Assignment #2 – Lingo Board

Prepare to work on this assignment by creating a work folder called assign2 in your w-number folder. Call your program LingoBoard#.java, where the # is whichever version you are working on at the time. You must start with version 1 (LingoBoard1.java) and get it working before moving on to version2 (LingoBoard2.java), etc.

Rules

In the full Lingo™ game, players are given a Lingo board, which is a 5 x 5 grid of 2-digit integers, all different. 10 numbers are randomly covered (but not so that 5 in a row are covered anywhere on the board), leaving 15 numbers. The remaining 15 numbers are left on the board, and matching numbered balls are placed in a bag. When players successfully solve a puzzle, they earn 25 points and draw two balls from the bag. The numbers drawn are covered on the board. If either of the numbers drawn result in 5 covered numbers in a row (horizontally, vertically, or diagonally), they earn 100 extra points for a “LINGO”, and are given a fresh Lingo board and bag of numbered balls. Players continue accumulating score, solving puzzles and drawing balls, until they fail to solve a puzzle in 6 guesses.

For example, the following board is generated randomly to start with:

\[
\begin{array}{ccccc}
70 & 66 & 37 & 44 & 57 \\
31 & 19 & 48 & 91 & 28 \\
58 & 63 & 71 & 61 & 62 \\
73 & 15 & 96 & 51 & 32 \\
92 & 74 & 17 & 16 & 46 \\
\end{array}
\]

Note that no two numbers are the same! Then 10 numbers are randomly covered:

\[
\begin{array}{ccccc}
70 & XX & 37 & XX & 57 \\
31 & 19 & XX & 91 & XX \\
58 & XX & XX & 61 & 62 \\
XX & XX & XX & 51 & XX \\
92 & 74 & 17 & XX & 46 \\
\end{array}
\]

Note that none of the covered numbers make 5 in a row in any direction. Next the players solve a puzzle, scoring 25 points and draw 61 and 44. Each is covered as it is drawn, but neither number makes 5 in a row, so the board is left at:

\[
\begin{array}{ccccc}
70 & XX & 37 & XX & 57 \\
31 & 19 & XX & 91 & XX \\
58 & XX & XX & 61 & 62 \\
XX & XX & XX & 51 & XX \\
92 & 74 & 17 & XX & 46 \\
\end{array}
\]

and they play another puzzle. In this case, they solve the second puzzle as well, so they score another 25 points, for a total of 50 points, and they draw another 2 balls. The first ball drawn is 51, so 51 is covered on the board, making 5 in a row horizontally. This is a LINGO, so a second ball is not drawn. They score 100 points for a total of 150 points, and the board is shown with the LINGO:

\[
\begin{array}{ccccc}
70 & XX & 37 & XX & 57 \\
31 & 19 & XX & 91 & XX \\
58 & XX & XX & 62 & L \\
I & N & G & O & \\
92 & 74 & 17 & XX & 46 \\
\end{array}
\]

Then a new Lingo board is generated, 10 numbers covered, and the game continues.
**Version 1**

Write a program to generate a lingo board and cover 10 numbers. Display the board with all numbers and then with 10 numbers covered, as shown in the example above. Remember that you can generate a random integer from $n$ to $m$ (inclusive) with the formula:

$$(\text{int})(\text{Math.random()} * (m-n+1)) + n$$

For this version, you don’t have to prevent 5 covered numbers in a row, but you must make sure that no numbers are duplicated. Make good use of methods to modularize your design for this program.

*When you get this version of LingoBoard working, make sure you include the required comments (including descriptive comments for each variable and method in your program), and then commit it with the log message "LingoBoard version 1" (it should be named LingoBoard1.java). If everything is correct, you will earn 70 points (C level) for Assignment #2.*

**Version 2**

Fix your lingo board so that none of the 10 covered numbers make 5 in a row either horizontally, vertically, or diagonally.

*When you get this version of LingoBoard working, make sure you include the required comments (including descriptive comments for each variable and method in your program), and then commit it with the log message "LingoBoard version 2" (it should be named LingoBoard2.java). If everything is correct, you will earn 85 points (B level) for Assignment #2.*

**Version 3**

After displaying the lingo board with 10 covered numbers, ask the user to pick one of the remaining numbers, cover it, and display the new board. Continue picking a number, covering it, and displaying the new board until 5 numbers in a row are covered horizontally, vertically, or diagonally. When this happens, display the board again with the letters L, I, N, G, O replacing the numbers in that row.

*When you get this version of LingoBoard working, make sure you include the required comments (including descriptive comments for each variable and method in your program), and then commit it with the log message "LingoBoard version 3" (it should be named LingoBoard2.java). If everything is correct, you will earn 100 points (A level) for Assignment #2.*

**What to turn in**

Commit versions 1, 2, and 3 in sequence as high as you can before the beginning of class on Tuesday, September 25, 2007. Remember that you may commit multiple times for each version if you wish (and it is a good idea to do so for every major change or at the end of each work session). You don’t have to make it all the way up to any version 1, but of course, if you do, your grade will be higher (as long as it is correct). Remember to have fun, and get help from the instructor when you need it!