

File Processing

BRACE YOURSELF

MIDTERM IS COMING

Midterm Logistics

- Midterm **tonight**, 7PM – 9PM
- Last name A – O: Cemex Auditorium
 - (Knight Management Center)
- Last name P – Z: Braun Auditorium
 - (Mudd Chemistry Building)



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Welcome to Big Data



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)
 - Eclipse (Java files)
 - Web browser (cookies)
 - IM client (stored login information)
 - Games (saved progress)
 - 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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A file is just a series of **bits** (ones and zeros).

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- **Plain-text: Bits represent characters.**

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etc.

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

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Step one:
Open the file for reading.

Yesterday, upon the stair,
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```
BufferedReader br =  
    new BufferedReader(new FileReader("poem.txt"));
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To use the `BufferedReader` and
`FileReader` types, you need to

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

Yesterday, upon the stair,

I met a man who wasn't there

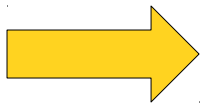
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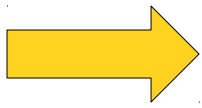
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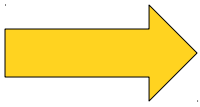
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Step Two:
Read the file,
one line at a time.



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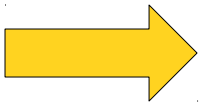
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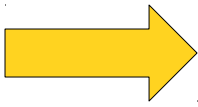
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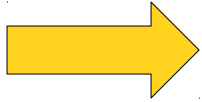
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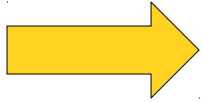
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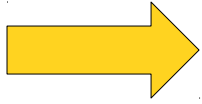
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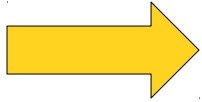
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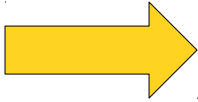
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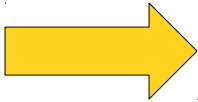
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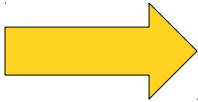
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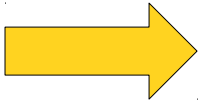

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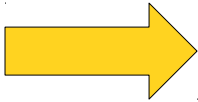
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String line6 = br.readLine();
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Step Three:
Close the file.

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String line6 = br.readLine(); // *Returns null*  
  
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

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try {
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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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} catch (IOException e) {
    println("An error occurred: " + e);
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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:

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

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

Writing to Files

- Writing to files is conceptually similar to reading files.
 - Open the file for writing (using **PrintWriter** instead of **BufferedReader**).
 - Write the contents you'd like to the file.
 - Close the file.



**//////// DANGER \\\ \ \ \ **

Writing to an existing file will permanently overwrite the contents of that file. Don't write to a file unless you're okay setting it on fire!

Putting Everything Together

empty fridge ?

honest ly

nothing ?

I tremble

Ascent



Big

The image shows the word "Big" in a large, black, serif font. The word is enclosed within a black rectangular bounding box. A horizontal red line is drawn across the word, serving as a baseline. The letters "B", "i", and "g" are positioned above this line, while the descender of the "g" extends below it. A black dot is placed above the dot of the lowercase "i".

Descent

(x, y - ascent)

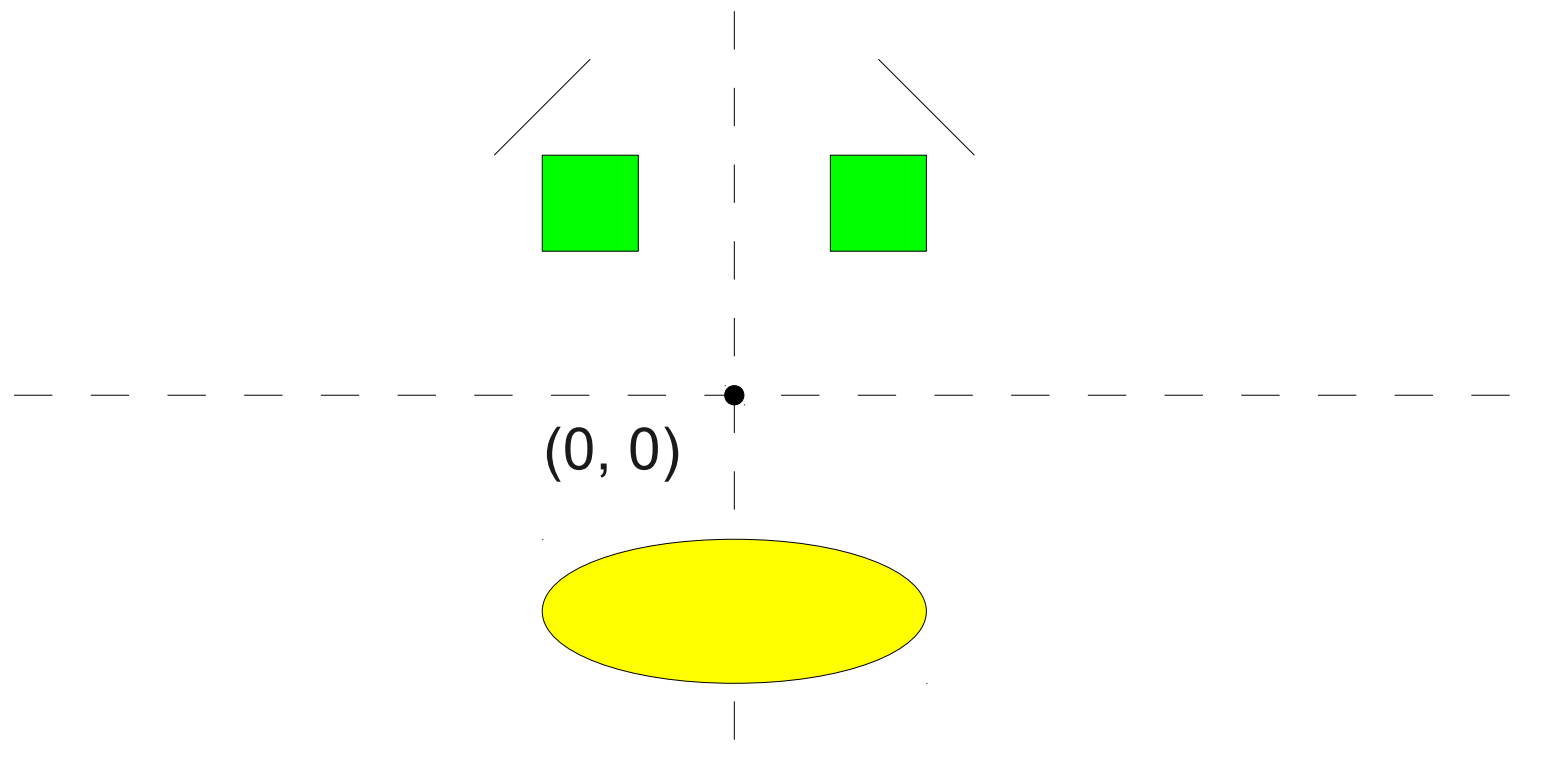
Ascent



Descent

Linking Objects Together

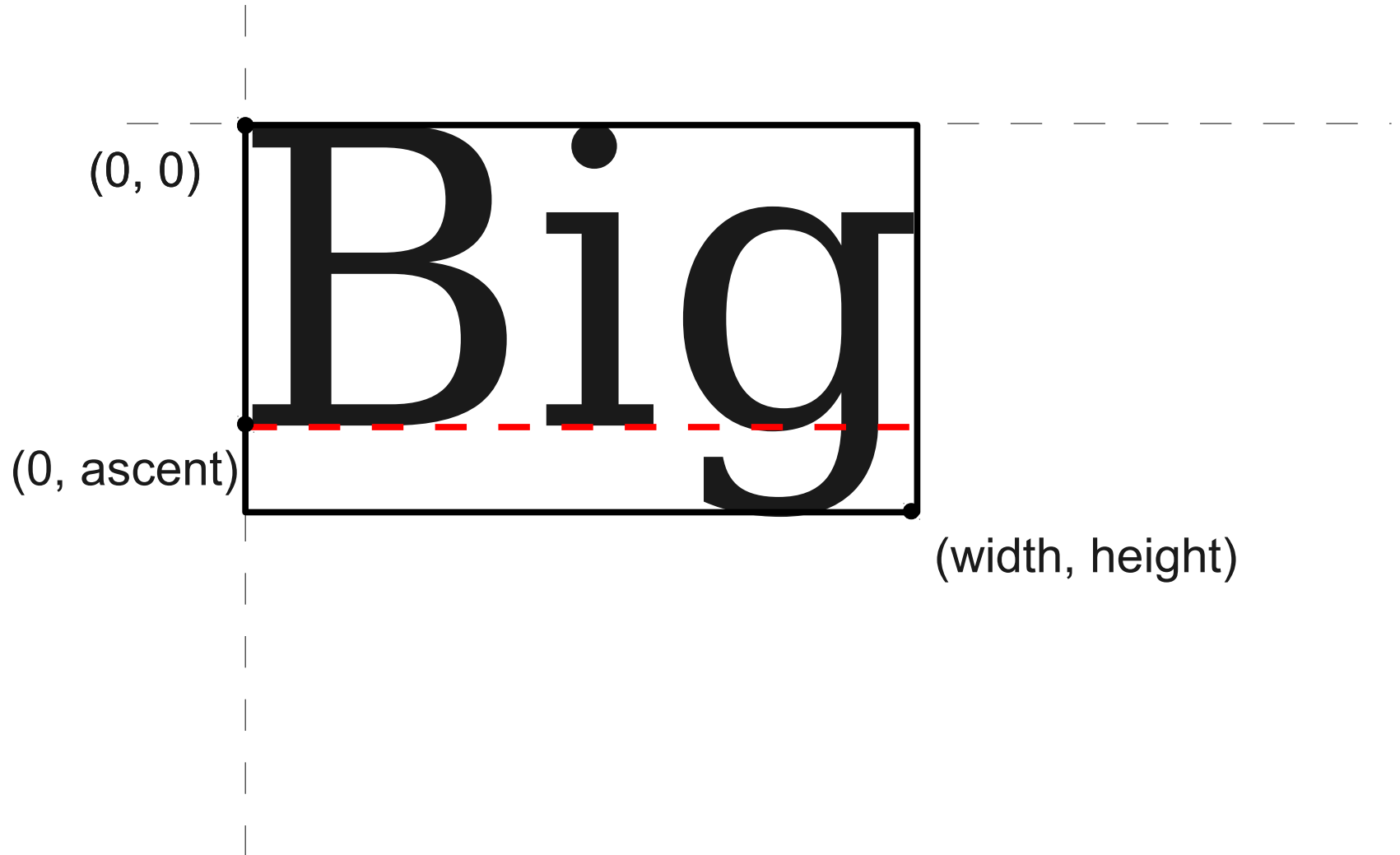
- The **GCompound** class holds a collection of **GObjects** that are treated as a unit.
- You can add objects to a **GCompound** by using the **GCompound's add** method.



GCompound



GCompound



Method Overrides

- A subclass can **override** a method of a superclass by providing its own implementation.
- When a method is invoked, Java will find the most specific version of that method to invoke.