EECS 150 Spring 2004

Lab Lecture 1
Instrumentation
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Today
- Labs & Lab Lecture
- Lab Policies
- Using the Computers
- Webcasts
- Cardkeys
- The first lab

Labs & Lab Lecture (1)
- Watching the slides
  - Projector
  - Plasma Screen
  - The LCD TVs (Channel 21), audio included
- ASK QUESTIONS!!!
  - If anything is unclear ASK!
  - Otherwise you will LITERALLY not be able to
do the labs
- Try to read the labs ahead of time

Labs & Lab Lecture (2)
- Lab Lecture slides are posted early
- Lab ZIP file
  - Contains verilog, bitfiles, etc...
  - Also contains the lab assignment
- The Assignment
  - Read it
  - Do it
  - Get checked off

Labs & Lab Lecture (3)
- Checkoff
  - Answer any questions on the lab
  - Prepare any requested demos
  - A TA will sign off that you did the lab
  - Signed checkoff sheets are due 10min into
    the NEXT lab
  - You can get a lab checked off up through
    10min the first 10min of the NEXT lab

Lab Policies (1)
- Lab Policy Enforcement
  - Suspend your account
    - Temporary for minor infractions
    - Permanently for major problems, this makes it
      REALLY hard to pass the class
  - Withhold your grades
  - Treat this lab with care
Lab Policies (2)
- Food & Drink
  - Nowhere near the computers
  - We’re not kidding about this
  - You MAY eat at the small white tables
  - CLEAN UP AFTER YOURSELVES!

Lab Policies (3)
- Trash
  - Trash goes in the white/gray bins
  - Recycling in the blue bins
  - CLEAN UP AFTER YOURSELVES!
- Other classes
  - CS152 can use some computers
  - EE42 uses the white tables
  - We have priority on the computers

Computers (1)
- Logins are posted
  - Username: cs150-<your e-mail name>
  - Password: Your Student ID
  - If you don't have an account listed, see TA

Computers (2)
- Printing
  - There are 3 printers
  - By default computers will print to the nearest printer
  - We have a finite amount of paper
  - We will run out of paper by the final
  - Try not to print lecture slides or labs (other than the checkoff sheet), it is wasteful

Computers (3)
- Storage!
  - Your U:\ drive is your permanent storage, it is available from all computers
  - U:\ is VERY slow, don’t work from it
  - C:\users\<your username> is your local storage (There’s a desktop shortcut)
  - C:\users\<your username> WILL BE DELETED WHEN YOU LOG OFF!
  - Copy stuff back to your U:\ drive!

Webcast
- Lab lecture webcasts will be available soon
- We will continue webcasting as long as attendance is high
- ATTEND LAB LECTURE!
  - The people who don't attend often fail the course. Literally.
Cardkeys
- We know they’re not active
- For now TAs will let people in
- Cardkeys will be activated Mon, Jan 26th
- Cardkey responsibility
  - Don’t let strange people in the lab, our equipment is expensive
  - If you have trouble with your cardkey see your TA

Oscilloscopes
- Can show analog signals and digital signals from CUT (Circuit Under Test)
- Very good for signal quality, delays, etc
- Graph of Voltage (Y-axis) vs Time (X-axis)

Analog Inputs
- Two analog inputs
  - Volts/Div knobs sets Y axis
  - Auto-scale (white button) does a lot of work for you
- Measurements of voltage, time, etc
- Use buttons, then follow menus

Triggering
- Triggering determines when to catch and display signals
  - Edge rising or falling
  - Normal or auto
- Trigger menus for manual adjustment
  - Time/division
  - Threshold
- Bad Trigger
- Good Trigger

Logic Analyzer
- 16 Digital Inputs
- Main debugging tool for this semester
- View internal FPGA and Board signals
- Select time/division for viewing

Triggering
- Pattern matching (some basic logical operations)
- Check signal for High, Low, Positive Edge, Negative Edge, or don’t care
- Storing sweeps of data
  - Single gets one sweep
  - Run/Stop freezes current output
  - Auto-store stores on trigger
A Bigger Logic Analyzer

- 16 Channels is kind of small
- 64 Channels is more like it
- The Big Analyzer
  - We have one up at the TA station
  - It’s harder to use
  - If your project is in deep trouble we might
    hook you up to it
  - You probably won’t need more than 16
    channels

Lab Work (1)

- Simple Power Supply Measurements
  - +12, -12, +5 Volts
  - Show Your TA
- Observe Signal Generator Output
  - 10 kHz, 45% duty cycle, 4 volt peak-to-
    peak, square wave
  - 10 MHz, 0-5V square wave with a 40ns
    pulse width

Lab Work (2)

- Simple Oscilloscope Viewing
  - Triggering (auto, norm, AC, DC, threshold)
- Measurements (periods, over/undershoots, rise/fall times, etc)
  - Analyze clock signals
  - Scales
  - Cursors
  - Measuring Buttons

Clock Quality

Lab Work (3)

- Download Small Circuit
- Logic Analyzer Triggering and Viewing
  - Triggering (Pattern, edges)
  - Storing (Single, Run/Stop)
- Measurements:
  - Propagation Delays (Ripple Carry)
- State Analysis
  - Finite State Machine sequencing
And Now…

- Stick around for questions
  - About lab
  - Administrativia
- Remember, labs and discussions next week!