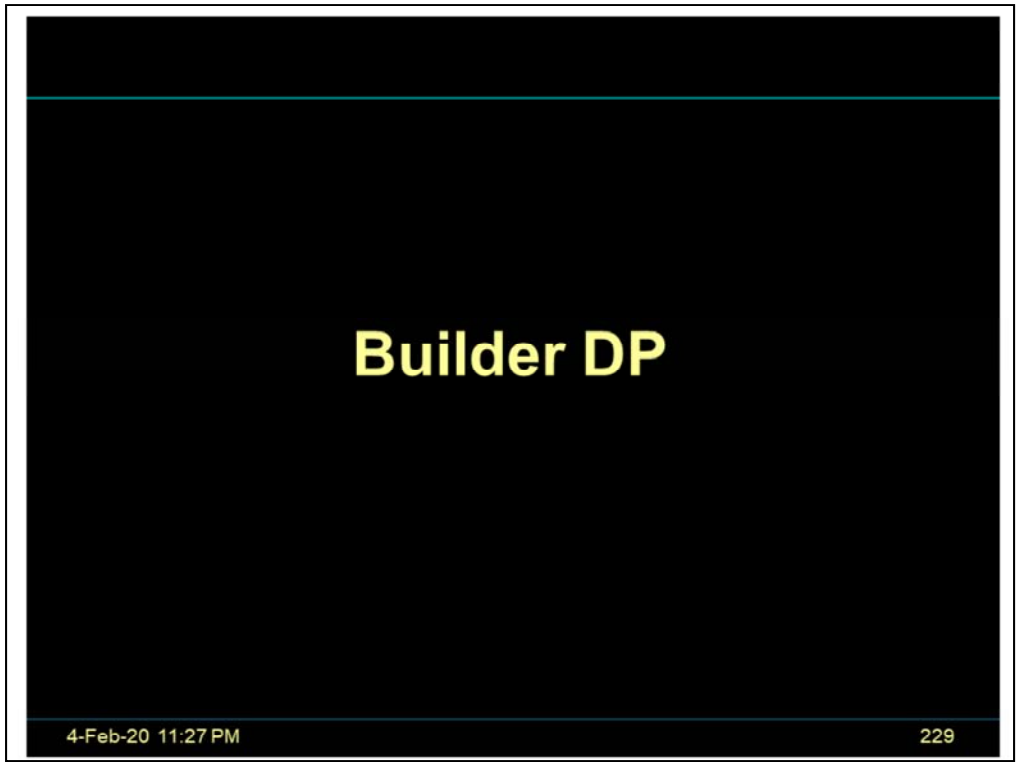
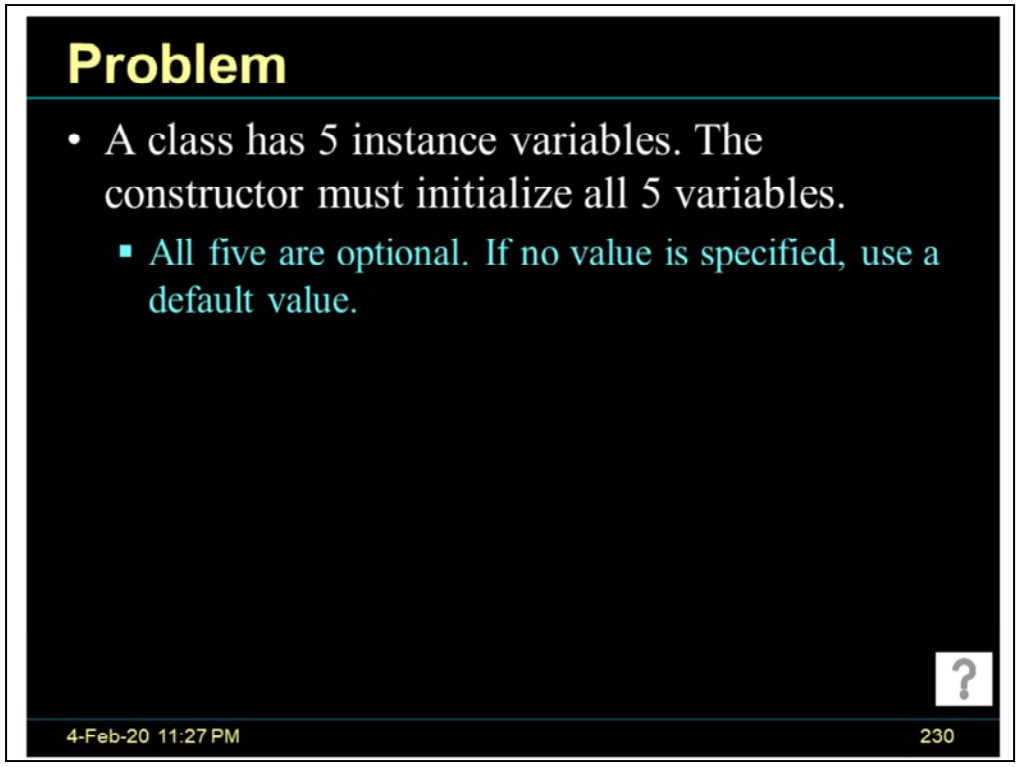

Builder DP
4-Feb-20 11:27 PM
229



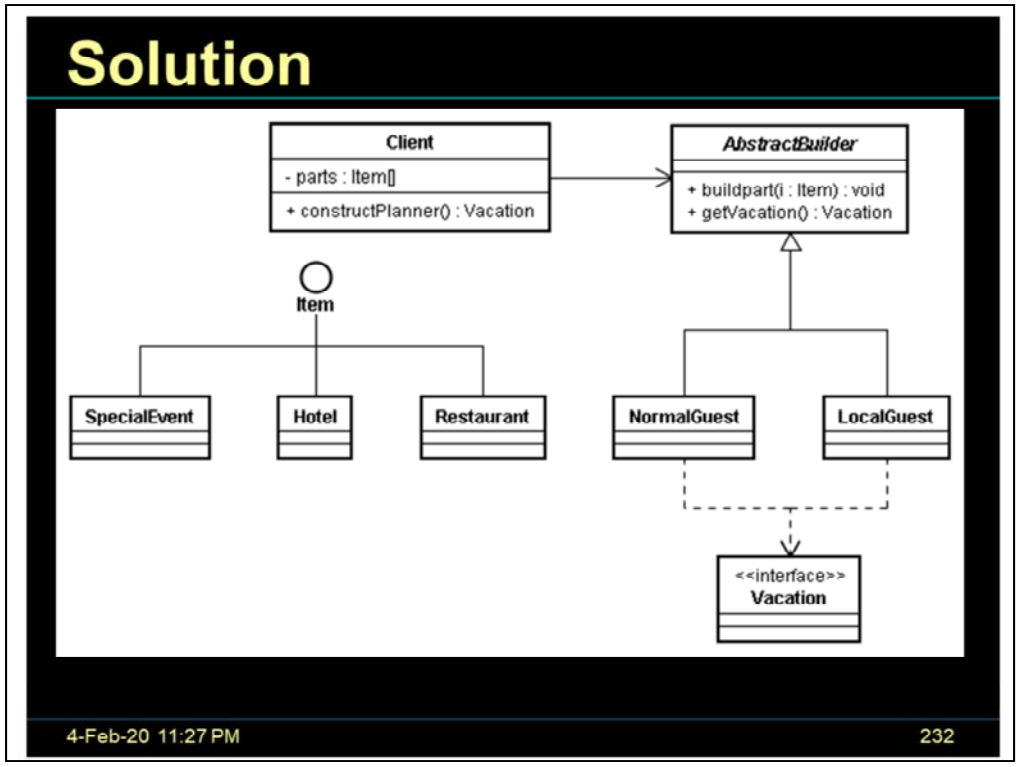
Integrity of an object should not be compromised even if the stack unwinds due to an exception.

Always, object should exist in a valid state.

Code present for this example.

Problem

- We have to build a vacation planner for Disney Land.
  - The guest can choose a hotel, various types of admission tickets, make restaurant reservations and even book for special events.
  - Each day can have any combination of hotel reservation, ticket meals and special events.
  - A local guest may not book a hotel but he may book a restaurant.



It encapsulates the construction of the complex object and allows it to be constructed in steps.

Hides the internal representation, of the product being built, from the client.

Use the Builder pattern when

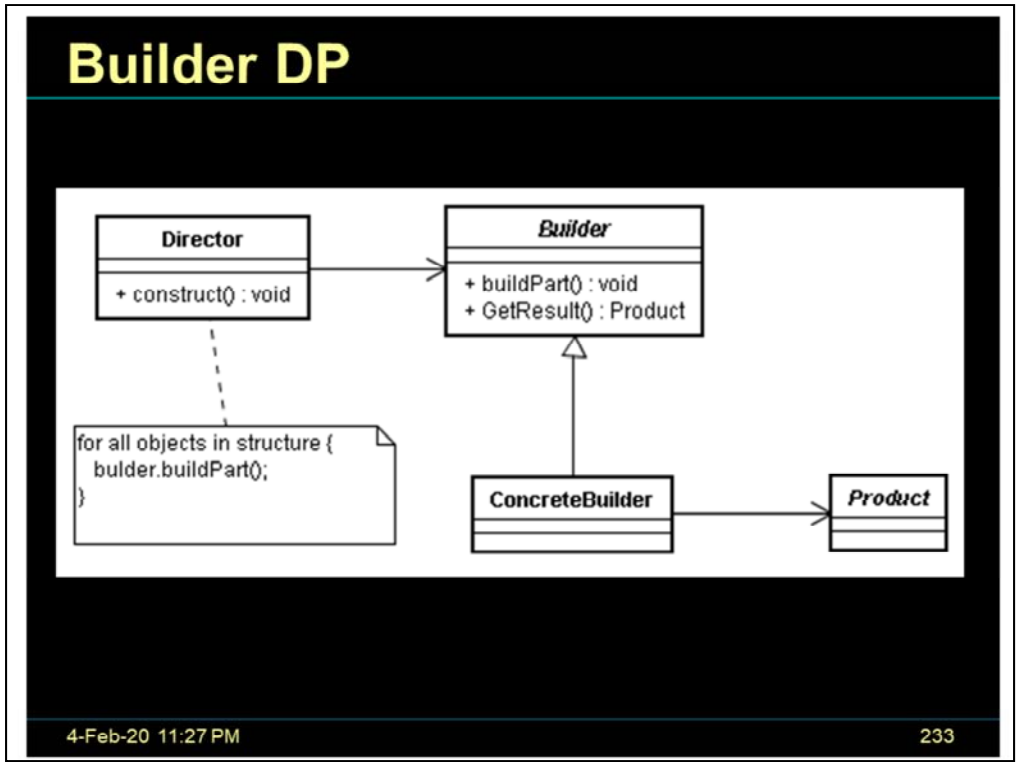
The algorithm for creating a complex object should be independent of

the parts that make up the object and

how they are assembled.

The construction process must allow different representations for the object that is constructed.

Product implementation can be swapped because the client only sees the interface of the product.



The Product represents the complex object under construction.

The Director constructs the object using the Builder interface.

ConcreteBuilder constructs and assembles parts of the Product.

It also provides an interface for retrieving the product

Consequences:

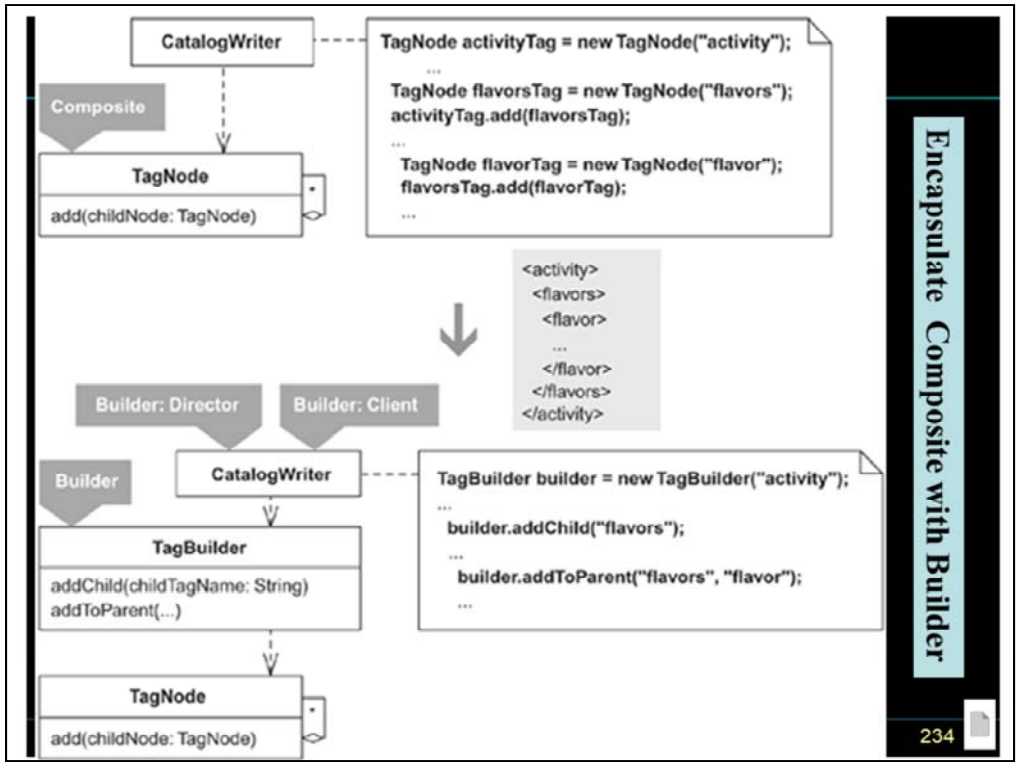
It hides the details of how the product is assembled.

It isolates the steps for construction from the representation of the product.

After the product is finished, the director retrieves it from the builder.

A Builder lets us vary the internal representation of the product it builds.

We can create a new product by adding a new concrete-builder.



A Builder performs burdensome or complicated construction steps on behalf of a client. A common motivation for refactoring to a Builder is to simplify client code that creates complex objects. When difficult or tedious parts of creation are implemented by a Builder, a client can direct the Builder's creation work without having to know how that work is accomplished.

Builders often encapsulate Composites because the construction of Composites can frequently be repetitive, complicated, or error-prone. For example, to add a child node to a parent node, a client must do the following:

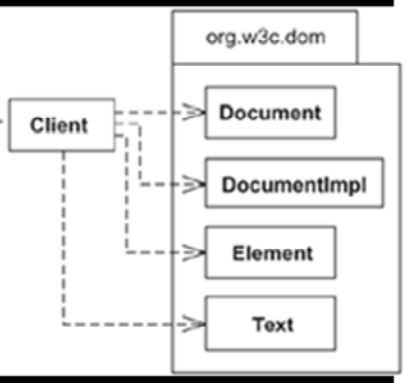
Instantiate a new node

Initialize the new node

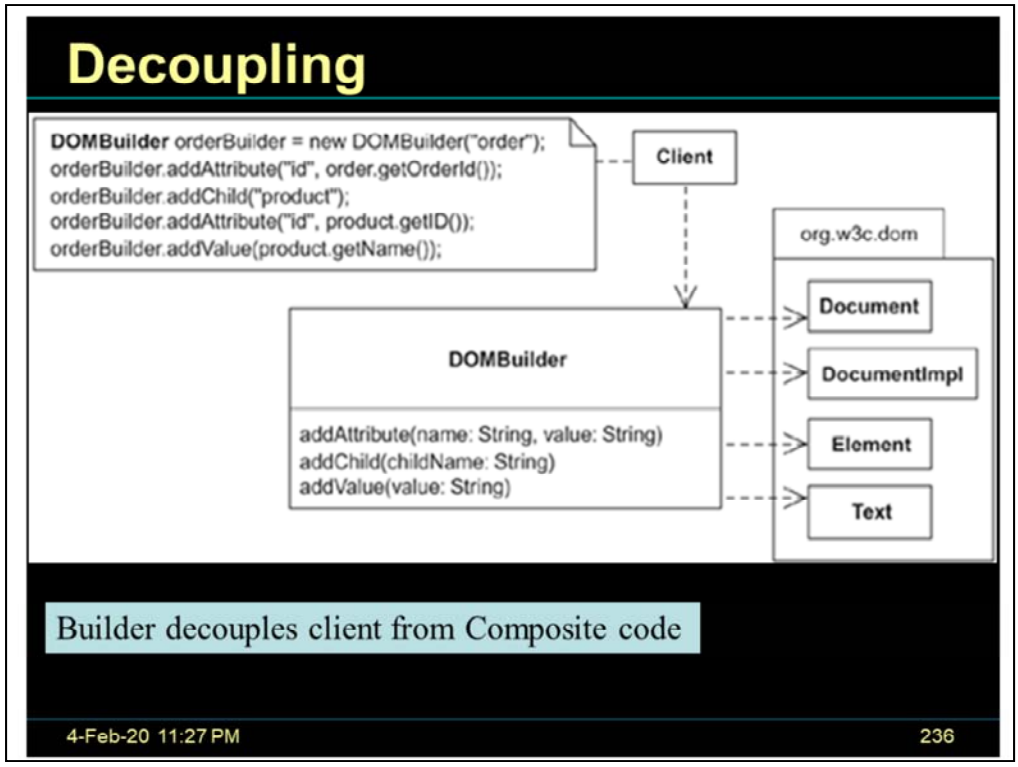
Correctly add the new node to the right parent node

Identify the problem

```
Document doc = new DocumentImpl ();
Element orderTag = doc.createElement("order");
orderTag.setAttribute("id", order.getOrderId());
Element productTag = doc.createElement("product");
productTag.setAttribute("id", product.getID());
Text productName =
  doc.createTextNode(product.getName());
productTag.appendChild(productName);
orderTag.appendChild(productTag);
```



?



+Simplifies a client's code for constructing a Composite.

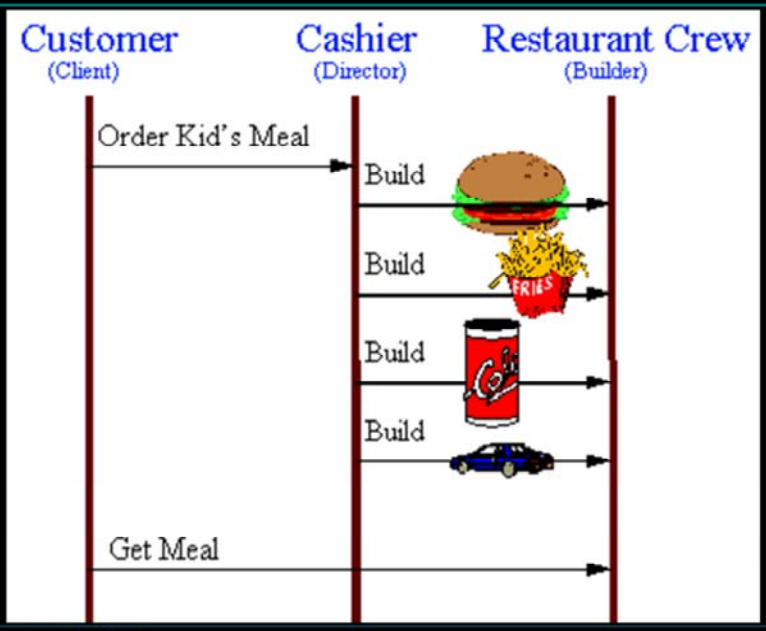
+Reduces the repetitive and error-prone nature of Composite creation.

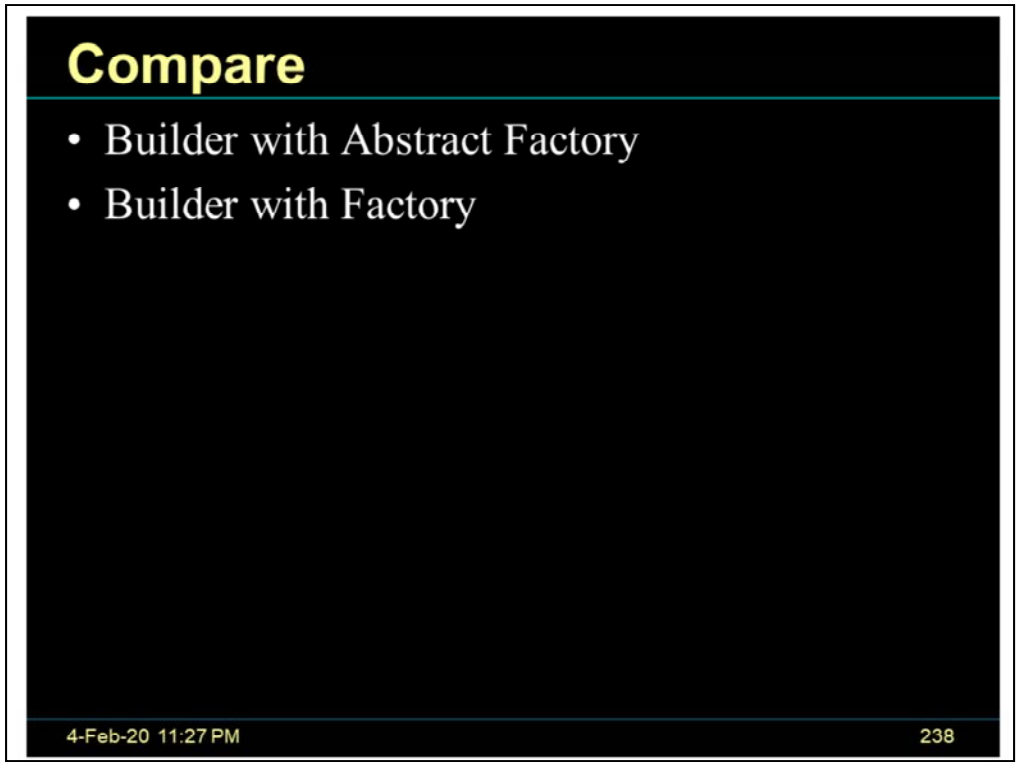
+Creates a loose coupling between client and Composite.

+Allows for different representations of the encapsulated Composite or complex object.

–May not have the most intention-revealing interface.

Real World Builder

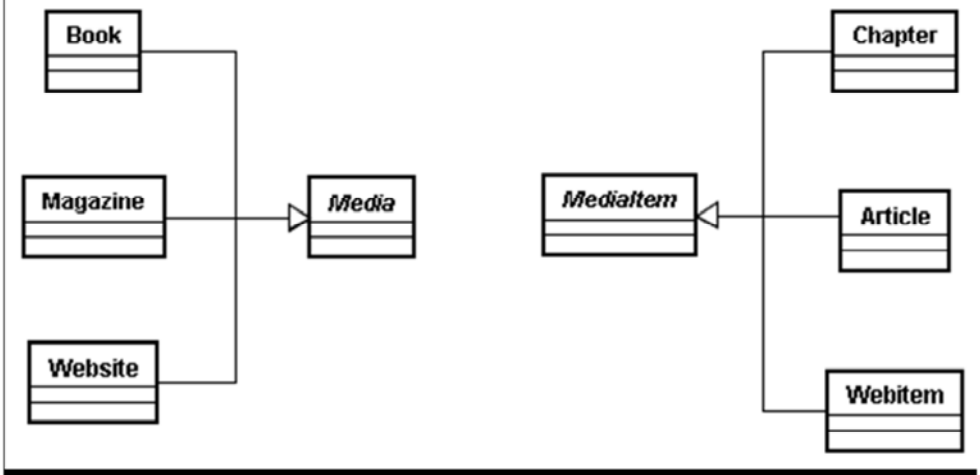




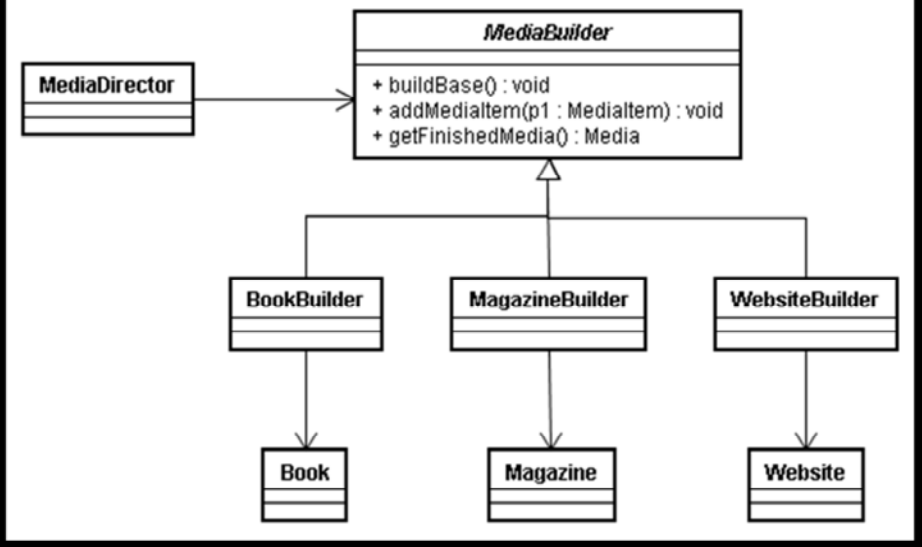
Abstract Factory DP emphasizes on product families, while Builder DP constructs a complex object step by step.

Builder returns the completed product at the end of construction, while Factory DP returns it immediately

Example of Builder



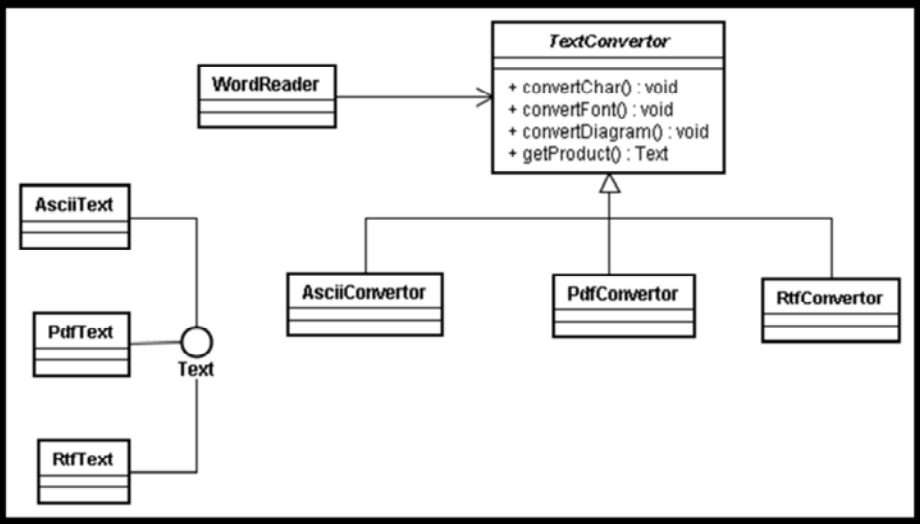
Example of a Builder



Assignment

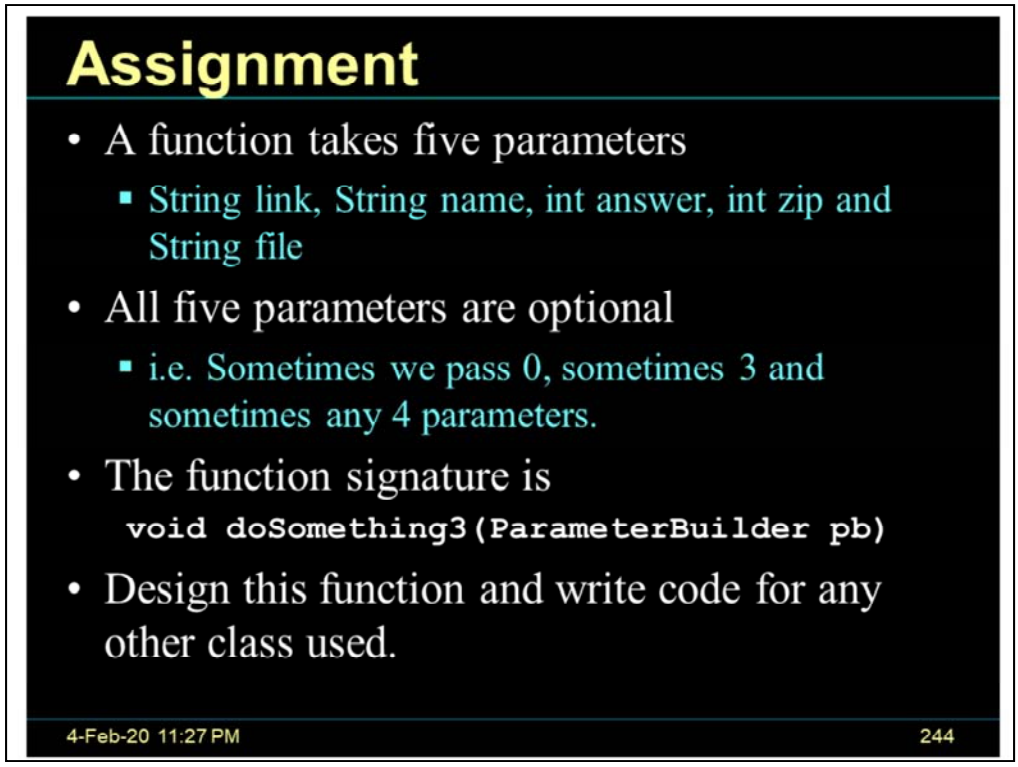
- A Word document needs to be converted to pdf, rtf and text.

Solution


TextConvertor
+ convertChar() : void
+ convertFont() : void
+ convertDiagram() : void
+ getProduct() : Text
WordReader
AsciiText
PdfText
RtfText
Text
AsciiConvertor
PdfConvertor
RtfConvertor

Assignment

- We have all the bus routes and distance between two bus stops in files.
  - Find all the routes that exist between the source and destination.
  - Is the Builder DP useful here?




```
doSomething3(new ParameterBuilder() .name("Alfred E. Neumann").link("http://blog.schauderhaft.de").ultimateAnswer(42).tempFile("c:\\temp\\x.txt").zip(23));


public class ParameterBuilder {
                private String link;
                private String name;
                private int answer;
                private int zip;
                private String file;
                public ParameterBuilder name(String aName) {       name = aName;
return this;    }
                public ParameterBuilder link(String aLink) {       link = aLink;
return this;    }
                public ParameterBuilder ultimateAnswer(int anAnswer) {       answer =
anAnswer;       return this;    }
                public ParameterBuilder zip(int aZip) {       zip = aZip;       return this;
}
                public ParameterBuilder tempFile(String aFile) {       file = aFile;
```

```
return this;    }
                // … getters for the fields omitted.
}
```