1. What is the output of the following? Explain.
   ```java
   int cnt = 0;
   for (int j = 0; j < 5; j++) {
       for (int i = 0; i < 6; i++) {
           cnt++;
       }
   }
   System.out.println("cnt = " + cnt);
   ```

2. What is the output of the following? Explain.
   ```java
   int cnt = 0;
   for (int j = 0; j < 5; j++) {
       cnt++;
       for (int i = 0; i < 6; i++) {
           cnt++;
       }
   }
   System.out.println("cnt = " + cnt);
   ```

3. Write a nested for-loop that prints (8 rows and 10 columns)
   ```
   * * * * * * * * * *
   * * * * * * * * * *
   * * * * * * * * * *
   * * * * * * * * * *
   * * * * * * * * * *
   * * * * * * * * * *
   * * * * * * * * * *
   * * * * * * * * * *
   ```

4. Add numbering to each row in problem 1:
   ```
   0 * * * * * * * * * *
   1 * * * * * * * * * *
   2 * * * * * * * * * *
   3 * * * * * * * * * *
   4 * * * * * * * * * *
   5 * * * * * * * * * *
   6 * * * * * * * * * *
   7 * * * * * * * * * *
   ```
5. Modify problem 2 to give the triangular shape below (do not use an if-else statement – just modify the bounds of one of the loops instead):

```
0
1 *
2 **
3 ***
4 ****
5 *****
6 ******
7 *******
```

6. Modify problem 2 to give the triangular shape below (do not use an if-else statement – just modify the bounds of one of the loops instead):

```
0 ****** ****** ******
1 ****** ****** ******
2 ****** ****** ******
3 ****** ****** ******
4 ****** ****** ******
5 ****** ****** ******
6 ******
7 *
```

7. Add an if-else statement to problem 2 to eliminate one column:

```
0 ****** ****** ******
1 ****** ****** ******
2 ****** ****** ******
3 ****** ****** ******
4 ****** ****** ******
5 ****** ****** ******
6 ******
7 *
```

8. Add an if statement to problem 2 to eliminate one row:

```
0 ****** ****** ****** ******
1 ****** ****** ****** ******
2 ****** ****** ****** ******
3 ****** ****** ****** ******
4 ****** ****** ****** ******
5 ****** ****** ****** ******
6 ****** ****** ****** ******
7 ****** ****** ****** ******
```
9. To problem 2, add an if-else statement (with a condition that makes use of the mod function) to generate the checkerboard pattern:

```
0 * * * * *
1 + + + + +
2 * + + + *
3 * * + * *
4 * * * * *
5 * * * * *
6 * * * * *
7 * * * * *
```

10. Use for-loops to print the multiplication table. Use tabs (the escape sequence "\t") for the spacing:

```
<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>
```

If you don’t know how to begin, break the problem into easier parts:

a. Do a single for-loop to generate the top labels:

```
<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>
```

b. Do a second separate for-loop to generate the side labels to give

```
<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

c. Add a nested loop inside of the second loop, in order to generate the table contents.