EECS 270 Final overview

This document is not meant to be complete, it is merely an attempt to organize things and provide a checklist of things you really know. Remember the exam is open book and open notes, but don't expect to have time to look everything up!

Things you should be able to do:

- Convert between a logic function, a truth table, and a digital circuit
- Be able to find the minimal sum-of-products/product-of-sums using a K-map or Quine-McCluskey
- Be able to find the minimal product-of-sums using a K-map (including don't cares)
- Be able to use and understand and implement basic MSI devices such as Encoders, Decoders, Priority Encoders, MUXes, Adders and Subtractors.
- Be able to convert to and from different number bases (base 2, 10, etc.)
- Be able to convert to and from different methods of number representation (unsigned, 2's complement, signed-magnitude, excess) as well as understand what values can be represented in these schemes given N bits.
- Manipulate a logic function using the basic rules of logic.
- Be able to use tri-state devices.
- Be able to understand the use of S-R latch, D latch and D flip-flop.
- Design a state machine given a state transition diagram
- Design a Mealy or Moore transition diagram given a clear specification.
- Given a state machine, be able to specify the state transition diagram.
- Be able to analyze and design basic CMOS circuits.
- Be able to design a simple data path.
- Be able to design a state machine that controls a simple data path.
- Understand how memory devices function
- Be able to read or write Verilog code involving any of the above.

Terms/concepts you should know:

- Gray code, MSB, sign extension, Hamming distance and its relationship to error checking/correction
- literal, min term, maxterm, canonical sum/product, Sigma/Pi notation, prime implicant, essential prime implicant, distinguished 1-cell, don't care
- Propagate and Generate in a carry look-ahead adder.
- S-R latch, Sbar-Rbar latch, D latch, D flip-flop, J-K flip-flop and S-R flip flop
- Commutative, Associative, Distributive, Combining, and DeMorgan's law.
- Computing the delay in a circuit.
- Set-up/hold time
- Mealy vs. Moore machine.
- NMOS and PMOS transistors

Obviously the exam will not be able to cover everything listed above. However I will try to hit as much as possible. **You *can* expect a very heavy weighting on state machines!**