Practice of Programming using Java
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Rushikesh K Joshi
Department of Computer Science and Engineering
Indian Institute of Technology Bombay
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
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
   ..
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
...
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
  PipedReader
  ..
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 bufferedreader's constructor
class System{
    static InputStream in;
    static PrintStream out;
    static PrintStream err;
}

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