
CS 4/55111

Project #4

VLSI Design

Due in class on Monday 1 May 2000
(Counts 20% of Your Class Grade)

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1. 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 specified using the graphic editor, and one of which must be specified using AHDL or VHDL and the text editor
   - 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 or DIP switch, and at least one LED or 7-segment display. This requirement can be waived for more complex designs that do not require I/O.

   When you finish, turn in:

   a) An overview of your design and any major design decisions that you made, including how you met the project requirements

   b) Printouts of the major components of the design

   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

   d) A description of what's particularly interesting in your design, and what you had to learn about to make it work.

   Turn all this in at class on Monday 1 May 2000, when class will meet in the VLSI Design Lab. You will also be required to demonstrate your design at that time. Your demo should include:

   a) An overview of your design and any major design decisions that you made, including how you met the project requirements.

   b) Displays or printouts of the major components of the design (OK to use transparencies if you want, I can work with you to make them, and I'll bring in a projector)

   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 (you can either do this "live" or print out the simulations and make transparencies)

   d) A description of what's particularly interesting in your design, and what you had to learn about to make it work.

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

   After the demo, give me a disk containing the input files for your project.

   Possible projects might include, but are not limited to:
   - programmable lock, alarm clock, etc. so long as sufficiently different from previous projects
   - a more complex ALU, possibly with an attached memory, different addressing modes, etc.
   - a small parallel machine, with a "control unit" supplying instructions in SIMD fashion to 4 PEs (this would be a good start on a thesis project for anyone interested
   - other projects of similar complexity (you might want to discuss your project ideas with me)