Factory Method in C++

Back to **Factory Method** description

Another Factory Method C++ source code example

Discussion. Frameworks are applications (or subsystems) with "holes" in them. Each framework specifies the infrastructure, superstructure, and flow of control for its "domain", and the client of the framework may: exercise the framework's default behavior "as is", extend selected pieces of the framework, or replace selected pieces.

The Factory Method pattern addresses the notion of "creation" in the context of frameworks. In this example, the framework knows WHEN a new document should be created, not WHAT kind of Document to create. The "placeholder" `Application::CreateDocument()` has been declared by the framework, and the client is expected to "fill in the blank" for his/her specific document(s). Then, when the client asks for `Application::NewDocument()`, the framework will subsequently call the client's `MyApplication::CreateDocument()`.

```
#include <iostream.h>

/* Abstract base class declared by framework */
class Document
{
  public:
    Document(char *fn)
    {
        strcpy(name, fn);
    }
    virtual void Open() = 0;
    virtual void Close() = 0;
    char *GetName()
    {
        return name;
    }
  private:
    char name[20];
};

/* Concrete derived class defined by client */
class MyDocument: public Document
{
  public:
    MyDocument(char *fn): Document(fn){}
    void Open()
    {
        cout << "   MyDocument: Open()" << endl;
    }
    void Close()
    {
        cout << "   MyDocument: Close()" << endl;
    }
};

/* Framework declaration */
class Application
{
  public:
    Application(): _index(0)
    {
        cout << "Application: ctor" << endl;
    }
    /* The client will call this "entry point" of the framework */
    NewDocument(char *name)
    {
        cout << "Application: NewDocument()" << endl;
        /* Framework calls the "hole" reserved for client customization */
```

```
        _docs[_index] = CreateDocument(name);
        _docs[_index++]->Open();
    }
    void OpenDocument(){}
    void ReportDocs();
    /* Framework declares a "hole" for the client to customize */
    virtual Document *CreateDocument(char*) = 0;
  private:
    int _index;
    /* Framework uses Document's base class */
    Document *_docs[10];
};

void Application::ReportDocs()
{
  cout << "Application: ReportDocs()" << endl;
  for (int i = 0; i < _index; i++)
    cout << "   " << _docs[i]->GetName() << endl;
}

/* Customization of framework defined by client */
class MyApplication: public Application
{
  public:
    MyApplication()
    {
        cout << "MyApplication: ctor" << endl;
    }
    /* Client defines Framework's "hole" */
    Document *CreateDocument(char *fn)
    {
        cout << "   MyApplication: CreateDocument()" << endl;
        return new MyDocument(fn);
    }
};

int main()
{
  /* Client's customization of the Framework */
  MyApplication myApp;

  myApp.NewDocument("foo");
  myApp.NewDocument("bar");
  myApp.ReportDocs();
}
```

Output

```
Application: ctor
MyApplication: ctor
Application: NewDocument()
   MyApplication: CreateDocument()
   MyDocument: Open()
Application: NewDocument()
   MyApplication: CreateDocument()
   MyDocument: Open()
Application: ReportDocs()
   foo
   bar
```

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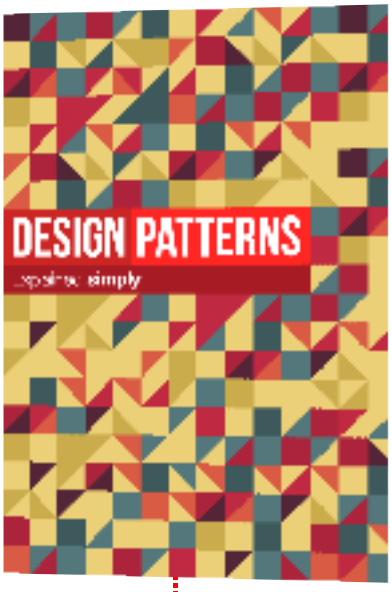

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