CSCI-C212/A592 – Intro to Software Systems
Spring 2017

Assignment 3
*Due by 2/24/2017, Friday midnight through Canvas*

Instructions:

- Review the requirements given below and complete **all three** parts from below. Please submit all files through Canvas.
- The grading scheme is provided on Canvas. Be sure that your code includes everything required in the grading rubric.

Part 1: Tic-Tac-Toe

Write a program that plsys tic-tac-toe. The tic-tac-toe game is played on a 3x3 grid as in the image shown below.

The game is played by two players, who take turns. The first player marks moves with a circle, and the second with a cross. The player who has formed a horizontal, vertical or diagonal sequence of three marks wins. Your program should draw the game board, ask the user for the coordinates of the next mark, change the player after every successful move, and pronounce the winner.
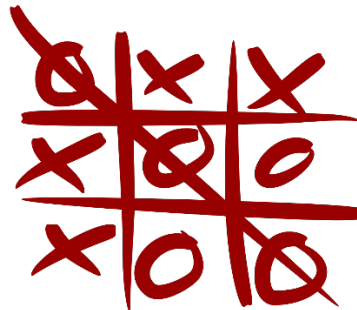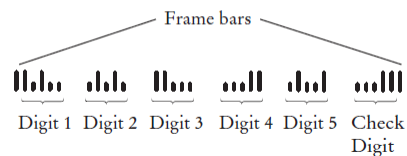

Part 2:

For faster sorting of letters, the United States Postal Service (USPS) encourages companies that send large volumes of mail to use a bar code denoting the ZIP code (see image).

The encoding scheme for a five-digit ZIP code is shown below. There are full-height frame bars on each side. The five encoded digits are followed by a check digit, which is computed as follows:

Add up all digits, and choose the check digit to make the sum a multiple of 10. For example, the sum of the digits in the ZIP code 95014 is 19, so the check digit is 1 to make the sum equal to 20.

Digit	Weight				
	7	4	2	1	0
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	0
4	0	1	0	0	1
5	0	1	0	1	0
6	0	1	1	0	0
7	1	0	0	0	1
8	1	0	0	1	0
9	1	0	1	0	0
0	1	1	0	0	0

Each digit of the ZIP code, and the check digit, is encoded according to the table at right, where 0 denotes a half bar and 1 a full bar. Note that they represent all combinations of two full and three half bars. The digit can be computed easily from the bar code using the column weights 7, 4, 2, 1, 0. For example, 01100 is

$$0 \cdot 7 + 1 \cdot 4 + 1 \cdot 2 + 0 \cdot 1 + 0 \cdot 0 = 6$$

The only exception is 0, which would yield 11 according to the weight formula.

Write a program that asks the user for a ZIP code and prints the bar code. Use : for half bars, | for full bars. For example, 95014 becomes

||:|:::|:|:||:::::::||:|::|:::|||

(Alternatively, write a graphical application that draws real bars.)

Your program should also be able to carry out the opposite conversion: Translate bars into their ZIP code, reporting any errors in the input format or a mismatch of the digits.

Part 3:

There are three files provided on Canvas for debugging purposes. Those are named:

- LowerCaseString.java,
- Student.java,
- Word.java.

Fix all errors and ensure that the programs work as described in comments above the code. Submit the corrected files on Canvas with comments **identifying what was the error/bug**