Project
Due Mon. 12/05

8085 Assembly Programming Project

1 Description

The assembly programming project is designed to teach and test the knowledge learned in CPE300 on the MCS-51 family of microcontrollers. The Intel 8051 is a popular 8-bit microcontroller programmed using the 8051 assembly language with a number of functions which include I/O, interrupts, and timers. The goal of this project is to write a program that is able to use the I/O of the 8051 to get some sort of user input, process that input, and deliver a useful output. Rather than work with discrete hardware, the project will make use of a software simulator. The software simulator we will use is

- EdSim51 - `http://www.edsim51.com`

which has been specifically designed for instructional purposes. The EdSim51 Simulator allows user interaction with the microcontroller with included virtual peripherals including

- LED bank
- 7-segment (number) display
- LCD
- keypad
- universal asynchronous receiver/transmitter (UART) serial port

The assembly programming project should be completed in groups of two. Each group will submit a project proposal before beginning programming and a report and final presentation at the completion of the project.

2 Proposal

After looking at the EdSim51 website, an initial project proposal must be submitted on Monday 11/07. The project proposal is a very short document (half a page) which describes the high-level functionality of the program.

3 Report

At the completion of the project a report must be generated to describe the assembly program. The project report should be approximately 4 pages and contain the following sections:

1. Abstract - This brief summary of the project purpose presents a general overview of the project topic and solution.
2. Description - The project description provides and introduction to the project topic and expands upon the abstract. This section completely explains the specifications of the project: e.g. the objectives, functionality, and components used.
3. Implementation - The project implementation provides the details on how the specified problem was solved. This implementation will include your programming methodology, the special microcontroller features that were utilized, efforts to optimize the project code, and any difficulties encountered while implementing the design.

4. Experimental evaluation - The experimental section describes how the project program performance was evaluated. This section should provide examples that highlight what input devices and sequence of actions were used to affect a result and how those results can be observed and confirmed. There should be sample input signals and corresponding output on an output device.

5. Summary - The conclusion of the report should provide a summary of the project aim and results as well as highlight both what was learned working on the project and what further directions would improve the project.

4 Presentation

Each group will be given 10 minutes to present their projects on Monday 12/05 in class. The presentation should be approximately 8 minutes (approximately 1 slide/min) to leave a few minutes for questions and discussion. The presentation should highlight the problem, solution, and demonstrate your code in action on the simulator. Each group member should be present and contribute to the presentation. It is highly encouraged for you to bring your own laptop to the class but the classroom will have Powerpoint, Arcrobat, and the EdSim51 Simulator. Be sure to bring a backup copy either on a disk or flash drive (this can be your electronic submission).

5 Deadlines and Deliverables

The following highlight the important dates and items to be submitted for the project. The project will be worth 20% of your final grade.

5.1 Deadlines

1. 11/07 Project proposal
2. 12/05 Project presentation
3. 12/05 Project report

5.2 Deliverables

1. Hard copy version of report (4 pages)
2. Electronic submission including report, code, and presentation

References

1. `http://www.edsim51.com`

2. `http://en.wikibooks.org/wiki/Embedded_Systems/8051_Microcontroller`

3. `http://en.wikipedia.org/wiki/Intel_MCS-51`

4. `http://www.mikroe.com/eng/chapters/view/65/chapter-2-8051-microcontroller-architecture`

5. `http://www.8052.com`