

Intro to Data Structures

Lecture #7 – File I/O, Objects and Arrays,
& the *Arrays* class

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Outline for Today

- HW1 OK? Some observations...
- HW2 out tonight
- File I/O demo
- Arrays class
- 2-d arrays (in recitation)

The Scanner class (Input from a file)

Reading from a file, a word at a time:

```
Scanner s =getFileScanner("SampleFile.txt");  
while (s.hasNext())  
    System.out.println(s.next());
```

Reading from a file, a line at a time:

```
Scanner s =getFileScanner("SampleFile.txt");  
while (s.hasNext())  
    System.out.println(s.nextLine());
```

Don't forget to close the file when you're done [s.close();]

The Scanner class (Input from a file)

Making use of this convenient helper function:

```
public static Scanner getFileScanner(String filename) {  
    Scanner scanner = null;  
    try { scanner = new Scanner(new java.io.File(filename)); }  
    catch (Exception e)  
    {  
        System.out.println("File not found:" + filename);  
        return null;  
    }  
    return scanner;  
}
```

Output to a file

Writing to a file:

```
PrintStream out = getFilePrintStream("myfile.txt");  
out.println("This will output to the file 'myfile.txt' ");
```

Output to a file

Making use of this convenient helper function:

```
public static PrintStream getFilePrintStream(String filename) {  
    PrintStream out = null;  
    try { out = new PrintStream(new java.io.File(filename)); }  
    catch (Exception e)  
    {  
        System.out.println("Error opening file: " + filename);  
        return null;  
    }  
    return out;  
}
```

Exceptions

You'll note that there's a try...catch in the helper functions. That's because file I/O can throw a `FileNotFoundException` exception (which is a checked exception)

- Checked exceptions
 - bad things that can occur which are nominally outside the control of the program (or programmer), like invalid input, missing files, etc.
 - MUST be handled or advertised as potentially thrown
- Unchecked exceptions
 - errors that the programmer should have caught (like `/ by 0`)

Creating a Contacts Class

- How do you keep track of contacts?
- Attributes/Fields
 - Let's keep it (very) simple for now—what can we use?
- Methods
 - Constructor (getting the data from...)
 - So we'll need...
 - toString
- What happens if I assign one entry to another?

The Arrays class (in recitation)

- Some useful methods from `java.util.Arrays`
 - `toString`:
 - `Arrays.toString(arr)`
 - `equals`:
 - `Arrays.equals(arr1, arr2);`
 - `sort`:
 - `Arrays.sort(arr)`

Problem solving (recitation Thursday)

- How did you write reverse in HW1?
- Let's write a method that swaps two integers and use that method to write reverse (discuss how with a neighbor before we write any code)...