실전 프로젝트1

5

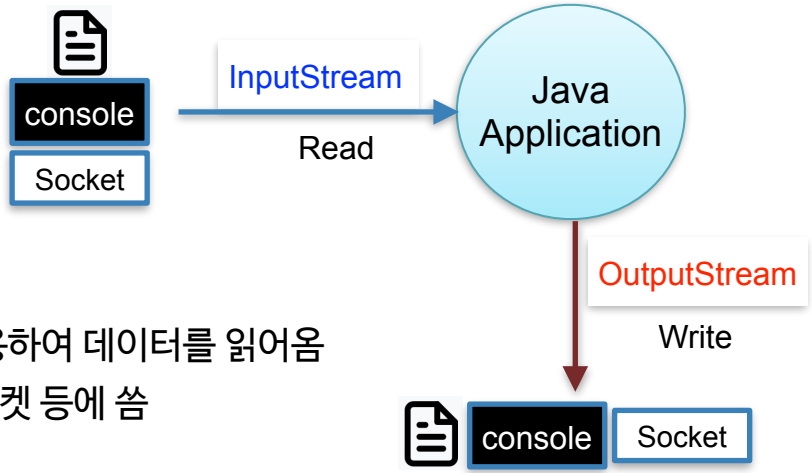
File I/O

공지

- 출석확인 방법
  - 화요일 (대면 / 줌)
  - 금요일 (줌), LMS 인경우 HD LMS에서 자동출석체크
  - 출석 및 과제 구글시트
  - Hisnet 온라인 출석
    - 수강과목 선택 〉 강의정보 〉 강의출석현황 메뉴에서 확인
- 3주차 9/17(금) 수업
  - 추석 연휴 시작일
  - HDLMS 동영상 시청으로 수업 진행함
- 4주차 9/24(금) 수업
  - 기존과 동일하게 줌으로 수업

Java input/output

- **Stream**
  - 데이터의 흐름, 바이트로 구성
  - 콘솔에 연결된 3개 스트림 자동 생성됨
    - System.out : 표준 출력 스트림
    - System.in : 표준 입력 스트림
    - System.err : 표준 에러 스트림
- **InputStream / OutputStream : Byte 단위**
  - InputStream : 파일, 주변장치, 소켓 등을 사용하여 데이터를 읽어옴
  - OutputStream : 데이터를 파일, 주변장치, 소켓 등에 씀
- **Reader / Writer : 문자 단위 (2bytes)**
- **BufferedReader / BufferedWriter : 문자열단위**



1) OutputStream class

- **abstract class** for writing
- the superclass of all classes representing an output stream of bytes
- Methods
  - public abstract void write(int)
  - public void write(byte[])
  - public void write(byte[], int off, int Len)
  - public void flush()
  - public void close()

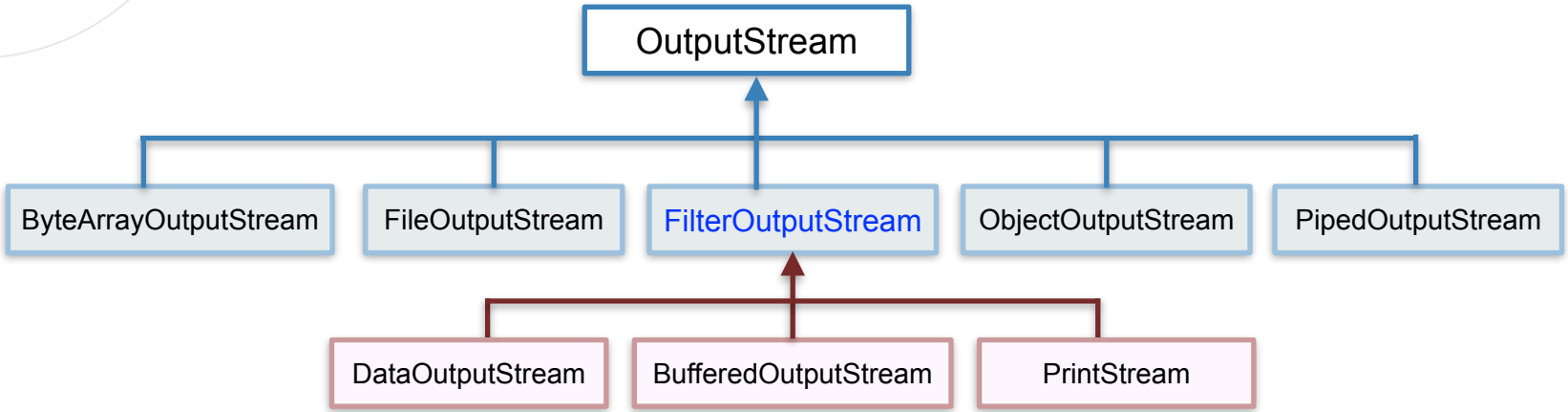
Module java.base
Package java.io

Class OutputStream

```
public abstract class OutputStream
extends Object
implements Closeable, Flushable
```

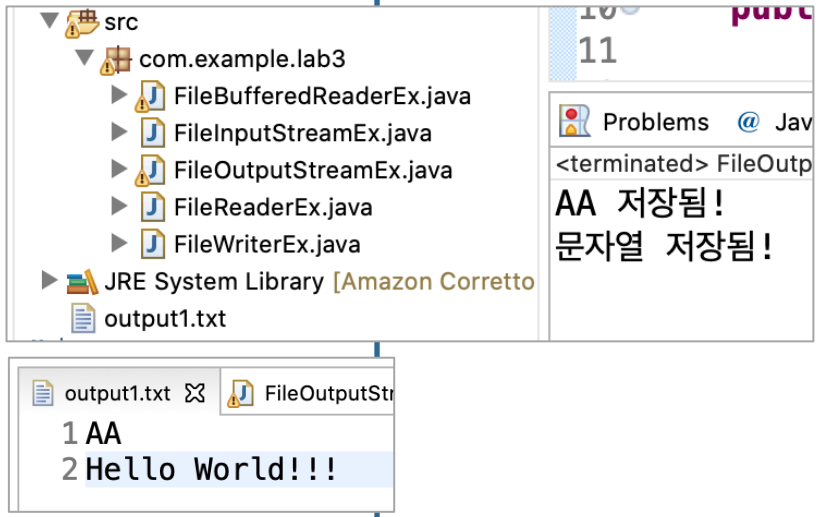
1) OutputStream class

- Direct Known Subclasses
  - ByteArrayOutputStream, FileOutputStream, FilterOutputStream, ObjectOutputStream, PipedOutputStream



예제 1 – FileOutputStreamEx

```java
public class FileOutputStreamEx {

    public static void main(String[] args) {
        try {
            FileOutputStream fos = new FileOutputStream("output1.txt");

            fos.write('A'); // A의 아스키코드는 65
            fos.write(65);
            fos.write('\n');
            System.out.println("AA 저장됨!");

            String str = "Hello World!!!";
            fos.write(str.getBytes());
            System.out.println("문자열 저장됨!");

            fos.close();

        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```



2) InputStream class

- abstract **class** for reading
- the superclass of all classes representing an input stream of bytes
- Methods
  - public abstract int read() – 입력스트림에서 데이터를 byte 단위로 읽음, 파일 끝은 -1 리턴
  - public int read(byte[] b)
  - public int read(byte[] b, int off, int Len)
  - public int available() – 현재 입력 스트림에서 읽을 수 있는 byte수
  - public void close()

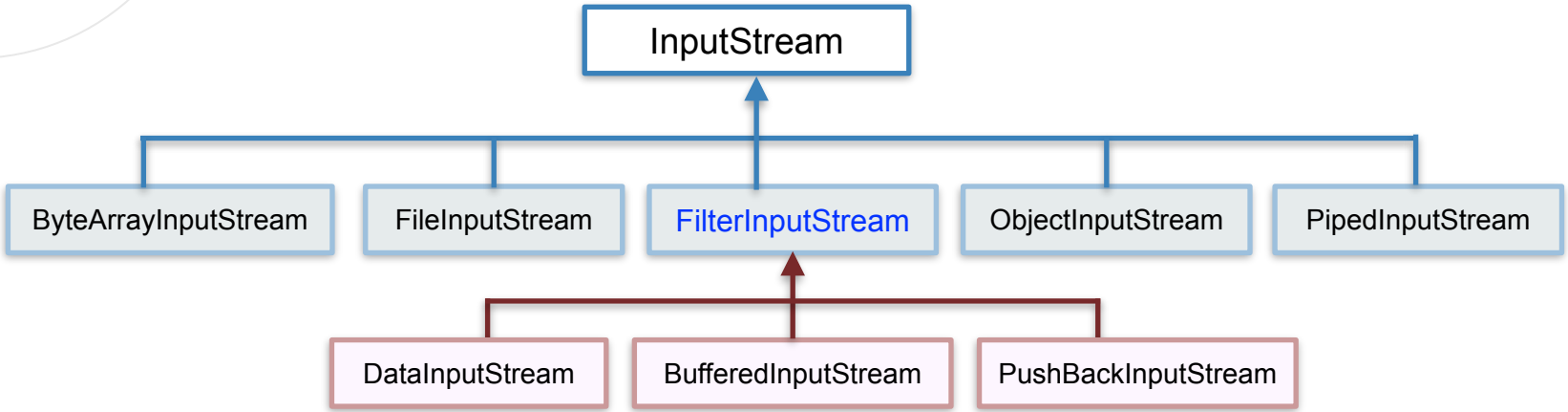
Module java.base
Package java.io

Class InputStream

```
public abstract class InputStream
extends Object
implements Closeable
```

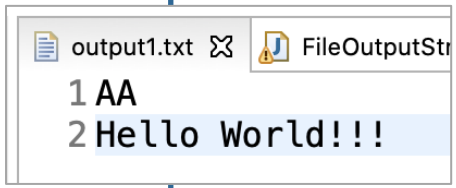
2) InputStream class

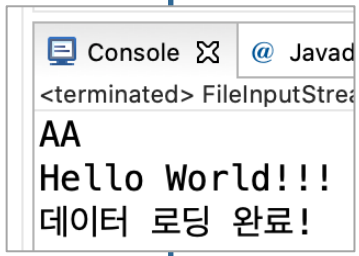
- Direct Known Subclasses
  - AudioInputStream, ByteArrayInputStream, FileInputStream, FilterInputStream, ObjectInputStream, PipedInputStream, SequenceInputStream, StringBufferInputStream



예제 2 – FileInputStreamEx

```
public class FileInputStreamEx {

    public static void main(String[] args) {

        try {
            FileInputStream fis = new FileInputStream("output1.txt");

            int one;
            while((one = fis.read()) != -1) {
                System.out.print((char)one);
            }
            System.out.println("\n데이터 로딩 완료!");
            fis.close();

        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```





3) Writer class

- **an abstract class for writing to character streams**
- Direct Known Subclasses
  - BufferedWriter, CharArrayWriter, FilterWriter, OutputStreamWriter, PipedWriter, PrintWriter, StringWriter
- Methods
  - public Writer append(char c)
  - public Writer append(CharSequence cs)
  - public void write(char[] cbuf)
  - public void write(int c)
  - public void write(String str)
  - abstract void write(char[] cbuf, int off, int len)
  - abstract void close()

Module java.base

Package java.io

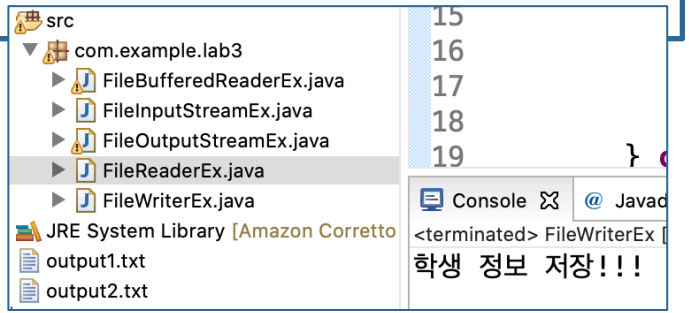
Class Writer

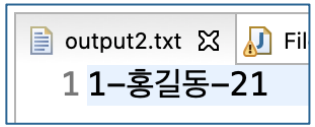
```
public abstract class Writer
extends Object
implements Appendable, Closeable, Flushable
```

예제 3 – FileWriterEx

```java
class Student {
    int no;          // number
    String name;     // name
    int age;         // age

    public Student(int no, String name, int age) {
        super();
        this.no = no;
        this.name = name;
        this.age = age;
    }

    @Override
    public String toString() {
        return no + "-" + name + "-" + age;
    }
}
```

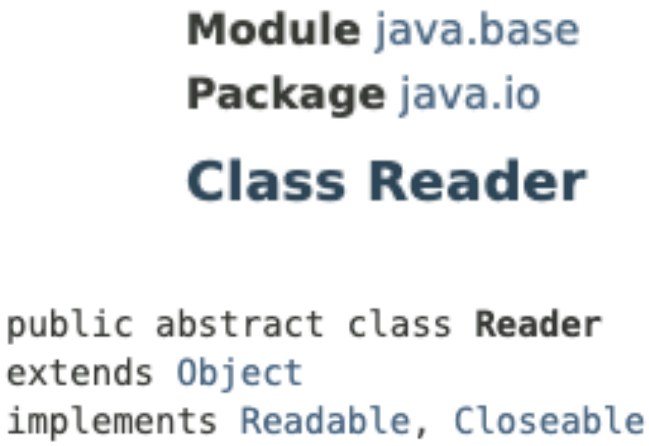
```java
public class FileWriterEx {

    public static void main(String[] args) {
        try {
            Writer w = new FileWriter("output2.txt");

            Student s = new Student(1, "홍길동", 21);
            w.write(s.toString());
            w.close();

            System.out.println("학생 정보 저장!!! ");
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```





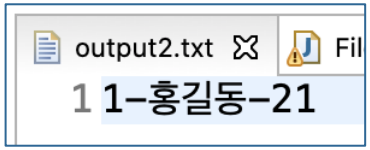
4) Reader class

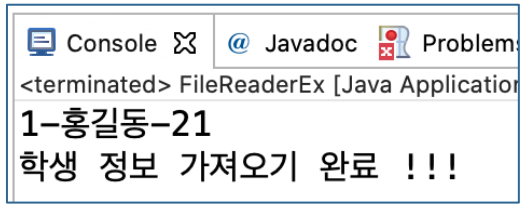
- **an abstract class for reading to character streams**
- Direct Known Subclasses
  - BufferedReader, CharArrayReader, FilterReader, InputStreamReader, PipedReader, StringReader
- Methods
  - public int read()
  - public int read(char[] cbuf)
  - abstract int read(char[] cbuf, int off, int len)
  - abstract void close()



예제 4 – FileReaderEx

```
public class FileReaderEx {

    public static void main(String[] args) {
        try {
            Reader reader = new FileReader("output2.txt");

            int data ;
            while ((data = reader.read()) != -1) {
                System.out.print((char) data);
            }
            reader.close();

            System.out.println("\n학생 정보 가져오기 완료 !!! ");
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```





5) BufferedReader class

- Scanner class와 유사
- 속도 측면에서는 Scanner 보다 빠름
- 데이터는 문자열로만 읽어올 수 있으므로 데이터 가공(정수, 실수) 필수
- 선언 및 객체화

```
BufferedReader in
   = new BufferedReader(new FileReader("foo.in"));
```

- 데이터 가공
  - split() 함수사용

```
String[] strarrr = s.split(“ “);
```

  - StringTokenizer class

```
StringTokenizer st = new StringTokenizer(s);
// StringTokenizer st = new StringTokenizer(s, "-");
int a = Integer.parseInt(st.nextToken());
String b = st.nextToken();
```

Module java.base
Package java.io

Class BufferedReader

java.lang.Object
    java.io.Reader
        java.io.BufferedReader

예제 5 – FileBufferedReaderEx

```java
public class FileBufferedReaderEx {

    public static void main(String[] args) {
        try {
            BufferedReader br = new BufferedReader(new FileReader("output2.txt"));

            String oneline;
            while((oneline = br.readLine()) != null) {
                //System.out.println(oneline);
                StringTokenizer st = new StringTokenizer(oneline, "-");
                int no = Integer.parseInt(st.nextToken());
                String name = st.nextToken();
                int age = Integer.parseInt(st.nextToken());

                Student s = new Student(no, name, age);
                System.out.println(s.toString());
            }
            br.close();
            System.out.println("학생 정보 로딩 완료 !!! ");
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```