LAB 3
Finite State Machines On Xilinx

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Copy Lab 2

- Open Lab 2
- Go to FILE->COPY PROJECT and resave Lab 2 as Lab 3
- Open the new Lab3 project
- Now you can build on it.

OVERVIEW

- Schematics capture and simulation (lab 2)
- Add IO interface components
- Map netlists to implementation
- Download circuits to Xilinx board
- Debugging

Xilinx IO

- Interface components
  - IPAD   OPAD
  - BUFG   OBUF
  - IBUF
- Debounce circuit ensures ENTER and RESET go high for exactly one clock cycle

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Things to do before lab

- Have a working version of lab 2
- Make sure that the necessary signals are in BUS form.
- Finish the prelab questions for lab 3

Debounce Circuit

- After pressing a mechanical switch once, without debouncing the arcing between the two contacts might "make or break" the connection several times before it settles into the desired position.
- This can result in erratic behavior in the circuit.

The Debounce Circuit
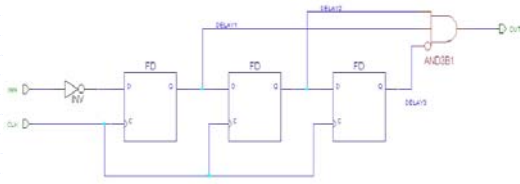
Implementation

◆ Open the project window and click on implementation

◆ If implementation is successful, the PROGRAMMING block turns black.

The interface has been done for you

◆ You DO NOT need to do you own interface for lab 3

◆ You DO need to add the library under u:\cs150 to your projects

◆ The name of the library is "Library"

◆ A macro called IO contains all of he interface components you need for the lab.

Implementaion Tip

◆ If you want to reimplement, it is a good idea to clear the implementaion data from the last implementation.

◆ This is done in PROJECT->CLEAR IMPLEMENTATION DATA on the Project Manager screen.

TA library suggestion

◆ PROBLEM: When you try to access the library there are access problems

◆ This happens when too many people try to access the file at once

◆ You should COPY the library to your own directory BEFORE you add it.

Downloading Circuit

◆ Power up the board

◆ Attach the Xchecker cable

◆ Be careful of the orientation of the cable and the delicate pins

◆ Click on the programming box in the Project Manager (below implementation)

◆ When the window pops up, choose Hardware Debugger

Communication Problems

- Make sure that the board has power
- Make sure that the Xchecker is hooked up correctly
- Make sure that the cable is configured correctly. It should be Xchecker on Com1.

Test Circuit

- The NUMLED on the right displays the state of the FSM
- NUMLED displays the state in hex
- State only has 3 bits, but hex needs 4 bits.
- State3 (MSB) is wired to ground.

More Test Circuit

- Make sure that sw4-7 is closed.
- Start the clock in the Hardware Debugger
- Watch the internal signals in the Hardware Debugger