UNITED STATES AIR FORCE ACADEMY

ECE 281

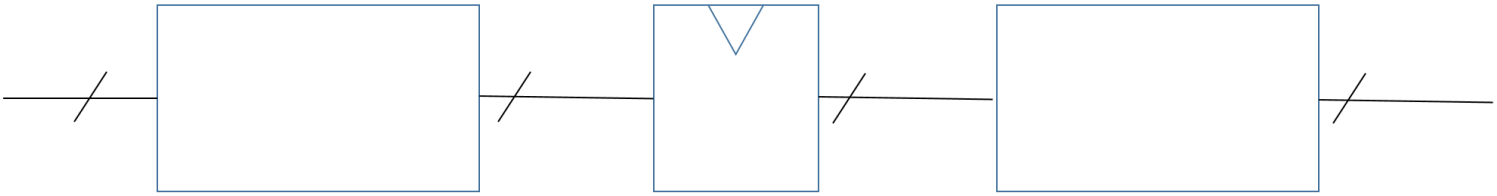
Lesson 20 Notes

Objectives:

- Know the three main parts of any FSM
- Understand the differences between Mealy and Moore machines
- Know the five steps in FSM design and analysis, and be able to apply them
- Demonstrate the ability to use various state encodings in FSM design, but particularly on-hot encoding and binary encoding

Review

Last lesson we talked about the **Moore FSM**. Recall that with the Moore FSM, the output depended solely on the current state of the system. We also briefly introduced the concept of the **Mealy FSM** where the output value is not only a function of the present state, but it is also dependent on the present input values.



In today's lesson we will run through the design process using the Mealy FSM on the same example that we discussed last lesson.

How to design a state machine:

1.

2.

3.

4.

5.

Example Design Problem: Design an FSM that represents a very simple soda machine that will only accept quarters and only sells Mountain Dew. As soon as you put in the proper amount of money, the soda machine will spit out a soda. The soda machine will not give change.

State Transition Diagram:

State Transition Table & Output Table

With the Mealy Machine, the output and state table are essentially combined to describe the system

State / Output Table			
Current State		**Next State**	**Output**

Next State and Output State Equations

Schematic

Practice Design Problem:

- A snail is crawling across a sequence of numbers and he smiles if the last two numbers are “01”
- Sequence: 0100110111
- Draw a picture of the Mealy State Transition Diagram
- Create the State Transition Table and Output Table
- Create the Next State and Output State equations
- Draw the schematic