***For every question clearly state any assumptions you make in your Class design as well as any design patterns used in the design.*** *Also ensure that you clearly define which methods are abstract, and which methods should be implemented. You may abstract out any non-design pattern specific code. Example: runsTest()*

1. (4 points) Identify 1 use case scenario of the following patterns
   1. Observer pattern
   2. Proxy Pattern
   3. Command Pattern

Composite Pattern

1. (5 points) You have been asked to design software for use by fast food restaurants to model the creation of their children's meals. Children's meals typically consist of a main item, a side item, a drink, and a toy (e.g., a hamburger, fries, Coke, and toy dinosaur). Note that there can be variation in the content of the children's meal, but the construction process is the same. Whether a customer orders a hamburger, cheeseburger, or chicken, the process is the same. The employee at the counter directs the crew to assemble a main item, side item, and toy. These items are then placed in a bag, and the drink is placed in a cup.   
     
   Builder Pattern
2. (5 points) You have been asked to design software that will allow users to search a simple contact list for contacts using a limited natural language search engine. The contact list contains: first names, last names, and ages. The user should be able to search by keyword match and the following conditions: “older than” and “younger than”. For example, the user can type in: “john older than jane”. This would return all contacts named john that are older than the oldest contact named jane.

Interpreter Pattern

1. You have a family tradition where you get Christmas tree ornaments from each member of the family. You want to write software that will create the ornament object, and place it on the tree. You must write a program that will allow family members to add an ornament object of various sizes, shapes, and functionality (music box, blinking light, motion sensor, etc.) to your tree. Can you also verify that each ornament is unique?

Builder

-or

Factory

-or-

Decorator

1. (5 points) A manufacturer of plastic toys wants software that will automate their toy making process. The have a lot of different kinds of toys, but creation of each of the toys uses the following process:
   1. mix plastic molding powder
   2. inject the plastic into molds.

The mold of the toy (car, action figure, etc.) is determined by the Toy subclass.

Factory