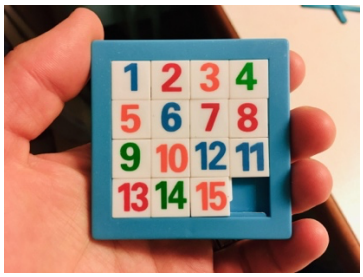
CSCE485 Mobile Application Development
Summer 2024

Assignment 1 – JAVA: The 15 Puzzle

Introduction

According to Wikipedia, the 15 puzzle (also called Gem Puzzle, Mystic Square, and many others) is a sliding puzzle with 15 square tiles numbered 1–15 in a frame 4 tiles high and 4 tiles wide, leaving one unoccupied tile position. Tiles in the same row or column of the open position can be moved by sliding them horizontally or vertically, respectively. The goal of the puzzle is to place the tiles in numerical order. Check https://15puzzle.netlify.app/ if you are not familiar with the puzzle.



The assignment

The objective of this assignment is to develop the 15 Puzzle in Java. Your implementation has to comply with the following:

- All game data and logic must be handled by an object called *puzzle* (An instance of a class called *Puzzle*)
  - The 4x4 grid (also referred to as board) is stored as an array
  - The *Puzzle* class provides public methods to update and query the board data.
  - The *Puzzle* class provides public methods to validate a move and check whether the board is sorted.
- The user interactions (printing the board and accepting the player input) must be handled by an instance (*view*) of a class called *View*
  - The *View* class provides a public method to read the user's input.
  - The *View* class provides a public method to print the board (see below).
- An instance (*ctrl*) of a third class called the *Ctrl* creates the above two objects (puzzle and view) and glues them together. The class *Ctrl* provides a method (*play*) to link the objects' interfaces. The *main()* method (of the public class *Game*) instantiates *ctrl* and calls its method *play()*.

Here is an example of a gameplay session:

```
        1       2       3       4
a               2       10      15
b       1       3       9       12
c       4       5       6       8
d       7       14      13      11
Your move: b1

        1       2       3       4
a       1       2       10      15
b               3       9       12
c       4       5       6       8
d       7       14      13      11
Your move: c1

        1       2       3       4
a       1       2       10      15
b       4       3       9       12
c               5       6       8
d       7       14      13      11
Your move:
.
```

```
.
.

        1       2       3       4
a       1       2       3       4
b       5       6       7       8
c       9       10      11      12
d       13      14              15
Your move: d4

        1       2       3       4
a       1       2       3       4
b       5       6       7       8
c       9       10      11      12
d       13      14      15
Well done! You solved the puzzle in 35 moves!

Play again (Y/N)?
```

Hint: The following Java code demonstrates reading an integer from the stdin:

```
import java.util.Scanner;
//...
String move;
Scanner in = new Scanner(System.in);
move = in.nextLine();
```

Hint: You may use the online Java IDE https://replit.com or any other online IDE for development.

Submission guidelines

- Submit the assignment through BB before June 13th, 2024 (11:59 PM)
- You must submit 2 files: Game.java and readme.txt
- The file readme.txt contains instructions on how to run the game and outlines any implementation issues. You may add any other information to it.