

## Lab 2

Design a console based 2048 puzzle. Here is the game description(source: Wikipedia)

*2048 is played on a 4×4 grid, with numbered tiles that slide smoothly when a player moves them in either of the four valid directions(Left, right, up, down). Every turn, a new tile will randomly appear in an empty spot on the board with a value of either 2 or 4. Tiles slide as far as possible in the chosen direction until they are stopped by either another tile or the edge of the grid. If two tiles of the same number collide while moving, they will merge into a tile with the total value of the two tiles that collided. The resulting tile cannot merge with another tile again in the same move*

Maintain a class with the following details:

Class name: MyPuzzle

Instance variable: a 4 by 4 grid( to be initialized to empty)

Methods:

- generateTile: A new tile will randomly appear in an empty spot(spot that has value 0) on the board with a value of either 2 or 4. As you may have guessed, this method must be called in a constructor to set the initial grid. You would also need to make call to this method at the end of moveLeft, moveRight, moveUp, moveDown methods(described below)
- displayGrid: display the content of the grid(basically the matrix status), with empty spots marked by 0
- moveRight: Perform operations when the player would slide tiles to right and display the obtained grid
- moveLeft, moveUp, moveDown: Same as moveRight but in the respective direction.
- isOver: Check for termination condition of the game i.e when there are no empty spaces and no adjacent tiles with the same value
- hasWon: Checks if a tile value is 2048. Prompts with a message 'You Win!' as soon as such a tile is obtained. Player may continue playing.

Create object of this class in the main method of another class called PlayGame and take user input to get directions to call respective method when user input of R should invoke moveRight()

and so on with L for moveLeft, U for moveUp and D for moveDown() and Q to quit the game(terminate your code)

You might want to use an instance of Random class available in `java.util.Random`

Sample test:

Initial grid is

```
0 0 2 0
0 0 0 0
0 0 0 0
0 0 0 0
```

User input: R

```
0 0 0 2
0 0 0 0
0 0 0 0
0 0 0 2
```

User input: U

```
0 0 0 4
0 0 0 0
2 0 0 0
0 0 0 0
```

User input: L

```
4 0 0 0
0 0 0 0
2 0 0 0
2 0 0 0
```

User input: U

```
4 0 0 0
4 0 0 0
0 0 0 0
0 0 0 2
```

User input: Q

Good Bye!

Submission: Mention the author name and roll number in both the .java files. Submit the two .java files compressed to a zip file