**CSIII: Programming Patterns**

**Lab 12 Assignment:**

**Decorator Observer Chain of Responsibility Coffee Shack**

The project is due in one week: by the midnight on the day of the next lab. Make sure to include your name in comments of the source files.

1. A "Coffee Shack" serves coffee to its customers that is composed of the base coffee: large ($3.00), medium ($2.00) or small ($1.00) and added ingredients: sprinkles ($.50), caramel ($.20), milk foam ($.40), ice ($0.10). The ingredients can be added in any order and multiple times. Here is an example dialog for the order (customer's input is in bold):

Welcome to Coffee Shack, can I get you [l]arge, [m]edium, or [s]mall coffee? m  
Would you like to add [s]prinkles, [c]aramel, milk [f]oam, [i]ce or [n]ot? s  
Would you like to add [s]prinkles, [c]aramel, milk [f]oam, [i]ce or [n]ot? f  
Would you like to add [s]prinkles, [c]aramel, milk [f]oam, [i]ce or [n]ot? f  
Would you like to add [s]prinkles, [c]aramel, milk [f]oam, [i]ce or [n]ot? n  
Can I get your name? Alex

Alex, your medium coffee with sprinkles, foam, foam is ready. It will be $3.30, please.

Code the service of "Coffee Shack" program using Decorator Design Pattern. Use “drink.h” to define your base class.

1. Extend your program as follows. In "Coffee Shack", the barista takes the customers' order and then prepares their drunks. The barista may serve her customers concurrently. Once the drink is ready, the customers are notified. Specifically, after taking an order, the barista randomly either notifies all customers that of one the drinks is ready or starts taking a new order. The drinks are not necessarily prepared in the FIFO order.

Code the service of "Coffee Shack" using Observer Design Pattern. Customer objects should be registering with Barista object and be notified when a drink is ready. All customers could be notified at once. Then, each customer should determine if it is her drink.

1. Extend Barista class so that it contains three different experience levels: JuniorBarista, SeniorBarista, Manager. Junior Barista may only prepare drinks with no added ingredients. Senior Barista may handle all added ingredients except for milk foam. Manager may handle all ingredients. Implement your barista class using Chain of Responsibility design pattern. In your dialog make sure to print the experience level of the barista preparing the order.

Milestone: Implement the first part of the assignment (the basic "Coffee Shack").