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AN ASSEMBLY LANGUAGE I.D.E. TO ENGAGE STUDENTS OF ALL LEVELS*

TUTORIAL PRESENTATION

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ABSTRACT

MIPS assembly language is widely taught in computer organization and related courses due to its elegant design and ease of learning. In this workshop, participants will explore varied uses of the MARS integrated development environment (IDE) and simulator for MIPS assembly language programming. Basic exploration is guided by a set of MIPS programming exercises to illustrate MARS use and its extensive and intuitive interactive debugging capabilities. The next level of exploration will introduce MARS "tools", applications that can interact with executing MIPS programs by observing the simulated MIPS memory and registers. Exercises will demonstrate how currently-available 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 the performance of different cache organizations while executing an arbitrary MIPS program. The advanced phase of the workshop will introduce participants to ways in which they can customize and extend certain MARS capabilities. The most powerful of these is the ability to develop and plug-in their own tools by extending an abstract Java class provided with MARS. By the end of the workshop, participants will be able to utilize MARS to compose and debug basic MIPS assembly programs, see potential uses for MARS in a variety of computer science courses ranging from operating systems to breadth-first introduction, and be aware of at least two techniques for extending and leveraging MARS' capabilities.