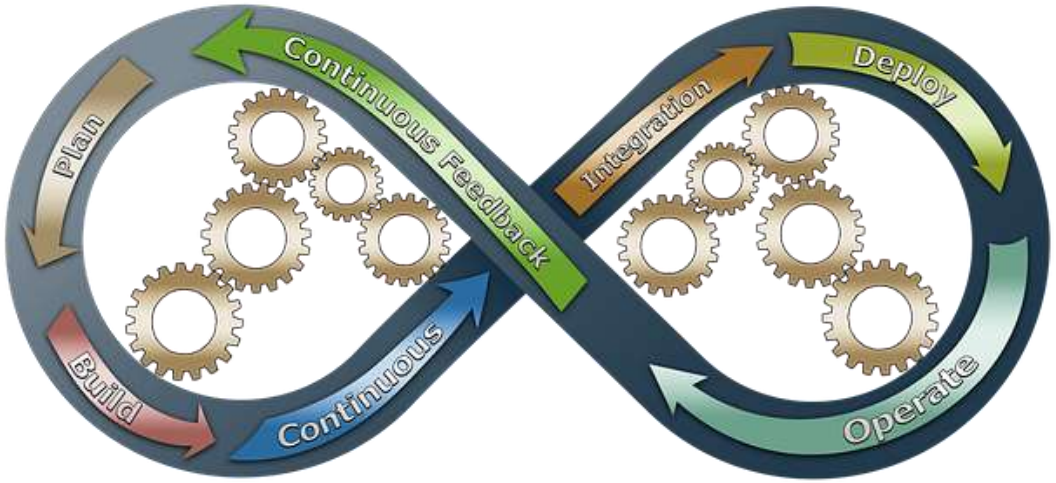

Session 3.8

IO Stream

AN INITIATIVE BY

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Introduction

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Let’s go!!!

Files & Streams

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A Java program opens a file by creating an object and associating a stream of bytes or characters with it.

Java creates three stream objects when a program begins execution

- System.in (the standard input stream object) normally inputs bytes from the keyboard
- System.out (the standard output stream object) normally outputs character data to the screen
- System.err (the standard error stream object) normally outputs character-based error messages to the screen.

Class System provides methods setIn, setOut and setErr to redirect the standard input, output and error streams, respectively.

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Streams that input and output bytes are known as byte-based streams, representing data in its binary format.

Streams that input and output characters are known as character-based streams, representing data as a sequence of characters.

Files that are created using byte-based streams are referred to as binary files. Binary files are read by programs that understand the specific content of the file and the ordering of that content.

File streams can be used to input and output data as bytes or characters. Files created using character-based streams are referred to as text files. Text files can be read by text editors.

Input Stream & Output Stream

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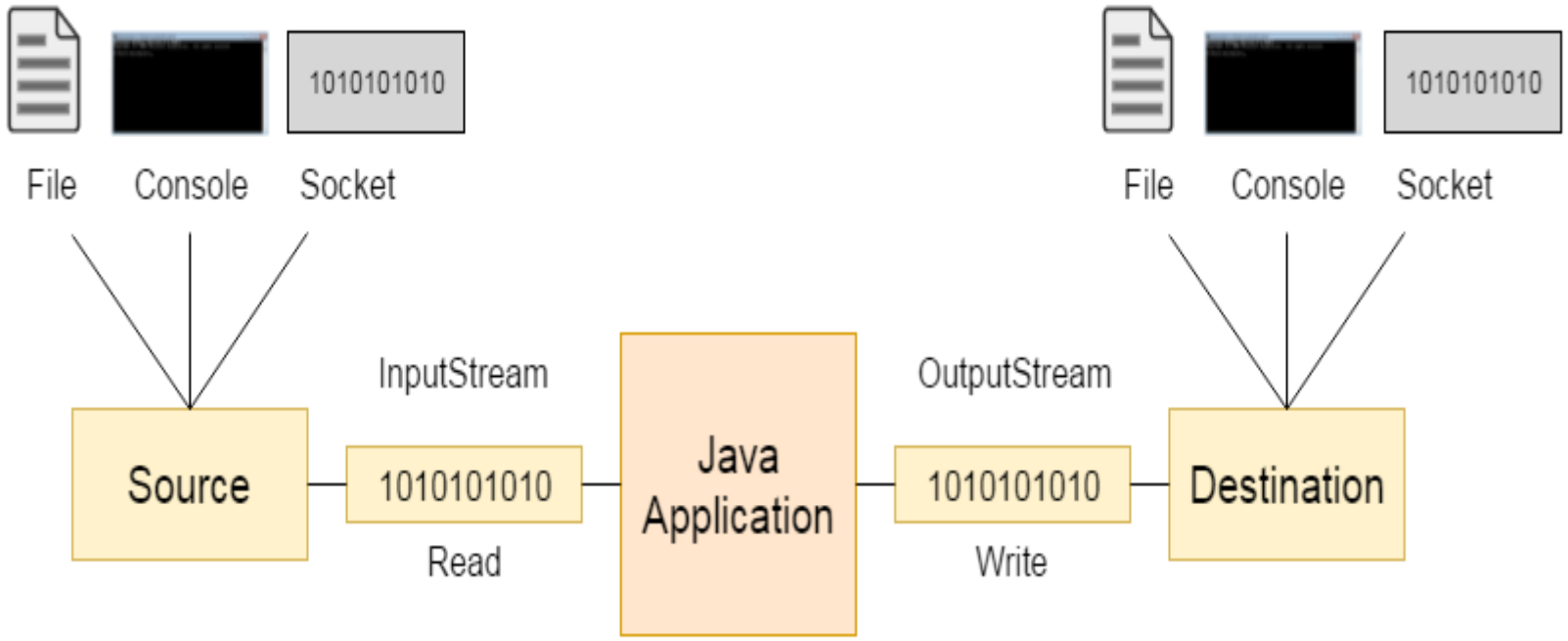
- Java application uses an input stream to read data from a source; it may be a file, an array, peripheral device or socket.

Working of Java OutputStream and InputStream:



Useful methods of Input Stream:

Method	Description
1) public abstract int read()throws IOException	reads the next byte of data from the input stream. It returns -1 at the end of the file.
2) public int available()throws IOException	returns an estimate of the number of bytes that can be read from the current input stream.
3) public void close()throws IOException	is used to close the current input stream.

Useful methods of Output Stream:

Method	Description
1) public void write(int)throws IOException	is used to write a byte to the current output stream.
2) public void write(byte[])throws IOException	is used to write an array of byte to the current output stream.
3) public void flush()throws IOException	flushes the current output stream.
4) public void close()throws IOException	is used to close the current output stream.

Input Stream

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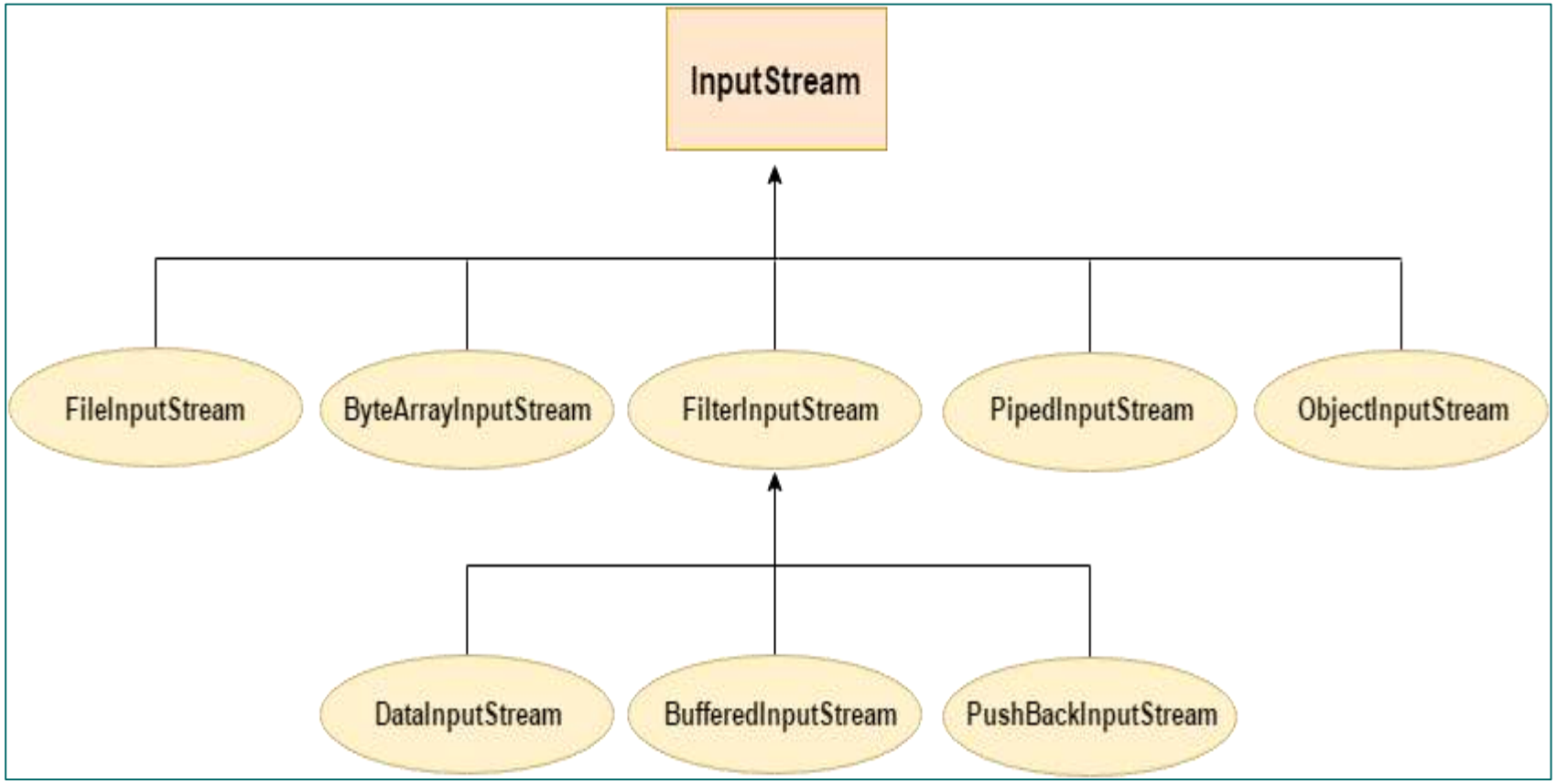
Input Stream Hierarchy:



Output Stream

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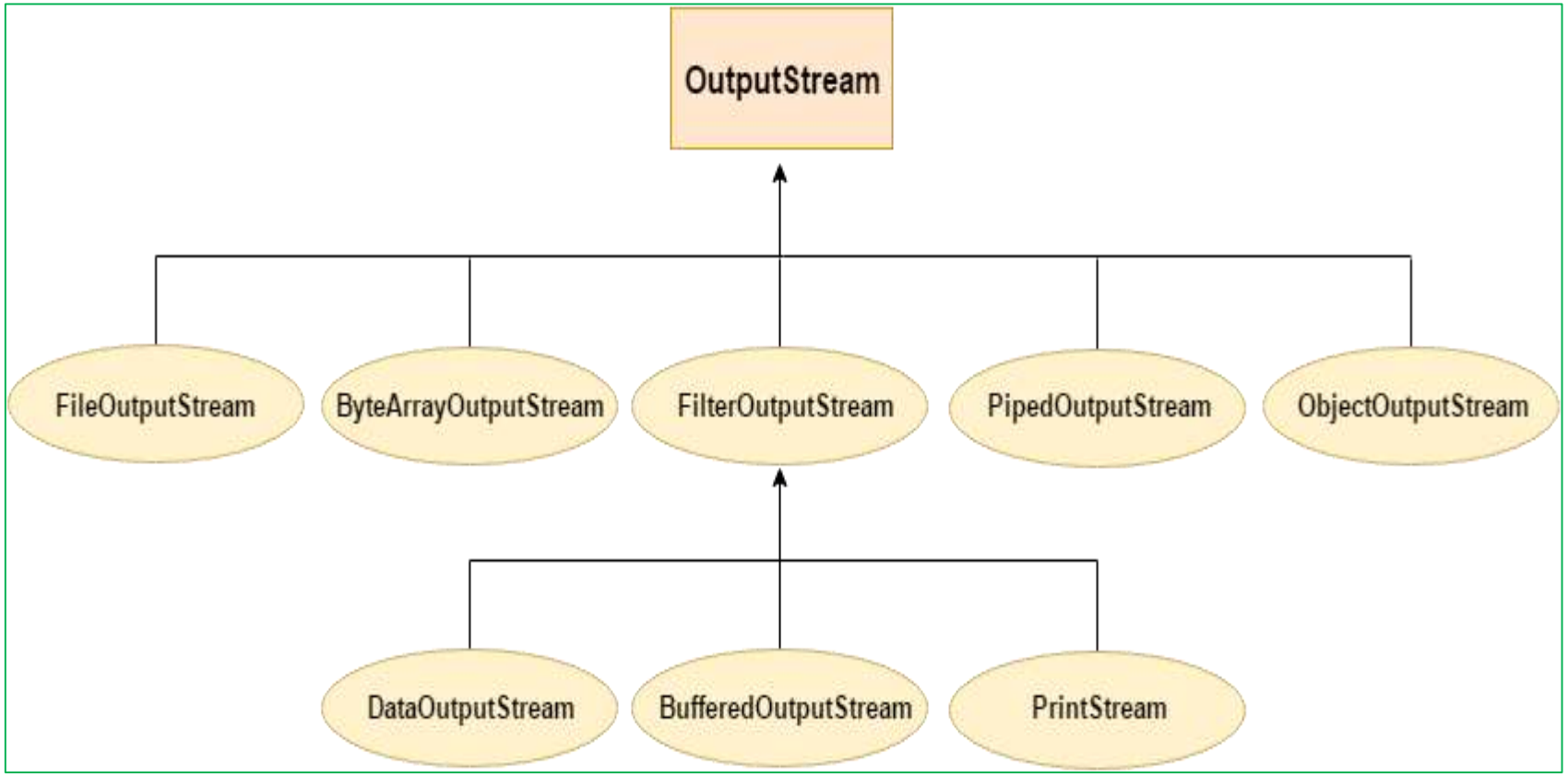
Output Stream Hierarchy:



File Reader

- File Reader class is used to read data from the file. It returns data in byte format like FileInputStream class

File Reader class declaration:

```
public class File Reader extends Input Stream Reader
```

Constructors of File Reader class:

Constructor	Description
File Reader(String file)	It gets filename in string. It opens the given file in read mode. If file doesn't exist, it throws File Not Found Exception.
File Reader(File file)	It gets filename in file instance. It opens the given file in read mode. If file doesn't exist, it throws File Not Found Exception.

Methods of File Reader class:

Method	Description
int read()	It is used to return a character in ASCII form. It returns -1 at the end of file.
void close()	It is used to close the File Reader class.

File Writer

- Java File Writer class is used to write character-oriented data to a file. It is character-oriented class which is used for file handling in java.

File Writer class declaration:

```
public class FileWriter extends OutputStreamWriter
```

Constructors of File Writer class:

Constructor	Description
File Writer(String file)	Creates a new file. It gets file name in string.
File Writer(File file)	Creates a new file. It gets file name in File object.

Methods of File Writer class:

Method	Description
void write(String text)	It is used to write the string into File Writer.
void write(char c)	It is used to write the char into File Writer.
void write(char[] c)	It is used to write char array into File Writer.
void flush()	It is used to flushes the data of File Writer.
void close()	It is used to close the File Writer.

Apachi -POI Excel data read & Write

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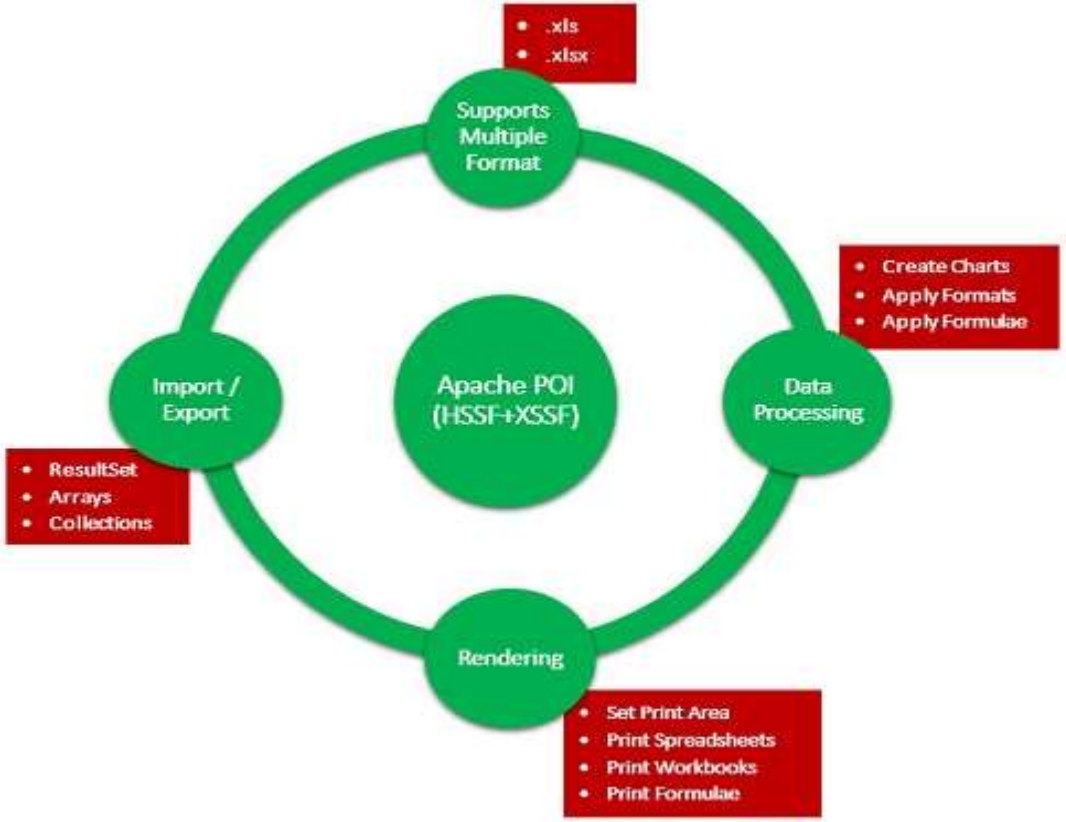
- Apache POI is a popular API that allows programmers to create, modify, and display MS Office files using Java programs.
- It supports all the basic features of Excel libraries; however, rendering and text extraction are its main features.



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Write into a Spreadsheet:

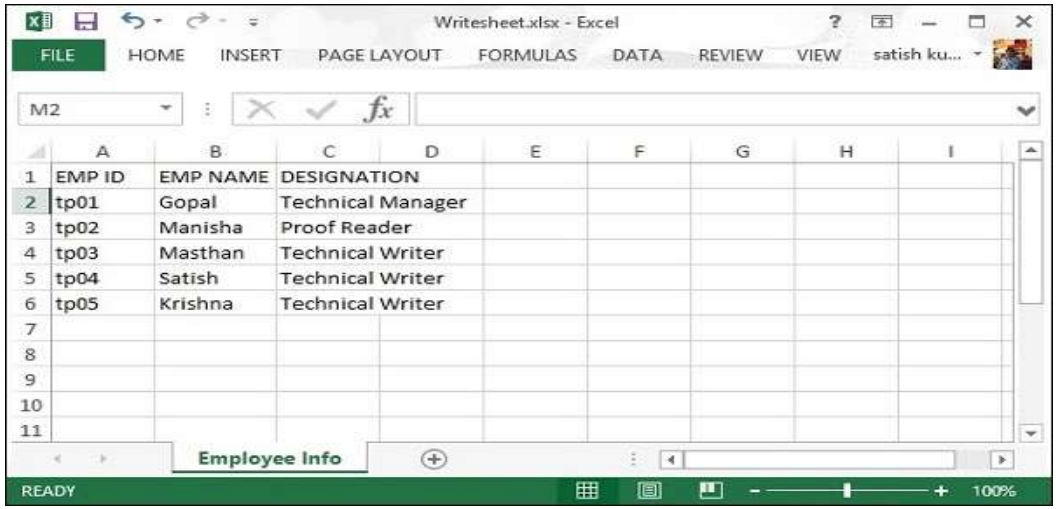
- Save the written java code as Writesheet.java, and then compile and run it from the command prompt as follows

```
$javac Writesheet.java
$java Writesheet
```

- It will compile and execute to generate an Excel file named Writesheet.xlsx in your current directory and you will get the following output in the command prompt.

```
Writesheet.xlsx written successfully
```

The Writesheet.xlsx file looks as follow:



EMP ID	EMP NAME	DESIGNATION
tp01	Gopal	Technical Manager
tp02	Manisha	Proof Reader
tp03	Masthan	Technical Writer
tp04	Satish	Technical Writer
tp05	Krishna	Technical Writer

Read from a Spreadsheet:

- Let us consider the above excel file named Write sheet.xslx as input. Reading the data from a spreadsheet.
- Save the written code in Readsheet.java file, and then compile and run it from the command prompt as follows –

```
$javac Readsheet.java
$java Readsheet
```

- If your system environment is configured with the POI library, it will compile and execute to generate the following output in the command prompt.

```
EMP ID      EMP NAME      DESIGNATION
tp01        Gopal         Technical Manager
tp02        Manisha       Proof Reader
tp03        Masthan       Technical Writer
tp04        Satish        Technical Writer
tp05        Krishna       Technical Writer
```

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Session Recap