# Sample Refactoring Documentation for Project “[Bulls-and-Cows-4](https://github.com/Helium-Team/Bulls-and-Cows-4)”

Team “Helium”

1. Redesigned the project structure:
   * Renamed the project to [**BullsAndCows**](https://github.com/Helium-Team/Bulls-and-Cows-4/blob/master/BullsAndCows.sln).
   * Renamed the main class **Program** to **BullsAndCows**.
   * Extracted each class in a separate file with a good name: **CommandReader, ConsolePrinter, GameEngine, NumberGenerator, PlayerCommand, PlayerHelper, ScoreBoard**;
   * Remove existing classes: **Player** and **Score**;
   * Add new classes: **CommandReader, ConsolePrinter, GameEngine, NumberGenerator, PlayerCommand, PlayerHelper, ScoreBoard;**
2. Reformatted the source code:
   * Removed all unneeded empty lines, e.g. in the class ConsolePrinter;
   * Remove variables: attempts and cheats from class GameEngine;
3. Introduced constants:
   * **SHOWED\_TOP\_SCORE = 5;**
4. Introduced class **ScoreBoard** and moved all related functionality in it and make it Singleton.
5. Introduced class **PlayerCommand** and moved enum in it..
6. Introduce class **NumberGenerator** and moved all related functionality in it.
7. Introduce class **PlayerHelper** and moved all related functionality in it.
8. Introduce class **ConsolePrinter** and moved all related functionality in it.
9. Split method **CalculateBullsAndCowsCount (playerInput,  generatedNumber,  out bullsCount,  out cowsCount)** in three different methods **CallculateBullsCount(bool[] isBull), CallculateCowsCount(bool[] isBull), CheckPlayerInputForBull;**
10. Make class PlayerHelper and Number generator static.
11. Add method ClearHlep in class PlayerHelper.