Section 1:
**Honor Code:** Like all work for this class, the Emory Honor Code applies. You should do your own work on all problems, unless you are explicitly instructed otherwise. If you get stuck or have questions, ask your instructor or a TA for help.

Initial here to indicate that you followed the Honor Code and this work is your own. __________

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1. (28 pts) For each row of the table, state whether the statement is correct or has an error. If there is an error, describe it. If there is no error, give the value stored by the assignment statement. Evaluate each statement with the original values of the variables. The first row has been completed for you.

Original values of the variables:
- int i1 = 3, i2 = 4, i3 = 6;
- double d1 = 3.0, d2 = 4.0, d3 = 6.0;
- String s1 = "3", s2 = "4", s3 = "654";
- char c1 = 'A', c2 = 'q', c3 = '5';

<table>
<thead>
<tr>
<th>Statement</th>
<th>Error? Y/N</th>
<th>Value (data type) or Error explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>i1 = i2 + i3;</td>
<td>N</td>
<td>10 (int)</td>
</tr>
<tr>
<td>s1 = i1 + i2;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s1 += s2;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s1 = i1 + s1;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s1 = i2 - i3 + s3;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s1 += i2 - i1;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s1 = s1 + i2 - i1;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s1 += c1;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i1 = c1 + c2;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c1 = s1.charAt(1);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c1 = s3.charAt(1);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s1 = s3.substring(0, 2);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d1 += Integer.parseInt(s3);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i1 -= Double.parseDouble(s1);</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i1 += -- c1;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. (22 pts) For each row of the table, evaluate the expression. If there is an error, describe it. If there is no error, give the value and datatype that results from evaluating the expression. The first row has been completed for you.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Error? Y/N</th>
<th>Value (data type) or Error explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5+1</td>
<td>N</td>
<td>6 (int)</td>
</tr>
<tr>
<td>“x = ” + 6 + 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 + 2 + “ = x”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘a’ ++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“5” + “5”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘5’ + 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“55” – “5”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘5’ – 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(char) (‘4’ + 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 + “5” * 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“1” – 4 * 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘a’ % 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. (4 pts) Find the round function in the Math class. Fill in the blanks for the data types in the following program (which does nothing useful) so that the program would compile and run.

```java
public class Problem3 {
    public static void main(String args[]) {
        float x = 1.45f;
        double y = 1.45;
        __________ a = Math.round(x);
        __________ b = Math.round(y);
    }
}
```

4. (6 pts) Access the Java API documentation from the class website. It is linked in the left hand sidebar. In the Java docs, look in the top left corner of the page for a list of packages. For each package listed below, write down the first sentence of the package description, and report how many classes it contains. (Just count classes, not interfaces, exceptions, or whatever else.)

**Example:**

- **java.awt.color**: Provides classes for color spaces. 5 classes (ColorSpace, ICC_ColorSpace, ICC_Profile, ICC_ProfileGray and ICC_ProfileRGB --- you don’t need to list them. I did it to show you what to look for to find the correct answer).
Section 2.

Honor Code: All submissions should include a comment statement near the top of the program of the form:

/* THIS CODE IS MY OWN WORK, IT WAS WRITTEN WITHOUT CONSULTING
 * A TUTOR OR CODE WRITTEN BY OTHER STUDENTS - YOUR NAME */

Cases of apparent plagiarism or collusion will be referred to the Honor Council.

Preparation: To disallow other students from reading your homework programs, you must save your file(s) in a directory inside your cs170 directory. If you follow the below commands, your work will be protected.

1. Create a directory called hw3 directory inside your cs170 project directory to save your hw3 files.
   
   ```
   mkdir ~/cs170/hw3
   ```

2. You must use ~/cs170/hw3 directory as your current directory when editing any program files for hw3. Change your current directory to your newly created hw3 directory:
   
   ```
   cd ~/cs170/hw3
   ```

3. You can now run gedit to edit your programs:
   
   ```
   gedit yourProgramName.java &
   ```

The name yourProgramName is the name of the Java program (and also the name of the class!).
1. (40 pts) Write a Java class named `StringOperation`, which should behave as following:
   1) Prompt the user to enter a String.
   2) Output the last letter (character) of the input String and its Unicode value.
   3) Output the last digit of the obtained Unicode value.
   4) Output the square root of the digit (now treat the digit as a number).
   5) Note: each output should be on a separate line.

**Sample output:**
Your program output should resemble the following:

1. >>> java StringOperation
   Please input a String: java
   The last letter is: a
   Its Unicode value is: 97
   The last digit is: 7
   Its square root is: 2.6457513110645907

2. >>> java StringOperation
   Please input a String: cs170
   The last letter is: 0
   Its Unicode value is: 48
   The last digit is: 8
   Its square root is: 2.8284271247461903

3. >>> java StringOperation
   Please input a String: hello!
   The last letter is: !
   Its Unicode value is: 33
   The last digit is: 3
   Its square root is: 1.7320508075688772

**Submission:**
- Submit your work using the following commands. You need to be in your ~/cs170/hw3 directory when you issue them.
  - /home/cs170001/turnin StringOperation.java hw3
- Your homework is not turned unless the above commands are successful (you will get a "success" message when turn in was successful).