CS 441 Homework 0

Due on paper and in class 2014-09-11. Covers course prerequisites, background material, and survey.
Name: ______________________  UAF Email: __________@alaska.edu

For each of these circuits, I'd like you to tell me all possible inputs that will make the “select” line true. Get .circ files for Logisim: https://www.cs.uaf.edu/media/filer_public/2014/09/04/hw0_problems.zip

hw0_0: Basic logic circuit.

hw0_1: 

hw0_2: 

hw0_3: This is a three input decoder.

hw0_4: This is a tristate bus, with non-inverting tristate drivers.

hw0_5: This is a “D” type flip-flop.

hw0_6: This is a logic circuit built from analog FET transistors.
hw0_7: This is a two-input decoder, driving some downstream logic.

hw0_8.) You're building a new ultra-fast cellphone charger to deliver 25 amps at 5 vdc.

a.) How many amps will it need at 120 vac?

b.) Will the charger need a heatsink?

hw0_9.) Write some assembly code on the left, to implement the C language function on the right:

Assembly code:

extern int bar(int y); /* function prototype */
int foo(int x, int y) {
    return 7 + bar(y);
}

(Pick any real CPU you like: x86, x64, ARM, MIPS, PIC, ...)

Survey.) Which of these things would you like to hear more about? Please rate your interest from 0 (not at all interested) through 3 (worth about a week) through 10 (willing to devote your life to this subject).

__ hands on breadboard/PCB style home fabricated circuits, e.g., for robotics
__ mechanics of semiconductor fabrication (photolithography, etching, masking)
__ high performance computing: supercomputers, cloud, big data
__ GPU performance tuning generally, and graphics card massively parallel programming models
__ SIMD performance tuning generally, and the single instruction multiple data programming models
__ multithreaded machine programming models
__ multithreaded correctness: memory consistency models, locking, atomic operations
__ cloud computing, such as Amazon's Elastic Compute Cloud
__ processor virtualization support, such as VT-x CPU extensions
__ latest and greatest CPU designs (e.g., Intel Core, AMD FX)
__ biological computing (computing using DNA nucleotides, protein soups, etc.)
__ quantum computing (computing with "qubits", which can store the "superposition" of 0 and 1)
__ _______________________________________________ (please suggest an interesting topic!)