Version ID: A Big Serialization Gotcha

Now you've seen that I/O in Java is actually pretty simple, especially if you stick to the most common connection/chain combinations. But there's one issue you might *really* care about.

Version Control is crucial!

If you serialize an object, you must have the class in order to deserialize and use the object. OK, that's obvious. But what might be less obvious is what happens if you ***change the class*** in the meantime? Yikes. Imagine trying to bring back a Dog object when one of its instance variables (non-transient) has changed from a double to a String. That violates Java's type-safe sensibilities in a Big Way. But that's not the only change that might hurt compatibility. Think about the following:

Changes to a class that can hurt deserialization:

Deleting an instance variable

Changing the declared type of an instance variable

Changing a non-transient instance variable to transient

Moving a class up or down the inheritance hierarchy

Changing a class (anywhere in the object graph) from Serializable to not Serializable (by removing 'implements Serializable' from a class declaration)

Changing an instance variable to static

Changes to a class that are usually OK:

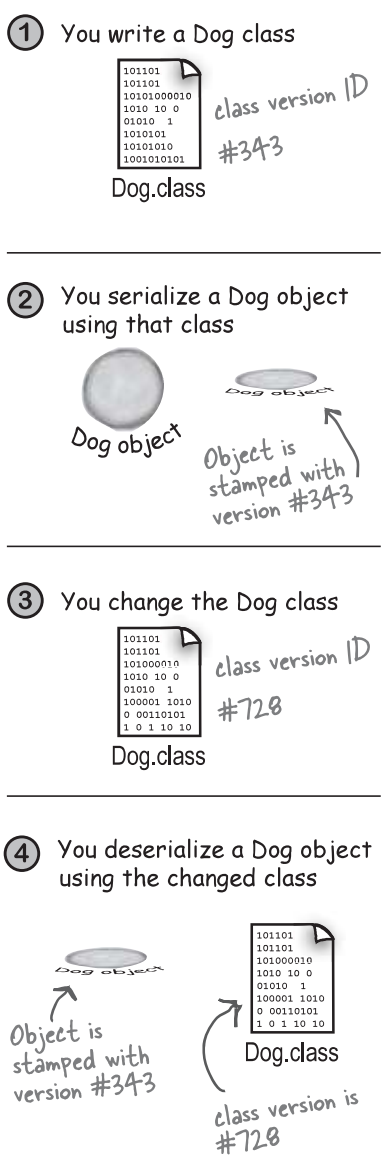
Adding new instance variables to the class (existing objects will deserialize with default values for the instance variables they didn't have when they were serialized)

Adding classes to the inheritance tree

Removing classes from the inheritance tree

Changing the access level of an instance variable has no affect on the ability of deserialization to assign a value to the variable

Changing an instance variable from transient to non-transient (previously-serialized objects will simply have a default value for the previously-transient variables)



Using the serialVersionUID

Each time an object is serialized, the object (including every object in its graph) is 'stamped' with a version ID number for the object's class. The ID is called the serialVersionUID, and it's computed based on information about the class structure. As an object is being deserialized, if the class has changed since the object was serialized, the class could have a different serialVersionUID, and deserialization will fail! But you can control this.

If you think there is ANY possibility that your class might *evolve*, put a serial version ID in your class.

When Java tries to deserialize an object, it compares the serialized object's serialVersionUID with that of the class the JVM is using for deserializing the object. For example, if a Dog instance was serialized with an ID of, say 23 (in reality a serialVersionUID is much longer), when the JVM deserializes the Dog object it will first compare the Dog object serialVersionUID with the Dog class serialVersionUID. If the two numbers don't match, the JVM assumes the class is not compatible with the previously-serialized object, and you'll get an exception during deserialization.

So, the solution is to put a serialVersionUID in your class, and then as the class evolves, the serialVersionUID will remain the same and the JVM will say, "OK, cool, the class is compatible with this serialized object." even though the class has actually changed.

This works *only* if you're careful with your class changes! In other words, *you* are taking responsibility for any issues that come up when an older object is brought back to life with a newer class.

To get a serialVersionUID for a class, use the serialver tool that ships with your Java development kit.

```
File Edit Window Help serialKiller
% serialver Dog
Dog: static final long
serialVersionUID = -
5849794470654667210L;
```

When you think your class might evolve after someone has serialized objects from it...

1. Use the serialver command-line tool to get the version ID for your class

```
File Edit Window Help serialKiller
% serialver Dog
Dog: static final long
serialVersionUID = -
5849794470654667210L;
```

2. Paste the output into your class

```
public class Dog {

    static final long serialVersionUID =
                -6849794470754667710L;

    private String name;
    private int size;

    // method code here
}
```

3. Be sure that when you make changes to the class, you take responsibility in your code for the consequences of the changes you made to the class! For example, be sure that your new Dog class can deal with an old Dog being deserialized with default values for instance variables added to the class *after* the Dog was serialized.