LogicWorks Tutorial

CSE 140L Spring 11

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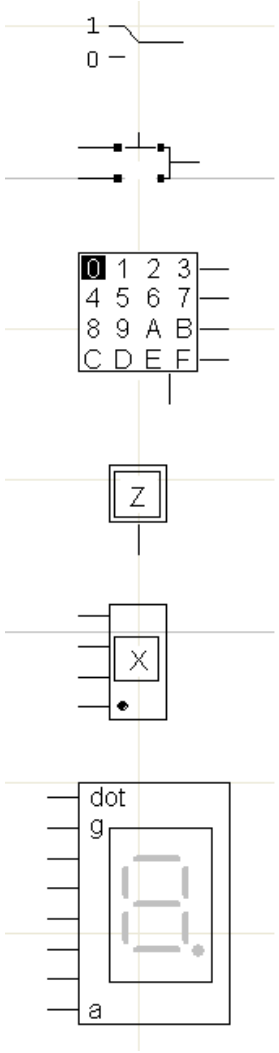
Input and Output Devices

- Input
  - Binary switch
  - SPDT Pushdown
  - Hex Keyboard
- Output
  - Binary Probe
  - Hex Display
  - 7-Seg Disp
- You can find them in the “Simulation IO.clf” library



Connecting Lines

- 3 ways to connect two sets of lines
  - Direct draw the connection
  - Assign the same name to two lines
  - Create a bus

Naming Signals

- Name a signal/bus by right clicking on it and selecting Name
  - ✓ Name window appears
- Enter desired name in text box, make sure that the Visible box is checked, and press OK.

Creating a Bus

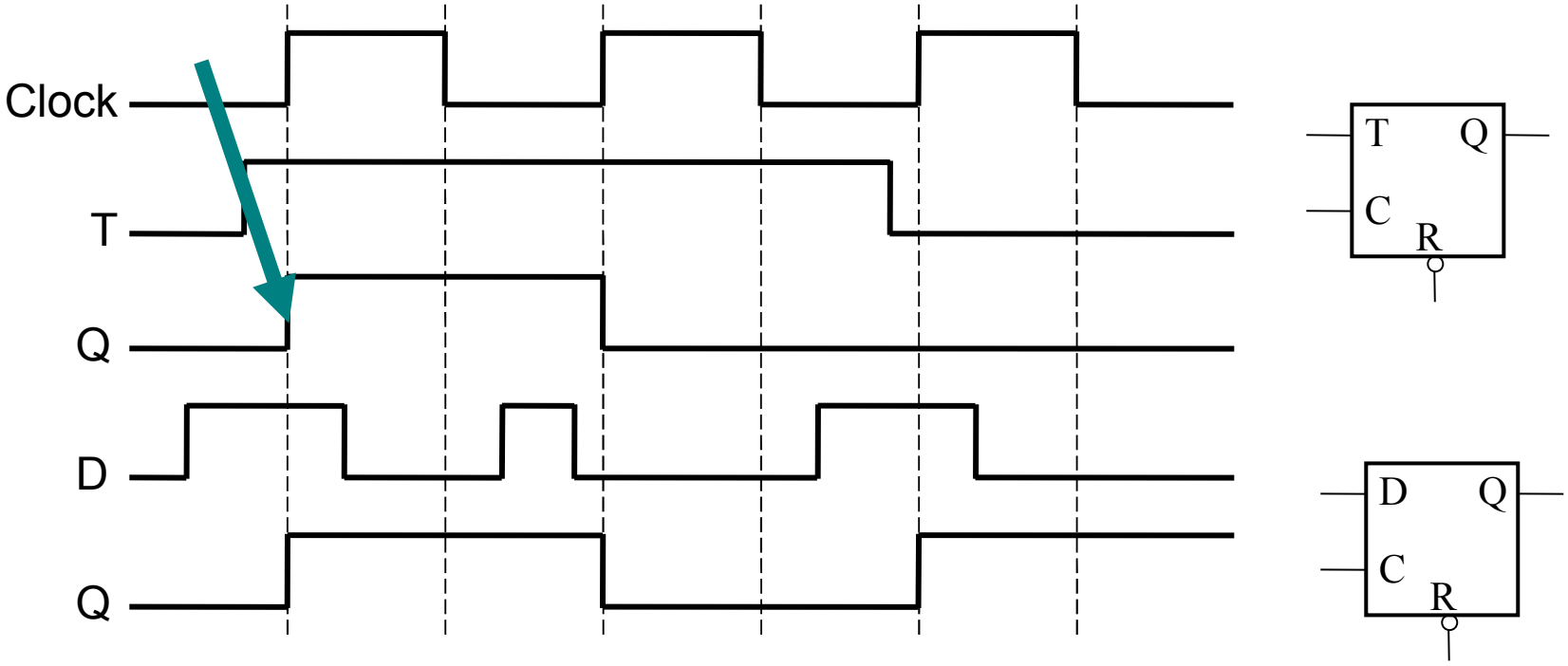
- Schematic -> New Breakout
  - ✓ New Breakout window appears
- Enter pin names for new breakout
  - i.e. for a 4-pin breakout: C0..3
- Connected busses must have same pin names

Loading additional libraries

- By default, some libraries are provided by the LogicWorks, such as:
  - Simulation_IO(binary switches, probes, displays..)
  - Simulation_logic(latches, flip flops, adders, counters)
  - Simulation_gates(basic logic gates like AND, OR, INV)
- To load a new library(as provided with the lab assignment), go to New → Library → Open lib, and then browse to the location where you have saved the library file(.clf).
- When you select the library, it gets loaded and you will see it on the right hand side along with the list of all other libraries.

Registers

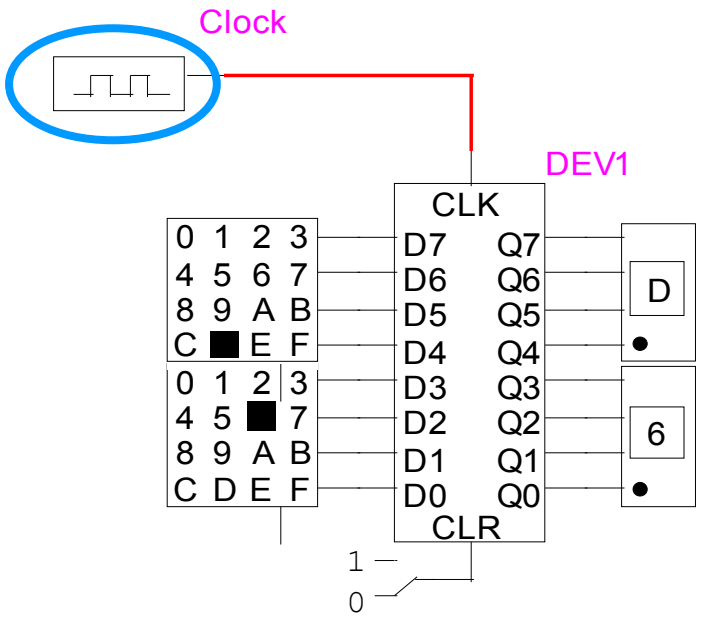
- Edge-triggered!!



Registers and Clock

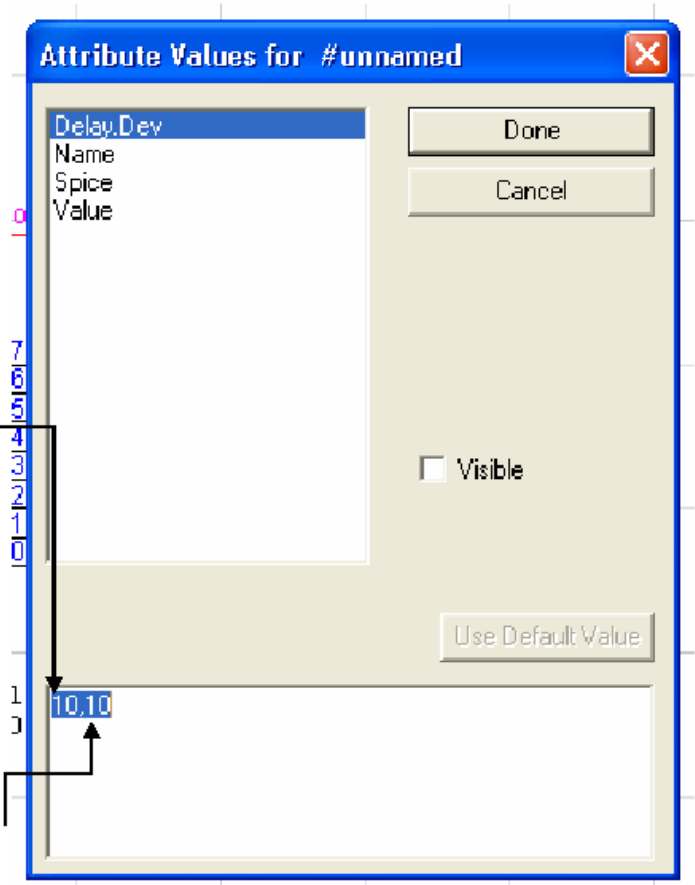
- Register of 8 bits (8 D Flip-Flops)
- Clock is used for triggering the register

To adjust clock timing
Right click on clock and
Select attribute



Adjusting Clock Timing

CLOCK STAYS LOW for 10 time unit



CLOCK STAYS HIGH for 10 time unit

Timing Diagrams

- Simulation -> Add Automatically
  - ✓ all signals named from that point on will be automatically added to timing diagram
- OR
- Select signal/bus to be added and Simulation -> Add To Timing
- For a signal (a single line or a bus) to be present in the timing diagrams, it must be named.

Creating a New Part Symbol

- File -> New -> Device Symbol
  - ✓ Parts Window appears
- Options -> SubCircuit and Part Type
  - ✓ Part Type window pops up
- Select second radio button (Create a subcircuit symbol and select an open circuit to attach to it).
- Select desired circuit file, press OK, and press Done.

New Part Symbol (cont.)

- Options -> AutoCreateSymbol
  - ✓ AutoCreateSymbol window appears
- Press Extract Pin List button (modify if desired)
- Enter part name in text box
- Press Generate Symbol button
  - ✓ New part appears!

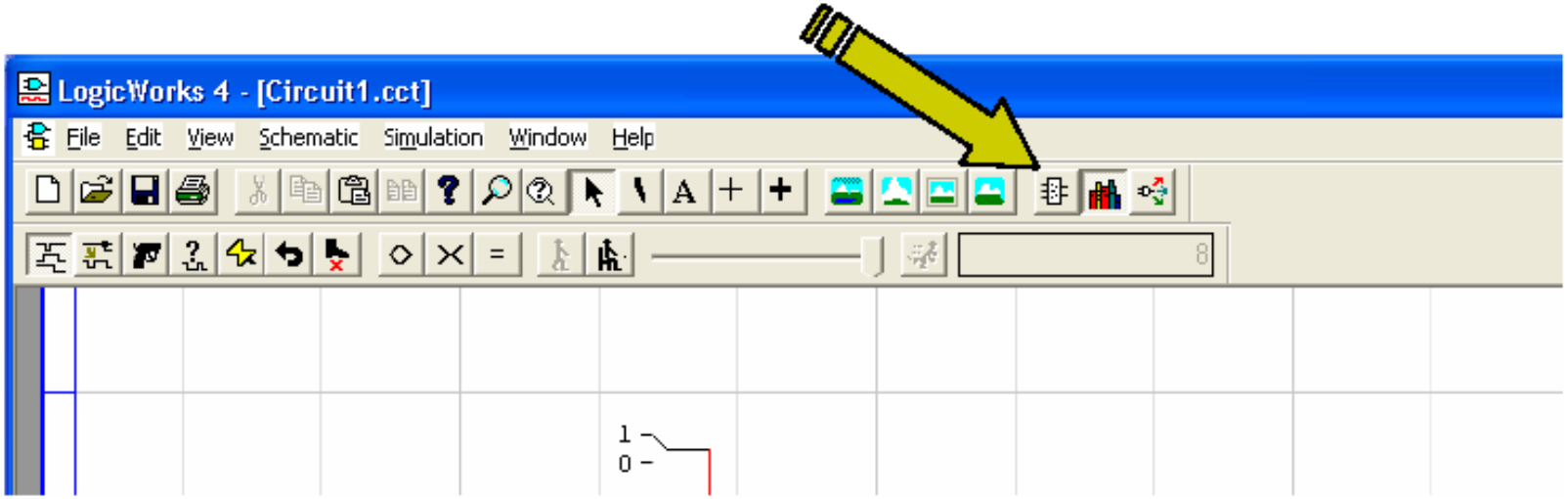
Saving new Part to Library

- File -> Save As
  - ✓ “Save Part As” window appears
- Select desired library (i.e. lab4_library.clf).
- Note: if your library does not appear in list, use the open library button to find your library in the appropriate directory
- Press Save.

Steps for building a PROM

Step 1:

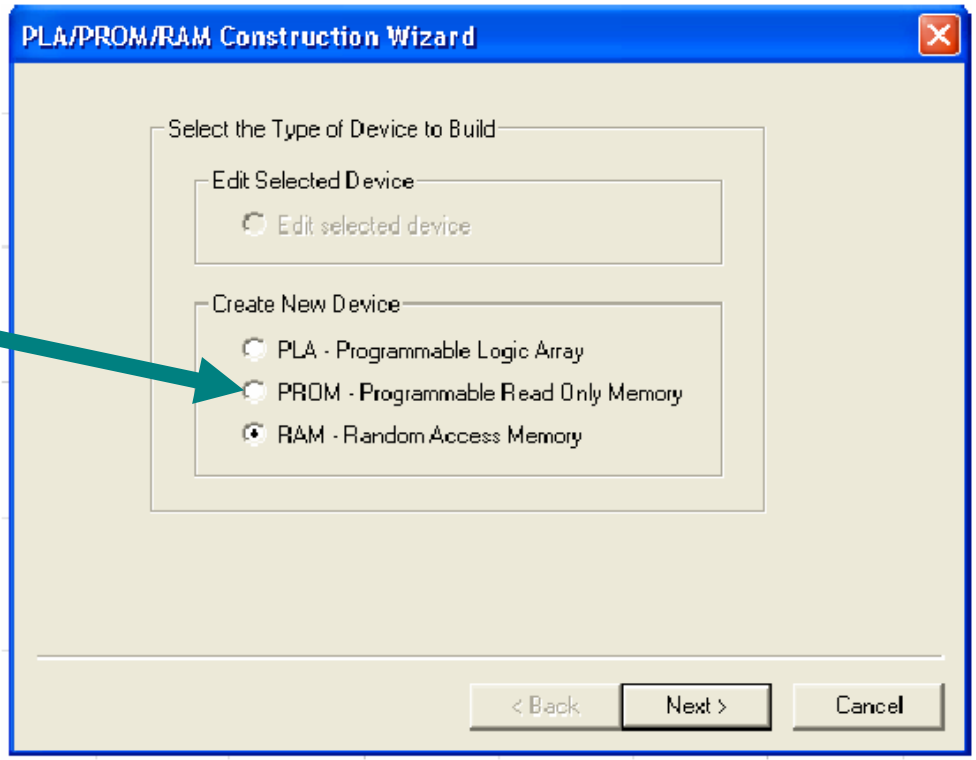
Click on the button



Steps for building a PROM

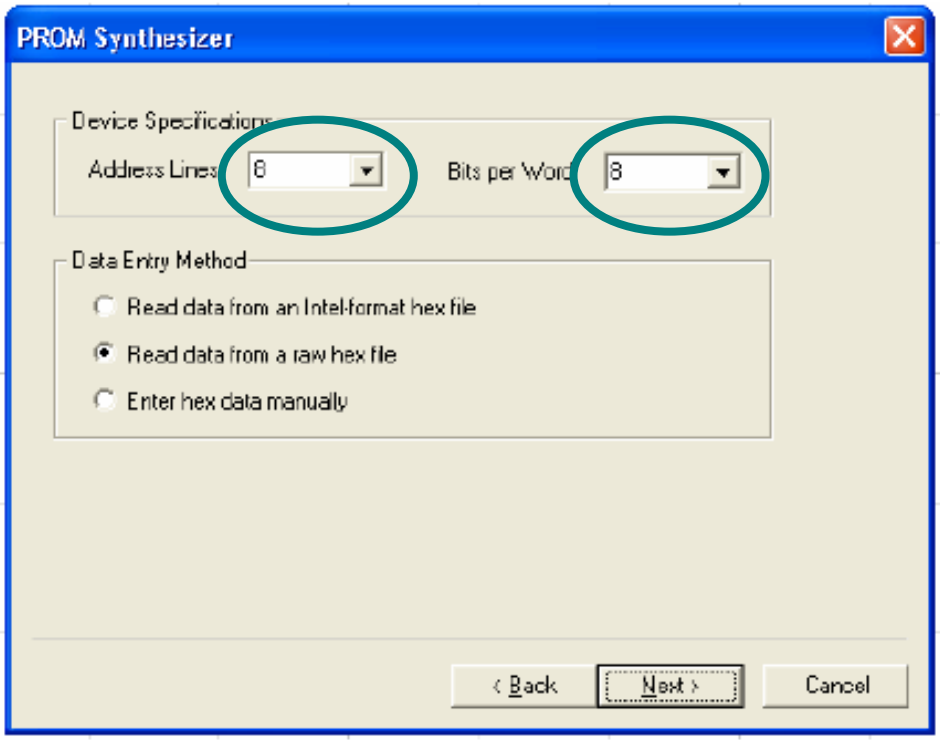
Step 2: Select PROM (for I-MEM)

Click here



Steps for building a PROM

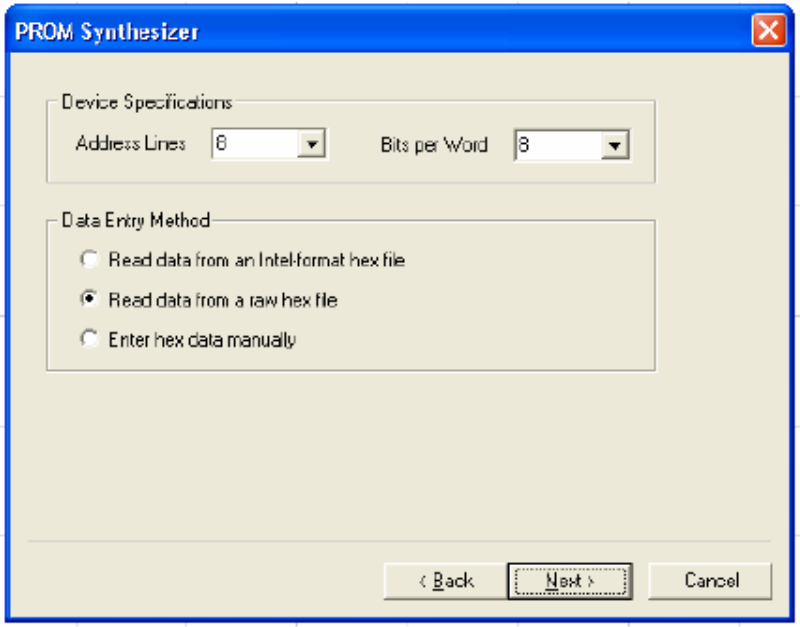
Step 3: Select Address and data size:



Steps for building a PROM

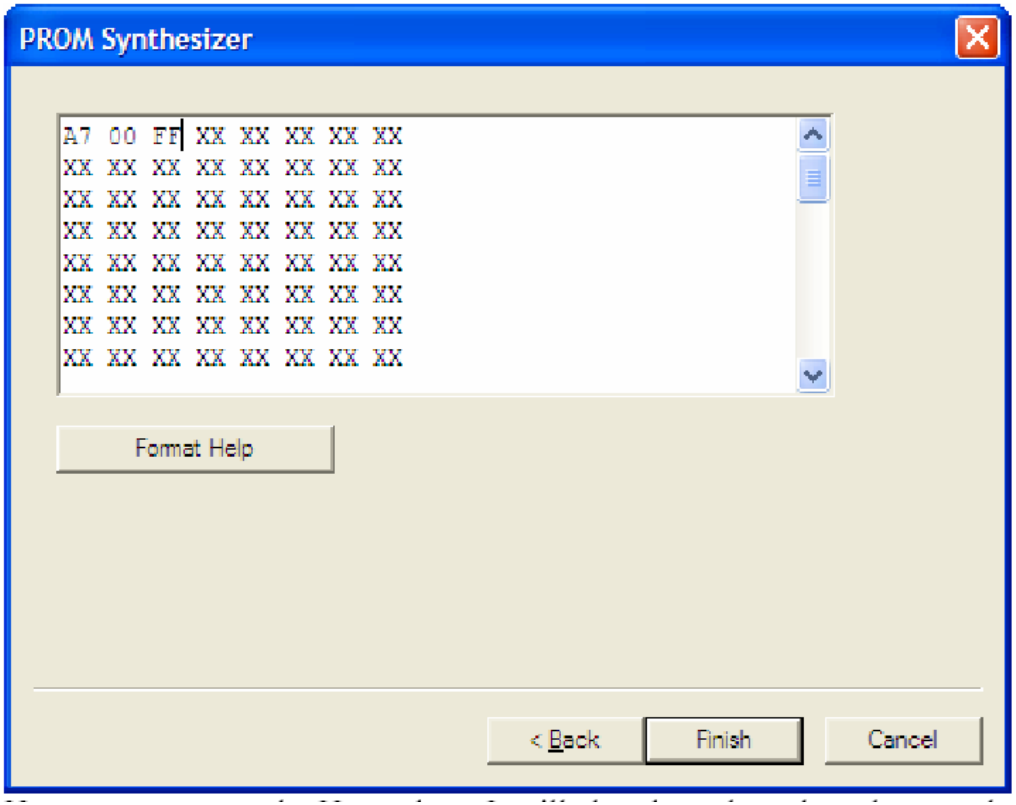
Step 4: Chose a method for entering and storing data

- Preferred options:
  - ❖ **Enter hex data manually**
  - ❖ **Read data from a raw hex file**



Steps for building a PROM

Example: Enter hex data manually (Program instructions)



Questions?