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A Nifty Tool for Studying Program and System Behaviors: Nifty Tools

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A NIFTY TOOL FOR STUDYING PROGRAM AND SYSTEM

BEHAVIORS*

NIFTY TOOLS

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MARS is an integrated development environment (IDE) and simulator for MIPS assembly language programming. New features enable MARS to be a useful tool for discovery and experimentation even in courses that do not involve assembly language programming.

MARS "tools" are GUI-based applications launched either independently or from its Tools menu that can interact with executing MIPS programs by observing the simulated MIPS memory and registers. Examples will demonstrate how MARS tools can be used to illustrate or experiment with concepts in different computer science courses. For instance, the Data Cache Simulation tool can be used by students at any level to explore and compare the performance of different cache organizations while an arbitrary MIPS program executes in the background. No programming is required.

Other currently-available MARS tools include the Memory Reference Visualization tool that paints grid cells according to the reference counts of corresponding MIPS data or

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program memory locations, the Sort Animation tool that animates the movement of values in a list, and the Floating Point Representation tool that simultaneously updates three views (base 2, 10 and 16) of IEEE floating point values and graphically illustrates the relationships between those views. MARS includes a framework that allows anyone to develop additional plug-in tools.

MARS and its tools are written in Java using the Swing user interface library. It is distributed as an executable JAR file that requires no installation and has been run on Windows, Mac OS-X and Linux platforms. It can be downloaded from www.missouristate.edu/MARS/

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