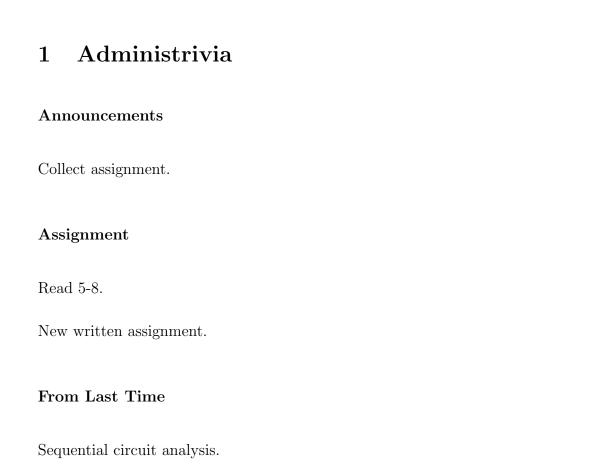
# Sequential Circuit Design

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### Outline

- 1. Sequential circuit design process.
- 2. Unused states.
- 3. Examples.

#### Coming Up

VHDL for sequential circuits.

## 2 Sequential Circuit Design Process

- 1. Obtain a state diagram. Assign binary numbers to the states (a non-trivial problem, actually).
- 2. Obtain a state table.
- 3. Derive flip-flop input equations from the next state entries and output equations. Simplify.
- 4. Draw your schematic.

### 3 Unused States

Suppose your design has 6 states:

- 1. Two unused states.
- 2. What happens if the circuit enters one of these states?

### 4 Examples

- 1. Sequence recognizer for 010.
- 2. Serial comparator. Inputs: A, B, msb. A and B are received least significant bit first. Receipt of msb is co-incident with msb's of A and B and resets circuit to begin next comparison. Output 0 if  $A \ge B$ , otherwise 1.
- 3. Serial comparator. Inputs: A, B, lsb. A and B are received most significant bit first. Receipt of lsb is co-incident with lsb's of A and B and resets circuit to begin next comparison. Output 0 if  $A \ge B$ , otherwise 1.

4.	Given an unsigned binary value $n$ serially, How would you compute $2n$ ?	starting	from th	e lsb,	compute $3n$ .	Hint: