

## Exam 2: Review

- **Sequential Networks**
  - Basic circuits with feedback
    - » Bistable elements
    - » Cross coupled NOR/NAND gates
    - » RS latches
  - R-S and D latches
  - J-K flip-flop
  - D flip-flop
  - T flip-flop
- **Clocking**
  - Setup and hold times
  - Edge triggered vs enable
  - Propagation delay
- **Flip-Flops and Registers**
  - General flip-flop behavior and terminology
    - » Edge triggered
    - » FF vs Latch
    - » Registers
  - Shift Registers
    - » Concepts
    - » Serial -> parallel
    - » Parallel -> serial
- **Timing Waveforms**

## Exam 2: Review

- **Characteristics of Different FF Types**
  - Function
  - Characteristic equation
  - D, T, JK
- **Finite State Machines**
  - Concept of state
  - State diagram
  - State transition table
  - Next state and output functions
- **Counters**
  - Binary
  - Ring counter
  - Johnson counter (twisted ring)
  - Cascaded counters with 74163
- **Timing Issues with FFs**
- **FSM Analysis**
- **FSM Design and Implementation**
  - representation
  - state minimization (by observation, row matching, implication chart)
  - state encoding (binary, one-hot)
  - implementation with FFs
- **Moore and Mealy Machines**
- **FSM Word Problems**
  - Description → Realization

## Exam 2: Review - Types of Problems

- **True-false problems**
- **Flip-flop concepts and conversion between FFs**
- **Timing waveform**
- **Analysis and Design of FF Circuits (FSMs)**
  - State diagram
  - State table
  - Flip flop choice
  - Analysis
  - Design (synthesis)
- **Word Problems**
- **Mainly focus on the material after the midterm exam.**
- **However, all Material From Exam 1 is Still Possible as Part of Another Problem!**
  - for example, K-maps and logic simplification in deriving the excitation and/or output equations for a FF circuit

## Exam 2: Review - Exam Format

- **All material covered in class and topics from laboratory exercises**
  - **Closed book**
  - **One Page Handwritten Notes (8.5x11 inches, single sided, original – not photocopied)**
  - **Short and Long Problems, and True/False**
  - **50 minutes**
  - **Same format as old exams on the web**
- **Study Suggestions**
    - review in-class notes – they are the authoritative reference for all material covered in this class
    - old exams? Posted on web.
    - skim the text material we covered in Katz
      - » review the terminology and notation
    - review quiz problems
      - » rework problems on your own
    - attend the review session with the TAs at 6pm Wed.