

## COMP 1451 Lab 8-b ( 10 points )

### Take-home lab

For this lab you will write four classes:

**GamePiece** is an abstract class used in a game like chess. It has a `String` field that indicates how a piece is to be displayed on the terminal, e.g. "X".

`GamePiece` has a method with this signature:

```
public abstract boolean isLegalMove(Location a, Location b)
```

**LabPiece** is a subclass of `GamePiece`.

Pieces move on a board, in this case a two-dimensional array. A legal move for `LabPiece` is to a position where either the row or the column, or both row and column, have a higher index position on the board. Neither row nor column can be to a lower index value. A piece can land on top of another piece and replace it.

**Board** has a two-dimensional grid (4 rows and 4 columns) of `GamePiece` objects. When picturing the board, imagine row 0, column 0 in the top left corner.

`Board` has a method that populates the board to place a piece in every location. For now, there is only one kind of piece so they are all the same.

`Board` has a method that displays the board contents as a grid. An empty location is indicated by "-".

`Board` has a method to move a piece:

```
public void movePiece(Location from, Location to)
```

This method checks to see if the proposed move can be made. If either of the locations is outside the boundary of the board, the move cannot be made. If there is no piece in the "from" position the move cannot be made. If the game piece at the "from" location reports that the move is not legal, the move cannot be made. If the move cannot be made the method displays an appropriate error message. If the move can be made it moves the piece and sets the "from" location to null.

**Location** has an x-position and a y-position to indicate the coordinates of a `GamePiece` on a `Board`, with appropriate accessor methods.

Test your classes by creating `Location` objects and passing them to the `Board's` `movePiece()` method.

The take-home lab is due the night before the next class. Upload it to the appropriate D2L dropbox by the deadline. A suggested solution will be discussed in class and labs not already in the dropbox will not receive any points.