

COMP 3111: Software Engineering

Lecture 18 Exercises: Design Patterns

Exercise 1: An object is loosely coupled if it is dependent on only a few other objects and/or the dependencies are abstract. In the Observer design pattern, the subject may have hundreds of observers (dependencies). In light of this, explain why the Observer design pattern is said to be loosely coupled.


Exercise 2: Consider the code for the Singleton design pattern given below. Modify this code so that at most 5 instances are created and each instance can be individually referenced. Note that the keyword static indicates a class attribute/operation.

```
public class Singleton {  
    private static Singleton instance = null;  
  
    private Singleton() { }  
  
    public static Singleton getInstance() {  
        if (instance == null) {  
            instance = new Singleton();  
        }  
        return instance;  
    }  
}
```

Question 1

The observer pattern is loosely coupled because it allows less coupling between different subjects.

Question 2



```
public class Singleton {
    private static Singleton instance = null;
    private []Singleton instances = [];

    private Singleton() { }

    public static Singleton getInstance(index) {
        if (instances[index] == null) {
            instances[index] = new Singleton();
        } else if (index > 5) {
            return null;
        }

        return instances[index];
    }
}
```