ArrayList

An Interesting Article

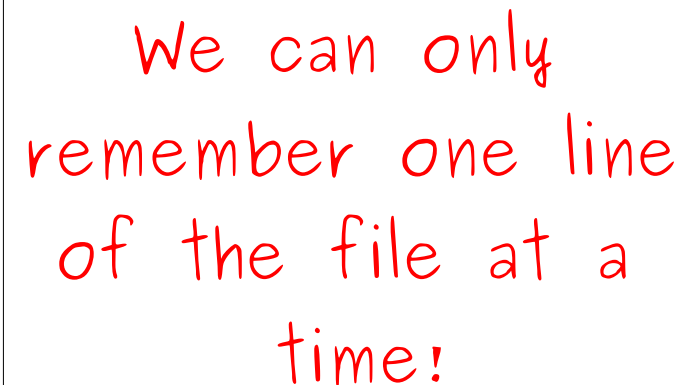*The New York Times*: "Silicon Valley and Immigrant Groups Find Common Cause"

http://www.nytimes.com/2013/02/13/business/tech-companies-and-immigrant-advocates-join-forces.html?pagewanted=1&hp

Announcements

- *Hangman* out, due next Wednesday, February 20.

- YEAH Hours (assignment review hours) tonight from 7PM – 9PM in Herrin T175.

  - Materials will be posted on the course website.

Reading a File

```java
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 … */
}
```

We can only remember one line of the file at a time!

Remembering Lots of Data

- Declare multiple variables.
  - Makes code really hard to read.
  - Have to know how much space in advance.
  - Can't treat variables uniformly.
- Store it in the canvas.
  - Only works for **GObject**s.
  - Can't easily retrieve them (**getElementAt** requires locations)
- Store it as a **String**.
  - Impractical for non-text information.

Looking Closer at Strings
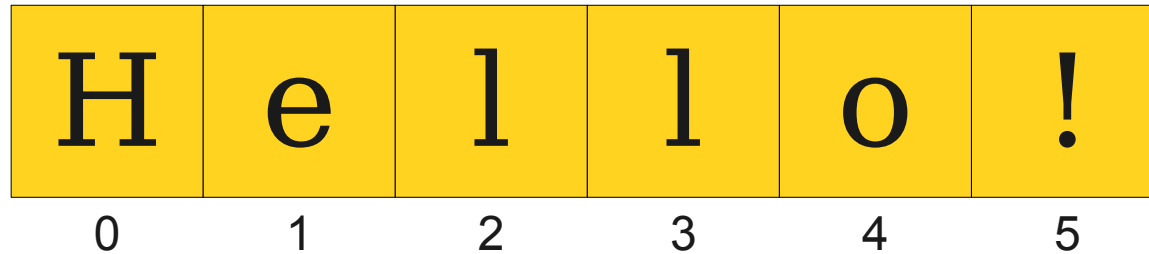
H	e	l	l	o	!
0	1	2	3	4	5

- A string stores a **sequence** of multiple characters.

  - Can access characters by index by calling `charAt`.

- Every character type is the same.

  - Namely, type `char`.

Looking Closer at Strings
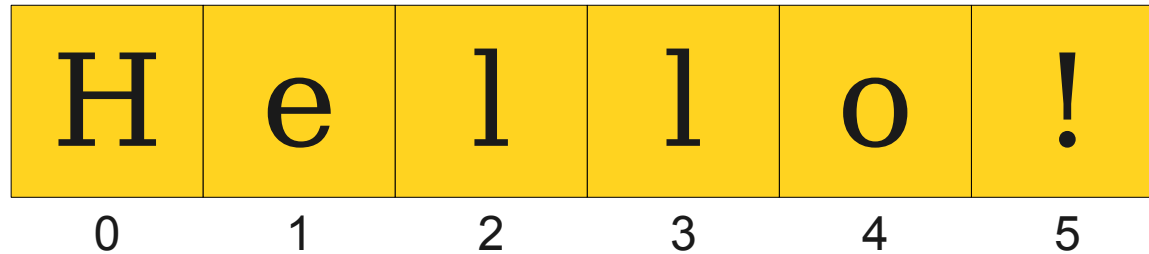
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A string stores a **sequence** of multiple characters.

Can access characters by index by calling `charAt`.

Every character type is the same.

Namely, type `char`.

What if we don't want to store `char`s?

Introducing `ArrayList`

137	42	314	271	160	178
0	1	2	3	4	5

- An `ArrayList` stores a **sequence** of multiple objects.

  - Can access objects by index by calling `get`.

- All stored objects have the same type.

  - You get to choose the type!

Strings and **ArrayList**s

- Both **String** and **ArrayList** store zero-indexed sequences.

  - **String**s store **char**s.

  - **ArrayList**s store objects.

- **ArrayList**s, unlike **String**s, are mutable.

  - You can insert, remove, and replace elements.

Importing `ArrayList`

- To use **`ArrayList`**, you must

$$\text{\color{purple}import} \ \text{java.util.*;}$$

- Do **<u style="color:red">not</u>** do the following!

$$\text{\color{purple}import} \ \text{acmx.export.java.util.*;}$$

Simple **ArrayList** Operations

- You can append an element to an **ArrayList** by calling

$$\textit{arrayList}\texttt{.add(}\textit{value}\texttt{)}$$

- You can get the nth element of an **ArrayList** by calling

$$\textit{arrayList}\texttt{.get(}\textit{n}\texttt{)}$$

- You can see how many elements are in an **ArrayList** by calling

$$\textit{arrayList}\texttt{.size()}$$

Wrapper Types

- **ArrayList** cannot directly store primitive types.

- Java provides **wrapper types** that "wrap" a primitive type inside an object.

`int`	`Integer`
`double`	`Double`
`char`	`Character`
`boolean`	`Boolean`

Putting it all Together

The Contiguous United States
Visualized by distance to the nearest McDonald's

by Stephen Von Worley • September 2009
DATA POINTED   datapointed.net
Location data courtesy of AggData
http://www.aggdata.com/