CS 3194 Design Project

Due on or before April 27, 2005, 4:30 p.m.

February 16, 2005

This problem is to be done on a group basis following the Trinity University Academic Integrity Policy. Laboratory problems should be submitted electronically (e-mail to cs3194@ariel.cs.trinity.edu) on or before the due date and should contain a problem write-up, source code to any programs and data sets used in solving the problem. The submitted files should be ASCII text files having Unix end-of-line characters (please convert all Windows and Mac text files to Unix format–I have found that Emacs or the Stone Text Tool seem to do a reasonable job of such conversions). If several files need to be submitted, put them in a directory having name *your-last-name-problem-set-number* and create a tar archive of this file system and attach it to your e-mail problem submission.

Introduction

The third year design problem is to design and implement a system which will emulate an actual processor design. The emulator should operate on a memory contents which contains program and data and produce a memory contents identical to the resulting memory after running the program on an actual machine. The machine to be emulated is an Motorola 68020.

Design teams must:

- Research the Motorola 68020 architecture.
- Input/output mechanisms do not have to be emulated. You may assume the existance of memory and register contents before starting the processor.
- You should assume the existance of a Motorola 68881 floating point coprossessor chip on the machine.
- You should develop designs for utility tools to enter and display memory contents. Such tools should be rudimentary in concept and do not require (and should not have) elaborate GUI interfaces.
- You should also develop similar tools for entering and displaying the contents of processor registers. It may be convenient to have a tracing facility for viewing step by step instruction processing.
- Your emulator should represent and process bits, bytes, words, etc. in the same manner as a 68020/68881 system does.

Design Groups

There are 22 third year design students. The following J expressions were used to select 4 design groups.

```
names =: 'Boney, John R.';'Markowitz, Elizabeth A.';'Robbins, Christopher M.';'West, Paul E.';'Agee, Mathieu J.'
names =: names,'Borrelli, Nick M.';'Bowden, Nicholas A.';'Brick, William B.';'Dietzel, Thomas M.';'Evans, David R.'
names =: names,'Farris, Bryon W.';'Kerr, William B.';'Krausnick, Andrew O.';'Lederle, Bret A.';'McCarty, Brian J.'
names =: names,'Pack, Jared B.';'Richardson, Heather E.';'Simmons, Matthew C.';'Smith, Charles K.';'Wilson, Daniel C.'
names =: names,'Winbow, Victoria V.';'Zinchak, Robert J.'
groups =: 'Group 1';'Group 2';'Group 3';'Group 4'
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(/: /: (12$1 0 0 0 0 0),14$1 0 0 0 0 0 0) { ((22?22){>names),>groups
Group 1
Richardson, Heather E.
Smith, Charles K.
Zinchak, Robert J.
Dietzel, Thomas M. (Group Leader)
Bowden, Nicholas A.
Group 2
Pack, Jared B.
Farris, Bryon W.
McCarty, Brian J.
Brick, William B.
Kerr, William B. (Group Leader)
Group 3
Boney, John R.
Robbins, Christopher M.
Borrelli, Nick M.
West, Paul E. (Group Leader)
Evans, David R.
Krausnick, Andrew O.
Group 4
Winbow, Victoria V.
Simmons, Matthew C.
Agee, Mathieu J.
Wilson, Daniel C.
Lederle, Bret A. (Group Leader)
Markowitz, Elizabeth A.
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Each group must meet and select a group leader before the beginning of the second class period (January 19, 2005 and e-mail the instructor cs3194@ariel.cs.trinity.edu the results of this selection.

Design groups must submit preliminary design documents to the instructor by e-mail cs3194@ariel.cs.trinity.edu before the beginning of the fourth class period (February 9, 2005). You should include some design narrative and the following UML diagrams:

1. use-case
2. analysis
3. class

Design Project Solution [HTML] [PS] [PDF]