

Java

I/O

File

- Long-term storage of large amounts of data
- Persistent data exists after termination of program
- Files stored on secondary storage devices
 - Magnetic disks
 - Optical disks
 - Magnetic tapes
- Sequential and random access files

File Class

- Provides useful information about a file or directory
- Does not open files or process files
- To obtain or manipulate path, time, date, permissions etc
- Constructor
 - File(String directoryPath)
 - File(String directoryPath, String fileName)
 - File(File dirObj, String fileName)
- ***Example: FileDemo.java***

Directory Class

- Directories are also files
- Contains list of files and directories
- For `Directory.isDirectory()` returns true
- *String[] list()*
 - returns an array of strings that gives the files and directories contained
- *File[] listFiles()*
 - Returns array of File objects
- **Example:** *DirectoryDemo.java*

Stream Classes

- Java views a File as a stream of bytes.
 - File ends with end-of-file marker or a specific byte number
 - File as a stream of bytes associated with an object.
 - Java also associates streams with devices
 - System.in, System.out, and System.err
 - Streams can be redirected
- Stream is an abstraction that either produces or consumes information

Stream Classes

- Java's stream-based I/O is built upon four abstract classes.
 - InputStream, OutputStream (for byte streams)
 - Reader, Writer (for character streams)
- They form separate hierarchies
- Use the character stream classes when working with characters or strings
- Use the byte stream classes when working with bytes or other binary objects

Byte Stream Classes

- Byte-Stream classes are topped by ***InputStream*** and ***OutputStream*** classes

- ***InputStream*** is an abstract class that defines Java's model of streaming byte input.

int available() *void close()* *int read()*

int read(byte buff[]) *int read(byte buff[], int off, int num)*

- ***OutputStream*** is an abstract class that defines Java's model of streaming byte output.

void flush() *void close()* *void write(int b)*

void write(byte buff[]) *void write(byte buff[], int off, int num)*

FileInputStream

- ***FileInputStream*** class creates an ***InputStream*** that you can use to read bytes from a file
- Constructors
 - `FileInputStream(String filePath)`
 - `FileInputStream(File fileObj)`
- ***Example: FileInputStreamDemo.java***

FileOutputStream

- ***FileOutputStream*** class creates an ***OutputStream*** that you can use to write bytes to a file
- Constructors
 - `FileOutputStream(String filePath)`
 - `FileOutputStream(File fileObj)`
 - `FileOutputStream(String path, boolean append)`
 - `FileOutputStream(File obj, boolean append)`
- ***Example: FileOutputStreamDemo.java, FileCopyDemo.java***

Character Streams

- Character Stream classes are topped by **Reader** and **Writer** class
- **Reader** is an abstract class that defines Java's model of streaming character input

void close() int read() int read(char buff[])

int read(char buff[], int off, int num)

- **Writer** is an abstract class that defines Java's model of streaming character output

void flush() void close() void write(int ch)

void write(char buff[]) void write(char buff[], int off, int num)

void write(String s) void write(String s, int off, int num)

FileReader

- ***FileReader*** class creates a ***Reader*** that you can use to read the contents of a file
- Constructors
 - `FileReader(String filePath)`
 - `FileReader(File fileObj)`
- ***Example: FileReaderDemo.java***

FileWriter

- ***FileWriter*** class creates a ***Writer*** that you can use to write to a file
- Constructors
 - `FileWriter(String filePath)`
 - `FileWriter(File fileObj)`
 - `FileWriter(String path, boolean append)`
 - `FileWriter(File obj, boolean append)`
- ***Example: FileWriterDemo.java***

BufferedReader

- ***BufferedReader*** is a ***Reader*** that buffers input
- It improves performance by reducing the number of times data is actually physically read from the input stream
- Constructors
 - `BufferedReader(Reader reader)`
 - `BufferedReader(Reader reader, int bufferSize)`
- ***Example: BufferedReaderDemo.java***

BufferedWriter

- ***BufferedWriter*** is a ***Writer*** that buffers output
- It improves performance by reducing the number of times data actually physically written to the output stream
- Constructors
 - `BufferedWriter(Writer writer)`
 - `BufferedWriter(Writer writer, int buffSize)`
- ***Example: BufferedWriterDemo.java***

Serialization

- Serialization is the process of writing the state of an object to a byte stream
 - This is useful when you want to save the state of your program to a persistent storage such as file
 - Later these objects can be restored by using the process of deserialization
- Serialization can be achieved by implementing ***Serializable*** interface

Object(Input/Output)Stream

- ***ObjectInputStream*** class extends the ***InputStream*** class
- It is responsible for reading objects from a stream
- ***ObjectOutputStream*** class extends the ***OutputStream*** class
- It is responsible for writing objects to a stream
- ***Example: ObjectSerializationDemo.java***

Data(Input/Output)Stream

- ***DataInputStream*** & ***DataOutputStream*** enable to write or read primitive data to or from a stream
- They implement the ***DataOutput*** & ***DataInput*** interfaces respectively
- Constructors
 - `DataOutputStream(OutputStream os)`
 - `DataInputStream(InputStream is)`
- ***Example: DataIODemo.java***

Console

- It is used to read and write to the console
- It supplies no constructor. A Console object is obtained by calling ***System.console()***
- Important Methods
 - printf
 - readLine
 - readPassword
- ***Example: ConsoleDemo.java***

RandomAccessFile

- This class support both reading and writing to a random access file
- A random access file behaves like a large array of bytes stored in the file system
- The file pointer can be read by the **getFilePointer** method and set by the **seek** method
- *Example: RandomAccessFileDemo.java*