1. (20 pts) Write the values that will be printed to the console by the program below:

```java
int x = 2;
int y = 5;
int z = 3;

z += y *= x -= 2;
System.out.println(x);
System.out.println(y);
System.out.println(z);
x = 3; y = 4;
z = x++ * --y;
System.out.println(x);
System.out.println(y);
System.out.println(z);
```

x: 0
y: 0
z: 3
x: 4
y: 3
z: 9

2. (20 pts) Complete the table below. For each Boolean expression, state whether the expression is correct or has an error. If there is no error, give the result (true or false) of the expression. Evaluate each expression with the original values given for the variables. The first row has been completed for you.

```java
int i = 4;
double x = 4;
```

<table>
<thead>
<tr>
<th>Expression</th>
<th>Error?</th>
<th>Result (if no error)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x &gt; 2</td>
<td>No</td>
<td>true</td>
</tr>
<tr>
<td>'a' &gt; 'A'</td>
<td>No</td>
<td>true</td>
</tr>
<tr>
<td>i &gt;= x &amp;&amp; i &lt; 3 &amp;&amp; x &gt; 3</td>
<td>No</td>
<td>false</td>
</tr>
<tr>
<td>0 &lt; i &lt; 10</td>
<td>Error</td>
<td></td>
</tr>
<tr>
<td>x != 4</td>
<td></td>
<td>i != 3</td>
</tr>
<tr>
<td>((x == 4)</td>
<td></td>
<td>true) &amp;&amp; false</td>
</tr>
</tbody>
</table>
3. (30 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 = 5,   i2 = 2,   i3 = 7;
double d1 = 5.0, d2 = 2.0, d3 = 7.0;
String s1 = "5", s2 = "2", s3 = "7";
```

<table>
<thead>
<tr>
<th>Assignment statement</th>
<th>Error?</th>
<th>Reason for Error OR value stored</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>i1 = i2;</code></td>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td><code>d1 = -d2;</code></td>
<td>No</td>
<td>-2.0</td>
</tr>
<tr>
<td><code>i1 = i2 + i3;</code></td>
<td>No</td>
<td>9</td>
</tr>
<tr>
<td><code>d1 = i1 + i3;</code></td>
<td>No</td>
<td>12.0</td>
</tr>
<tr>
<td><code>d1 = i2 + d2;</code></td>
<td>No</td>
<td>4.0</td>
</tr>
<tr>
<td><code>s1 = i1 + i3;</code></td>
<td>Yes</td>
<td>Trying to assign an integer to a String variable.</td>
</tr>
<tr>
<td><code>s1 = s2 + s3;</code></td>
<td>No</td>
<td>&quot;27&quot;</td>
</tr>
<tr>
<td><code>s1 = i1 + s1;</code></td>
<td>No</td>
<td>&quot;55&quot;</td>
</tr>
<tr>
<td><code>s1 = i2 - i3 + s3;</code></td>
<td>No</td>
<td>&quot;-57&quot;</td>
</tr>
<tr>
<td><code>s1 = s3 + i2 - i1;</code></td>
<td>Yes</td>
<td>Cannot subtract int from string</td>
</tr>
<tr>
<td><code>s1 = s3 + i2 * i1;</code></td>
<td>No</td>
<td>&quot;710&quot;</td>
</tr>
</tbody>
</table>

Note: there is no − (minus) operation defined for Strings in Java.
4. (30 pts) You are given the following variable definition:

```java
char c;
String s = "Hello Emory Computer Science Students";
```

You can assume that the `char` typed variable `c` is initialized with Unicode of some character.

a) (10 pts) Write Java statement(s) that prints the message "it is a lowercase vowel" if the variable `c` contains the code for 'a', 'e', 'i', 'o', or 'u' (i.e., a vowel but not capitalized). The statement(s) should not print anything otherwise.

```java
if (c == 'a' || c=='e' || c=='i' || c=='o' || c=='u') {
    System.out.println("it is a lowercase vowel");
}
```

Note: could have 5 separate if statements, but this would be less efficient.

Scoring:

- +1 for each correct comparison to lowercase vowel
- +3 correct use of if stmt(s)
- +2 prints information correctly

b) (10 pts) Write Java statement(s) that update the Unicode in variable `c` to the corresponding upper case letter if the variable `c` contains a code for a lower case letter. The statement(s) should not update the variable `c` otherwise.

answers vary but something like these:

```java
if (c <= 'z' && c>= 'a') {
    c = (char)(c – 'a' + 'A')
}
if (c <= 122 && c >= 97) {
    c = (char)(c - 32);
}
```

- +4 correctly identifies whether c is lowercase
- +4 correctly updates c to uppercase
- +2 correct use of if-stmt

c) (10 pts) Write a Java statement that stores the string "Emory Science Students" into a `String` typed variable named `greeting` by extracting substrings from the string variables `s` and concatenating them together.

```java
String greeting = s.substring(6,12) + s.substring(21,37);
```

- +3 each correct word (Emory, Science, and Students)
- +1 correct spacing