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

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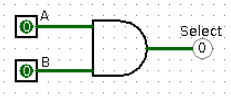
hw0_0: Basic logic circuit.



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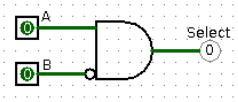
hw0_1:



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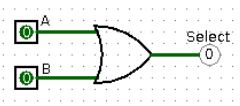
hw0_2:



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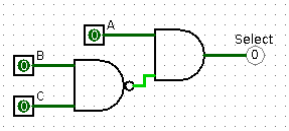
hw0_3: This is a three input decoder.



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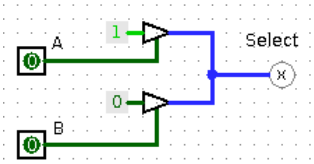
hw0_4: This is a tristate bus, with non-inverting tristate drivers.



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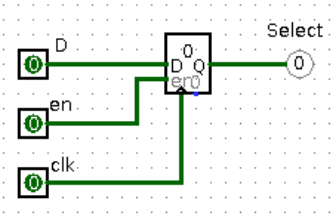
hw0_5: This is a "D" type flip-flop.



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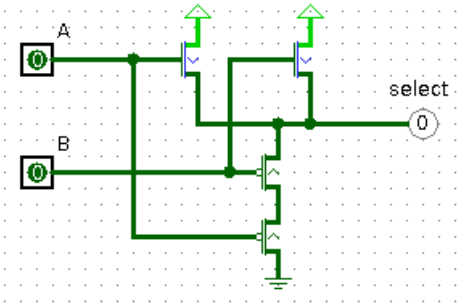
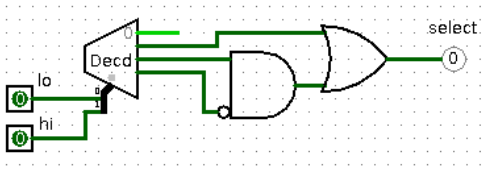
hw0_6: This is a logic circuit built from analog FET transistors.



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 <u>any</u> 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!)