Appendix D: Open Letter to Students of Software Engineering

This is an open invitation to students of software engineering to join the Modelibra Wicket Builder project.

Modelibra Wicket Builder

Modelibra Wicket Builder is a new project for creating dynamic web applications based on domain models and reusable web components. The project will produce an open source software in Java based on two frameworks: Modelibra for domain models and Wicket for web components.

Modelibra Overview

This is a brief overview of Modelibra [Modelibra], the open source software family that is used to develop dynamic web applications based on domain models. In computer terms, a domain model is a model of specific domain classes that describe the core data and their behavior. The heart of any software is a domain model. When a model is well designed and when it can be easily represented and managed in an object oriented language, a developer may focus on views of the software and they are what users care about the most.

Modelibra has been designed to help developers of small applications in representing and using application domain models in a restricted way. The main restriction of Modelibra and at the same time its main feature is that all data must be present in main memory. This and other restrictions of Modelibra minimize the number of decisions that a domain designer must make. This makes Modelibra easy to learn. Modelibra is an Open Source Software (OSS). It is hosted at JavaForge. Developers of small OSS may find Modelibra useful for developing their software around a domain model, for providing an easy installation for their users and for developing a web application to introduce their software to the public audience.

By default, Modelibra uses XML files to save model objects. However, Modelibra allows the use of both relational and object databases. The upgrade of an application from XML data files to a database does not require a single line of programming code to be changed. Modelibra also provides the data migration from XML files to a database. Although the focus of Modelibra are small software applications, it provides some advanced features such as transactions and undo. A domain may have several models. One of them may be a reference model where common data, common to all models within a domain, are kept. A domain model may also inherit some of its definitions from another model in the same domain. In Modelibra, a part of the base model may be exported to another model, which can be taken for an off-line work, then returned back to synchronize changes with the base model.

The Modelibra software family consists of a graphical design tool, a domain model framework, a web component framework, and code generators for XML configurations, database schemas and Java classes. Modelibra facilitates the definition and the use of domain models in Java [Java]. It uses Wicket [Wicket] for application views of domain models. Wicket is a web framework that provides web components to construct, in an object oriented way, web concepts, such as web pages and page sections. Modelibra interprets the application model and makes it alive as a default web application, which may help developers validate and consequently refine the domain model. In addition, Modelibra has a collection of generic web components

that may be easily reused in professional web applications to display or update entities.

Educational Objective

Open Source Software [OSS] is a software for which the programming code is available on the Web so that developers can modify and redistribute it. This contrasts with most commercial software, for which the source code is a closely guarded trade secret. OSS has a license agreement for its use that may cover rights to modify and redistribute it, even for commercial purposes. Thus, OSS does not necessarily mean "free" software. The basic idea behind OSS is simple. When developers on the Web can read and modify freely the source code, the software evolves. Programmers improve it and this can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing.

For students, OSS is important for multiple reasons. Most of it is legally free. They can create an exciting development environment on their personal computers. There are many OSS projects that can be an incredible source of learning. A student can open a software and see how programmers have organized it, in a similar way that a student of literature learns the most by reading classics. An advanced student may even a join an OSS project. OSS is the best way for a young software developer to get an international recognition. For companies, organizations, governments and students in developing countries, OSS provides a way to prevent the widespread illegal copying of software, and an opportunity to raise the level of software development to international standards.

The educational objective of this project is involve advanced students of software engineering to work together in a team over Internet by using collaboration technologies. The principal software engineer of Modelibra is also a professor of software engineering. He offers to provide an introductory Modelibra course over Internet to advanced students wherever they are, so that they can be introduced to the project in a gradual manner. The course would be open to assistants and professors that are willing to join the project. The book about Modelibra is in the final phase and it will be offered to all members of the project.

All software and documents produced in the project would be kept on a server. Software will be maintained in a Subversion repository [Subversion]. Subversion is an OSS for software version management. Project members will use a Subversion plug-in in Eclipse [Eclipse] to share the code. Different web technologies will be used to communicate among team members, to collaborate on common tasks, and to give presentations to other team members

Research Objective

A dynamic web application is seen in a web browser through web pages that are created dynamically on a server. A request from a browser's user is sent to a server, where it is processed, usually with some data retrieved and embedded dynamically in a web page that is returned as a response to the user request. For most companies and organizations their own web site is strategically important. The more it is important, the more it becomes dynamic. The subject of developing dynamic web applications is exciting for students, since they can easily show on the Web what they are capable of doing. In addition, web applications have been popular both in business and education. Unfortunately for students, the subject is considered to be an advanced topic in both computer science and information systems.

It takes time to develop a dynamic web application. If we had a software that already knows how to organize a web application, we could focus on application data, on data actions, and on making web pages appealing to users. Fortunately, such a software exists in different forms. The most popular category of software that improves the productivity of software developers is called framework [Framework]. A framework is an integrated set of components that collaborate to produce a reusable architecture for a family of applications.

More specifically, a framework is a predefined architecture in a vertical domain (such as web applications), consisting of both generic and specific building blocks. Areas that are specific must be refined by application developers by means of extending existing framework objects to provide application specific features.

The research objective of this project is to use Modelibra, the domain model framework, and Wicket, the web component framework, to make a web application builder, so that even students in introductory courses may design and develop professional web applications with the minimal programming effort. Modelibra Wicket Builder will be based on a catalog of domain models. The catalog will have tree levels: Modelibra, Reusable and Specific. A user of Modelibra Wicket Builder will be able to design graphically a specific domain model linked to his user name. A domain model may be reused among users that belong to the same group. Domain models at the Modelibra level may be shared by different groups of users. Reusable and shared models will have their corresponding web components. In addition, in order to respond to specific needs, a way to develop specific web components will be offered.

The configuration mechanism of Modelibra will be completely redesigned to allow for a dynamic creation of domain models and a dynamic interpretation of domain models in the form of dynamic web applications. Different templates of web pages will be proposed to speed up a decision making of the design process. A web page will be created based on a template and on reusable web components, one for each section of the web page. For those users that are not interested in programming their own specific web components, the team of Modelibra Wicket Builder will provide a development service for web components.

This project is in the domain of software engineering. The proposed research is applied and experimental. The key words are: software engineering, frameworks, domain models, meta models, web components, reusable models and components, code generation, code interpretation. Hopefully, the number of members of this project will at least double in a short period of time. Modelibra Wicket Builder should be designed and developed in the time frame of two years. At least a few students theses will be defined in the context of this project. Several research papers about Modelibra Wicket Builder will be prepared for publication in software engineering journals and conferences.

Short Biography

Dženan Riđanović [Dženan] is a professor of software engineering at the University of Sarajevo, Bosnia and Herzegovina and an asso,ciate professor at the Laval University, Quebec, Canada. He received a B.Sc. in informatics from the University of Sarajevo in 1976, an M.Sc. in computer science from the University of Maryland in 1982, and a Ph.D. in management information systems from the University of Minnesota in 1986. From 1987 to 1999 he was a director of research and development of the Silverrun CASE tools. He is a designer and a principal developer of several tools and frameworks. He is the founder and the principal software engineer of the Modelibra open source software family. His research interests are: software engineering, open source software, spiral development, frameworks, dynamic web applications, domain models, meta models, reusable models and components, code generation.

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Web Links

[DomainModel] DSM Forum
http://www.dsmforum.org/

[Dženan] Dženan Riđanović
http://drdb.fsa.ulaval.ca/dr/

[Eclipse] Eclipse
http://www.eclipse.org/

[Framework] Framework
http://st-www.cs.uiuc.edu/users/johnson/frameworks.html

[Java] Java
http://java.sun.com/

[JavaForge] JavaForge
http://www.javaforge.com/

[Modelibra] Modelibra
http://www.javaforge.com/project/1647

[OSS] Open Source Software
http://en.wikipedia.org/wiki/Open-source_software

[Subversion] Subversion Repository
http://subversion.tigris.org/

[Wicket] Wicket Web Framework
http://wicket.apache.org/