# CS-141 Nested Loop Problems

1. What is the output of the following? Explain.

```
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.

```
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:

```
Multiplication Table
        0       1       2       3       4       5
0       0       0       0       0       0       0
1       0       1       2       3       4       5
2       0       2       4       6       8       10
3       0       3       6       9       12      15
4       0       4       8       12      16      20
5       0       5       10      15      20      25
```

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:

```
Multiplication Table
        0       1       2       3       4       5
```

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

```
Multiplication Table
        0       1       2       3       4       5
0
1
2
3
4
5
```

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