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ALICE 3.0 WORKSHOP: OPENING THE GATE TO INNOVATIVE APPROACHES TO TEACHING PROGRAMMING

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Abstract:

Alice 3.0 is the latest release of the *Alice* programming environment developed at Carnegie Mellon University by the late Randy Pausch. Over 200 universities use *Alice* to introduce object-oriented, event-driven programming to novice students. *Alice 3.0* generates its worlds as Java code, and answers the primary criticism that earlier versions of *Alice* were a sealed environment and did not expose student to computer code. This workshop will guide participants in building an *Alice 3.0* program, demonstrate its integration with NetBeans Java IDE, and show how *Alice 3.0* code can be modified with Java code in NetBeans. Participants will receive the latest release of the software suite.

Keywords: introductory programming, visualization, pedagogy

I. WORKSHOP INTRODUCTION

Alice is a programming environment and approach to introducing programming that recognizes contemporary students have grown up in a media-rich world. *Alice* programs are virtual worlds, either animations or games, where students program interactions between characters and objects. *Alice* is a visual language where students directly interact with the integrated development environment (IDE) to build their programs by dragging and dropping tiles that represent commands.

Over two hundred national and international university computer science programs have adopted *Alice* to bootstrap students in computing programs (<http://alice.org>). *Alice* has been shown to improve success in more advanced programming classes and improve retention in the field (Moskal, et. al. 2004). The use of *Alice* in IS programs is less common, in part because it is less well known in the IS community which also has had less input in its development.

The *Alice* environment is a response to the studies that indicated the idiosyncratic syntax of computer languages could be a barrier to success for beginning programmers (Kelleher and Pausch 2005). Figure 1 shows the *Alice 3.0* IDE, with the object tree and scene setup in the upper left, the object details below, and, to the right, the tiles for the control structures above the program editor. Programmers drag command tiles from the object details section to the editor to create programs. Programmers control program flow by dragging tiles from above the editor. The "Hello World" program is shown running in the run-time window.

Alice 3.0 is the latest version and, while still Beta, was released publicly in August 2009. In addition to the extensive interest in the inclusion of the Sims characters, licensed by Electronic Arts, to improve the animation, there are major changes in the interface and code generated. *Alice 3.0* is designed to produce Java code. The resulting programs can then be modified using a traditional IDE and writing Java code directly to create a new world. Sun NetBeans Java IDE has modules corresponding to the releases of *Alice 3.0* that allow an *Alice* world to be imported as Java code and subsequently modified. Exposing the code answers a significant criticism of earlier versions of *Alice* that it was just a "toy" and its sealed worlds did not allow students to see how the drag and drop interface created code (Dann and Cooper, 2009).



Figure 1: Alice 3.0 Interface with "Hello World" Running

II. WORKSHOP OUTLINE

Alice 3.0 and the NetBeans Modules (NLM) are available for Macintosh OS-X, Windows, and Linux. The workshop will enact the activities below. Many of these are modeled on instructional practice developed in introducing *Alice 3.0* in an undergraduate programming course to prepare novices for subsequent programming courses in Java or C#.

Distribution, installation, and configuration of

- *Alice 3.0*
- Netbeans
- NetBeans Modules

Introduction to *Alice* Versions (all current)

- *Alice* Version 2.2 – Traditional *Alice*
- Storytelling *Alice*
- *Alice 3.0* – Java, Electronic Arts, and SIMS

Developing a simple *Alice 3.0* World (Models instructional practice)

- Planning – storyboard/pseudocode
- Building/coding
- Run and Debug

Importing *Alice* world to NetBeans (Models instructional practice)

- Running world from within NetBeans
- Modifying code
- Run and debug

Extending *Alice 3.0* with new classes

- Creating *Alice 3.0* world
- Building program logic
- Import to Netbeans
- Adding New Class (read/write)
- Implementing class in *Alice*

Instructional issues

- Classroom models
- Syllabus
- Support materials, and *Alice* community

Questions

Attendees are expected to bring a laptop in order to install the software. Installation makes no changes to registry entries or other system level areas so can be uninstalled. The programs do, however, require Java to run.

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LIST OF ACCRONYMS

- IDE Integrated Development Environment
- NLM NetBeans Module

ABOUT THE AUTHOR

Dr. W. Brett McKenzie has been teaching with Alice since 2004 and was awarded an NSF Fellowship in 2007 and 2008 to present workshops for NCTT as well as presentations at the Alice summer workshops and ISECON. In summer 2007, he hosted the first Alice/Media Comp conference at Roger Williams University. Dr. McKenzie was selected to participate in the first large scale testing of the Alice 3.0 Beta release in a classroom in Spring 2009. As the only business school and IS program testing prior to the initial release, his classes provided a unique perspective to the development team.