Review

• Introductory Material
  – Truth tables
  – K-Maps
  – Logic implementations
    • Standard / special
    • Tri-state vs 2 state
    • Signal characteristics (Tsu, Thold, Tdly, sum)
  – Shape of gates & Logical State Indicators

More Stuff

• Signal integrity: can cause problems
• Programmable logic: FPGA vs PLD vs CPLD vs PAL
• Boolean algebra & system representation
Steps for Combinational Design

• Understand { requirements, solutions, algorithms, number representations, etc.}
• Create a basic block diagram
  – Identify Ins and Outs as necessary
  – Identify assertion levels
• Partition problem as needed
• Define OUTS = fn( INS )
• Reduce, implement, check out

Hardware Description Language: VHDL

• Review basic VHDL techniques
  – Signal assignment
    • Conditional signal assignment statement
    • Selected signal assignment statement
  – Process
    • Sequential statements: signal assignment, variable assignment, if statement, case statement, loop statement
  – Concurrent vs sequential
  – Checking edges
Info Representation

- Unsigned Binary
- Two’s complement
- Fixed point with both UB and 2C
- Excess codes
- Floating Point Representations
- Arithmetic in different representations

Coding for Errors

- Simple Parity
- Hamming techniques
Addition/Subtraction

- Basic ripple technique
- Concepts involved in look-ahead
- How to build larger systems by repeated application of look-ahead elements

More Math: Multiplication and Division

- Basic algorithms
  - Gradeschool
  - Modified gradeschool algorithms
  - Divide with direct
- Faster stuff
  - Row reduction units – high speed multiply
  - High speed divide
- Math for Floating Point
Clocked Sequential Systems

• Use of clock for synchronization
• Creation of register type elements
• Creation of state machines
  – VHDL (simplest)
  – Classical
  – One-Hot
  – Others
• Use of Register Transfers