

Practice of Programming using Java

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Streams



Program connects to data source/target through a stream

Through streams meant for reading, program can read data

Through streams meant for writing, programs write to data target

Types of Streams

Read Stream or Write Streams

Character Streams or Byte Streams

Files, Arrays, Strings, Pipes

an example: a character read stream to read characters from files

Character Streams: 16 bit Reading

class Reader

int read () -- blocks. Throws exception if end of stream/io error
int read (char inbuf[]) -- reads into array (blocking)
int read (char inbuf[], int offset, int len) – reads into portion of array (blocking)
bool ready () -- is the stream ready to be read
close() --- close the stream

Some Reader streams (subclasses of Reader)

CharArrayReader
FileReader
StringReader
PipedReader
..

Character Streams: 16 bit Writing

class Writer

void write (int c) -- char is in 16 lower order bits, higher 16 bits are ignored

Writer append (char c) --- returns this writer after writing c

void write (char outbuf[]) -- writes the array

void write (char outbuf[], int offset, int len) – writes portion of array

void write (String s);

void write (String s, int offset, int len);

close(), flush()

Some Reader streams (subclasses of Reader)

CharArrayWriter

FileWriter

StringWriter

PipedWriter

..

Byte Streams: 16 bit Reading

class InputStream

int read () -- blocks. Throws exception if end of stream/io error
int read (byte inbuf[]) -- reads into array (blocking)
int read (byte inbuf[], int offset, int len) – reads into portion of array (blocking)
int available () -- how many bytes available to read?
close() --- close the stream

Some Input streams (subclasses of InputStream)

ByteArrayInputStream
FileInputStream
StringBufferInputStream
PipedInputStream
..

Byte Streams: 16 bit Writing

class OutputStream

void write (int c) -- char is in 8 lower order bits, higher 24 bits are ignored

void write (byte outbuf[]) -- writes the array

void write (byte outbuf[], int offset, int len) – writes portion of array

close(), flush()

Some Reader streams (subclasses of Reader)

CharArrayOutputStream

FileOutputStream

StringOutputStream

PipedOutputStream

..

BufferedReaderStream

To read from character input stream by buffering required no. of characters

`BufferedReaderStream (Reader input)` -- creates a buffered reader from an input reader

`close()`

`int read()` read 1 char

`int read (char [] buff, int offset, int len)` read into portion of array

`String readLine()` read a line of text

`bool ready()` is it ready for reading?

InputStreamReader

Bridge from Byte streams to character streams

Reads bytes and decodes them into characters

An input stream can be wrapped by a

BufferedReader stream

for using the latter's `readLine()` method

i.e. Pass it into `bufferreader`'s constructor

System

```
class System{  
    static InputStream in;  
    static PrintStream out;  
    static PrintStream err;  
}
```

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