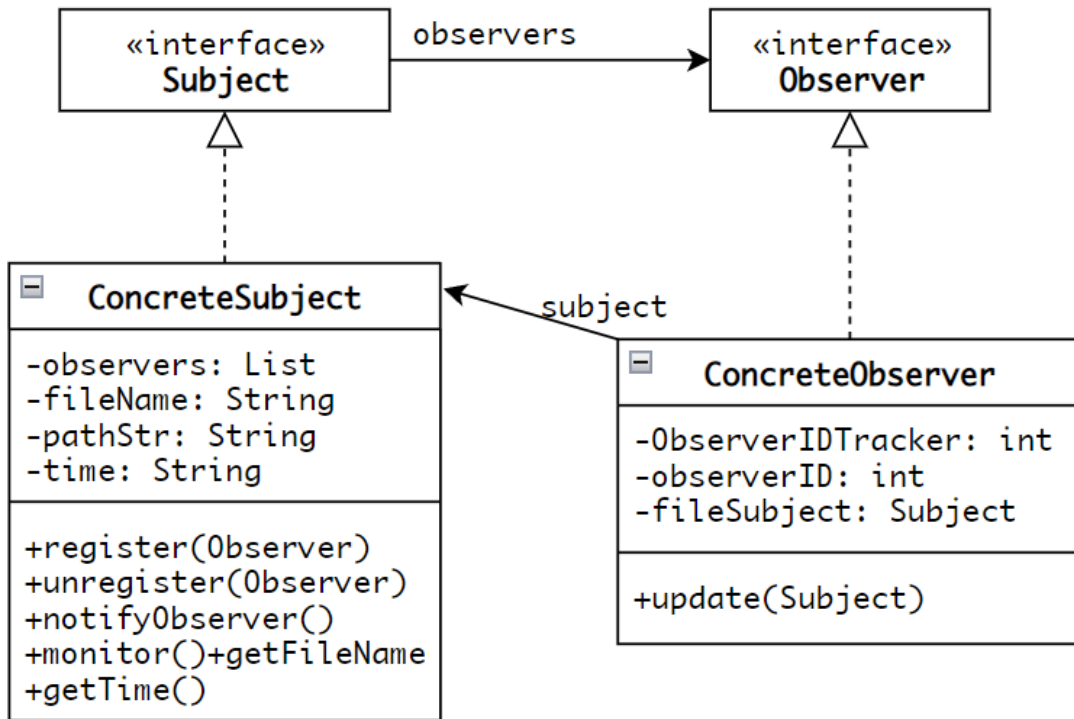


Report

UML Diagram



Benefits

- **Decoupling:** The Observer Design Pattern decouples the subject (the file being monitored) from the observers (the monitors). This means that changes to the subject do not affect the observers directly, and the observers can be added, removed or modified without affecting the subject.
- **Flexibility:** The Observer Design Pattern allows for a flexible and modular design. New observers can be easily added to the system to track additional aspects of the file or to take different actions in response to file changes.
- **Real-time notifications:** The Observer Design Pattern allows for real-time notifications of changes to the file being monitored. This is important in applications where immediate action is required based on changes to the file.

Drawbacks

- **Overhead:** The Observer Design Pattern can add some overhead to the system. Each time a change is made to the file, the subject needs to notify all of the registered observers. This can become computationally expensive if there are a large number of observers.
- **Scalability:** The Observer Design Pattern may not scale well to large and complex systems. As the number of observers and the complexity of the system grows, it may become difficult to maintain and manage the interactions between the subject and the observers.
- **Resource usage:** The Observer Design Pattern may consume a significant amount of system resources, especially when monitoring files on a remote server. This can lead to performance issues and may require additional resources to be allocated to the system.

Usage in monitoring files in real-time

Let's say there is a file named 'test.txt'. We can create a ConcreteSubject object to monitor this file and register a ConcreteObserver to receive notifications of changes. We can then simulate changes to the file by editing it using a text editor. When we save the changes, the ConcreteObserver is notified and its update method is called to display the details of the changes. Every time any changes are made, the ConcreteObserver is notified. Thus, the file monitoring system can be used to monitor and track changes in files in real-time.