

## Team 4

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**Design Pattern:** Observer

**Application:** Google Maps

In Google Maps, the Observer pattern is used to enable real-time interaction between the user and the map. The map is an observable subject that notifies interested components, such as the user interface and data processing services, about state changes occurring on the map.

```
import java.util.ArrayList;
import java.util.List;

public class GoogleMaps {
    private List<Observer> observers = new ArrayList<Observer>();
    private String location;

    public String getLocation() {
        return location;
    }

    public void setLocation(String location) {
        this.location = location;
        notifyAllObservers();
    }

    public void attach(Observer observer){
        observers.add(observer);
    }

    public void notifyAllObservers(){
        for (Observer observer : observers) {
            observer.update();
        }
    }

    public abstract class Observer {
        protected GoogleMaps googleMaps;
        public abstract void update();
    }

    public class MapView extends Observer {
        public MapView(GoogleMaps googleMaps){
            this.googleMaps = googleMaps;
            this.googleMaps.attach(this);
        }

        public void update() {
            System.out.println("Map View: " + googleMaps.getLocation());
        }
    }
}
```

```

public class LocationView extends Observer {
    public LocationView(GoogleMaps googleMaps){
        this.googleMaps = googleMaps;
        this.googleMaps.attach(this);
    }

    public void update() {
        System.out.println("Location View: " + googleMaps.getLocation());
    }
}

public class Main {
    public static void main(String[] args) {
        GoogleMaps googleMaps = new GoogleMaps();

        new MapView(googleMaps);
        new LocationView(googleMaps);

        googleMaps.setLocation("New York");
        googleMaps.setLocation("San Francisco");
    }
}

```

