Patterns Design Studio: Challenge Problems

1. Creational patterns provide “(f)lexibility in what gets created, who creates objects, how objects are created, and when objects are created”. We’ll refer to these as the *what, who, how, when* dimensions of flexibility. For each of the following creational patterns discuss their flexibility in each of these dimensions: Factory Method, Abstract Factory, Singleton.

2. In the Abstract Factory pattern each concrete factory typically creates parts of a *single* type (e.g., in the maze factory, a BombedMazeFactory only creates bombed walls, i.e., no other walls can be created). In the “real world” situations may arise where a factory needs to produce different types of parts (e.g., a bombed maze factory may have bombed walls and ordinary walls). Discuss how this can be done.

3. A potential problem with adapters is that they are not transparent to all clients: an adapted object does not conform to the interface of an adaptee and thus it cannot be used in places where an adaptee is expected. Discuss ways of overcoming this problem (is it possible to have 2-way adapters?)

4. Develop a design model that shows how factory methods can be used to flexibly create iterators.

5. How can you use the Observer pattern to avoid problems when a collection (aggregate) is changed during an iteration?