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/

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Characters 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 in... 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

```
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

```
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\n... 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));
    System.out.println("... and\n... down: "+ (count - 1));
    ```

  3) How can we get all this output to print all in one line?

- Other examples (textbook): Countdown.java, Facts.java
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.");
  ```

---

Example from textbook: **Roses.java**

```java
//****************************************************************************
// Roses.java
// Demonstrates the use of escape sequences.
//****************************************************************************
public class Roses {
    public static void main (String[] args) {
        System.out.println("Roses are red,\nViolets are blue,\nSugar is sweet,\nBut I have "commitment issues",\nSo I’d rather just be friends\nAt 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.
Strings and Printing

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);
```

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";
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;, &quot;B&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, 12345</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>