

A Scanner can be connected to a text file and then the Scanner methods can be used to read the text from the file. To open a file and connect it to a Scanner:

```
File f = new File("name of the file");
Scanner in = new Scanner(f);
```

Java will look in the folder where your program is executed and if the file can't be opened a `FileNotFoundException` occurs. This is a "checked" exception, which means your code must handle it or your code won't compile. Here's one way to do it (*Building Java Programs* shows you another).

```
import java.util.Scanner;
import java.io.File;
import java.io.FileNotFoundException;

...

Scanner in = null;
try {
    in = new Scanner(new File("name of file"));
}
catch (FileNotFoundException e) {
    System.out.println("File could not be opened");
}
if (in != null) {
    // Code using Scanner goes here
}
```

Once a Scanner is hooked up to a text file, it's easy to work through it.

`in.hasNext()` - returns true if there's another token to be read and false otherwise. It will return false if the end-of-file (EOF) is reached.
`in.hasNextLine()` - returns true if there is anything remaining in the file. It will return false if EOF is reached.

This means that

```
while (in.hasNext()) {
    // Do something that reads a token
}
```

and

```
while (in.hasNextLine()) {  
    // Do something that reads a line  
}
```

are patterns that allow you to work through a file token by token or line by line.

- 1) Write a small program that opens a text file and reads it token by token, printing each token on its own line. You will need to create a sample text file and figure out where to put it (your facilitators can help with this). Make sure your sample file has at least a few lines with at least a few tokens per line.
- 2) Write a small program that opens a text file containing only integers and reads it token by token, and prints the sum of them. You will need to create a sample text file. Make sure your sample file has at least a few lines with at least a few integers per line.
- 3) Write a small program that opens a text file containing a combination of integer and non-integer tokens, reads it token by token, and prints the sum of the integers. You will need to create a sample text file. Make sure your sample file has at least a few lines, each with a mixture of integer and non-integer tokens. Inside the while loop use `hasNextInt` to tell the token type.

There's a trick for processing a file line by line, but then processing each line token by token. The beginning of code for this might look like this:

```
Scanner inFile = ... // Hook up a Scanner to a file  
while (inFile.hasNextLine()) {  
    String line = inFile.nextLine();  
    Scanner inLine = new Scanner(line);  
    // Do something with inLine  
}
```

The temporary Scanner `inLine` will behave like a Scanner that's been hooked up to a file. You can use the `hasNext` methods to work through its tokens.

- 4) Write a static method that takes an already initialized Scanner full of integers and returns their sum as an int.
- 5) Write a small program that opens a text file containing several lines each containing several integers and prints the sum of each line on its own line of output. Use the code above and the method you just wrote. You will need to create a sample text file to test your program.