Basics of Java Programming
- Strings and Printing

CSC 1051 – Algorithms and Data Structures I
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Course website:
www.csc.villanova.edu/~map/1051/

Character Strings
- A string literal is represented by putting double quotes around the text
- Examples:
  "This is a string literal."
  "123 Main Street"
  "X"

Lab 1:
- Learn about jGrasp - the programming environment that we will be using in this class
  - Compile and run a java program
- Understand the relationship between a Java class name and the name of the .java file where the class is defined
- Practice using basic Java output statements and adding comments
- Learn about variables, string literals, concatenation. E.g.,
  System.out.println("Howdy " + name);
  System.out.println("The answer is " + x);
  System.out.println("Counting... up: " + (count + 1));
  System.out.println("... and down: " + (count - 1));
- Explore Java syntax
- Experience some errors!

Character Strings
- A string literal is represented by putting double quotes around the text
- Examples:
  "This is a string literal."
  "123 Main Street"
  "X"

Spaces matter in here!
Strings and Printing

The println Method

- In the Lincoln program we invoked the println method to print a character string.
- The System.out object represents a destination (the monitor screen) to which we can send output.

```java
System.out.println("Whatever you are, be a good one.");
```

The print Method

- In the Lincoln program we invoked the println method to print a character string.
- The System.out object represents a destination (the monitor screen) to which we can send output.
- print is similar to the println except that it does not advance to the next line.

```java
System.out.print("Whatever you are, be a good one.");
```

String Concatenation

- The string concatenation operator (+) is used to append one string to the end of another.

"And one more " + "thing"

Hands on:

- Use MyQuote.java as a starting point (program from Lab 1), focus on this part of the code:

```java
System.out.println("Howdy " + name);
System.out.println("The answer is " + x);
System.out.print("Counting... up: " + (count + 1));
System.out.println("... and... down: " + (count - 1));
```

- Try the following:
  1) What if you remove the parentheses around (count + 1)?
  2) What happens if we try this way of breaking a line:

```java
System.out.print("Counting...
up: " + (count + 1));
```
  3) How can we get all this output to print all in one line?

- Other examples (textbook): Countdown.java, Facts.java
Strings and Printing

Escape Sequences

• What if we wanted to print the quote character?
• Let’s try something like this...
  ```java
  System.out.println("I said "Hello" to you.");
  ```

• An escape sequence is a series of characters that represents a special character
• An escape sequence begins with a backslash character (\)
  ```java
  System.out.println("I said "Hello" to you.");
  ```

Some Java escape sequences:

<table>
<thead>
<tr>
<th>Escape Sequence</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>\b</code></td>
<td>backspace</td>
</tr>
<tr>
<td><code>\t</code></td>
<td>tab</td>
</tr>
<tr>
<td><code>\n</code></td>
<td>newline</td>
</tr>
<tr>
<td><code>\r</code></td>
<td>carriage return</td>
</tr>
<tr>
<td><code>\&quot;</code></td>
<td>double quote</td>
</tr>
<tr>
<td><code>\'</code></td>
<td>single quote</td>
</tr>
<tr>
<td><code>\</code></td>
<td>backslash</td>
</tr>
</tbody>
</table>

Example from textbook: Roses.java

```java
//****************************************************************************
// Roses.java
// Author: Lewis/Loftus
//****************************************************************************
public class Roses
{
  // Demonstrates the use of escape sequences.
  public static void main(String[] args)
  {
    System.out.println("Roses are red,
Violets are blue,
Sugar is sweet,
But I have \"commitment issues\",
So I'd rather just be friends
At this point in our \"relationship.\")
  }
}
```

Output

```
Roses are red,
Violets are blue,
Sugar is sweet,
But I have \"commitment issues\",
So I'd rather just be friends
At this point in our \"relationship.\`
```

Quick Check

Write a single println statement that produces the following output:

"Thank you all for coming to my home tonight," he said mysteriously.
Next: variables

From Lab 1:

```java
int x = 42, count = 100;
String name = "Kripke";
System.out.println("Howdy " + name);
System.out.println("The answer is " + x);
name = "Sheldon";
int x = 33;
System.out.println("Howdy " + name);
System.out.println("The answer is " + x);
```

Variables

- A variable is a name for a location in memory
- A variable must be declared by specifying the variable’s name and the type of information that it will hold

```java
int sum;
double milesPerGallon;
String name, petName;
```

Some types of data in Java

<table>
<thead>
<tr>
<th>type</th>
<th>set of values</th>
<th>literal values</th>
<th>operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>char</td>
<td>characters</td>
<td>&quot;A&quot;</td>
<td>compare</td>
</tr>
<tr>
<td>String</td>
<td>sequences of characters</td>
<td>&quot;Hello World&quot; &quot;jackie123&quot;</td>
<td>concatenate</td>
</tr>
<tr>
<td>int</td>
<td>integers</td>
<td>17</td>
<td>add, subtract, multiply, divide</td>
</tr>
<tr>
<td>double</td>
<td>floating-point numbers</td>
<td>3.1415 6.022e23</td>
<td>add, subtract, multiply, divide</td>
</tr>
<tr>
<td>boolean</td>
<td>truth values</td>
<td>true false</td>
<td>and, or, not</td>
</tr>
</tbody>
</table>