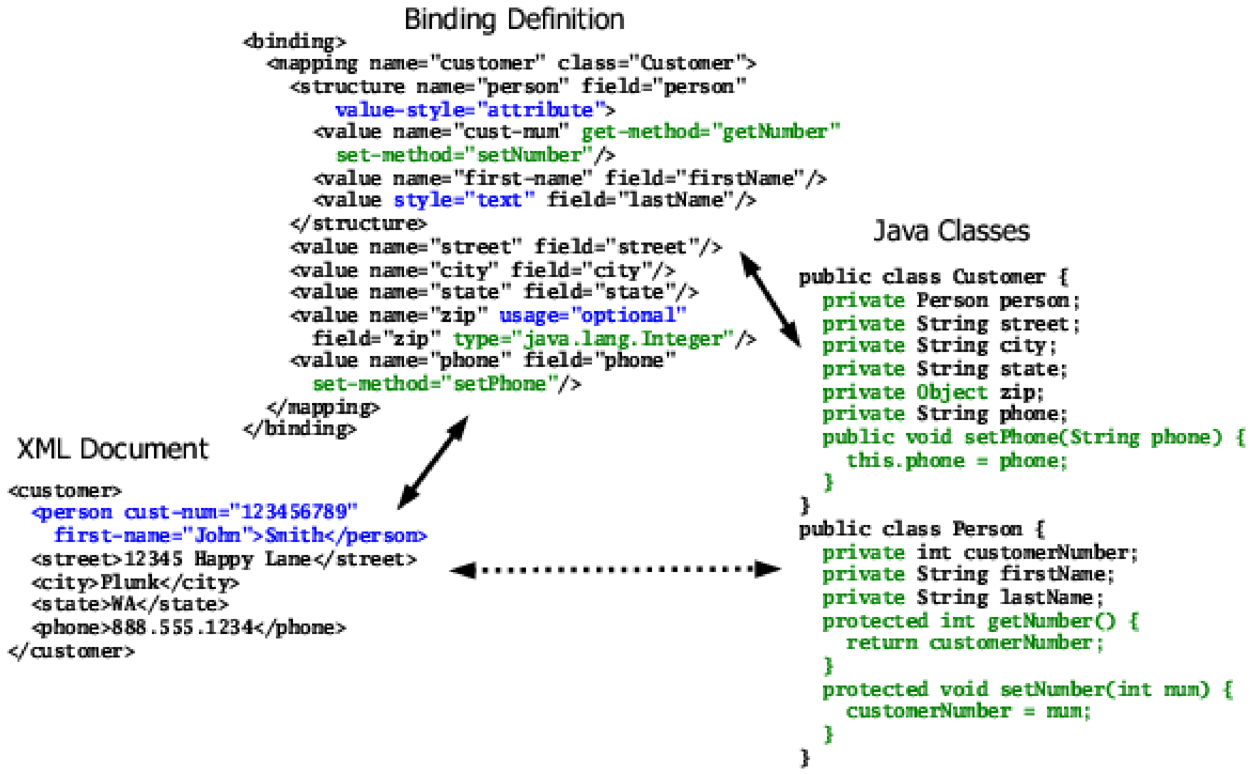
Variations on a theme

The first simple example only used required elements and public fields. JiBX isn't limited to just these choices, though. You can also work with optional elements and attributes in your XML, and with both fields and get/set access methods using any access level. Figure 2 gives an example of some of these features. I've shown the changes to the XML representation from Figure 1 in blue, and the changes to the Java representation in green.

Figure 2. Attributes, optional, access, and more...



```
<binding>
  <mapping name="customer" class="Customer">
    <structure name="person" field="person"
        value-style="attribute">
      <value name="cust-num" get-method="getNumber"
        set-method="setNumber"/>
      <value name="first-name" field="firstName"/>
      <value style="text" field="lastName"/>
    </structure>
    <value name="street" field="street"/>
    <value name="city" field="city"/>
    <value name="state" field="state"/>
    <value name="zip" usage="optional"
      field="zip" type="java.lang.Integer"/>
    <value name="phone" field="phone"
      set-method="setPhone"/>
  </mapping>
</binding>
```

```
public class Customer {
  private Person person;
  private String street;
  private String city;
  private String state;
  private Object zip;
  private String phone;
  public void setPhone(String phone) {
    this.phone = phone;
  }
}
public class Person {
  private int customerNumber;
  private String firstName;
  private String lastName;
  protected int getNumber() {
    return customerNumber;
  }
  protected setNumber(int num) {
    customerNumber = num;
  }
}
```

```
<customer>
  <person cust-num="123456789"
    first-name="John">Smith</person>
  <street>12345 Happy Lane</street>
  <city>Plunk</city>
  <state>WA</state>
  <phone>888.555.1234</phone>
</customer>
```

I added **value-style="attribute"** to the **structure** element of the binding definition in order to change the expression of the child values in the XML from the default of elements to attributes. The **value-style** attribute can be used on any of the binding definition elements that can contain **value** elements. It changes the default style for all nested **value** elements. The actual **value** element always has the final say over its XML representation, though, using the **style** attribute. In the Figure 2 binding the **value** definition for the `lastName` field illustrates this, using an XML representation of **text** rather than the **attribute** representation used for the other fields of the `Person` class. The end result is the changed **person** element structure in the XML document, with the customer number and first name as attributes and the last name as text content of the element.

The other change in the XML handling shown in Figure 2 is that I made the **zip** element optional (and deleted it from the document shown). This change is shown in the binding definition by the addition of **usage="optional"** to the zip element value definition. Using everything as shown, the `zip` field will be set to `null` when unmarshalling the document. You can also define defaults for optional values. When you unmarshal a document with the value missing, the default you specify will be used instead. When you marshal objects to create a document, the value present will be compared to the default. If the value is the same as the default, JiBX will skip writing the value to the XML document.

The access methods added on the Java side are reflected in the binding definition by the use of **get-method** and **set-method** attributes on the appropriate **value** elements. If both **get-method** and **set-method** are supplied there's no need to include a field name, as shown by the value definition for the customer number. You can also use a get or set method in conjunction with direct access to the field, as shown for the phone number binding. When you do this the supplied method will be used where possible, with direct field access used for storing values when only a get method is supplied, or for loading values when only a set method is supplied.

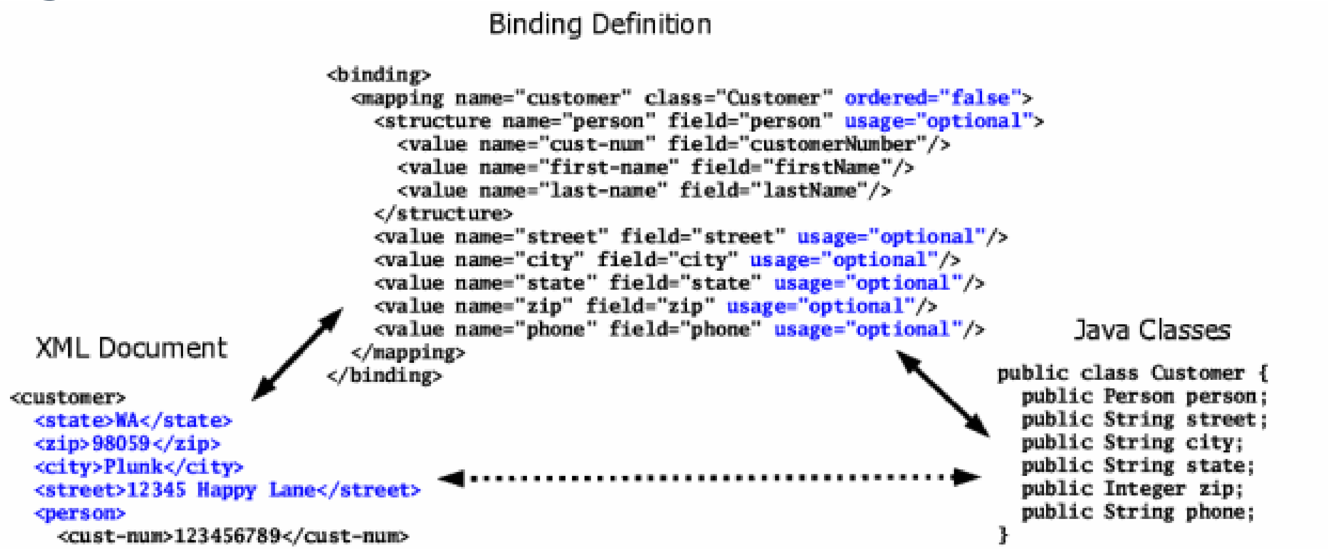
I also changed the type of the `zip` field in the Java code, from `java.lang.Integer` to `java.lang.Object`. It's sometimes convenient to use generic types like `Object` (or interfaces) in code, even when you know the runtime type is going to be something more specific. But JiBX needs to know what type to create when unmarshalling a value, and `Object` can't be used directly for that purpose. The **type** attribute allows you to override the type defined in the source code for a field (or get/set methods) with a more specific type. In this case I've given `java.lang.Integer` as the actual type to be assumed when working with the `zip` field.

For full details on the options available for the **value** element see the <value> element details page.

Mixing it up

Another sometimes useful variation supported by JiBX is the ability to use either ordered or unordered lists of child elements. By default, JiBX assumes that elements in the XML document are in a fixed order. This allows for more efficient unmarshalling of documents, and also reflects the most-common usage of XML. For the exceptional cases where elements are not ordered JiBX allows the default behavior to be overridden. Figure 3 shows how this works, with changes from Figure 1 again highlighted in color.

Figure 3. Unordered elements



```
<binding>
  <mapping name="customer" class="Customer" ordered="false">
    <structure name="person" field="person" usage="optional">
      <value name="cust-num" field="customerNumber"/>
      <value name="first-name" field="firstName"/>
      <value name="last-name" field="lastName"/>
    </structure>
    <value name="street" field="street" usage="optional"/>
    <value name="city" field="city" usage="optional"/>
    <value name="state" field="state" usage="optional"/>
    <value name="zip" field="zip" usage="optional"/>
    <value name="phone" field="phone" usage="optional"/>
  </mapping>
</binding>
```

```
<customer>
  <state>WA</state>
  <zip>98059</zip>
  <city>Plunk</city>
  <street>12345 Happy Lane</street>
  <person>
    <cust-num>123456789</cust-num>
```

```
public class Customer {
  public Person person;
  public String street;
  public String city;
  public String state;
  public Integer zip;
  public String phone;
}
```

As compared to Figure 1, here I've added an **ordered="false"** attribute on the **mapping** element, and also added **usage="optional"** on all the child components of the **mapping** element in the binding. The first change tells JiBX that I want to use unordered child elements within the **customer** element. The second change, making all the child components optional, used to be required for an unordered group. As of the 1.1 release this is no longer the case, so the same binding would work if you took off the **usage="optional"** attributes (and would throw an exception at runtime if one of the required elements was not found when unmarshalling). I've scrambled the child elements within the XML document in Figure 3 to illustrate the unordered operation.

Note that the **ordered="false"** setting only applies to the children of the element with the setting. In the Figure 3 example, this means that the **person** element of the XML document can occur in any order amoung the children of the **customer** element, but the children of the **person** element still have to be in their original order. If I wanted to change this I'd need to add the **ordered="false"** setting on the **structure** element of the binding definition and make all the child elements optional.

As of the JiBX 1.1 release, you have the option of ignoring unknown elements within an unordered group. To enable this behavior you need to include a **flexible="true"** on the binding element containing the group (the same place you set the **ordered="false"**). Also as of 1.1, repeated elements within an unordered group will by default be treated as an error when unmarshalling (so if the Figure 3 sample document had a second instance of the **<address>** element, for instance, the runtime code would throw an exception). You can disable this checking for repeated elements by using the **allow-repeats="true"** attribute on the containing element. Both these options can only be used in combination with **ordered="false"** - if you're using an ordered group, JiBX expects the elements to be exactly as specified. See the structure attribute description for full details on these options.

There's one more change I made in Figure 3, though this is a change just for the purpose of showing that it has no effect. This is the reordering of the fields within the `Person` class. The order of the fields in the class definition is ignored by JiBX - only the order of binding definitions that reference these fields matter. In this case I kept the order of the **value** binding components within the **structure** definition for the `Person` class unchanged, so the XML representation for this class also remained the same.

Next: Structure mapping between XML and Java