**Lab 5 (September 25 or September 26)**

**Instructions:** Complete the steps below. Be sure to show your code to one of the lab TAs before you leave, so that you can receive credit for this lab. You must also upload a copy of all your source code (.java) files to the link on Blackboard by 11:59 PM on Tuesday, September 26.

1. Write a Java program that reads two integer values from the user. The first integer is a value between 1 and 31, inclusive, representing the number of days in a month. The second integer is a value between 0 and 6, inclusive, indicating the offset value (the number of positions that should be skipped for the first row of output. Your program should use the input values to print a simple grid of numbers corresponding to a typical calendar month (i.e., several rows of up to 7 integers each). You do not need to produce perfect spacing, but each "day" should have at least one space between itself and its neighboring values.

   For example, given 31 days and an offset of 2, your program would print something like:

```
        1  2  3  4  5
 6  7  8  9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31
```

   Alternately, given 28 days and an offset of 6, your program would print:

```
                    1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28
```

   **Hint:** Use a variable that counts up from 1 through the total number of days (including the offset value). Call `System.out.println()` after every seventh value to begin the next line of the output.

2. A DNA strand can be represented as a String of characters, where each character represents one of four nucleotide molecules: **A**denosine, **C**ytosine, **G**uanine, and **T**hymine. The DNA strand contains only these four letters, but may have an arbitrary length.

   The *complement* of a DNA strand consists of another sequence of nucleotide molecules, except this time, every nucleotide in the original strand is replaced with a specific different nucleotide. Every Adenosine nucleotide is replaced by a Thymine (and vice-

versa), and every Cytosine is replaced by a Guanine (and vice-versa). For example, the complement of ACTGA would be TGACT.

Finally, the *reverse complement* of a DNA strand is identical to the complement of that strand, except the order of the bases is reversed. For example, the reverse complement of the sample DNA strand above would be TCAGT (the complement sequence, only in reverse).

Write a Java program that reads in a `String` representing a DNA strand. You may assume that the input `String` is completely capitalized, and *only* contains the four letters A, C, G, and T. Your program should print out a new `String` that corresponds to the reverse complement of the input String.

**Grading Guidelines:** This lab is graded on a scale of 0-3 points, assigned as follows:

0 points: Student is absent or does not appear to have completed any work for the lab

1 point: Student has written only one program, but it does not compile or run at all due to errors.

2 points: Student has written (or attempted to write) both programs, but only one compiles and runs without error.

3 points: Student has written both programs, and they both compile and run correctly, without any apparent errors.