

Slide 1

Administrivia

- Reminder: See Web page for homework deadlines.

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I/O In Java — Overview

- Abstract view — “file” is a collection of data. Java provides methods for sequential and “random” (non-sequential) access.
- Sequential file access is via “streams” — concept that applies to other kinds of sequential I/O (stdin/stdout, sockets, etc.).
- Stream — sequential flow of data.
 - Input streams connect program with an outside “source” (stdin, file, socket, etc.). (If data is characters, use “reader” instead.)
 - Output streams connect program with outside “destination”. (If data is characters, use “writer” instead.)

Stream I/O

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- Most I/O in Java requires at least two classes:
 - One that connects to the desired source/destination (file, socket, array, string, etc.).
 - One that defines interface for program (character or binary data, byte-by-byte or a line at a time, etc.)

- Short examples:

```
BufferedReader rdr =  
    new BufferedReader(new InputStreamReader(System.in));  
String s = rdr.readLine();
```

```
PrintWriter pw =  
    new PrintWriter(new FileWriter("out.txt"));  
pw.println("hello, world");
```

Character-Based Stream I/O

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- Parsing text input — `String` methods may be useful, also `Integer.parseInt`, `Double.parseDouble`, etc.
Prior to Java 1.5, `StringTokenizer`, `StreamTokenizer`, `Integer.parseInt`, `Double.parseDouble`, etc.
Newer `Scanner` class may also be useful, plus `split()` method of `String` class.
- Example (“almost an editor” program(s)).

Binary Stream I/O

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- Can also read/write binary data:
 - `DataInputStream`, `DataOutputStream` to write out primitive types.
 - `ObjectInputStream`, `ObjectOutputStream` to write out primitives, `Serializable` objects.
- Object serialization:
 - Object and all referenced objects (except `static` and `transient` variables) are turned into sequential stream of bytes.
 - Can override `readObject`, `writeObject` to control what happens more precisely.
- Example (“silly class” and saver).

Minute Essay

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- None — quiz.