Visitor in C++

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Visitor design pattern

1. Add an `accept(Visitor)` method to the "element" hierarchy
2. Create a "visitor" base class w/ a `visit()` method for every "element" type
3. Create a "visitor" derived class for each "operation" to do on "elements"
4. Client creates "visitor" objects and passes each to `accept()` calls

```cpp
#include <iostream>
#include <string>
using namespace std;

// 1. Add an accept(Visitor) method to the "element" hierarchy
class Element
{
  public:
    virtual void accept(class Visitor &v) = 0;
};

class This: public Element
{
  public:
     /*virtual*/void accept(Visitor &v);
    string thiss()
    {
        return "This";
    }
};

class That: public Element
{
  public:
     /*virtual*/void accept(Visitor &v);
    string that()
    {
        return "That";
    }
};

class TheOther: public Element
{
  public:
     /*virtual*/void accept(Visitor &v);
    string theOther()
    {
        return "TheOther";
    }
};

// 2. Create a "visitor" base class w/ a visit() method for every "element" type
class Visitor
{
  public:
    virtual void visit(This *e) = 0;
    virtual void visit(That *e) = 0;
    virtual void visit(TheOther *e) = 0;
```

```
};

 /*virtual*/void This::accept(Visitor &v)
{
  v.visit(this);
}

 /*virtual*/void That::accept(Visitor &v)
{
  v.visit(this);
}

 /*virtual*/void TheOther::accept(Visitor &v)
{
  v.visit(this);
}

// 3. Create a "visitor" derived class for each "operation" to do on "elements"
class UpVisitor: public Visitor
{
     /*virtual*/void visit(This *e)
    {
        cout << "do Up on " + e->thiss() << '\n';
    }
     /*virtual*/void visit(That *e)
    {
        cout << "do Up on " + e->that() << '\n';
    }
     /*virtual*/void visit(TheOther *e)
    {
        cout << "do Up on " + e->theOther() << '\n';
    }
};

class DownVisitor: public Visitor
{
     /*virtual*/void visit(This *e)
    {
        cout << "do Down on " + e->thiss() << '\n';
    }
     /*virtual*/void visit(That *e)
    {
        cout << "do Down on " + e->that() << '\n';
    }
     /*virtual*/void visit(TheOther *e)
    {
        cout << "do Down on " + e->theOther() << '\n';
    }
};
```

```
int main()
{
  Element *list[] =
  {
    new This(), new That(), new TheOther()
  };
  UpVisitor up; // 4. Client creates
  DownVisitor down; //    "visitor" objects
  for (int i = 0; i < 3; i++)
  //    and passes each
    list[i]->accept(up);
  //    to accept() calls
  for (i = 0; i < 3; i++)
    list[i]->accept(down);
}
```

Output

```
do Up on This               do Down on This
do Up on That               do Down on That
do Up on TheOther           do Down on TheOther
```

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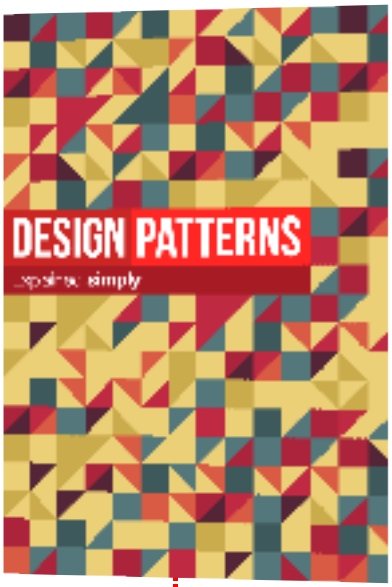

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