Undergraduate (CS 45111) Demos are scheduled for:
11:00–12:30 on Wednesday 3 December and Friday 5 December in the VLSI Design Lab

Graduate (CS 55111) Demos are scheduled for:
11:00–12:30 on Friday 5 December in the VLSI Design Lab

Project Reports are due to Prof. Walker by 3:00pm on Friday 5 December

Students are expected to attend all demos unless they discuss any necessary
absences with Prof. Walker <u>in advance</u> of their absence

this project counts as 30% of your course grade
more difficult projects will be expected of CS 55111 students

For the final class project, use the Altera MAX+PLUS II tools to implement a design of your choice on the Altera UP1 Education Board, subject to the requirements below:

- you must use either the MAX 7000 or FLEX 10K device on the UP1 Education Board
- your design must have at least 3 major components, one of which must be a non-trivial component specified using VHDL
- your design must contain at least one state machine, specified using either AHDL or VHDL and the text editor or using the waveform editor
- you must use at least one push-button, DIP switch, mouse, or keyboard, and at least one LED, 7-segment display, or video monitor. This requirement can be waived by Prof. Walker for more complex designs that do not require I/O.

Possible projects might include, but are not limited to:

- a comparison of several addition circuits, multiplication circuits, or other arithmetic circuits
- interesting extensions to the MIPS processor from the Hamblen book
- an image processing system, a video game, or something interesting using the keyboard, mouse, and / or monitor
- other projects of similar complexity, sufficiently harder than previous projects that I will be convinced it is worth 30% of your grade (feel free to discuss your project ideas with me in advance)

When you finish, put together a report consisting of the items listed below, and turn in this report as well as a disk or CDROM containing the <u>input</u> files for your project (or, if you prefer, email a ZIP archive of those files to me):

a) An overview of your design and any major design decisions that you made, including how you met the project requirements, along with a description of what's particularly interesting in your design, and what you had to learn about to make it work (25 points)

b) Printouts of the major components of the design (10 points)

c) Simulations showing the full operation of your project, plus any additional simulations of individual components that may be necessary to demonstrate more fully how each works (30 points)

You must also describe and demonstrate your design through a 10–15 minute demo in class on the dates listed above, which should include:

a) An overview of your design and any major design decisions that you made, including how you met the project requirements, along with a description of what's particularly interesting in your design, and what you had to learn about to make it work

b) Displays (on the computer) or printouts of the major components of the design

c) A "live" demo of your design in operation

The demonstration counts 10 points, and a working design counts 25 points.

If you are unable to get your design completely working to your satisfaction, describe what you tried to do, what does work, what does not work, and what you would do to make the rest of the design work if you had more time.