Strings and Arrays

2-4-2010
Do you have any questions about the assignment?

Minutes Essay comments
- Seeing the big picture.
- What is Arrays.asList?
- List of common Java syntax?
- How are programs like Eclipse written? In Java?
- Value of different languages in real life. Using Java for the game/graphics. Sprites?
- Does Eclipse only work with Java?
- Why not start in Java?
- Alternate information sources.
- Do you use the Java libraries a lot?

Javadoc and designs
C had enums. What were they supposed to do? What was the problem with them?
Java includes enums as well. They serve the same goals, but lack the pitfalls.
Java enum syntax can get quite complex, but the basic form is simple and very similar to C.
How did you handle errors in C? (Consider the fopen function.)
What are some problems with this method?
■ Error handling in Java is done with exceptions, not return values or flags.
■ Normal exceptions can't be ignored and they don't propagate. Runtime exceptions don't propagate.
For anything that isn't a RuntimeException you have to include handling code. For RuntimeExceptions it is optional.

If you want to deal with a possible exception in the current method do this:
- try {
  statements
- } catch(ExceptionType1 e) {
  statements
- } [catch(ExceptionType2 e) { ...} ...]

If this method can't handle it you add a throws clause to the method and it will go up to the calling method.
- Type name(args) throws ExType[, ...] { ...}
Exceptions also have the advantage that they can provide additional information.

- Stack trace.
- Informative message.

You can create your own exception classes. Strive to have them provide sufficient information for debugging.
How did you represent a string in C? How do we represent a string in Java?

Let's go look at the API for String to see what the Java developers have provided us with.

Strings are immutable so it is very inefficient to build big strings from a lot of little pieces. If you need to do that, use StringBuilder.

It is the only class with an overloaded operator, + for string concatenation.

Functions that look like they mutate the String return a new String instead.

To get a single character, use charAt.
In class we will be going through the same project that is developed in the textbook. It is a drawing program with a somewhat different structure than paint.

In addition to drawing, the application will also have command processing that we can use to extend the power of the application.
To give us a chance to play with strings some let's go ahead and write the beginnings of the command processor.

We want a class that will take a string, break off the first word as the command, then execute the command with the rest of the string as the arguments.

We should go ahead and make two commands, echo and add, that we can test it with.
You'll notice that some of the methods in String say that they take regular expressions (regex). This is a topic that we won't directly cover in this class, but it is a very powerful technique for you to learn.

The java.util.regex package contains the two main classes that are used for regular expressions. The Pattern class has a lot of description about them at the top.
Arrays

- Array syntax in Java is just like it was in C as far as using the arrays. There are significant differences though.
- Array types are made by putting [] after a regular type.
- Array types are object types so your variables are references and should be instantiated with new.
- Arrays have bounds checking and know their length.
- You can't make arrays of generics.
- Each element in the array is like a variable. So for primitives they store values while for object values they are references.
Our command parser was pretty lame in how it picked the command. It definitely isn't very flexible. I want to write a class called ArrayMap and use it to make the code more flexible.
Write the following method:
  * String replaceAll(String s, char f, char t)
This method should return a new string where all instances of f in s have been replaced with t. Don't use the method in String to do exactly this.
Remember to submit your design for assignment #1 today.
Interclass Problem – Write a program where a user types in a line of text and you print out each word in the line and the number of characters in it.