Supplement to
The Design and Implementation of Multimedia Software

The Factory-Method Pattern

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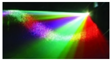


Motivation

- Situations that arise when constructing objects:

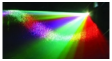
  A limit on the number

  Initialization can't be completed

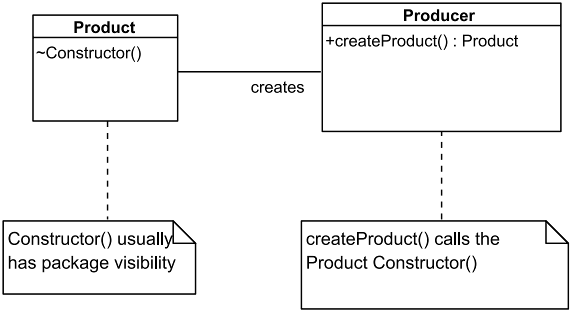
  May reside on multiple machines

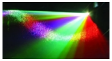
- Dealing with these situations:

  The Factory-Method pattern

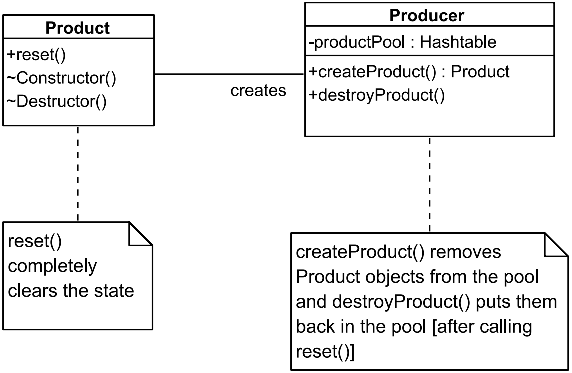


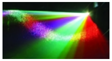
A Simple Version


Product
~Constructor()
creates
Producer
+createProduct() : Product
Constructor() usually has package visibility
createProduct() calls the Product Constructor()



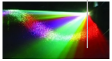
Using a “Pool”


Product
+reset()
~Constructor()
~Destructor()
creates
Producer
-productPool : Hashtable
+createProduct() : Product
+destroyProduct()
reset() completely clears the state
createProduct() removes Product objects from the pool and destroyProduct() puts them back in the pool [after calling reset()]



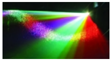
Example - The Class to be Constructed

```
import java.io.*;
import java.util.*;

public class DirectoryListing
{
    private File        dir;
    private File[]      files;
    private long        lastTimeCheck;


    DirectoryListing(String path) // package visibility
    {
       dir = new File(path);

       lastTimeCheck = 0;
       update();
    }


    public File[] getContents()
    {
       update();
       return files;
    }


    private void update()
    {
```



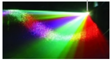
Example - The Class to be Constructed (cont.)

```
       long        lastModified;

       lastModified = dir.lastModified();
       if (lastTimeCheck != lastModified)
       {
          lastTimeCheck = lastModified;
          files         = dir.listFiles();
          Arrays.sort(files);
       }
    }
}
```



Example - The Factory

```
import java.util.*;

public class DirectoryListingFactory
{
    private Hashtable<String,DirectoryListing>   pool;


    public DirectoryListingFactory()
    {
       pool = new Hashtable<String,DirectoryListing>();
    }


    public DirectoryListing createDirectoryListing(String path)
    {
       DirectoryListing       dl;

       dl = pool.get(path);
       if (dl == null)
       {
          dl = new DirectoryListing(path);
          pool.put(path, dl);
       }

       return dl;
    }
```



Example - The Factory (cont.)

```
}
```