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# **Observer in C++**



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### Observer design pattern

- 1. Model the "independent" functionality with a "subject" abstraction
- 2. Model the "dependent" functionality with "observer" hierarchy
- 3. The Subject is coupled only to the Observer base class
- 4. Observers register themselves with the Subject
- 5. The Subject broadcasts events to all registered Observers
- 6. Observers "pull" the information they need from the Subject
- 7. Client configures the number and type of Observers

```
#include <iostream>
#include <vector>
using namespace std;
class Subject {
    // 1. "independent" functionality
    vector < class Observer * > views; // 3. Coupled only to "interface"
    int value;
  public:
    void attach(Observer *obs) {
        views.push_back(obs);
    void setVal(int val) {
        value = val;
        notify();
    int getVal() {
        return value;
    void notify();
};
class Observer {
    // 2. "dependent" functionality
    Subject *model;
    int denom;
  public:
    Observer(Subject *mod, int div) {
        model = mod;
        denom = div;
        // 4. Observers register themselves with the Subject
        model->attach(this);
    virtual void update() = 0;
  protected:
    Subject *getSubject() {
        return model;
    int getDivisor() {
        return denom;
    }
};
void Subject::notify() {
  // 5. Publisher broadcasts
  for (int i = 0; i < views.size(); i++)</pre>
    views[i]->update();
```

```
class DivObserver: public Observer {
 public:
    DivObserver(Subject *mod, int div): Observer(mod, div){}
    void update() {
        // 6. "Pull" information of interest
        int v = getSubject()->getVal(), d = getDivisor();
        cout << v << " div " << d << " is " << v / d << '\n';
   }
};
class ModObserver: public Observer {
 public:
   ModObserver(Subject *mod, int div): Observer(mod, div){}
    void update() {
        int v = getSubject()->getVal(), d = getDivisor();
        cout << v << " mod " << d << " is " << v % d << '\n';
};
int main() {
 Subject subj;
 DivObserver divObs1(&subj, 4); // 7. Client configures the number and
 Div0bserver div0bs2(&subj, 3); // type of Observers
 ModObserver modObs3(&subj, 3);
 subj.setVal(14);
}
```

#### **Output**

```
14 div 4 is 3
14 div 3 is 4
14 mod 3 is 2
```

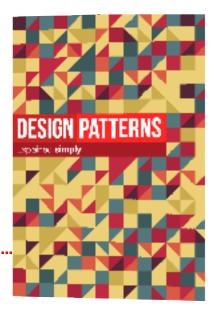
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## **Code examples**

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