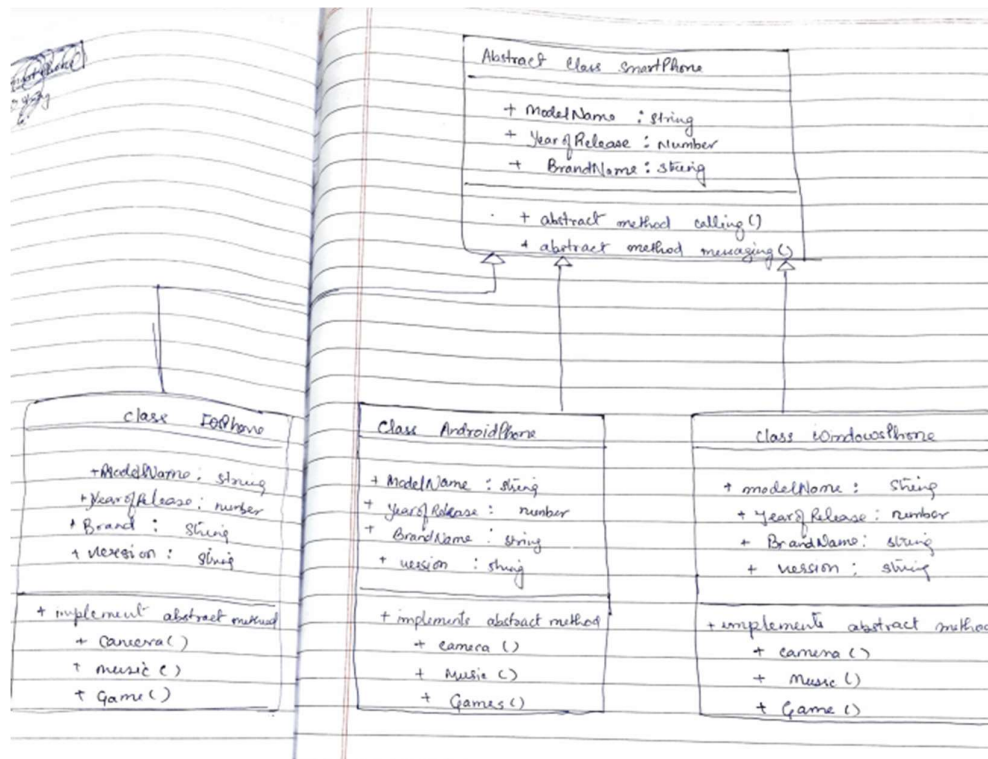
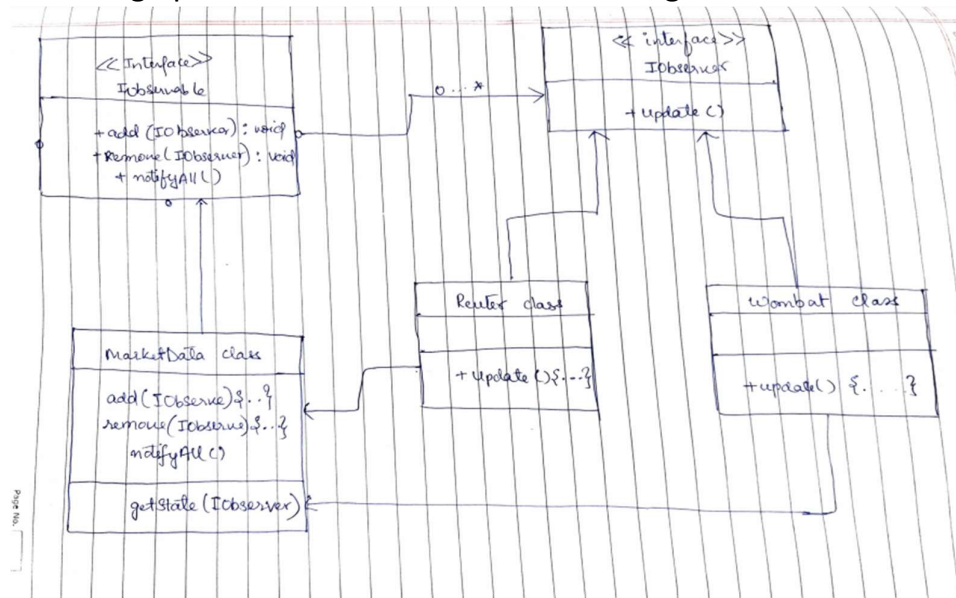


Solutions

1. The design pattern will be Strategy Pattern



2. The design pattern used will be Observer Design Pattern.



3. Singleton pattern in Java is a pattern which allows only one instance of Singleton class available in whole application. The singleton class must provide a global access point to get the instance of the class. It is used for logging, drivers objects, caching and thread pool.

Thread Safe Singleton:

The easier way to create a thread-safe singleton class is to make the global access method synchronized, so that only one thread can execute this method at a time. General implementation of this approach is like the below class.

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

4.

