SE 3I03 Group Project
By: Mike Darmitz
Jeff Zagorac
Date: Nov. 26, 2004

To Lessen Dismay, Put Labs in 2A

Background

The purpose of the course SFWR ENG 2AA4, Software Design I, is to introduce students to the proper methods of software design for small systems. This course covers material which is not only important for several other courses in the software engineering program, but also imperative for success in the software engineering profession. It is clear that this is an extremely important course whose material should lead smoothly into the subsequent software design courses, as well as other courses which may have this course as a prerequisite. Unfortunately, many software engineering students are experiencing difficulty with the transition from Software Design I to Software Design II, and also lack confidence in their ability to apply the knowledge which they have gained to practical situations.

Objective

The objective of this proposal is to help students make the transition from Software Design I to later courses which build on this material, and, ultimately, to help make the transition to a career in software engineering easier. In order to do this, students must better understand the material required for courses following SFWR ENG 2AA4, as well as have sufficient experience with the employment of the material in practical applications.

Approach

In order to attain the above objectives, we propose to introduce lab sessions conducted by teaching assistants to the SFWR ENG 2AA4 class. These lab sessions would be three hours long, conducted weekly, and the focus of the sessions would alternate between the design process and test plans during one week, and implementation of the design during the following week.

During the first of each pair of lab sessions, the teaching assistants would provide an example design problem for a module or several modules, followed by a possible solution and accompanying test cases. Following this presentation of the example problem, students would be given an assignment with similarities to the example problem and provided with the remainder of the 3 hour lab session to start the design and ask the teaching assistants questions. This initial portion of the assignment consisting of the design and test cases would be collected the following week at the beginning of the lab session.

The second of each pair of lab sessions would begin with a demonstration of the implementation of the design example provided in the previous lab by the teaching assistants. The students would then be given another assignment which would consist of producing an implementation of their design as well as results of

the identified test cases. A sample solution for the design portion associated with this assignment would be made available to students at this time so that students would first have an opportunity to correct any problems with their initial designs before proceeding to the implementation of them. The remainder of the 3-hour lab session would then be available for students to work on design corrections (if necessary) and the implementations of those designs.

Approximately halfway through the term, students would begin work on a final design project for the course. This design project would be very similar to the assignments given during the previous lab sessions, but would consist of larger and possibly more complex problems. The project would be completed in groups, and, similar to the lab assignments, would also consist of the production of a design with appropriate test cases, and an implementation of the design with the results of the test cases.

The implementations of both the lab assignments and the final group project would be done in Java. Since only limited previous experience with the Java programming language is necessary for this course, students would also receive some instruction on the basics of Java as necessary for the assignments and project. This instruction would be provided mostly during the lab sessions focused on the implementations of designs (the second of each pair of lab sessions).

Impact

The provision of examples and instruction pertaining to design and implementation during the labs will give students a greater ability to apply the material of the course in a practical way. Furthermore, completion of the given assignments and group project will provide even more of a base for the students' practical experience. This increase in practical experience will also result in a greater understanding of the material, making the transition into subsequent courses much easier for the students. The use of the Java programming language for implementation in this course will also aid students a great deal in classes where Java is expected to be known, but is not explicitly taught, such as SFWR ENG 3A04. Additionally, students will have more programming experience with a language that is currently used for implementing a large number of systems in the real world. This will make the transition to a career in software engineering a great deal easier.

Cost

The costs associated with this proposal are minimal. Firstly, the teaching assistants would have to be paid both for their time during the labs, as well as their time marking assignments and preparing for the labs. A room would also be required for a 3-hour session each week in order to accommodate the labs. Preparation of the material for the labs such as the examples, assignments, and their associated solutions would also be required. A final cost is that students would have a slightly greater workload from this course. This increase, however, could be easily controlled through the complexity of assignments and the final group project.