 1101_2
c) 1101_8
d) 1101_{16}

P4. (8 points) Convert the following numbers to binary:

a) 45
b) 281
c) 281_{16}
d) CAD_{16}

P5. (20 points) Consider the following statement: “If any of my two friends picks me up in time and the movie is not sold out or my friend who picks me up has already bought tickets then I will see the movie tonight.” Suppose the events that your two friends pick you up on time are represented by logic variables A and B, respectively, for the two friends; their having bought tickets in advance are represented by logic variables T1 and T2, respectively; the movie being sold out is represented by the logic variable S, then write down all combinations of logic variables (like X=1 and Y=0) one at a time, which when true will allow you to see the movie.

P6. (20 points) Consider the logic function f(x, y) = x + (x.y).

A. (8 points) Draw the circuit diagram for f(x, y).
B. (8 points) Write the truth table for f(x, y).
C. (4 points) By looking at the truth table in (b), what observation can you make about f(x, y)?

P7. (20 points) Consider the circuit below. Name the three inputs as A, B, and C and name the output as F.

A. Write the logic expression for it.
B. Write the truth table for the circuit.