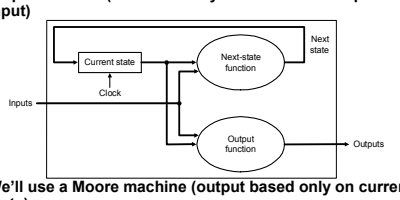
Implementing the Control

- Value of control signals is dependent upon:
  - what instruction is being executed
  - which step is being performed
- Use the information we've accumulated to specify a finite state machine
  - specify the finite state machine graphically, or
  - use microprogramming
- Implementation can be derived from specification

©1998 Morgan Kaufmann Publishers

Review: finite state machines

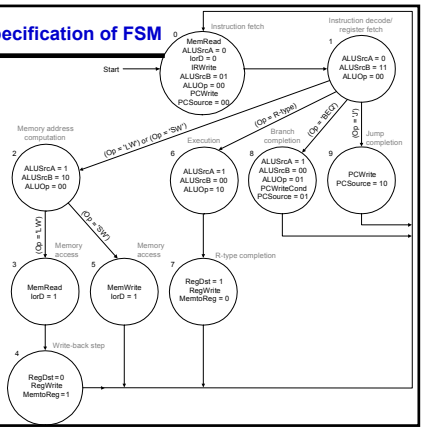
- Finite state machines:
  - a set of states and
  - next state function (determined by current state and the input)
  - output function (determined by current state and possibly input)



  - We'll use a Moore machine (output based only on current state)

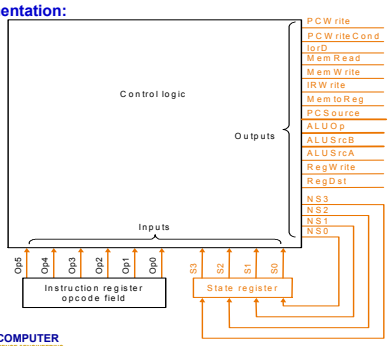
©1998 Morgan Kaufmann Publishers

Graphical Specification of FSM



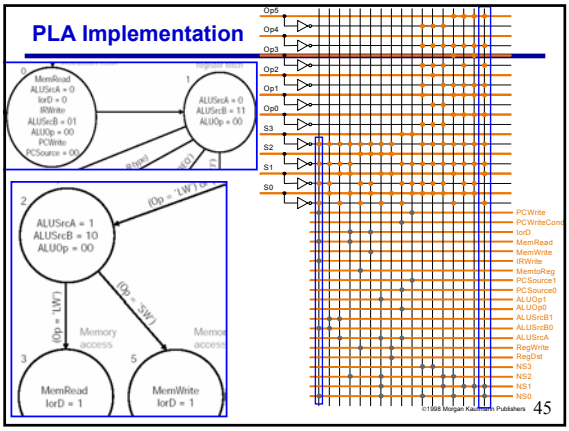
Finite State Machine for Control

- Implementation:



©1998 Morgan Kaufmann Publishers

PLA Implementation



©1998 Morgan Kaufmann Publishers

Other Implementation

- ROM (read only memory)
  - Stores the truth table of inputs, states and outputs
  - PLA is much smaller in the amount of logic
- Mirocoprogramming
  - Executes microinstructions to generate signals
  - Suitable for large number of opcodes and complex control signals.

©1998 Morgan Kaufmann Publishers