File Processing

Getting Data Into Programs

- Put it directly in the program:

  - Define constants holding your values.

- Get it from the user:

  - Mouse events, `readLine`, etc.

- Generate it randomly:

  - Use a `RandomGenerator`.

- Get it from an external source.

  - Store it in a file and read it later.

Reading Files

- Virtually all programs that you've used at some point read files from disk:
    - Word processing (documents)
    - Web browser (cookies)
    - Games (saved progress)
    - Eclipse (Java files)
    - Music player (songs)

The Structure of Files

- A file is just a series of ***bits*** (ones and zeros).

- Those bits can have structure:

  - Plain-text: Bits represent characters.

  - JPEG: Bits encode information about the structure of an image.

  - MP3: Bits encode frequency information about music.

  - etc.

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I wish, I wish he'd go away...
- Hughes Mearns, "Antagonish"

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Step one:
Open the file for reading.

```
Yesterday, upon the stair,
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He wasn't there again today
I wish, I wish he'd go away...
- Hughes Mearns, "Antagonish"
```

```java
BufferedReader br =
    new BufferedReader(new FileReader("poem.txt"));
```
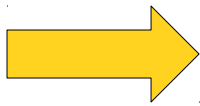
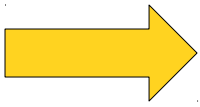```
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```

```java
BufferedReader br =
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```

To use the **BufferedReader** and **FileReader** types, you need to

```java
import java.io.*;
```

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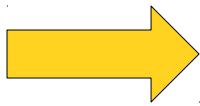
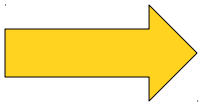I met a man who wasn't there

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I wish, I wish he'd go away...

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```
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```

Step Two:
Read the file,
one line at a time.
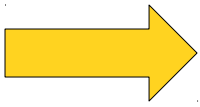
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```java
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String line1 = br.readLine();
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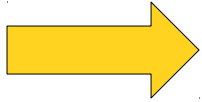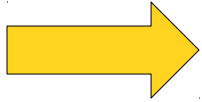
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Yesterday, upon the stair,
```

→
```
I met a man who wasn't there
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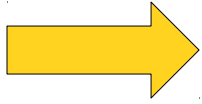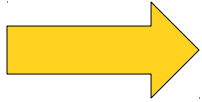
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➡

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```
Yesterday, upon the stair,
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→ `I wish, I wish he'd go away...`
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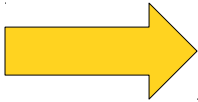
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String line5 = br.readLine();
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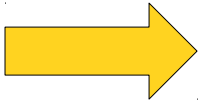
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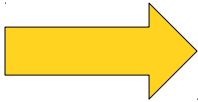
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Step Three:
Close the file.

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br.close();
```

Let's Try It Out!

There's a Catch...

Sometimes Things Break

- Programs sometimes encounter unexpected errors.

- Sometimes these are bugs:

  - Dividing by zero.

  - Sending a message to a `null` object.

- Sometimes these are due to external factors:

  - Network errors.

  - Missing files.

Exceptional Cases

- If Java encounters a case where it can't proceed as normal, it will cause an ***exception***.

- Java requires that your program handle certain types of exceptions.

- Think of exceptions as rerouting control in an emergency:

  - If all goes well, program continues as usual.

  - If something goes wrong, handle the emergency.

Let's Try It Out!

Let's **try** It Out!

try-ing Your Best

- To use a method or class that might cause an exception, you need to tell Java to **try** its best, knowing that it might fail.

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try-ing Your Best

- To use a method or class that might cause an exception, you need to tell Java to **try** its best, knowing that it might fail.

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try {
    BufferedReader br =
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    String line1 = br.readLine(); // Yesterday, upon the stair,
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There's a Catch...

There's a **catch**...

try and **catch** me

- If an exception occurs, you may need to tell Java to **catch** that exception.

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- If an exception occurs, you may need to tell Java to catch that exception.

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    br.close();
} catch (IOException e) {
    println("An error occurred: " + e);
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try and **catch** me

- If an exception occurs, you may need to tell Java to **catch** that exception.

> If something fails up here...

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```

… we immediately jump down here.

Finally... let's make this program work!

Reading a File

- The idiomatic "read all the lines of a file" code is shown here:

```java
try {
    BufferedReader br = /* … open the file … */
    while (true) {
        String line = br.readLine();
        if (line == null) break;

        /* … process current line … */
    }
    br.close();
} catch (IOException e) {
    /* … handle error … */
}
```

Time-Out for Announcements!

Announcements

- Midterm is next Tuesday from 7PM – 10PM.
  - Taking the exam at an alternate time? If you didn't hear back from Alisha with details, contact us ASAP.
- Provided reference sheet updated; new version is online.
- Location divvied by last name:
  - `Abb  - Jon:` Go to **Hewlett 200**
  - `Jun  - Mari:` Go to **Hewlett 201**
  - `Marq - Mik:` Go to **Hewlett 101**
  - `Mil  - Ogr:` Go to **Hewlett 102**
  - `Oke  - Pat:` Go to **Hewlett 103**
  - `Pau  - Tan:` Go to **Braun Auditorium**
  - `Tao  - Zuc:` Go to **320-105**
- Assignment 4 due Monday at 3:15PM.

Palindromes

- Last time, I asked you whether there are palindromes in other languages. Here's some of the responses I got back:

  - بلح تعلق تحت قلعة حلب (Dates hang underneath a castle in Halab)

  - 여보, 안경 안보여 (Honey, I can't see my glasses)

  - कड़क (a loud thunderous sound)

  - 上海自來水來自海上 (Shanghai tap water originates from "above" the ocean)

- The comedian Dmitri Martin also has a routine about palindromes; check it out at

  https://www.youtube.com/watch?v=0hUHDIOazIU

- Thanks for sharing! ☺

Back to CS106A!

Putting Everything Together

US Geography

empty fridge ?

honest ly

nothing ?

I tremble