EECS 270 Lab

Introduction to the Lab
Lab Instructor

• Background
  – University Affiliation (Undergrad, grad, faculty, etc)
  – Area of Study and Interests

• Contact Info
  – Email
  – Office

• Office Hours
  – Open Lab Hours
Lab Assignments

Lab assignment are posted on the lab webpage at http://www.eecs.umich.edu/courses/eecs270/labs.html or go to the Pages tab on the Canvas course site.

All the lab materials you need will be posted there.
Enrolled and Open Labs

**Enrolled Labs**

- Your **home** lab
- Labs graded by home lab instructor
- You receive priority help

**Open Labs**

- Anyone can attend any open lab with same help priority
- Open labs posted on lab website (next slide)
- Your home section provides average support: ~170mins/18students = **9.44 mins** per student
- **TAKE ADVANTAGE OF OPEN LABS!!!!!!**
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Attending Other Labs

EECS 270 Labs

• You may attend other EECS 270 home labs:
  – With permission of instructor
  – If there is room
• You may only receive help after home section students!
• If it is a particularly busy lab, you may not receive help for the entire period!

EECS 100 Labs (winter term)

• You may attend EECS 100 open and enrolled labs:
  – With permission of instructor
  – If there is room
• Support
  – EECS 100 students have priority
  – EECS 100 instructors are not necessarily prepared to help you.
Assignment Components

• Pre-Lab
  – Preliminary lab work that can be completed outside the lab:
    • Simulations
    • Answers to pre-lab questions
    • Attend open lab if you need additional help before the lab!

• In-Lab
  – Functional demonstration on lab kit

• Post-Lab
  – Answers to post lab questions
  – May contain simulations or brief write-up
Submission Policy

• Pre, Post lab assignments must be submitted to your Gradescope home lab section.

• The instructor will provide you with a code that will allow you to sign up for your Gradescope section.

• Assignment components need to be submitted as a composite (1) PDF file:
  – Verilog Code
  – Schematic Images
  – QSF Constraint Listing
  – Answers to Questions
  – Simulation Waveforms
  – Handwritten scanned materials

• See Suggestions Link
  – A link is listed with the first lab with suggestions for creating composite PDF file.
  – Various tools are available to integrate
    • PDF Integrators
    • Word Processors
Example Composite Submission

```
module lab2tb();
reg V.s, W.s, X.s, Y.s, Z.s; //define input ports
wire OUT_s; //define output port

lab2 t1(.V(V_s), .W(W.s), .X(X.s), .Y(Y.s), .Z.Z.s), .OUT(OUT_s));

//the test procedure
initial begin
    //test procedure code
end
endmodule
```
Submission Policy Continued

• In-lab demonstrations must be certified by a 270 lab instructor.
  – Print the In-lab certification sheet and fill in the student part.
  – Demonstrate to any 270 lab instructor.
  – The instructor will verify your demo and collect the certification sheet.
  – Take a picture of the signed demo sheet and submit it on Gradescope.
Submission Policy cont

- Lab components are due according to the schedule posted on the lab webpage. (next slide)
- Pre and Post labs may be submitted up to this time electronically without penalty.
- In-labs may be certified in lab anytime before this time without penalty.
- Lab materials submitted after this time will be subject to 5%/day late penalty the first day and 10% subsequent days.
- To be considered for a late penalty waiver, contact your lab instructor as soon as possible. Waivers will be considered for documented illness and other extenuating circumstances.
Submitting Late Assignments

- Gradescope does not have a provision for submitting late work.
- Email your instructor the late assignments.
- Be sure the assignment components are in pdf format.
In Lab Submissions

• Print the Demo Sheet
• Your lab instructor will verify your demo, sign and date the sheet.
• Take a picture of the demo sheet and submit it on Gradescope.
• The instructor will keep the hardcopy as evidence of your demo.
Sample Assignment Schedule

<table>
<thead>
<tr>
<th>Week #</th>
<th>Date  (Mon)</th>
<th>Lab Starts</th>
<th>Pre Lab Due</th>
<th>In Lab Due</th>
<th>Post Lab Due</th>
<th>Exceptions</th>
<th>Conflicting Events</th>
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<td>2</td>
<td>9/10</td>
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Typical Lab Schedule

**Week 3:** In-Lab 1 and Post-Lab 1 Due

Schedule Exceptions

**Week 2:** There is no PreLab 1
Grading Cycle and Reporting

- Labs will be graded in 1 week or less after the due date.
- Graded labs will be on your home lab section Gradescope site including In-lab scores.
- Review your graded materials and grades.
- Notify the instructor soon after the posting for change consideration.
Book Bags

• The lab isles are narrow, so be sure to keep your book bags out of the isle.
• You can place them under the desk.
Food and Drink

• No Food or Drink is allowed in the lab.
• You may have water, but please no glass containers.
• Instructors are allowed food because of extended hours.
Emergency Exit

• In the event of an emergency alarm, you must exit the building.
• DO NOT exit into the parking area between EECS and the Auto Lab as seen out of the lab window.
• Use center stairs and EXIT via the atrium and out either end preferably toward the bell tower.
• In the event that someone needs medical attention, there is a campus phone on the instructors desk. Dial 911 for Campus Safety.
General Lab Support Policy

- You are expected to develop debugging and development skills over the course of the labs.
- The lab instructor is available to tutor and provide support in these methods.
- The lab instructor will attempt to assess your problem and recommend a path of action to help YOU debug the problem.
- You should pursue this path and consider how it addresses your problem before consulting the instructor again.
- Do not expect to resolve hardware debugging issues with a few words from the instructor or a simple recommendation.
- Hardware debugging takes time, but can be productive if approached in a systematic and constructive manner.
The Help Queue

- A help queue is maintained on the front white board to provide even, orderly help.
- Place your first name and station number in the first available slot when you need help.
  - You may only enter your name once.
  - You should only enter your name if you have a prepared question.
  - Put signoff next to your name if you have a In-lab demo and you will be given priority.
  - If you are visiting a home lab, you must write visitor next to your name.
- The lab instructors will attempt to move thru the queue as efficiently as possible so use their time wisely.
270 Homework Support

- 270 Lab Instructors are only prepared to provide lab support.
- You should always use the course GSI office hours first for homework support.
- You should always email the course GSI for homework issues and questions.
- You may ask a 270 Lab Instructor for homework support, but keep in mind you should always check with the course GSI for correctness.
- 270 Lab Instructors will always give priority to lab support.
Email Support

• While it is possible to address minor issues with email, it is generally very difficult to address lab issues with email.

• In the lab, the instructor can interact with you much easier and assess the problem quicker.

• Instructors are not allocated time for extensive email support.

• The best way to get lab support is to go to open lab or your home lab!
Collaboration

• All lab work in 270 is done individually
• You may seek help or discuss such problems with others such as:
  – CAD tool use, for example:
    • How do I find this function?
    • How do I make this connection?
  – What does this error mean?
  – DE2 kit details, for example:
    • How do I program the FPGA?
    • Where is this switch?
• You may not discuss or provide help on specific solutions to lab design problems or questions with others.
Lab Environment

CAD: Computer Aided Design Tools
- Design Entry
- Simulation
- FPGA Programming

Input Devices:
- Switches,
- Audio,
- Serial,
- USB, etc

DE2

FPGA: Programmable Logic Device

Output Devices:
- LEDs,
- 7 Segment LEDs,
- LCD,
- Video,
- Serial, etc
Altera DE2 Kit
Alternate Lab Resources

• DE2 Kits
  – Academic offer available from Altera
  – See Altera Web Site for details

• Quartus Software
  – Free Web Pack from Altera (download)
  – Runs under Windows OS, but compatible with Linux Versions.
  – Good for doing design entry and simulations
  – Must import your project files to run in lab or use removable media ie USB drive

• CAEN Labs
  – Quartus is available under Linux Boot (and Windows)
  – Can use AFS file space which is accessible in 270 lab

• CAEN Remote Connection with VNC
  – Just like being in the 270 lab or CAEN lab (without the kit)
  – Great for doing design entry, simulations, etc
Today's Assignment

• Do Tutorial
• You will Learn:
  – Basic Design Entry
    • Express your logic design in abstract form (schematic)
  – Simulation
    • Check the functionality of your design
  – Synthesis
    • Converts your design into a form that can program the FPGA
  – FPGA Programming
    • Program the FPGA on the DE2 and check your logic function
  – Basics of DE2 Kit
    • Switches and LEDs
• Finished? Get Started on Pre-Lab 1 assignment. It is due soon!