**MARS - Mips Assembly and Runtime Simulator**

**Release 4.5**

**August 2014**

**Operating Requirements**

MARS is written in Java and requires at least Release 1.5 of the J2SE Java Runtime Environment (JRE) to work. The graphical IDE is implemented using Swing. It has been tested on Windows XP, Vista and 7; Mac OS X; and is also being used under Linux.

**Some MARS Assembler and Simulator Limitations**

Releases 3.0 and later assemble and simulate nearly all the MIPS32 instructions documented in the textbook *Computer Organization and Design, Fourth Edition* by Patterson and Hennessy, Elsevier - Morgan Kaufmann, 2009. All basic and pseudo instructions, directives, and system services described in Appendix B are implemented.

Limitations of MARS as of Release 4.4 include:

* Memory segments (text, data, stack, kernel text, kernel data) are limited to 4MB each starting at their respective base addresses.
* There is no pipelined mode (but delayed branching is supported).
* If you open a file which is a link or shortcut to another file, MARS will *not* open the target file. The file open dialog is implemented using Java Swing's JFileChooser, which does not support links.
* Very few configuration changes, besides those in the Settings menu, are saved from one session to the next. The editor settings, which include font settings and display of line numbers, are saved.
* The IDE will work only with the MARS assembler. It cannot be used with any other compiler, assembler, or simulator. The MARS assembler and simulator can be used either through the IDE or from a command prompt.
* *Bug:*The error message highlighter does not automatically select the code for the first assembly error if the file containing the error is not open at the time of assembly (assemble-on-open, assemble-all).
* *Bug:* The Screen Magnifier screen capture feature does not appear to work properly under Windows Vista.
* *Bug:* There appears to be a memory leak in the Editor. Several different people have independently reported the same behavior: severe slowdown in editor response during an extended interactive session. If MARS is exited and restarted, this behavior disappears and the editor responds instantly to actions.
* *Not a bug, but documented here anyway:* MIPS Branch instruction target addresses are represented by the relative number of words to branch. With Release 3.4, this value reflects delayed branching, regardless of whether the Delayed Branching setting is enabled or not. The generated binary code for branches will now match that of examples in the *Computer Organization and Design* textbook. This is a change from the past, and was made after extensive discussions with several faculty adopters of MARS. Previously, the branch offset was 1 lower if the Delayed Branching setting was enabled -- the instruction label: beq $0,$0,label would generate 0x1000FFFF if Delayed Branching was enabled and 0x10000000 if it was disabled. Now it will generate 0x1000FFFF in either case. The simulator will always branch to the correct location; MARS does not allow assembly under one setting and simulation under the other to occur.

This document is available for printing on the MARS home page **http://www.cs.missouristate.edu/MARS/**.