Suduku game

C++ OOP Version

Updates:

- OOP implementation
- Two classes implemented (one friend class)

generator.hpp > GeneratedGrid

```
6
7   class GeneratedGrid {
8       private:
9           int availArr[81][9];    //to generare a solvable 9*9 grid
10
11      protected:
12          int generatedGrid[9][9];
13
14      public:
15          GeneratedGrid();
16          //~GeneratedGrid();
17          int getNum (int row, int col);
18          void setNum (int row, int col, int num);    //it should be guaranteed that the number set is valid (both locatio
19
20          void printGrid();
21
22          //bool spaceAvailable (int row, int col);
23
24          //void initialAvailable();
25          //Given the blank Sudoku grid, the linear fill function will fill in every number into the block
26          //and ensures the filled numbers are legal so that the puzzle is solvable.
27
28          void linearFill();
29
30          bool outOfNumber(int indexAvail);
31          //Determine if there is still an available number in the list
32
33          void replenishSquareNum(int index);
34          //Remove the "count" number of digits from the generated solvable grid in a random manner.
35
36          void removeKDigits();
37
38          bool checkMoveLegal(int userDigit, int userRow, int userCol);
39          bool repeatInSubGrid (int userDigit, int userRow, int userCol);
40          bool repeatInRow (int userDigit, int userRow);
41          bool repeatInCol (int userDigit, int userCol);
42
43          friend class GameGrid;
44  };
45
46
47  #endif
```

game_mode.hpp > ...

```
1   #ifndef _GAME_MODE_H_
2   #define _GAME_MODE_H_
3
4   #include "generator.hpp"
5   #include "stdlib.h"
6   #include "string"
7   #include "fstream"
8
9   class GameGrid {
10      private:
11          int gameGrid[9][9];
12
13      public:
14          GameGrid(GeneratedGrid *gGrid);
15          //~GameGrid();
16
17          void clayColour();
18          void resetColour();
19          void printGrid(GeneratedGrid *gGrid);
20
21          bool gameNotDone();
22          void playing(GeneratedGrid *gGrid);
23          bool notWantToContinue();
24
25          void gameRecord(GeneratedGrid *gGrid);
26          void clearRecord();
27  };
28
29
30  #endif
31
```

First Run

```
Please enter a number to choose the difficulty level (1 (easy), 2 (medium), 3 (hard): 1
     A   B   C    D   E   F    G   H   I

  A  1   5   6 |  2   7   8 |  4   9   3 |

  B  8   4   9 |  1   5   3 |  7   6   2 |

  C  3   7   2 |  6   9   4 |  8   1   5 |
    -----------------------------------------
  D  4   9   7 |  5   6   2 |  1   3   8 |

  E  6   3   1 |  8   4   7 |  2   5   9 |

  F  2   8   5 |  9   3   1 |  6   7   4 |
    -----------------------------------------
  G  9   2   4 |  7   1   5 |  3   8   6 |

  H  7   6   3 |      8   9 |  5   2   1 |

  I  5   1   8 |  3   2   6 |  9   4   7 |
    -----------------------------------------
If you want to restart this game, enter 10.
Exiting the game without finishing it may lead to the loss of data.
Enter the number you want to fill in: 4
Enter the location you want to fill 4 in: (row col): a 1

Invalid location! Please make sure the row and col are capital letters in the range of 'A' to 'I' (inclusive)

Enter the number you want to fill in: p
Invalid input!
Please enter a number from 1 to 9 (inclusive), or 10 to restart the game

Enter the number you want to fill in: 4
Enter the location you want to fill 4 in: (row col): A G

The move is illegal.
Please refer to the rules of sudoku to fill in a valid number

Enter the number you want to fill in: 4
Enter the location you want to fill 4 in: (row col): H D

     A   B   C    D   E   F    G   H   I

  A  1   5   6 |  2   7   8 |  4   9   3 |

  B  8   4   9 |  1   5   3 |  7   6   2 |

  C  3   7   2 |  6   9   4 |  8   1   5 |
    -----------------------------------------
  D  4   9   7 |  5   6   2 |  1   3   8 |

  E  6   3   1 |  8   4   7 |  2   5   9 |

  F  2   8   5 |  9   3   1 |  6   7   4 |
    -----------------------------------------
  G  9   2   4 |  7   1   5 |  3   8   6 |

  H  7   6   3 |  4   8   9 |  5   2   1 |

  I  5   1   8 |  3   2   6 |  9   4   7 |
    -----------------------------------------

You win!
```

- Different difficulty levels result in different number of digits removed
- (for simplicity of demo only one digit is removed)
- Problematic inputs will be caught. The program will tell the user what is wrong with the input
- User inputs have different color to be distinguished.
- Once the board is filled, the single game ends.

Second Run

```
Do you want to continue to the next game?
If you want to clear the past game data, enter 'c'. (y/n/c):
y
Please enter a number to choose the difficulty level (1 (easy), 2 (medium), 3 (hard): 1
     A   B   C    D   E   F    G   H   I

  A  7   5   4 |  8   6   2 |  1   3   9 |

  B  3   9   1 |  5   7   4 |  2   6   8 |

  C  6   8   2 |  1   3   9 |  4   5   7 |
    ------------------------------------
  D  2   4   7 |  9   1   5 |  3   8   6 |

  E  5   6   3 |  4   8   7 |  9   2   1 |

  F  9   1   8 |  6   2   3 |  7   4   5 |
    ------------------------------------
  G  8   2     |  7   4   6 |  5   1   3 |

  H  1   3   5 |  2   9   8 |  6   7   4 |

  I  4   7   6 |  3   5   1 |  8   9   2 |
    ------------------------------------
If you want to restart this game, enter 10.
Exiting the game without finishing it may lead to the loss of data.
Enter the number you want to fill in: 9
Enter the location you want to fill 9 in: (row col): G C

     A   B   C    D   E   F    G   H   I

  A  7   5   4 |  8   6   2 |  1   3   9 |

  B  3   9   1 |  5   7   4 |  2   6   8 |

  C  6   8   2 |  1   3   9 |  4   5   7 |
    ------------------------------------
  D  2   4   7 |  9   1   5 |  3   8   6 |

  E  5   6   3 |  4   8   7 |  9   2   1 |

  F  9   1   8 |  6   2   3 |  7   4   5 |
    ------------------------------------
  G  8   2   9 |  7   4   6 |  5   1   3 |

  H  1   3   5 |  2   9   8 |  6   7   4 |

  I  4   7   6 |  3   5   1 |  8   9   2 |
    ------------------------------------

You win!

Do you want to continue to the next game?
If you want to clear the past game data, enter 'c'. (y/n/c):
n
```

- After one game, the program asks if the user wants to continue.
- Three options are provided, respectively yes/no/clear.
- If y is entered, a new game is generated.
- If n is entered, the program stops.

Game Record File

Game_Record.txt

```
Game number 1
Initial generated game:

1  5  6  2  7  8  4  9  3

8  4  9  1  5  3  7  6  2

3  7  2  6  9  4  8  1  5

4  9  7  5  6  2  1  3  8

6  3  1  8  4  7  2  5  9

2  8  5  9  3  1  6  7  4

9  2  4  7  1  5  3  8  6

7  6  3     8  9  5  2  1

5  1  8  3  2  6  9  4  7

Final solution:

1  5  6  2  7  8  4  9  3

8  4  9  1  5  3  7  6  2

3  7  2  6  9  4  8  1  5

4  9  7  5  6  2  1  3  8

6  3  1  8  4  7  2  5  9

2  8  5  9  3  1  6  7  4

9  2  4  7  1  5  3  8  6

7  6  3  4  8  9  5  2  1

5  1  8  3  2  6  9  4  7

Game number 2
Initial generated game:

7  5  4  8  6  2  1  3  9

3  9  1  5  7  4  2  6  8

6  8  2  1  3  9  4  5  7

2  4  7  9  1  5  3  8  6
```

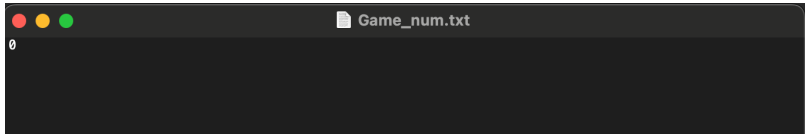
- At this point, the Game_Record.txt file saves the previous games played with game number recorded so that the user can keep track of the previous games.
- Even when the program restarts, the game number is still saved in another text file for the program to read and update.

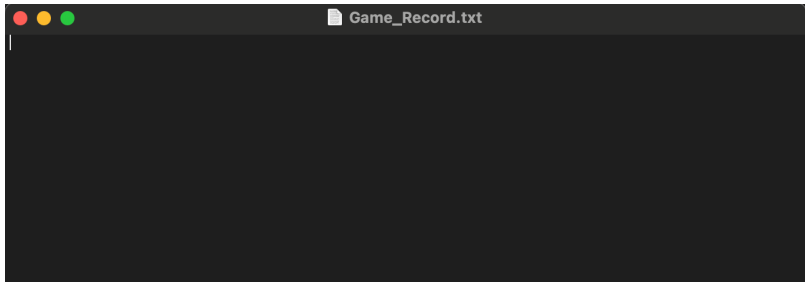
Game_num.txt

```
2
```

Clear record

```
Do you want to continue to the next game?
If you want to clear the past game data, enter 'c'. (y/n/c):
c
```





- When the user enters ‘c’ to clear the record:
- Game_num resets to 0
- Game_Record resets to nothing