A Digital Riddle Solver for Hobbits and Elves

Final Project Report
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E155

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Abstract:

A 100-150 word abstract states the problem you are trying to solve, your approach to solving it, and the key results. Example:

Hobbits and Elves wandering the caves of Middle Earth occasionally encounter ferocious creatures that challenge them to rhyming riddles. As one's life may depend on winning the riddle contest, travelling hobbits may be willing to pay many gold coins for a technological edge. This project prototypes a portable digital riddle solver consisting of a keyboard, microcontroller, speech synthesizer, and speaker. The user types in key words from the riddle. The microcontroller searches for these key words in its internal SRAM and guesses a solution. The solution is sent through glue logic in an FPGA to a speech synthesizer, which in turn drives a speaker to read forth the answer, even in the dark where LCD displays will not work.

Introduction

Give an overview of your project, including a motivation, block diagram, and description of how the system is partitioned between the PIC, FPGA, and any external logic on the board. Set the reader up so he or she will understand how each of the next sections fits into the context of the overall project. The introduction should stand alone from the abstract, so repeat what background is necessary.

If your project does not involve both an PIC and FPGA, the structure of your report will be somewhat different.

The entire report should be no more than 12 pages plus appendices.

New Hardware

If your project includes new hardware not used before in E155 such as a monitor or LCD, you should include this section to thoroughly document the hardware at a level another student can read and use next year. Reference data sheets as necessary. If you do not use new hardware that somebody would likely wish to use in the future, omit this section.

Schematics

Show and describe schematics of anything on your breadboard. If you constructed a printed circuit board instead, document the function, schematics, and layout of your board.

Microcontroller Design

Describe the function of the microcontroller, including its inputs and outputs and the major software modules. Discuss any key algorithms. This section should give the reader enough information to understand the code in your .asm file in the appendix.

FPGA Design

Describe the function of the hardware in your FPGA, including inputs, outputs, and major hardware modules. Describe the key logic, using datapath or FSM diagrams as needed. This section should give the reader enough information to understand the Verilog code and/or FPGA schematics in the appendix.

Results

State the results of your project. Discuss the most difficult parts of the design. Note any differences between your initial proposal and final results, explaining why the differences arose.

References

Include key references, especially to documentation necessary for somebody else to understand and reconstruct your project.

[1] J. Rabaey, *Digital Integrated Circuits*, Upper Saddle River, NJ: Prentice Hall, 1996.
[2] TalkTronics Speech Synthesis Products, `http://www.talktronics.com/talktronics.htm`

Parts List

List all of the components you used other than standard resistors, capacitors, and parts available in the MicroP's lab.

Part	**Source**	**Vendor Part #**	**Price**
Bla784 Speech Synthesizer Module	TalkTronics (800) 123-4567	BlaBlaBla478	$28.37
741 Op Amp	DigiKey	LM741CM-ND	$0.91
Speaker	Stock Room		

Appendices

Include your .asm files and Verilog modules here. Be sure they are adequately commented and easy to read. The most important comments are the ones at the beginning listing the filename, the author and email address, and date, followed by a description of the purpose of the file. You may also include simulation results, measured data, or other supplemental information as needed.