Lecture 30

I - O Stream - I

IIT KHARAGPUR

NPTEL ONLINE
CERTIFICATION COURSES

OBJECT ORIENTED PROGRAMMING WITH JAVA

Input-Output Handling in Java – I

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Stream in Java

Java treats flow of data as stream.

Java streams are classified into two basic types, namely, input stream and output stream.

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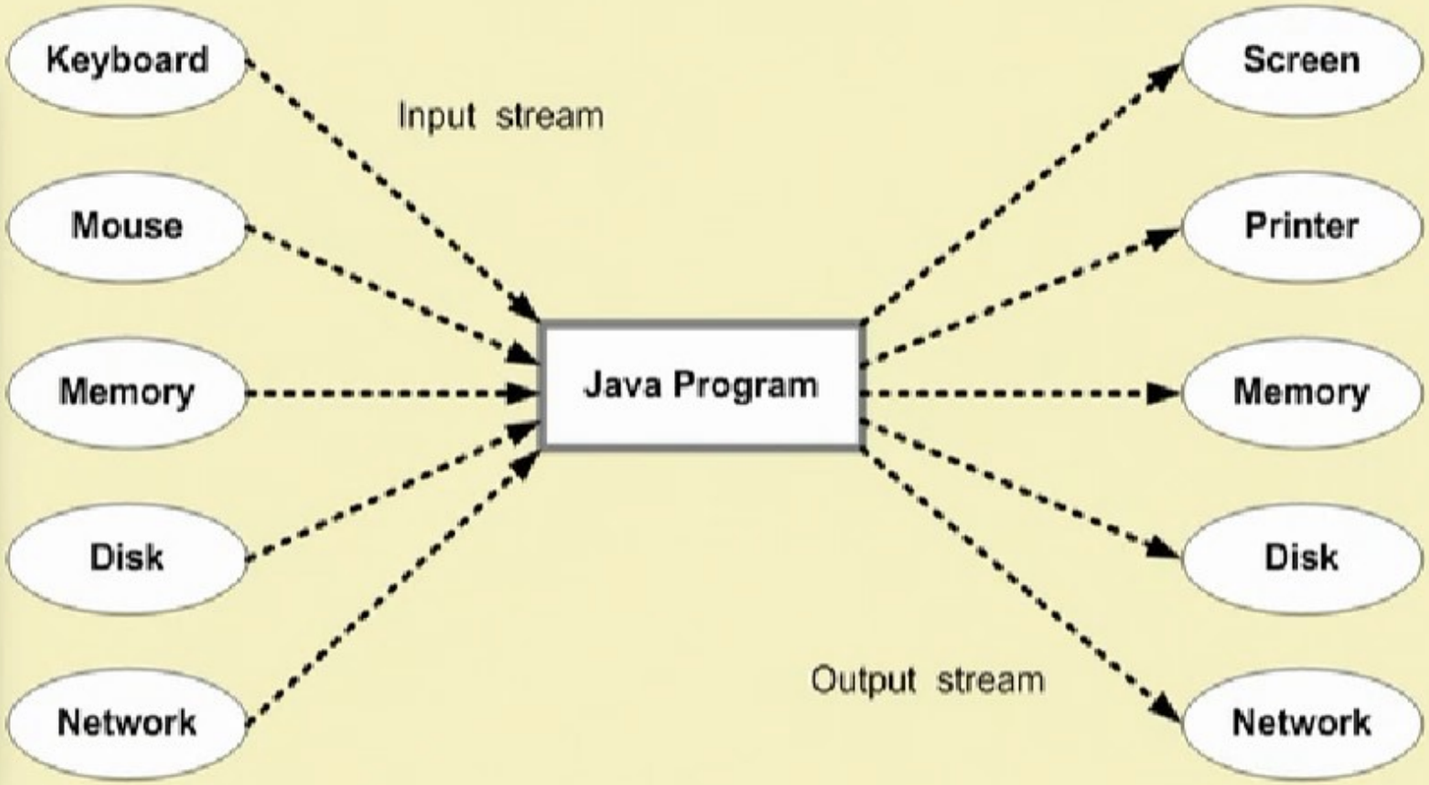
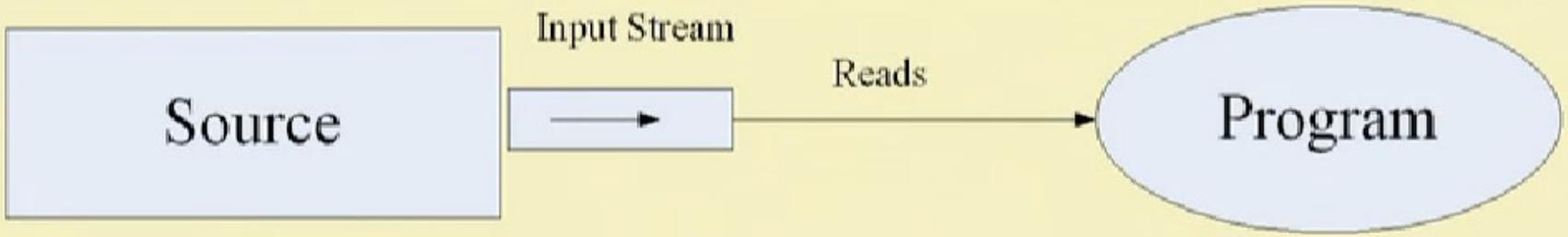
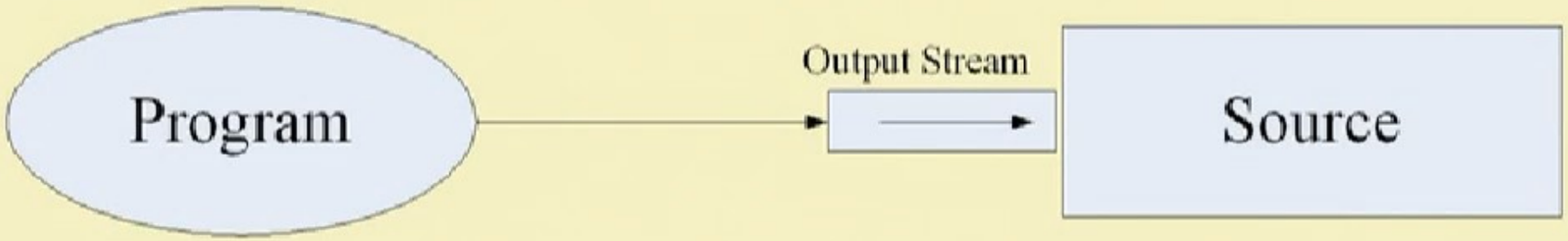


Input and output streams



(a) Reading data into a program



(b) Writing data to a destination

Java Classes for I-O Streams

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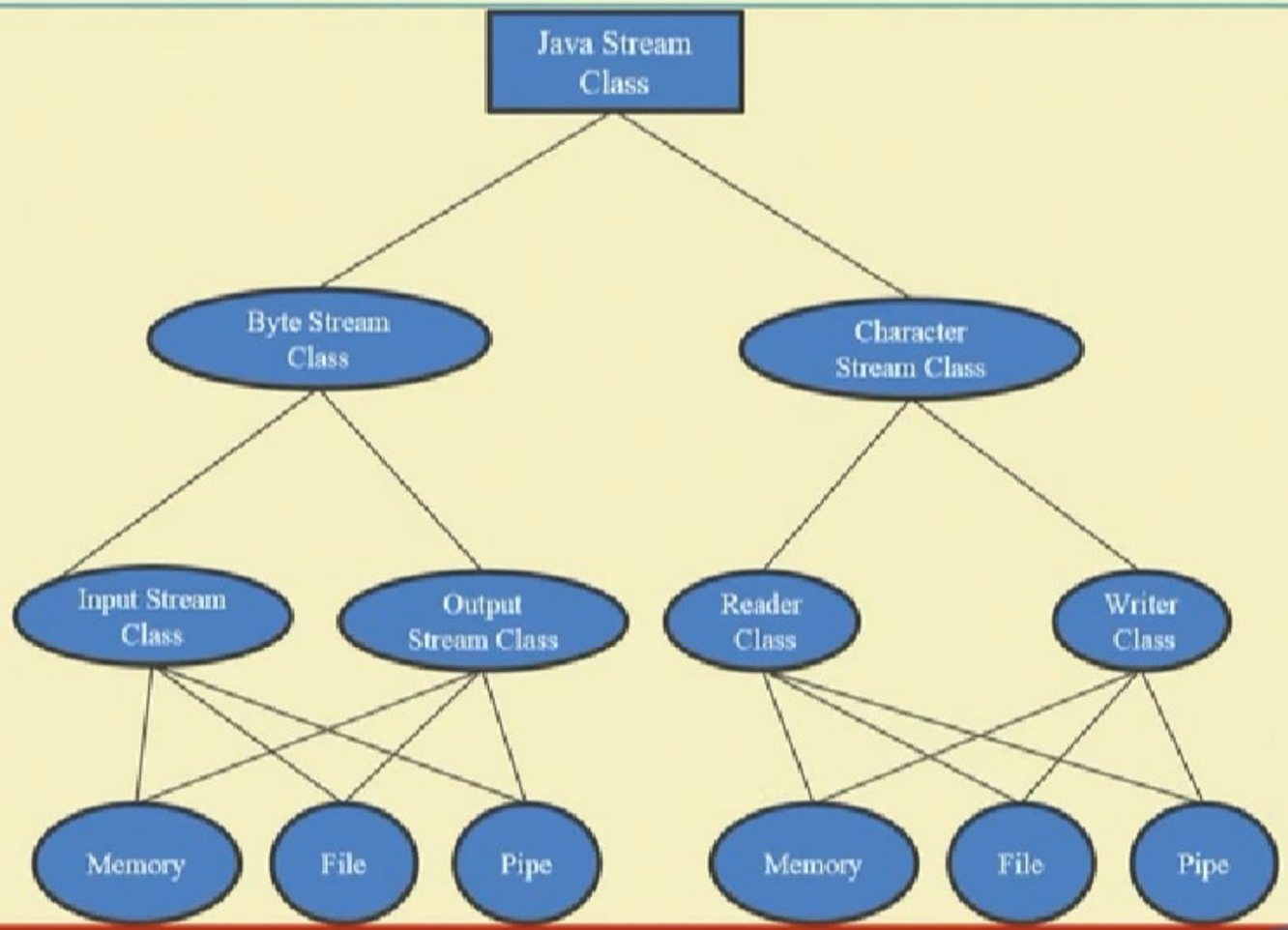
I-O stream classes in Java

Java provides java.io package which contains a large number of stream classes to process all types of data

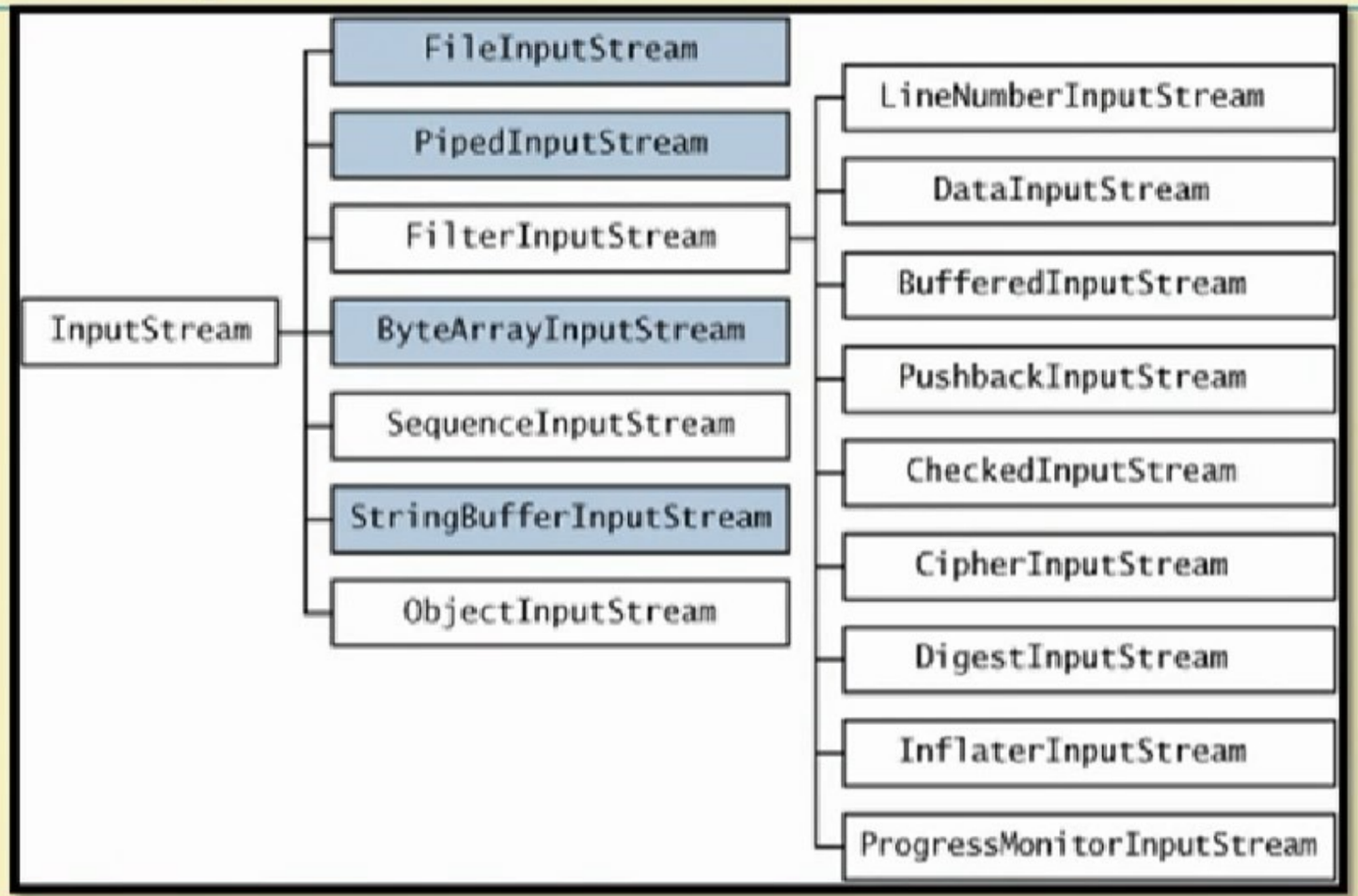
- Byte stream classes
  - Support for handling I/O operations on bytes
- Character stream classes
  - Supports for handling I/O operations on characters

Taxonomy: Java stream classes



Java Input Stream Classes

Java input streams classes



Java input stream classes

InputStream classes is used to read 8-bit bytes and supports a number of input-related methods

- Reading bytes
- Closing streams
- Marking positions in streams
- Skipping ahead in streams
- Finding the number of bytes in stream
- and many more…

Some input stream methods

Method	Description
`read( )`	Read a byte from the input stream
`read(byte b[ ])`	Read an array of bytes into b
read(byte b[ ], int n, int m)	Reads m bytes into b starting from n^{th} byte
`available( )`	Gives number of bytes available in the input
`skip(n)`	Skips over n bytes from the input stream
`reset( )`	Goes back to the beginning of the stream
`close( )`	Close the input steam

Example:

DataInputStream

readShort( )	readDouble( )
readInt( )	readLine( )
readLong( )	readChar( )
readFloat( )	readBoolean( )
readUTF( )	

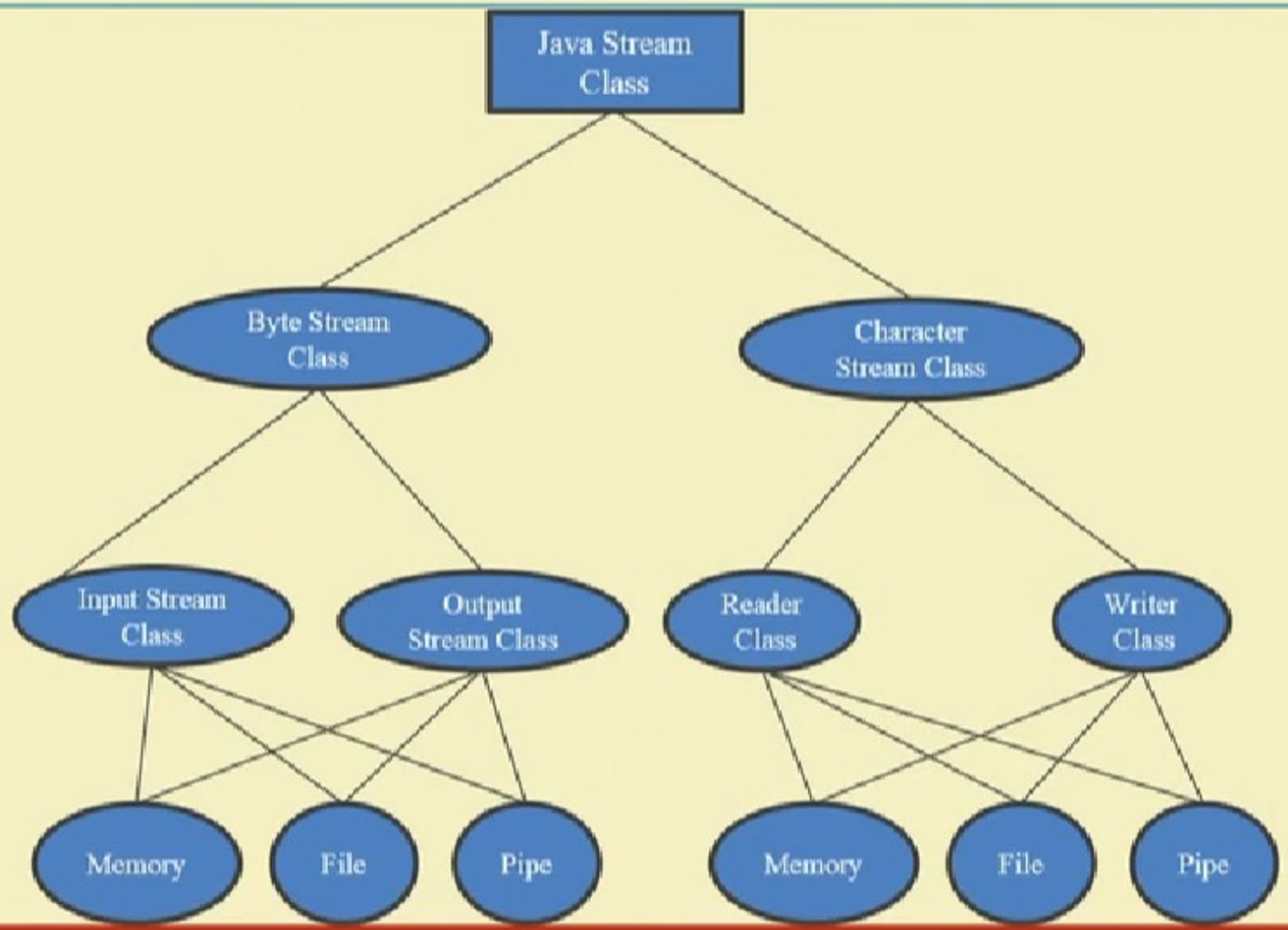
Example: Use of class InputStream

- Reading bytes
  - `int read()`
  - `int read (byte b[])`
  - `int read (byte b[], int off, int len)`
- Closing streams
  - `void close()`
- Finding the number of bytes in a stream
  - `int available()`

- Skipping ahead in a stream
  `long skip (long n)`
- Marking positions in a stream
  `void mark (int limit)`
  `void reset()`
  `boolean markSupported()`

Java Output Stream Classes

Taxonomy: Java stream classes

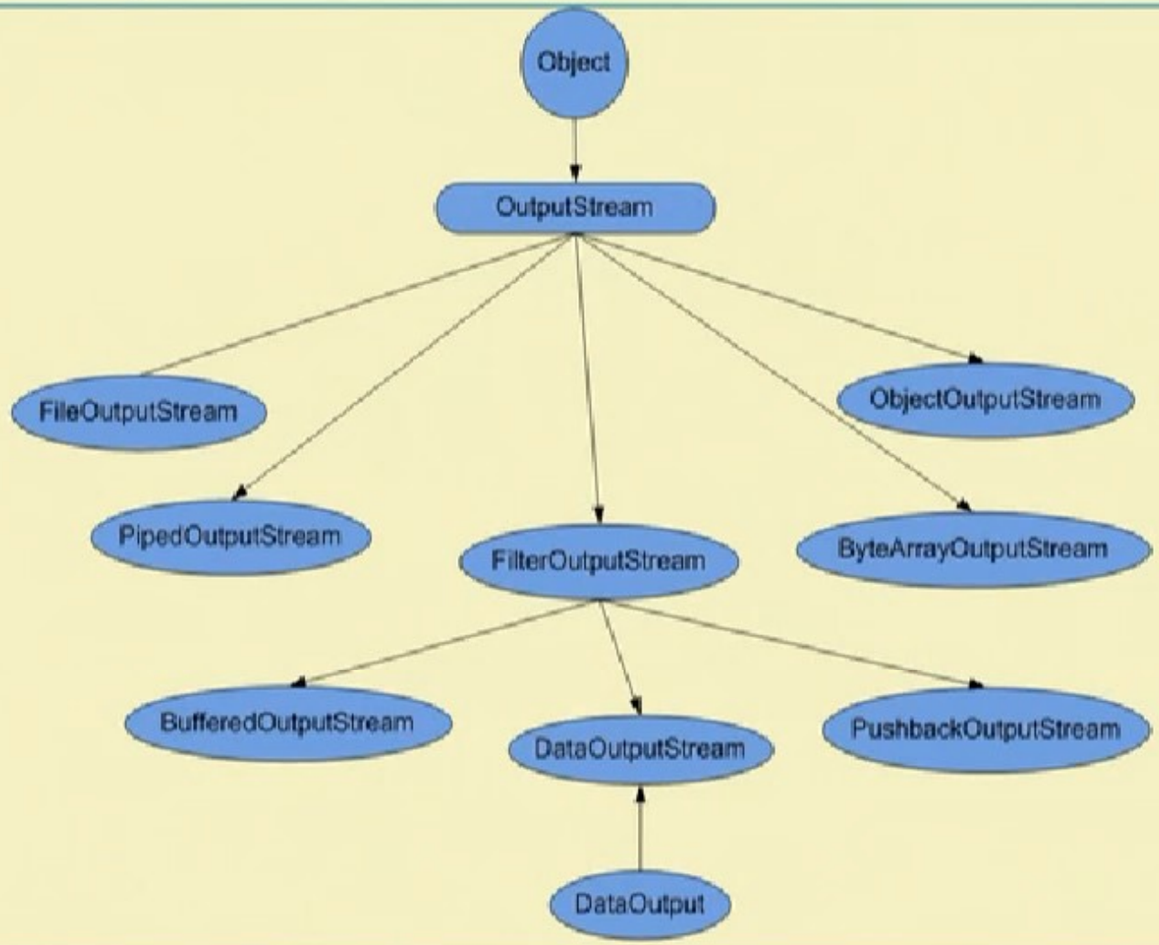


Java output stream classes

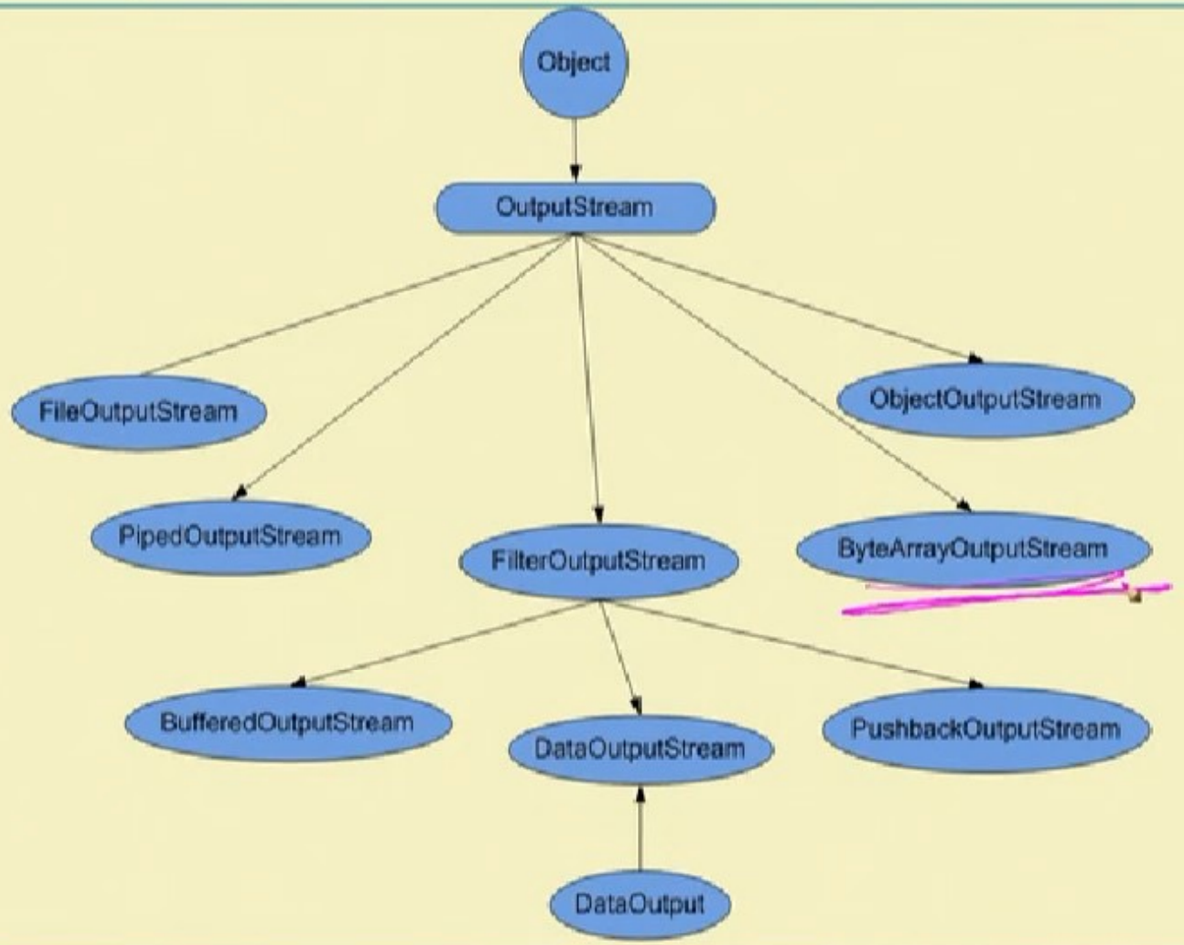
OutputStream classes is used to write 8-bit bytes and supports a number of input-related methods

- Writing bytes
- Closing streams
- Flushing streams
- etc.

Java output stream classes



Java output stream classes



Some methods in output stream classes

Method	Description
`write ( )`	Write a byte from the input stream
`write (byte b[ ])`	Write all bytes in the array b to the output steam
write (byte b[ ], int n, int m)	Write m bytes from array b starting from n^{th} byte
`close( )`	Close the output stream
`flush( )`	Flushes the output stream

Example:

DataOutputStream

`writeShort( )`	`writeDouble( )`
`writeInt( )`	`writeLine( )`
`writeLong( )`	`writeChar( )`
`writeFloat( )`	`WriteBoolean( )`
`writeUTF( )`	

Use of class OutputStream

Writing bytes

- void write (byte b)
- void write (byte b[])
- void write (byte b[], int off, int len)

Closing a stream

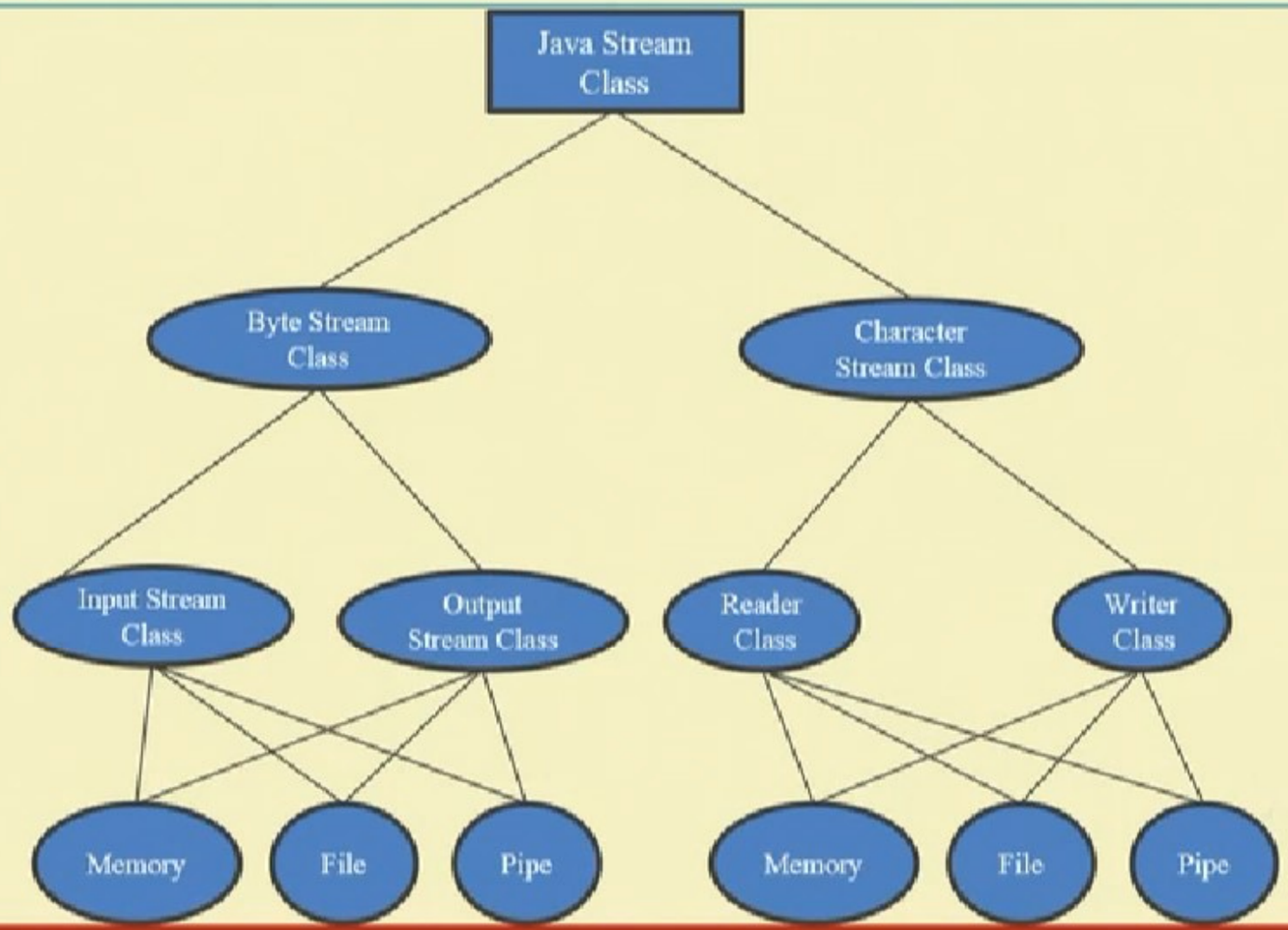
- void close()

Clearing a buffer

- void flush()

Character Stream Classes

Taxonomy: Java stream classes

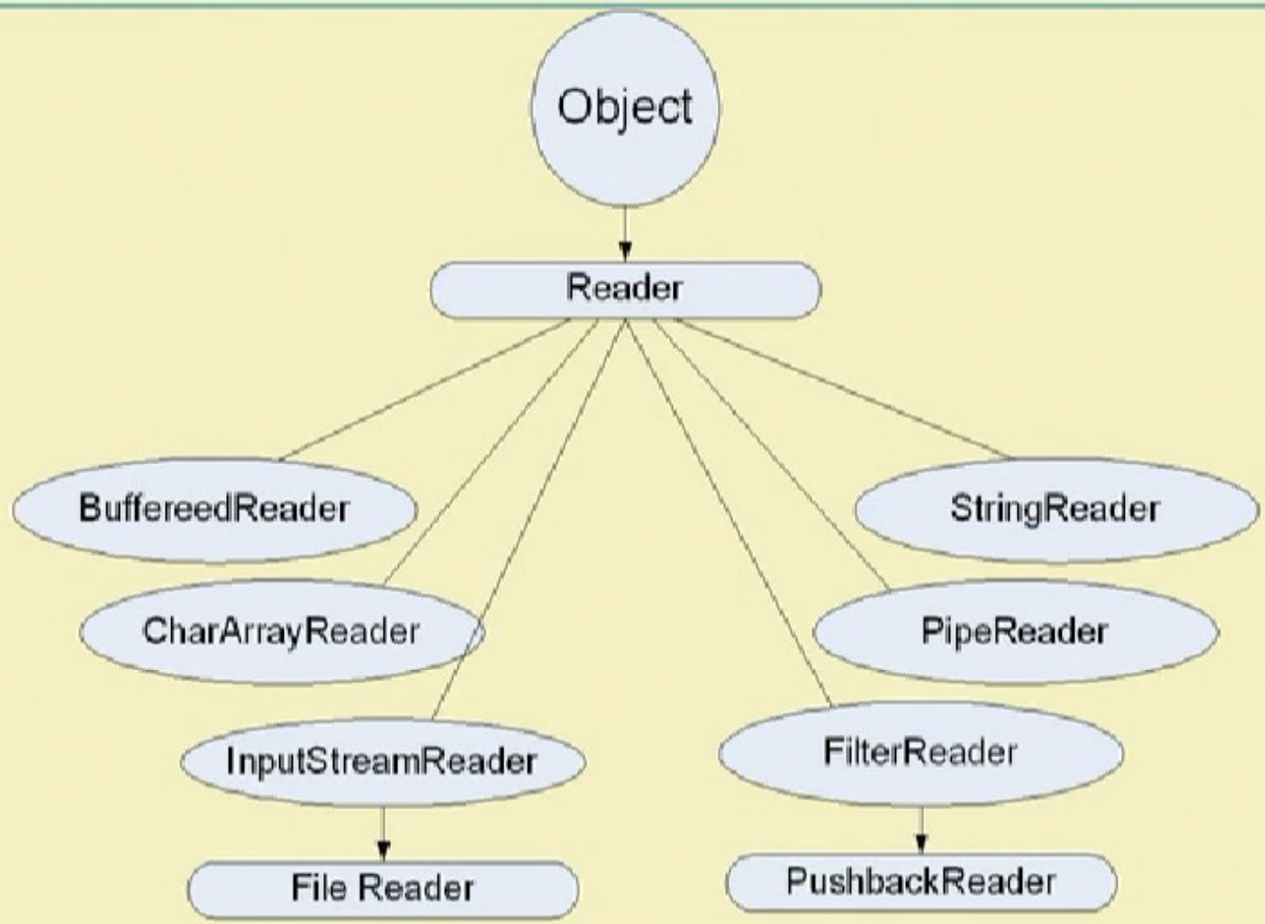


Character stream classes

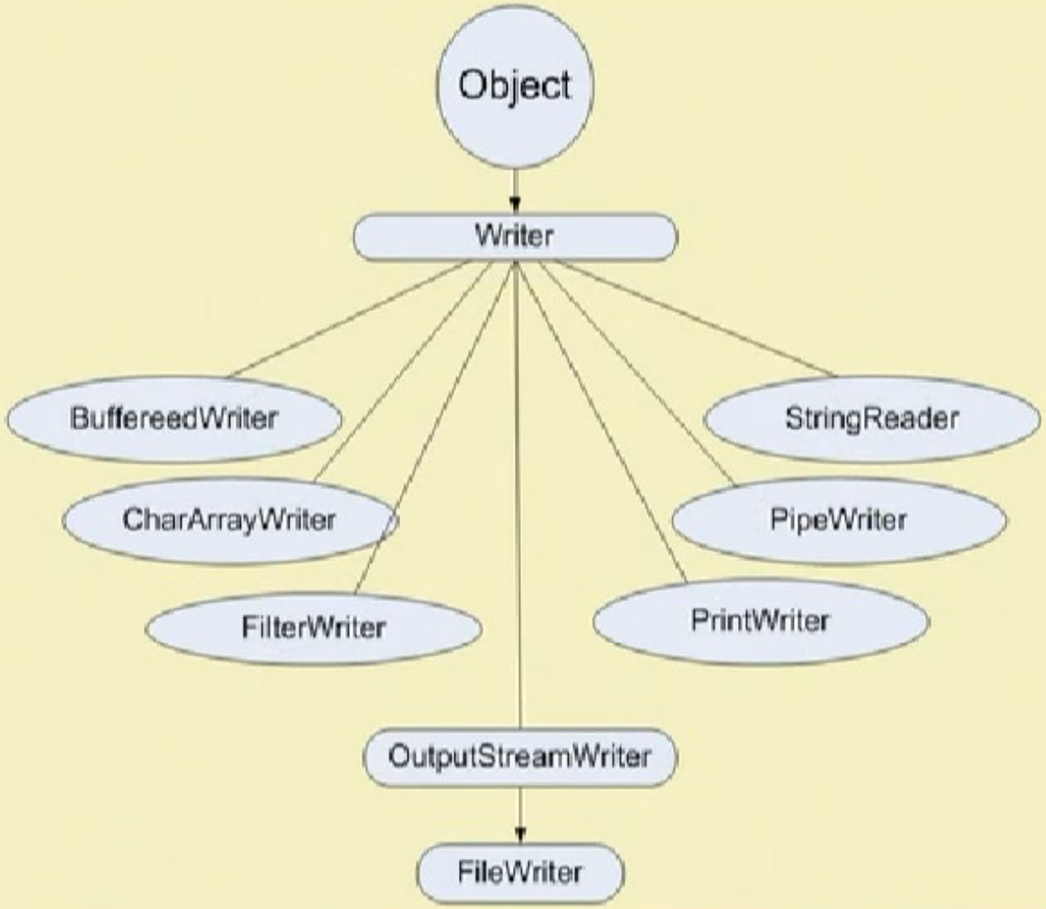
Character stream classes is used to read and write characters and supports a number of input-output related methods

- Reader stream classes
  - To read characters from files.
  - In many way, identical to InputStream classes.
- Writer stream classes
  - To write characters into files.
  - In many way, identical to OutputStream classes.

Reader stream classes



Writer stream classes



List of Important tasks and their Classes

Task	Character Stream Class	Byte Stream Class
Performing input operations	Reader	InputStream
Buffering input	BufferedReader	BufferedInputStream
Keeping track of line numbers	LineNumberReader	LineNumberInputStream
Reading from an array	CharArrayReader	ByteArrayInputStream
Translating byte stream into a character stream	InputStreamReader	(none)
Reading from files	FileReader	FileInputStream
Filtering the input	FilterReader	FilterInputStream
Pushing back characters/bytes	PushbackReader	PushbackInputStream
Reading from a pipe	PipedReader	PipedInputStream
Reading from a string	StringReader	StringBufferInputStream
Reading primitive types	(none)	DataInputStream
Performing output operations	Writer	OutputStream
Buffering output	BufferedWriter	BufferedOutputStream
Writing to an array	CharArrayWriter	ByteArrayOu tpu tS tream
Filtering the output	FilterWriter	FilterOutputStream
Translating character stream into a byte stream	OutputStreamWriter	(none)
Writing to a file	FileWriter	FileOutputStream
Printing values and objects	PrintWriter	PrintStream
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Writing to a string	StringWriter	(none)
Writing primitive types	(none)	DataOutputStream

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Thank You