

CmpE 150 Introduction to Computing
Fall 2016
Project 2—Due: 23/11/2016, 9am

(INDIVIDUAL PROJECT) You will write an interactive program to play a board game. The board is of size $4 * 4$ and is made of cells that contain letters. Below is the default configuration of the board:

```
| A | B | G | E |  
| R | T | F | F |  
| A | K | E | M |  
| G | V | J | A |
```

The cells of the board can be identified using coordinates. The cell in the top left corner has coordinate (1,1) whereas the lower right corner has coordinates (4,4). For example, in the picture, **J** has coordinates (4,3); **A** has coordinates (1,1), and **T** has coordinates (2, 2).

The user plays the game by swapping two letters on the board. The user makes the swap by giving coordinates as input. The user collects points if she can align two of the same characters next to each other horizontally. The total points of the board is equal to the number of same letters that are next to each other.

The user can choose the initial configuration of the board. If that is the case, you need to ask the user for four strings, where each string corresponds to a row of the board. Assume that the users will enter the correct number of strings in correct form. For example, in the above board configuration, the first row can be represented with "ABGE".

Sample Runs:

Welcome to this weird game of SWAP

Do you want to use the default board configuration? No

Enter row 1 of the board: PGPG

Enter row 2 of the board: OXXO

Enter row 3 of the board: JOPP

Enter row 4 of the board: KJHG

This is the board configuration now:

PGPG

OXXO

JOPP

KJHG

How many moves do you want to make? 3

Make a move and press enter. After each move, the board configuration and your total points will be printed. Input the coordinates to be swapped.

1 1 1 2

This is the board configuration now:

GPPG
OXXO
JOPP
KJHG

Your total score is 3.

1 2 1 4

This is the board configuration now:

GGPP
OXXO
JOPP
KJHG

Your total score is 4.

3 1 4 1

This is the board configuration now:

GGPP
OXXO
KOPP
JJHG

Your total score is 5.

Thank you for playing this game.

Welcome to this weird game of SWAP

Do you want to use the default board configuration? Yes

This is the board configuration now:

ABGE
RTFF
AKEM
GVJA

How many moves do you want to make? 2

Make a move and press enter. After each move, the board configuration and your total points will be printed. Input the coordinates to be swapped.

3 1 4 3

This is the board configuration now:

ABGE

RTFF
JKEM
GVAA

Your total score is 2.

3 3 1 3

This is the board configuration now:

ABEE
RTFF
JKGM
GVAA

Your total score is 3.

Thank you for playing this game.

Bonus: After printing "This is the board configuration now:", print a hint on which two coordinates should be swapped so that the user can receive the maximum points.

Implementation: Please make sure that you follow the following rules in your implementation:

1. Your program should have at least two static methods in addition to your main method. These methods have to take at least one parameter and return a value.
2. You are not allowed to use arrays or while loops. You can use for loops and if statements of any kind as well as any methods of the String class.

Submission: You will submit a project report and your code over Moodle. Your program should be named with your initials and your student number together (e.g., OS2013800027).

Project report should consist of five sections. These are:

1. Problem Description: In this section, you should describe the problem in your words.
2. Problem Solution: In this section, you should specify the concepts (methods, for loop, etc.) that you use in your program. Explain each one (i.e. why you need it, what you accomplish by using it, so on.). Report how many for loops you use.
3. Implementation: This section will include your whole code with comments. You need to pay attention to indentation in order to improve readability.
 - Do not forget to explain each variable that you use (i.e. `int count=0; // count is the number of items`).
 - Before each method, specify what the method does (i.e. `/* This method . */`)
4. Output of the program: A screen-shot of your program output should be put in this section.
5. Conclusion: You should evaluate your work here. State whether you have solved the problem correctly. If not, state what is missing, what could have been improved, and so on.

Your .java file should be named with your initials and your student number together (e.g., OS2013800027). You will submit these over Moodle as a single zip file where the file name is your student number. Your zip file should consist of your .java file and your report in .doc or .pdf format.

Partial Submission: If you cannot do everything above, you should still submit your code as well as your report. Try to do as much as possible.

Late Submission: Any submission after the deadline is considered late and will not be accepted.