Observer Pattern

1. 介绍

1.1 针对的问题

1. 相同内容多种展示形式

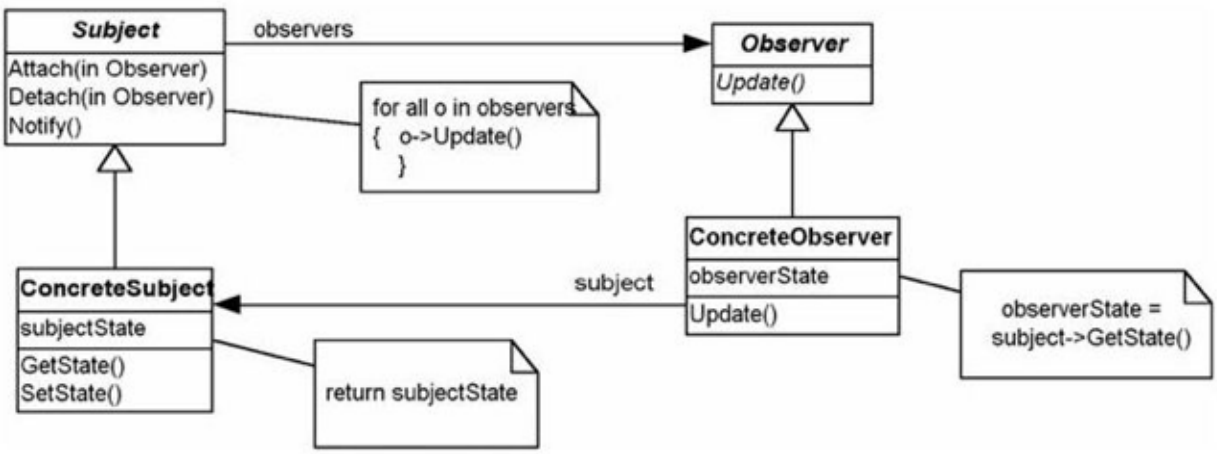
   一个内容, 可以有多种展示形式. 例如某各数据, 既可以用表格, 也可以用柱状图,饼状图来展示. 如何保证内容与展示统一, 且即时更新.

1.2 解决方法

1. Observer

   将内容与展示分开, 一旦内容有改变, 就通知展示回来取内容并重新刷新.

2. UML图



1.3 优点

1. 内容与展示分隔开

   将内容与展示分隔开, 保证了各个展示的内容统一.

2. 即时更新

   内容一旦改变, 各展示形式都可以即时更新.

2. 例子

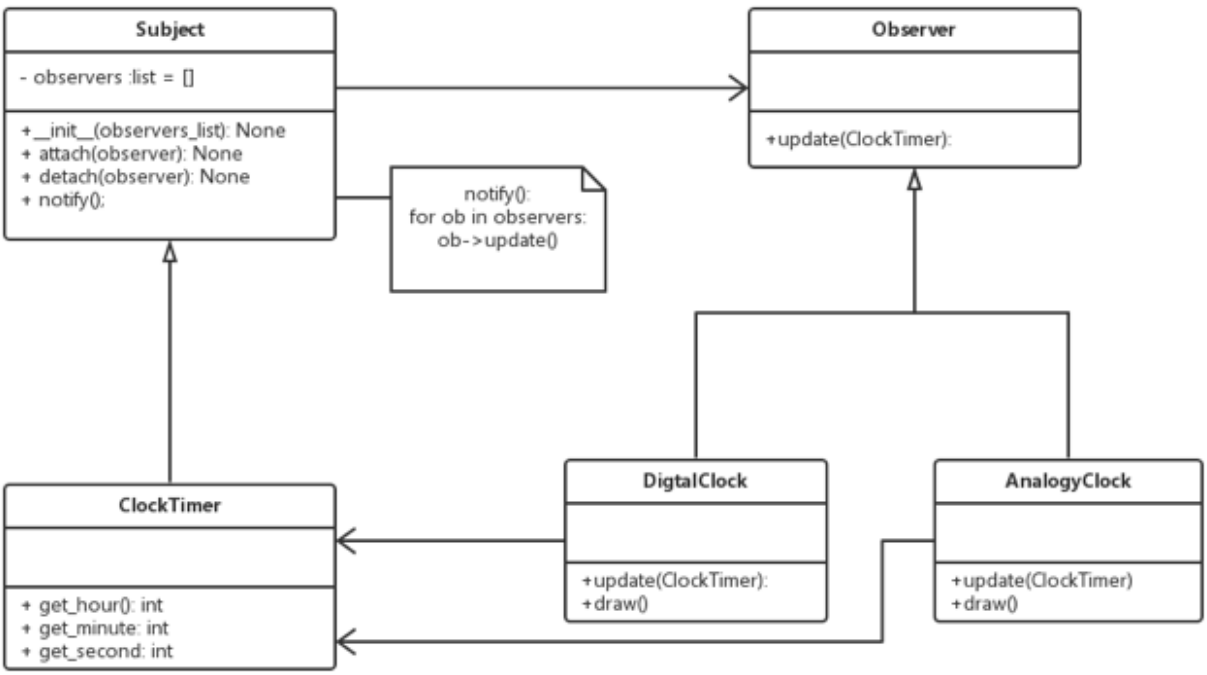
2.1 需求

1. 需求描述

   系统内有一个计时器（模型，没有界面），这个计时器驱动两个形式的时钟界面，一个数字时钟，一个模拟时钟.

2.2 方案

1. UML图



3. 总结

将内容与展示的形式分割开, 单独设计. 内容一旦改变就通知展示重新取内容并更新. 展示形式像是一个观测者, 观察内容的变动.

4. 附录:

4.1 例子代码

1. python

   observer.py:

```
# coding: utf-8
"""
    Example of  Observer pattern.
    @author: Liu Weijie
    @data: 2015-12-25

    需求:
        系统内有一个计时器（模型，没有界面），这个计时器驱动两个形式的时钟界面，一个数字时
"""

class Subject(object):
    """ Subject """

    def __init__(self):
        self.observers = []

    def attach(self, observer_add):
        self.observers.append(observer_add)

    def detach(self, observer_del):
        self.observers.remove(observer_del)

    def notify(self):
        for ob in self.observers:
            ob.update(self)

class Observer(object):
    """ Observer """

    def __init__(self):
        pass

    def update(self, subject):
        pass

class ClockTimer(Subject):
    """ ConcreteSubject """

    def __init__(self, hour_in, minute_in, second_in):
        super(ClockTimer, self).__init__()
        self._hour = hour_in
        self._minute = minute_in
        self._second = second_in

    def get_hour(self):
        return self._hour

    def set_hour(self, hour_in):
        self._hour = hour_in

    def get_minute(self):
```

```
        return self._minute

    def set_minutr(self, minute_in):
        self._minute = minute_in

    def get_second(self):
        return self._second

    def set_second(self, second_in):
        self._second = second_in

class DigtalClock(Observer):
    """ ConcreteObserver """

    def __init__(self, subject):
        self._hour = subject.get_hour()
        self._minute = subject.get_minute()
        self._second = subject.get_second()

    def update(self, subject):
        self._hour = subject.get_hour()
        self._minute = subject.get_minute()
        self._second = subject.get_second()

    def draw(self):
        print "DigtalClock:", self._hour, ":", self._minute, ":", self._second, "\

class AnalogyClock(Observer):
    """ ConcreteObserver """

    def __init__(self, subject):
        self._hour = subject.get_hour()
        self._minute = subject.get_minute()
        self._second = subject.get_second()

    def update(self, subpreject):
        self._hour = subject.get_hour()
        self._minute = subject.get_minute()
        self._second = subject.get_second()

    def draw(self):
        print "Analogylock:", self._hour, ":", self._minute, ":", self._second, "\

if __name__ == "__main__":
    # init
    clock_timer = ClockTimer(6, 0, 0)
    digtal_clock = DigtalClock(clock_timer)
    analogy_clock = AnalogyClock(clock_timer)
    clock_timer.attach(digtal_clock)
    clock_timer.attach(analogy_clock)
    digtal_clock.draw()
    analogy_clock.draw()
```

```
    # an hour later
    clock_timer.set_hour(7)
    clock_timer.notify()
    digtal_clock.draw()
    analogy_clock.draw()

    # an hour later
    clock_timer.detach(analogy_clock)
    clock_timer.set_hour(8)
    clock_timer.notify()
    digtal_clock.draw()
    analogy_clock.draw()
```