

Module 1-17

File Output

Objectives

- Investigate File and Directory metadata using the File class
- Write text data to a file
- Explain the concept of buffering in File I/O
- Understand the importance of releasing external resources

File Object

- Java's representation of file or directory path name
 - File and directory names have different formats depending on OS
- Has methods for working with:
 - Path name
 - Deleting and renaming files
 - Creating new directories
 - Listing contents of directory
 - Listing common attributes of files and directories

File Object

```
import java.io.File; // Import the File class

public class GetFileInfo {
    public static void main(String[] args) {
        File myFile = new File("filename.txt");
        if (myFile.exists()) {
            System.out.println("File name: " + myFile.getName());
            System.out.println("Absolute path: " + myFile.getAbsolutePath());
            System.out.println("Writeable: " + myFile.canWrite());
            System.out.println("Readable " + myFile.canRead());
            System.out.println("File size in bytes " + myFile.length());
        } else {
            System.out.println("The file does not exist.");
        }
    }
}
```

Java Output

Java has the ability to communicate data back to the user. Consider some of these methods:

- Using `System.out.println()` that sends a message to the console.
- Write data to a database (Module 2).
- Transmit data to an API (Module 2).
- Send a HTML view back to the user (Module 3).

For today, we will focus on something simpler, writing data back to a text file.

File class: create a directory.

```
public static void main(String[] args) {  
    File newDirectory = new File("myDirectory");  
  
    if (newDirectory.exists()) {  
        System.out.println("Sorry, " + newDirectory.getAbsolutePath() +  
            " already exists.");  
    }  
    else {  
        newDirectory.mkdir();  
    }  
}
```


We won't create a new directory if it exists.


Otherwise, the .mkdir method will create a new directory.


File class: create a directory.


Just like with reading from files, writing is done with respect to the project root.


Name


 .settings


 myDirectory

 src

 target

 .classpath

 .project

 pom

Note that the folder specified in the example is now present at the root.

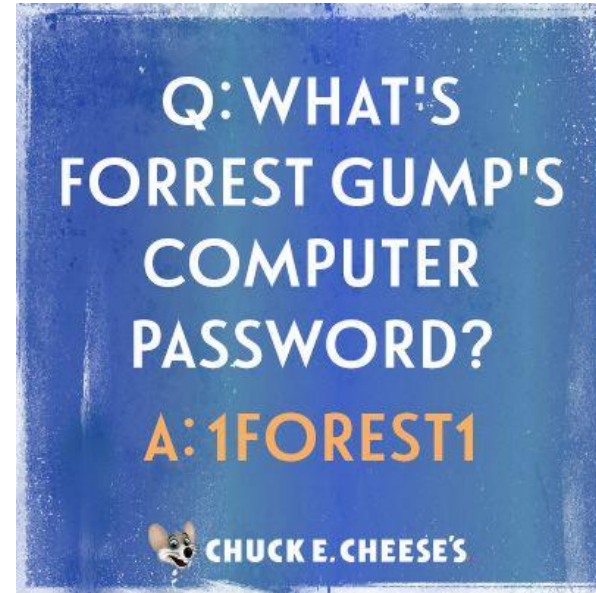
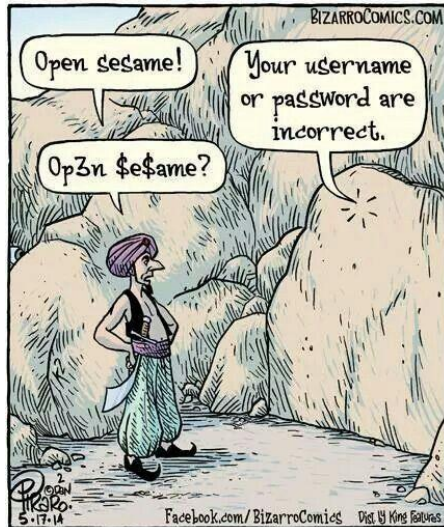
File class: create a file.

```
public static void main(String[] args) throws IOException {  
    File newFile = new File("myDataFile.txt");  
    newFile.createNewFile();  
}
```

File class: create a file within a directory.

```
public static void main(String[] args) throws IOException {  
    File newFile = new File("myDirectory", "myDataFile.txt");  
    newFile.createNewFile();  
}
```

Let's write some code!



Writing to a File

Just like with reading data from a file, writing to a file involves bringing in an object of another class. In this case, we will need an instance of the `PrintWriter` class.

When more than one class is required to solve a problem, we typically refer to these classes as **collaborators**. In this case, the `File`, and `Printwriter` classes are collaborators.

Writing a File Example

```
public static void main(String[] args) throws IOException {  
    File newFile = new File("myDataFile.txt");  
    String message = "Appreciate\nElevate\nParticipate";  
  
    PrintWriter writer = new PrintWriter(newFile);  
    writer.print(message);  
    writer.flush();  
    writer.close();  
}
```

Create a new file object.

Create a PrintWriter object.

print the message to the buffer.

flush the buffer's content to the file.

The expected result:

- There will be a new text file in the project root.
- The file will be called myDataFile.txt
- The file will contain each of the three words in its own line.

What is a buffer?

A buffer is like a bucket where the text is initially written to. It is only after we invoke the **.flush()** method that the bucket's contents are transferred to the file.

The flush (and the .close()) can be performed automatically if the the following pattern is used:

```
public static void main(String[] args) throws IOException {  
    File newFile = new File("myDataFile.txt");  
    String message = "Appreciate\nElevate\nParticipate";  
  
    try(PrintWriter writer = new  
        PrintWriter(newFile)) {  
        writer.print(message);  
    }  
}
```



Try with resources...

Appending to a File

The previous example regenerates the file's contents from scratch every time it's run. Sometimes, a file might need to be appended to, preserving the existing data content. The `PrintWriter` supports two constructors:

- **`PrintWriter(file)`**, where `file` is a file object.
- **`PrintWriter(fileWriter)`**
 - `fileWriter` will be an instance of the `FileWriter` class.
- `fileWriter` constructor can take in 2 arguments, the `File` object and a boolean value for appending
- `FileWriter fw = new FileWriter(file, true);` to append

Appending a File Example

```
public static void main(String[] args) throws IOException {
    File newFile = new File("myDataFile.txt");
    String message = "Appreciate\nElevate\nParticipate";
    PrintWriter writer = null;

    // Instantiate the writer object with append functionality.
    if (newFile.exists()) {
        writer = new PrintWriter(new FileWriter(newFile, true));
    }
    // Instantiate the writer object without append functionality.
    else {
        writer = new PrintWriter(newFile);
    }
    writer.append(message);
    writer.flush();
    writer.close();
}
```

The expected result is that *myDataFile.txt* will be continuously appended with the message text each time it runs.

Objectives

- Should be able to investigate File and Directory metadata using the File class

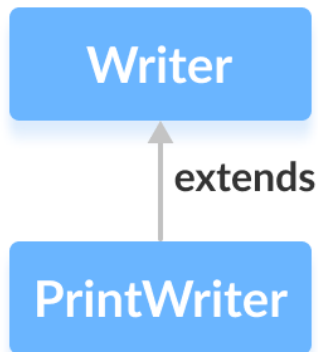
```
C:\COMPUTED\system32\cmd.exe

C:\snr\way2java\io>java FileMetaData
pathSeparatorChar = ;
separatorChar = \
getName(): pqr.txt
getAbsolutePath(): C:\snr\way2java\io\pqr.txt
canRead(): true
canWrite(): true
isFile(): true
isDirectory: false
File last modified date: 1299755731546
File size: 15 Bytes
File exists(): true
```



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- Should be able to write text data to a file

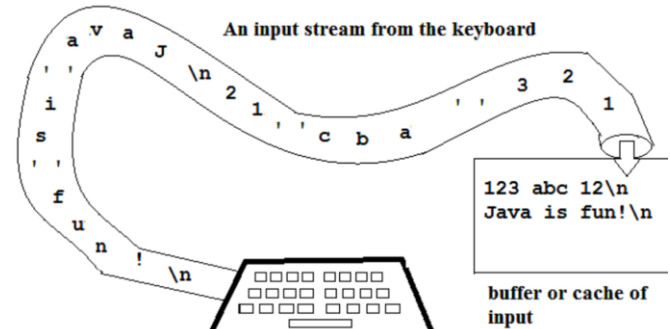
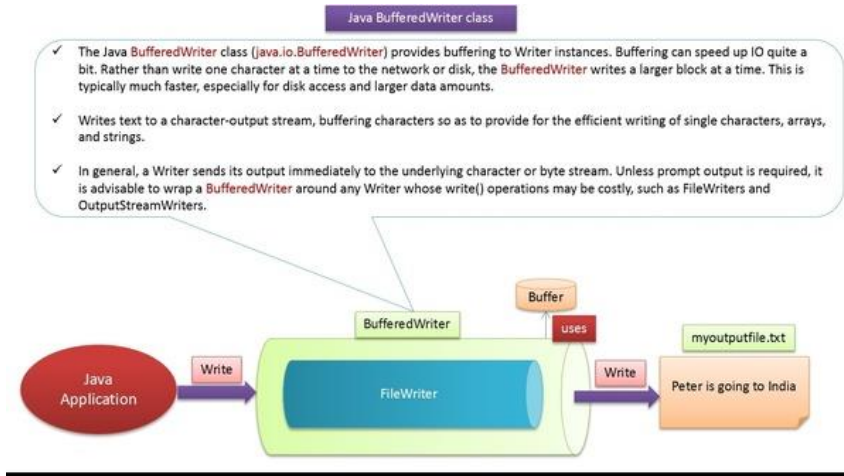


```
/**
 * @param args the command line arguments
 */
public static void main(String[] args) {
    File file = new File("C:/Users/...");
    if (file.exists()) {
        PrintWriter pw = new PrintWriter(file);
        pw.println("Hello World");
        pw.close();
    }
}
```

unreported exception FileNotFoundException; must be caught or declared to be thrown
(Alt-Enter shows hints)

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Close that I/O