Project Specification – Fall 2017
Due: Nov 27, 2017 by the end of the day

You are implementing a strategy board game played by two players, Black and White. It is played on an N by N board. The winner is the player who has more discs of his color than his opponent at the end of the game. This will happen when neither of the two players has a legal move or there are no spaces left on the board

Starting Position

At the beginning of the game, two black discs and two white discs are placed in the middle of the board.
Black always begins, and the two players subsequently take turns moving.

Making a Move

At his turn, a player must place a disc of his color on one of the empty squares of the board, adjacent to an opponent's disc. No two matching colors are connected vertically or horizontally so a miniature-chequered pattern is made

The Game

Both players take it in turns to make their move which consists of placing one piece down in a legally acceptable position and then turning any of the opposing player's pieces where applicable.
A legal move is one that consists of, for example, a black piece being placed on the board that creates a straight line (vertical, horizontal ***or diagonal which diagonal is optional for this project***) made up of a black piece at either end and only white pieces in between. When a player achieves this, they must complete the move by turning any white pieces in between the two black so that they line becomes entirely black. This turning action must be completed for every legal turning line that is created with the placing of the new piece.
Players will then continue to move alternately until they get to the end of the game and a winner is decided. This decision is reached by identifying which of the two opponents has the most pieces on the board.

Different version of the Game

1. **Player versus the computer** ***(Mandatory for this project)***
2. Computer versus computer ***(Optional for this project)***
3. Player versus player ***(Optional for this project)***

A) Draw a UML class diagram. Identify classes and the relation between them (for example inheritance or aggregation)

- Use a standard tool to draw UML diagram such as starUML which you can download it from http://staruml.io/download. Manual UML class diagrams are not accepted.

B) Convert the class diagram to java classes.

Note:

- NUM_OF_PLAYERS = 2
- NUM_OF_ROW = N
- NUMBER_OF_COLUMN = N
- Color is either black “B” or “W”

** You can find a sample run at the end of this file.

Grading Criteria

The project is an individual project. Please do not collaborate with other students. Copying, in whole or in part, from other sources will be considered an act of scholastic dishonesty. This policy includes copying from other students, from assignments from previous semesters or from the Internet.

The project will be posted in eLearning and should be turned in via eLearning ONLY. No e-mail submissions are accepted. No late submissions are accepted. Submissions should contain:

1) A class diagram for your solution drawn using a UML tool such as starUML. (you can download it from http://staruml.io/download.) Manual solutions are not acceptable.

2) Zip all the source codes (.java) in a zip file. PLEASE INCLUDE A COMMENT SECTION AT THE BEGINNING OF YOUR CODE WITH YOUR NAME, LASTNAME, SECTION NUMBER, AND DESCRIBE HOW TO RUN YOUR PROGRAM.

Project will be graded on a 100-point basis, utilizing the following criteria:

Summary **Review details for grading in GradingCriteria.pdf file in elearning			
Criteria			**Points**
Source Code	Program Design	20	45
	Comments	10	
	Code Style	15	
Execution	Program Execution	15	45
	Specification	30	
Documentation	UML Class Diagram	10	10
Total			**100**
Optional for this project	Diagonal move	5	15
	Player vs player	5	
	Computer vs computer	5	
Total			115

Sample Run for computer versus computer version

Initial game with 4 by 4 board and two white ”W” discs and two black “B” discs in the middle of the board:

```
____
_WB_
_BW_
____

Success: Black move at (1, 0)

____
BBB_
_BW_
____

Score: Black: 4, White: 1
Success: White move at (2, 0)

____
BBB_
WWW_
____

Score: Black: 3, White: 3
Success: Black move at (3, 1)

____
BBB_
WBW_
_B__

Score: Black: 5, White: 2
Success: White move at (0, 0)

W___
WBB_
WBW_
_B__

Score: Black: 4, White: 4
```

```
Success: Black move at (2, 3)

W___
WBB_
WBBB
_B__

Score: Black: 6, White: 3
Success: White move at (1, 3)

W___
WWWW
WBBB
_B__

Score: Black: 4, White: 6
Success: Black move at (0, 3)

W__B
WWWB
WBBB
_B__

Score: Black: 6, White: 5
Success: White move at (3, 2)

W__B
WWWB
WBWB
_BW_

Score: Black: 5, White: 7
Success: Black move at (3, 3)

W__B
WWWB
WBWB
_BBB

Score: Black: 7, White: 6
Game over. No moves found for White
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