# Refactoring Documentation for Project “Game 15”

Team “**BORON**”

1. Redesigned the project structure:
   * Renamed the project to **GameFifteen**.
   * Renamed the main class **Program** to **PlayGameFifteen**.
   * Extracted each class in a separate file with a good name: **GameFifteen.cs**, **Board.cs**, **Point.cs**.
   * Create GameFifteenLiberary project and move there all classes for generating the game there.
   * Change name from Console application User Interface to GameFifteenUI .
2. Reformatted the source code:
   * Removed all unneeded empty lines, e.g. in all methods.
   * Inserted empty lines between the methods.
   * Split the lines containing several statements into several simple lines, e.g.:

|  |  |  |
| --- | --- | --- |
| **if (input[i] != ' ') break;** | **🡪** | **if (input[i] != ' ')**  **{**  **break;**  **}** |

* + Formatted the curly braces **{** and **}** according to the best practices for the C# language.
  + Put **{** and **}** after all conditionals and loops (when missing).
  + Character casing: variables and fields made **camelCase**; types and methods made **PascalCase**.
  + Give appropriate names for fields, properties, methods. Renamed all constant fields, using PascalCase instead of ALL\_CAPS.
  + Formatted all other elements of the source code according to the best practices introduced in the course “[High-Quality Programming Code](http://codecourse.telerik.com/)”.

1. Renamed: variables:  
   * In class Game**Fifteen**: **number** 🡪 **numberOfMoves**.
   * In **Main(string[] args)**: **g** 🡪 **gameFifteen**.
   * Rename switchedindexNumber field to position.
   * Renamed cnt field to movesCount.
   * Rename s field to command.
   * All freeTile appearances in fields and methods renamed to emptyTile.
   * Rename tempTile fields, to currentTile. tileName and tileValue fields renamed to tileLabel.
   * Rename resultMatrix field in ShuffleMatrix() method, renamed to shuffledMatrix.
   * Rename isValidHorizontalNeighbour and isValidVerticalNeighbour to areValidHorizontalNeighbours and areValidVerticalNeighbours.
   * Rename flag field to isMatrixSolved.
   * Rename destinationTileValue field to tileLabel.
   * Rename isSuccessfulParsing field to isMovingCommand.
   * Rename rowCounter field to currentColumn.
   * Rename currentElement to currentTile.
   * Rename tileLabelInt and parsedLabel fields to currentTileLabel.
   * Change method name CommandType to IsCommandValid.
   * scoreboardLine is changed and concatenate of string to string.Format
   * Enum members renamed from camelCase to PascalCase.
2. Refactoring and correct some bugs in methods:

* Refactoring if statements at PlayGameFifteen.cs.
* Refactoring AreValidNeighbours method.
* Make DeleteAllExceptTopFivePlayers method to private and call it every time when add player. We mustn't have more than 5 player in Player list.
* Add CheckPlayerScores method to check if player must be added to playlist, and use it in PlayGameFifteen to ask for player name.
* Add AssemblyInfo.cs to the project so we could add internal method visible for test class.
* Add ClearPlayers internal method and add it to be visible for test class GameFifteenUnitTests
* Correct Players list Sort, it is not working.

1. Introduced constants:
   * MatrixSize = 4.
   * HorizontalNeighbourDistance = 1.
   * VerticalNeighbourDistance = MatrixSize.
   * MinimumMoves = 20.
   * MaximumMoves = 50.
2. Extracted and changing method.

* Remove Empty Tile constructor and correct DetermineEmptyTile and change it's name to GetEmptyTile.
* Remove GenerateNeighbourTilesList - it is unneeded.
* TilePositionValidation method removed.
* Change name PrintScoreboard method from print to the console to return string.
* Remove class Command and change method isValidCommand to one enumeration checking for validate it.
* Change MoveTiles method logic.
* Remove dublicated method AreValidNeighbours().

1. XML Documentation headers added to classes Tile, Scoreboard, PlayGameFifteen, MatrixGenerator, Gameplay, Player and Scoreboard and all their methods, properties and constructors.
2. Unit Tests added - GamePlayTest, MatrixGeneratrTest, ScoreboardTest, TileTest, PlayerTest.