A "DESIGN-FIRST" CURRICULUM AND ECLIPSE™ TOOLS[*]

TUTORIAL PRESENTATION

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This tutorial introduces a curriculum and tools supporting a design-first pedagogy for teaching object-oriented programming in a CS1 course (Moritz and Blank 2005, Moritz et al. 2005). Design-first emphasizes the "big picture of software development"—how to understand and solve a customer's problem, rather than just coding. The design-first approach subsumes objects-first—instead of a "Hello, World" program, in the first lesson students learn how to use classes, constructors and methods to create scenes out of graphical objects. They also quickly learn how to develop use cases to analyze a customer's problem, and then how to design class diagrams in Unified Modeling Language (UML). Interactive multimedia courseware helps introduce these concepts (Blank et al. 2003). Students learn how to manipulate objects using the open-source Eclipse IDE with the DrJava interactive interpreter plug-in. They design class diagrams in the LehighUML plug-in, which automatically generates skeletons of Java source code. The LehighUML plug-in also sends each step of student work to a server, where an intelligent tutoring system analyzes their work and provides hints and lessons (Blank et al. 2005 and Wei et al. 2005).

The tutorial will provide participants with a complete curricula and lesson plans for a design-first course introducing Java in a high school or ins and sample code for novices, plus sample multimedia courseware. Participants will experience excerpts from the first

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two or three weeks of materials in the course. The presenters will then describe the rest of the course and experiences teaching it in high school and college settings. At the end of the tutorial, there will be a short time for discussion.

PRESENTERS BACKGROUND/BIOGRAPHY

Sally Moritz, a PhD student and NSF Teaching Fellow, developed and taught the design-first curriculum at a local high school (in connection with the Lehigh Valley Partnership for Teaching Fellows, an NSF GK-12 project; see www.lehigh.edu/STEM), designed the UML plug-in, and is developing the expert evaluator component of the intelligent tutoring system, all in connection with her dissertation research, and has taught courses at Lafayette and Muhlenberg colleges as an Adjunct Professor. Glenn Blank, Associate Professor of Computer Science and Engineering, principal investigator of the NSF-sponsored CIMEL (Constructive Inquiry-based Multimedia E-Learning) project (see www.cse.lehigh.edu/~cimel) and advisor for CIMEL-ITS (CIMEL Intelligent Tutoring Systems project, see www.cse.lehigh.edu/cimelits), is a Co-PI for the LVPTF STEM project, and is the advisor of the other three presenters.   Shahida Parvez and Fang Wei (Sophia) are PhD students working on the student model and pedagogical agent components of the ITS; Fang Wei is also a lead developer and maintainer of CIMEL multimedia.

REFERENCES

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