

CSCI 1581 Laboratory 7

Character, Strings, and Files

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Introduction

In this lab we will learn to work with strings and files. Strings are one of the most important data types as they can be used to convey all kinds of information. We can think of websites as just strings of HTML, CSS, and JavaScript that get “read” another piece of software, the web browser. A large portion of the data in databases is strings. This lab will introduce the basics. Later in the semester will cover advanced topics on strings.

Class String

Java unlike many programming languages does not have a string primitive data type. Instead strings are implemented using a class. The consequence of this is strings are objects and as objects have a number of methods that can be called to manipulate them. Learning to use these methods effectively is important.

Comparing Strings

We already know how to check if two strings are identical using `.equals()`. But there are other types of comparison that are useful.

EXERCISE ONE: Let's create a simple program that will ask the user for strings and we can then do comparisons of those strings.

1. Open Gedit to a new file and type in the “boiler-plate” code. Be sure to import the Scanner.
2. In the main method initialize the Scanner and two String variables to hold strings given by the user.
3. Write a loop that will terminate when the user enters “-1”
4. Inside the loop ask the user for two strings and store them in the variables created in step 2.
5. Inside the loop first compare the strings for equality using the `equals` method and use a conditional to print the result (either they are equal or they are not).

6. Next use the `compareTo` method to find out which of the two strings comes first alphabetically.
7. Last use the `length` method to compare the length of the two strings. Print both string's lengths.
9. Save, add, commit, compile, and run your program.

File Processing & Searching Strings

Now that we have some basic tools to use on strings lets look at some more powerful string methods and file operations.

EXERCISE TWO:

1. Open Gedit to a new file and type in the “boiler-plate” code. Be sure to import the `Scanner`.
2. On GitLab create a Lab7 project and clone it to your computer into the `~/1581` directory
3. Go to <http://www.gutenberg.org/files/16780/16780-0.txt> and save the file to `~/1581/lab7` as `declaration.txt`
4. Initialize a new file object for the file `declaration.txt` and initialize the `Scanner` to read that file object.
5. Use the `indexOf` method to find the index of the end of the first sentence.
6. Use the `substring` method to extract the first sentence.
7. Create a `Formatter` object initialized to an output file called `sentence.txt`
8. Use the `format` method of `Formatter` to write the first sentence to the output file
9. Close the input and output files.

10. Add, commit, and push the java file for your program.

Just for Fun

Getting computers to “read” and “understand” text has been a goal of computer science for decades. This field is called natural language processing and is closely related to artificial intelligence. A great book on artificial intelligence, natural language processing, and the nature of what it means for anything, including humans, to be intelligent is *Godel, Escher, Bach: The Eternal Golden Braid*. It is a classic book, and well worth the effort to read, even if you are not going to study artificial intelligence.