# 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 projectand move there all classes.
   * Change name from Console application to GameFifteen .
2. Reformatted the source code:
   * Removed all unneeded empty lines, e.g. in the method **PlayGame()**.
   * 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**.
  + Appropriate names for fields, properties, methods, given. 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 **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. Introduced constants:
   * MatrixSize = 4.
   * HorizontalNeighbourDistance = 1.
   * VerticalNeighbourDistance = MatrixSize.
   * MinimumMoves = 20.
   * MaximumMoves = 50.
3. Extracted and changing method.

* Remove Empty Tile constructor and correct DetermineEmptyTile and change it to GetEmptyTile.
* Remove GenerateNeighbourTilesList - it is unneeded.
* TilePositionValidation method removed.
* Change name PrintScoreboard method from print to the console to return string.

1. Remove class Command and change method isValidCommand to one enumeration checking for validate it.
2. XML Documentation headers added to classes Tile, Scoreboard, PlayGameFifteen, MatrixGenerator, Gameplay, Player and Scoreboard.
3. Unit Tests added GamePlayTest, MatrixGeneratrTest, ScoreboardTest, TileTest, PlayerTest.
4. Moved method **GenerateRandomNumber(int start, int end)** to separate class **RandomUtils**.