

ECE243S - Computer Organization - Lab Information

For each lab exercise, you will be marked for *preparation*, which must be done prior to the lab period, and *in lab* work, which is performed during the lab period.

Preparation

Each lab exercise requires a significant amount of preparation, which you must complete before the lab period begins. **Each partner in the group of two should perform their own preparation.** While it is acceptable to discuss your preparation with your partner, your work may not be copied from your partner; you will be required to explain your preparation. Preparation work will be graded by the teaching assistants at the beginning of the lab, on the following basis:

Judgment of TA	Grade
Unable to explain any part of preparation	0
Some merit to the work	1
Made a legitimate attempt	2
Well done, but missing some components	3-4
Very well done	5

In-Lab Work

In each lab you will have to typically build a working circuit or make a working program. Each lab exercise specifies that certain parts of the work are to be demonstrated to a teaching assistant for marking:

Judgment of TA	Grade
Did not attend or try	0
Tried, but failed to get much working	1
Small amount working	2
Significant portion working	3
Almost everything working	4
Everything working	5

Note: Although the lab portion of the course is worth 25% of the course grade, both the midterm and the final exam will contain questions directly related to skills learned in the lab.

Lab Workstation Number and Maintenance

Each digital workstation that you'll be sitting at has a number. Please use the same station each week. If a piece of equipment is not working, please tell a TA to tag the board with the problem and notify someone to have it repaired. Otherwise it will be broken the next time you need it!

Access to Software Used in This Course

The lab in this course depends heavily on the use of commercial software for both design of circuits and compiling software for execution on a processor. We will be using Intel FPGA Quartus Prime Version 18.0 Lite Edition software, and associated ARM development tools. This software is free. You will be able to access this software in one of three ways:

- **On your own home computer.**

This software requires a Windows 10 computer. If you have a Mac computer, you will need to run a Virtual Machine system (either [Virtual Box](#) which is free, or [Parallels](#) which costs \$USD 80) and then load in Windows 10. If you have a Linux-based operating system for your computer, you can download Quartus.

You will need to download and install the software from Intel's FPGA products website. Before doing so, you will have to create an Intel Customer account by filling out an online form on Intel's FPGA products web site. This form asks for your name and address. You can use 'The University of Toronto' as the company, and the address '10 King's College Rd, Toronto, Ontario, Canada M5S 3G4' as the address if you do not wish to use your own. Once you have acquired this account, download the software below (you only need the first download for the first few labs of the course):

- Quartus Prime version 18.0 Lite Edition (do NOT download the Standard or Pro Editions) and ModelSim-Intel FPGA Starter Edition

The following software will be necessary for the later lab exercises in the course:

- Intel Monitor Program

Go to this [link](#) and scroll down to 'downloads' and download the 'University Program Installer.' Be sure to select version 18.0 (same version as your Quartus Prime installation).

- **On the Windows Machines in the lab – Bahen 3125, 3135, 3145 and 3155**

The computers in the Bahen Centre labs have the same software listed above installed. These machines will have access to your home directory on the ECE system.

- **On the ECF PC Systems**

Quartus Prime may be available on the ECF Windows PC systems.

Buying Your Own Lab Board

If you choose to do so, you can buy a lab board for use at home. This is completely optional. The lab board is called the DE1-SoC board, and is available from:

<http://ut.terasic.com>