Computer Programming

IO (Input/Output) Programming

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Agenda

- Lecture Goal(s)
- Files
- Streams
- Examples
- Conclusion

Lecture Goal(s)

Lectures Overview

Java

- 8: Summarizing Example
- 9: Standard library
- 10: GUI – AWT
- 11: GUI – Swing
- 12: IO programming
- 13: Network programming
- 14: Java archives and JavaBeans
- 15: Conclusions

LECTURE GOALS

Today's Goal

To provide programming knowledge about using input and outputs in Java

Files

File Systems

- Organization of data in
  - Files
  - Directories
- Depending on the OS
  - Windows: `C:\\Program Files\`
  - Unices: `/usr/bin/vi`
- Meta-data
  - Read, Write, Last modified, Hidden
- Absolute vs. Relative

Files in Java

- The java.io.File class
- For
  - Files, the `isFile()` method
  - Directories, the `isDirectory()` method
- 2 Major Constructors
  - Absolute: `new File(String fileName)`
  - Relative: `new File(File parent, String fileName)`

Creating Files/Directories

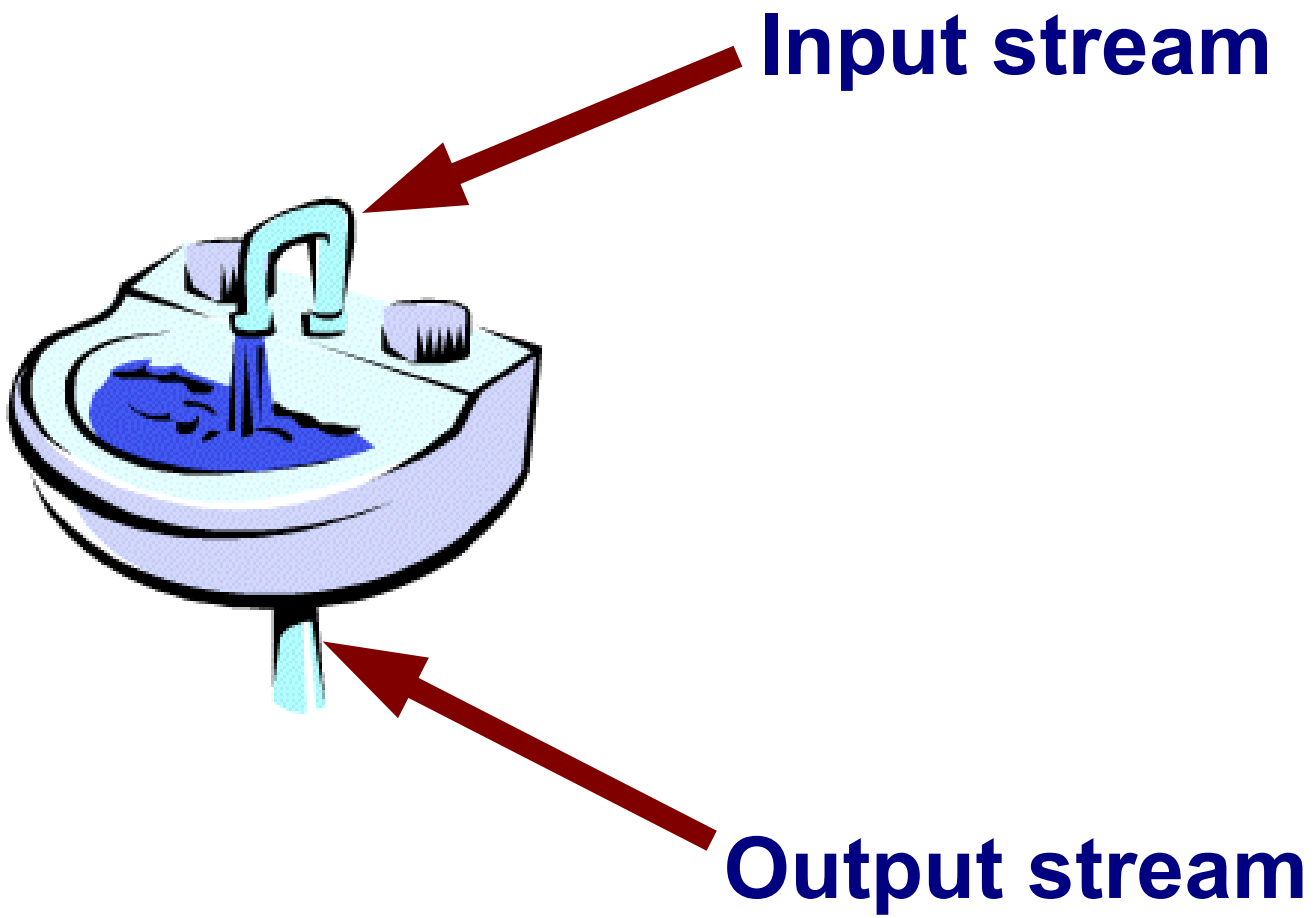
- Constructors
  - Creates only Java objects!!!
- Directory creation
  - The `mkdir()` method
- File creation
  - The `createNewFile()` method

Exploring a File System

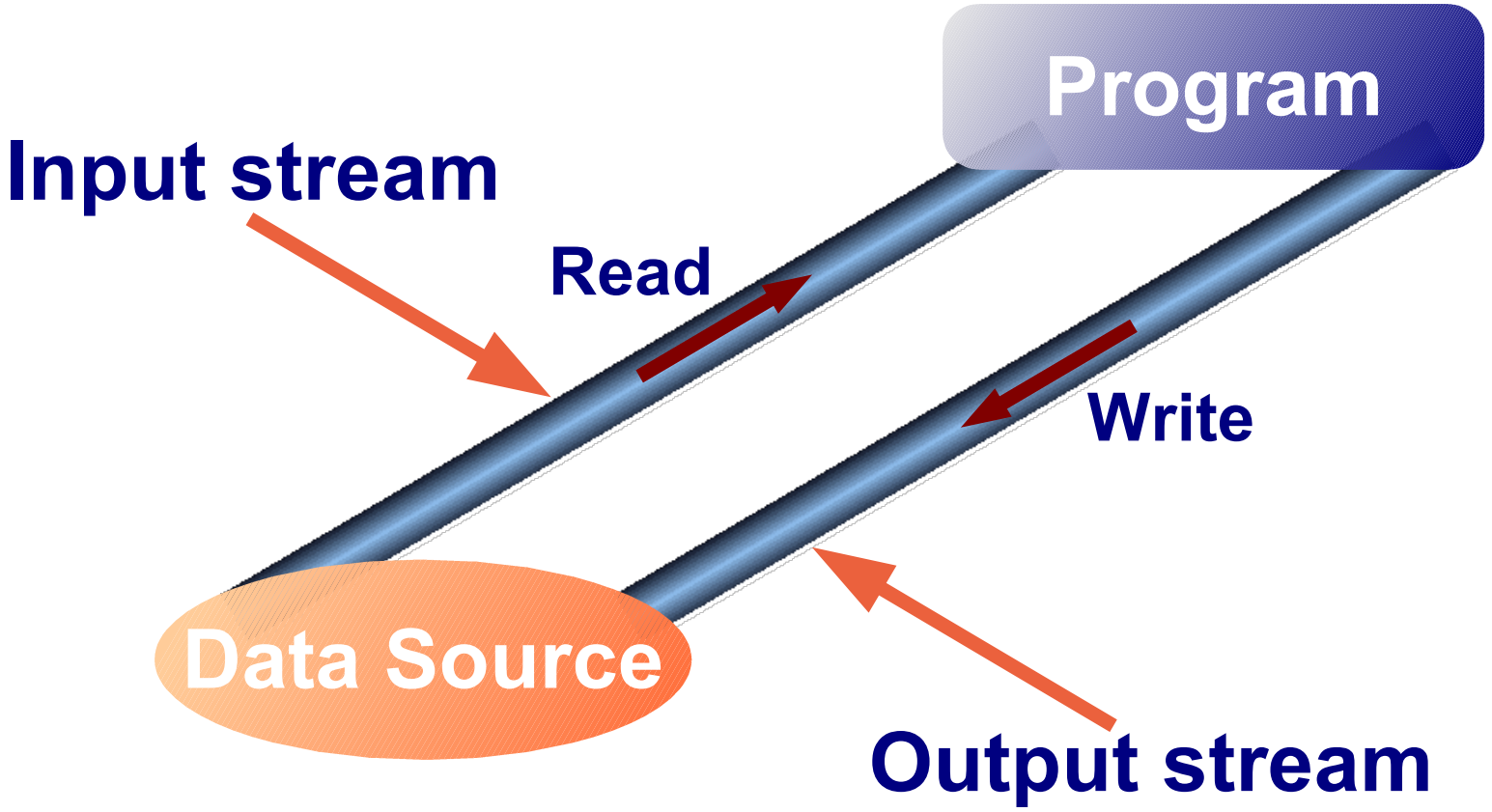
- File system browsing
  - The `getParentFile()` method
  - The `list()`, `listFiles()` methods
- Meta-data
  - `canRead()`
  - `canWrite()`
  - `isHidden()`
  - `lastModified()`

Streams

Input and Output Streams



IO Streams in Computer Programming



Characters vs Bytes Streams

- For characters
  - `Reader`
  - `Writer`
- For bytes
  - `InputStream`
  - `OutputStream`
- Beware!
  - Java source files are character-based
  - MS Word files are byte-based

Reading from Streams

- For `Reader`
  - A character: `int read()`
  - An array of chars:
    `int read(char[] chars)`
- For `InputStream`
  - A byte: `int read()`
  - An array of bytes:
    `int read(byte[] bytes)`

Writing to Streams

- For `Writer`
  - A character: `write(int aChar)`
  - An array of chars:
    `write(char[] chars)`
  - A String:
    `write(String aString)`
- For `OutputStream`
  - A byte: `write(int aByte)`
  - An array of bytes:
    `write(byte[] bytes)`

Stream Wrapping

- Many classes in `java.io`
- Wrapper around streams
- Added functionalities
  - File support `FileReader`
  - Buffering `BufferedReader`
  - Data Input `DataInputStream`
  - Line counting `LineNumberReader`

Examples

Example

File Info Example

Example

File Reader Example
File Writer Example

Example

File Statistics Example

Conclusion

IO

- Information system
  - Logic
  - Environment
  - Input
  - Output
- Support in Java
  - High level of abstraction
  - Improved in Java2 1.4

See you next week