Advanced Software Engineering

CSE870, Spring 2003

Homework 3 Due: March 28, 2003

In this assignment, you will learn how to use Design Patterns. You are to develop a program that implements the BECS system in Java. The development of the system will be much easier if you carefully develop the design. Before you start coding the system, you should understand the functionality and identify the potential locations of the design patterns within the system. The following Design Patterns need to be included in your final implementation. You are allowed to work in pairs on this assignment.

1. **Facade**: You will provide a user (customer and manager) with unified interface to the BECS’ subsystems such as inventory, login and promotion access.

2. **Iterator**: You will provide a means for a user to access items in the inventory system without exposing how items are stored in the inventory.

3. **Observer**: You will use the observer design pattern to handle sending e-mail to a customer user when a promotion has been added.

4. **Strategy pattern for security**: There are many schemes that can be used to implement security. You will provide a common interface so that these schemes are interchangeable. Examples of these schemes are:
   a) SHTTP (secure hypertext transfer protocol) –
      o [http://www.homeport.org/~adam/shttp.html](http://www.homeport.org/~adam/shttp.html) (Detailed description)
   b) SSL (secure sockets layer) –

**Extra Credit**: Additional pattern

If you are able to identify other useful design patterns that would be appropriate for the implementation of the system, you will receive extra credit for each additional pattern beyond the four assigned patterns.
**Assignment Deliverables**
The deliverables for this assignment include the following:

1. Class diagram for the modified BECS system.
2. All files for testing your program, including the makefile for compiling and running your program. You will also include a readme file describing how to use your program.
3. A written report on your work and result.

**Project Report**
Your project report will include the following sections (in the order specified):

1. Names of the group members.
2. A brief description of the design patterns implemented. Your description should include the potential benefits of including a design pattern at a particular location of your implementation.
3. Class Diagram of the BECS system. The class diagram should identify the design pattern implemented. This can be done by attaching an explanatory note (manually or by program) in the Class Diagram. Some data dictionary to clarify the role of each class will be greatly appreciated.
4. Any assumptions you made about the interpretation of specifications that might have been unclear.