

EECS 270 Midterm 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 a logic function to a truth table and/or a digital circuit
- Convert digital circuit to a truth table and/or logic function
- Be able to find the minimal sum-of-products using a K-map (including don't cares)
- Be able to find the minimal product-of-sums using a K-map (including don't cares)
- Be able to find the minimal sum-of-products using the Quine-McCluskey algorithm
- Be able to use and understand and implement Encoders, Decoders, Priority Encoders, MUXes, Adders and Subtractors including carry look-ahead adders.
- 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 find parity bits of a string.
- 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 state transition diagram given a clear specification.
- **Be able to do digital design using the tools mentioned 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.

Obviously the exam will not be able to cover everything listed above. However I will try to hit as much as possible...