

Gild: Groupware enabled Integrated Learning and Development for Java

Gild Project: Jan 8/2003

Motivation for the project

- Java is the first programming language taught at many universities
- Good methodologies for teaching students how to program involve significant “hands-on” experiences
- “Pair Programming” has been shown to be a very successful technique in the classroom
- Few tools exist to help instructors teach and students learn how to program
 - Better tools needed to assist student programmers
 - Better tools needed for lab instruction
 - Better tools needed to provide support outside the classroom

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Goal

- Develop a web-based learning plug-in for Eclipse to help novice through intermediate programmers learn Java
- Eclipse already has significant support for programmers by way of
 - Content Assist
 - User Assistance Plugin
 - Markers
 - Refactoring
 - Compilation messages
 - Collaborative support is currently being added to Eclipse (see http://www1.internetwire.com/wire/release.html_b1?release_id=49637)

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Proposed Instructor support mechanisms

- Currently there is very little support for instructors when teaching first year programming
- Some exceptions exist (for example BlueJ and DrJava) – but they are buggy and incomplete
- Current techniques for creating materials for students may involve for example using an IDE, Powerpoint and Frontpage (to publish notes)... continuously cutting and pasting, reformatting between the tools....
- Ideally the Eclipse learning plugin would provide support for instructors to write notes which will then be linked to compilable code samples and exercises, and can be published from within Eclipse
- Students could complete exercises which would be submitted through Eclipse with some of the marking could be done automatically
- Instructors could help students with programming exercises outside the classroom
- Materials could be shared between instructors....

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Proposed Student support mechanisms

- Students need to see lots of code and do lots of programming to learn.... Right now it is a struggle to get them to do this as they have to follow lots of links and switch between many tools to read notes and see the code examples
- Students help each other by way of a webboard – perhaps support for community building could be added to the Eclipse tool itself
- More support for students getting going on the first day
- Web based learning tools better integrated with Eclipse could help (forum, chat, instant messaging, collaborative editing etc)

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Leveraging existing components in Eclipse

- A look at how we can leverage and extend the existing technologies in Eclipse:
 - Perspectives
 - Eclipse help system and other User Assistance (UA) technologies
 - Content Assistance in Eclipse
 - Markers in Eclipse
 - Existing visualizations plug-ins (UML, SHriMP)
- Furthermore, many more plug-ins that are being added to Eclipse could prove beneficial
 - Other groups working on related projects (e.g. Echelon, Cool project in France)

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Perspectives

- What is an appropriate perspective for novice programmers?
- User studies would need to be done to discover the ideal set of views and features for novice programmers – as well as consulting instructors

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Eclipse Help System

- The help system has (or will have) support for being served from a web server
- The appearance of the help browser can be customized
- Integration of documentation sources is supported
- Support for other content types such as DHTML, Flash, Javascript, XML
- Search Engine functionality can be extended
- Infopops and Active help

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Content Assistance

- Could be tailored to novice programmers
- The amount and type of content assist would vary as the programmers learn the concepts
- The tool would need to “remember” using very simple knowledge management techniques what the programmer has learned
- Eventually the content assistance provided would be the same as provided to expert users

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Markers in Eclipse

- Existing:
 - ▣ **Problems** - for representing invalid states (errors, warnings, information)
 - ☒ **Tasks** - for capturing user created reminders (todo's)
 - ▮ **Bookmarks** - for marking a location that can be quickly jumped to later
- Could be extended with new marker types to support learning tasks – use of additional metadata to support sharing and searching

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Some links of interest

- [Java as a first programming language](#)
- [Pair programming](#)
- [BlueJ](#) development environment for novice programmers
- [DrJava](#)
- [Eclipse markers](#)

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Proposed Project Participants

- Peggy Storey
- Daniela Damian
- Marin Litoiu
- Derek Rayside
- Mary Sanseverino (50% in Spring, part time after that)
- Jeff Michaud (50% in Spring)
- Rob Lintern (20% in Spring)
- Adrian Damian (50% in Spring)
- Other people also interested....

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Agenda today

- Proposed project plan
- Participant roles (to discuss)
- Meeting times (to select)

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Project plan

- Some ideas:
 - Pedagogical requirements Jan – Feb
 - Scenarios (Mary Sanseverino, All)
 - Survey of instructors/students (Mary)
 - Report on web based learning tools in general and on programming (Mary and input from others)
 - Technology options Jan - Feb
 - Rob Lintern, Jeff Michaud, Adrian, and others
 - Select requirements for further development, and early prototyping (all, end of Spring)
 - Continued prototyping and early evaluation (Summer)
 - Deploy in course(s) (Fall)

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How to get wider involvement?

- Workshop at ICSE perhaps?
- Other ideas?
 - Website? Contact other groups?

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