**Exercise 7: Implementing the Observer Pattern**

**Scenario:**

You are developing a stock market monitoring application where multiple clients need to be notified whenever stock prices change. Use the Observer Pattern to achieve this.

**Steps:**

1. **Create a New Java Project:**
   * Create a new Java project named **ObserverPatternExample**.
2. **Define Subject Interface:**
   * Create an interface **Stock** with methods to **register**, **deregister**, and **notify** observers.
3. **Implement Concrete Subject:**
   * Create a class **StockMarket** that implements **Stock** and maintains a list of observers.
4. **Define Observer Interface:**
   * Create an interface Observer with a method **update().**
5. **Implement Concrete Observers:**
   * Create classes **MobileApp**, **WebApp** that implement Observer.
6. **Test the Observer Implementation:**
   * Create a test class to demonstrate the registration and notification of observers.

using System;

using System.Collections.Generic;

public interface IObserver

{

void Update(string stockName, decimal newPrice);

}

public interface IStock

{

void RegisterObserver(IObserver observer);

void DeregisterObserver(IObserver observer);

void NotifyObservers();

}

public class StockMarket : IStock

{

private List<IObserver> observers = new List<IObserver>();

private string stockName;

private decimal stockPrice;

public StockMarket(string name, decimal price)

{

stockName = name;

stockPrice = price;

}

public void SetPrice(decimal price)

{

stockPrice = price;

NotifyObservers();

}

public void RegisterObserver(IObserver observer)

{

observers.Add(observer);

}

public void DeregisterObserver(IObserver observer)

{

observers.Remove(observer);

}

public void NotifyObservers()

{

foreach (var observer in observers)

{

observer.Update(stockName, stockPrice);

}

}

}

public class MobileApp : IObserver

{

public void Update(string stockName, decimal newPrice)

{

Console.WriteLine($"MobileApp - {stockName} is now {newPrice}");

}

}

public class WebApp : IObserver

{

public void Update(string stockName, decimal newPrice)

{

Console.WriteLine($"WebApp - {stockName} is now {newPrice}");

}

}

public class Program

{

public static void Main()

{

StockMarket appleStock = new StockMarket("AAPL", 150.00m);

IObserver mobile = new MobileApp();

IObserver web = new WebApp();

appleStock.RegisterObserver(mobile);

appleStock.RegisterObserver(web);

appleStock.SetPrice(155.00m);

appleStock.SetPrice(160.50m);

appleStock.DeregisterObserver(web);

appleStock.SetPrice(162.30m);

}

}

