**Refactoring Documentation for Project “Game 15”**

Team “Chlorine”

1. Redesigned the project structure:
   * Renamed the solution to **GameFifteen**.
   * -Extracted each class in a separate file with a good name: **GameFifteen.cs**, **Board.cs**, **Point.cs**.
   * …
2. Reformatted the source code:
   * Removed all unneeded empty lines, e.g. in the method **FillOutGameField**.
   * 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**.
  + 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 **GameFifteen, FillOutGameField(…)**: **rnd** 🡪 **rand**; **matricata** 🡪 **gameField**; **used** 🡪 **usedNumbers**; **isFilled** 🡪 **isPositionFilled**.
   * -In **Main(string[] args)**: **g** 🡪 **gameFifteen**.
   * …
2. Introduced constants:
   * **GAME\_FIELD\_ROWS = 4**
   * **GAME\_FIELD\_COLUMNS = 4**
   * …
3. -Extracted the method **GenerateRandomGame()** from the method **Main()**.
4. -Introduced class **ScoreBoard** and moved all related functionality in it.
5. -Moved method **GenerateRandomNumber(int start, int end)** to separate class **RandomUtils**.
6. Created method **GenerateGameField()** in class **GameFifteen**.
7. Created method **IsSolvable(string[,] gameField)**.
8. Fixed a bug in method (**proverka(string[,] matrica)**).
9. Added some notes in code as comments – will be removed later (**// TODO: …**).
10. “Fixed” some “magic” numbers.
11. Fixed a game logic issue concerning introduction of Exceptions and logic that didn’t expect exceptions (Position(-1, -1)).
12. Added a few tests for **IsSolvable(…)**.
13. Fixed a bug in **IsSolvable(…)**.

…