Reading/Writing Files

For file Input/Output, need:
  import java.io.*;
  throws IOException - after method header of any method that performs I/O either directly or through calls to other methods.

ex:
  public static void main(...) { throws IOException

  readUserFile(),

  public static void readUserFile() throws IOException

To read a file, need:
(1) Create File object:
  String filename = "data.txt"; (must be stored in same directory as project)
  File myfile = new File(filename);
  OR: File myfile = new File("data.txt");
(2) Scanner to read file: (different than scanner to read user input)

Scanner fileReader = new Scanner(myFile);

Combine (1)+(2)

Scanner fileReader = new Scanner(new File(filename));

⇒ API for Scanner

* Can read a file only if there is text to read
  How to check? hasNext()

* To read a word: next()

(1) Read + print every word in the file?

```java
while (fileReader.hasNext())
    println(fileReader.next());
```

(2) Read + print every line in the file?  

```java
while (fileReader.hasNextLine())
    println(fileReader.nextLine());
```

<Sample code: FileIO.java>
(3) Store words in an array. Assume max # words = 100

```java
String[] words = new String[100];
int counter = 0;

while (fileReader.hasNext())
    words[counter] = fileReader.nextLine();
    counter++;
```

(4) Use hasNextInt(), nextInt() for integers

hasNextDouble(), nextDouble() "" doubles

(5) Read combination of strings and integers.

```
(deposits.txt, <SAMPLE CODE>)

while (fileReader.hasNext())
    String name = fileReader.nextLine();   // Alice
    int dep = fileReader.nextInt();        // 100
    System.out.println(name + " " + dep);  // (not an int!)
```

Problem? ?

nextInt() reads only an int, not entire line

We see: 

<table>
<thead>
<tr>
<th></th>
<th>Java sees:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>Alice \n</td>
</tr>
<tr>
<td>100</td>
<td>100 \n</td>
</tr>
</tbody>
</table>
Solution? Add `nextLine()` after `nextInt()`

```java
while (...) {
    String name = fileReader.nextLine();
    int dept = fileReader.nextInt();
    fileReader.nextLine(); // reads "\n"
}
```

Writing to Files:

1. Specify file:

   ```java
   String outfile = "output.txt";  // will be saved in HW8/
   ```

2. Create `BufferedWriter`: (other ways but this is most efficient)

   ```java
   BufferedWriter out = new BufferedWriter(new FileWriter(outfile));
   ```

   ```java
   Special characters: out.write("\n": new line
                       ("\t": tab
                       ("\\": \\
   ```

   # To save file: `out.close();`

To Do: Write a program that reads integers from `integers.txt` (see file) and writes the squares of each in another file.
filereader = new Scanner(new File("integers.txt").

BufferedWriter out = new.. ("squares.txt");

while (filereader.hasNextLine())

filereader.nextLine(); //read+ discard line1, line2...

while (filereader.hasNextInt())

int thisInt = filereader.nextInt();

int square = thisInt * thisInt;

out.write(square + " "); //must include " ", since

3

3

//is String (not int)