

File-based Persistence: Serializability

COMP53

Dec 7, 2007

Persistence

- an object has ***persistence*** if it has a lifetime that longer than the program that creates or manipulates it
- Two common methods for implementing persistence
 - file storage: write and read data from a file
 - database: store objects in a database such as Oracle, SQL Server, Sybase, Access, MySQL ...

Java Serializability

- Java provides the file-based persistence through ***serializability***: objects are converted to byte sequences that can be read and written through I/O streams

Making Objects Serializable

- Serializable classes must implement the `Serializable` interface
 - this interface has no methods, it is simply a marker to tell Java that instances can be serialized
 - JCF classes all implement `Serializable`, so collections can be easily stored in files
- To make your own classes serializable:
 - `import java.io.Serializable;`
 - `public class PhoneBookEntry implements Serializable`
`{ }`

Writing Objects to a File

- Open a file as an output stream:
 - `FileOutputStream fos = new
FileOutputStream("myobjects.ser");`
- Connect an object output stream to your file
 - `ObjectOutputStream out = new
ObjectOutputStream(fos);`
- Send your object(s) to the output stream:
 - `out.writeObject(phone_book);`
- Close the stream:
 - `out.close();`

Writing Objects to a File - Notes

- A typical file name for serialized objects ends with `.ser`, but any filename is allowed
- Possible exceptions:
 - `java.io.FileNotFoundException`
(`FileOutputStream` constructor)
 - `java.io.IOException`
(most Java input/output methods)
- The input/output library must be imported:
 - `import java.io.*;`

Reading Objects from a File

- Open a file as an input stream:
 - `FileInputStream fis = new
FileInputStream("myobjects.ser");`
- Connect an object output stream to your file
 - `ObjectInputStream in = new
ObjectInputStream(fis);`
- Get your object(s) from the output stream:
 - `phone_book =
(Map<String,PhoneBookEntry>)in.readObject();`
- Close the stream:
 - `in.close();`

Reading Objects from a File - Notes

- Possible exceptions:
 - `java.io.FileNotFoundException`
(`FileInputStream` constructor)
 - `java.io.IOException`
(most Java input/output methods)
 - `java.lang.ClassNotFoundException`
(`ObjectInputStream.readObject()`)
- The input/output library must be imported:
 - `import java.io.*;`