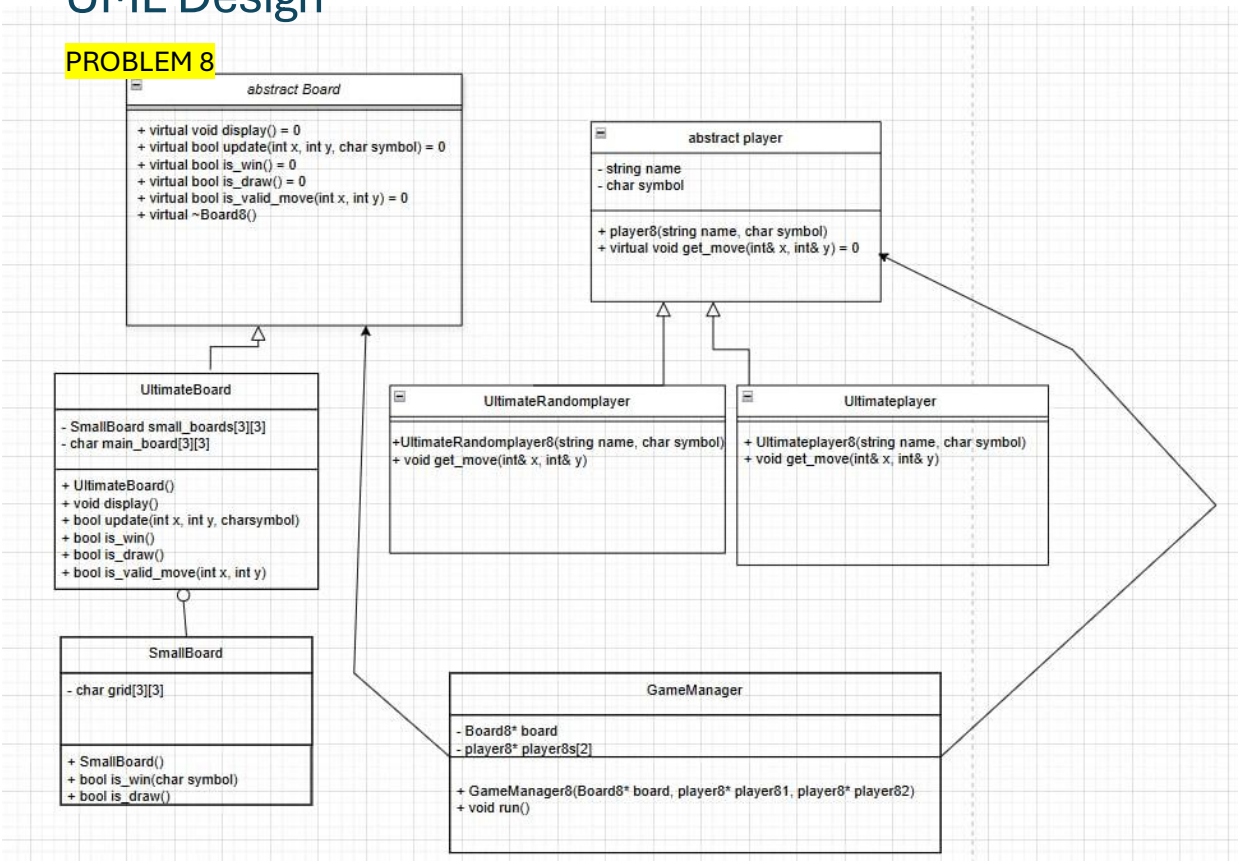
Faculty of Computers and artificial intelligence

CS213 - Object Oriented Programming

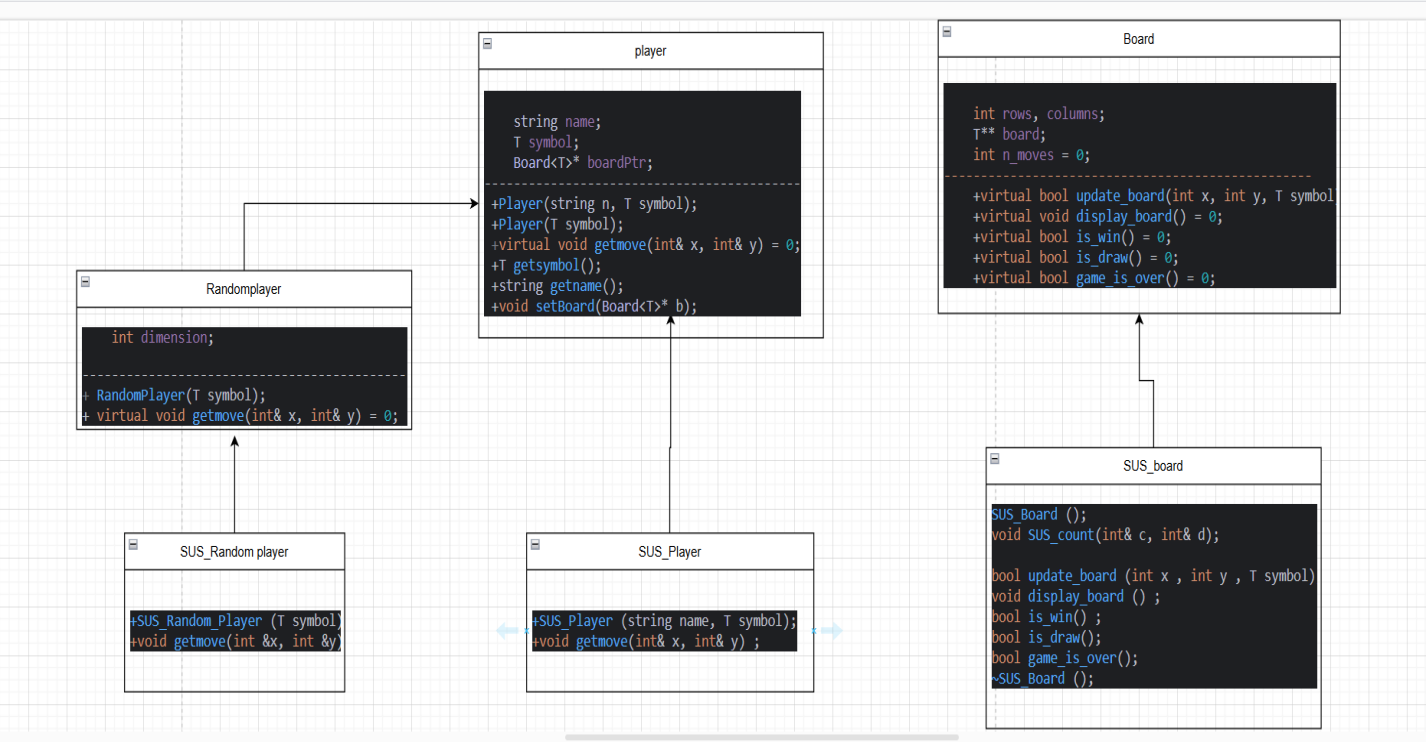
Name	ID	What he has done
Moamen Wael	20230434	Games 2, 5, 9 - Final code improvements & UML
Mohanad Essam	20230428	Games 1, 4, 8 & 9 - Code Report – Game 1 AI player
Ahmed Abdelsamea	20231010	Games 3, 6 & 8 - Report content (UML)

UML Design

PROBLEM 8



PROBLEM 9



Code Explanation

Overview

The main menu of the code presents the user with 8 different Games (Pyramic Tic-Tac-Toe, Four-in-a-row, 5 x 5 Tic-Tac-Toe, Word Tic-Tac-Toe, Numerical Tic-Tac-Toe, Misere Tic-Tac-Toe, Ultimate Tic-Tac-Toe and SUS). Asking the user for the names and the Types of the players. The code is divided in three categories: the main menu, the main header (BoardGame_Classes) and all the headers of the games inheriting from the main header.

Class Structure

The code consists of several main classes, each responsible for a different aspect of the games:

- 1. Board: This class represents the board on which all the games are played in.
- 2. player: This class represents the player holding its name and symbol.
- 3. Random player: This class gives the user the ability to play against a basic computer player with random plays.
- 4. Game Manager: This class runs the games typically calling all the functions.
- A specific class for each game.

Algorithms and Functions

The code consists of several main functions, sometimes differing from one game to the other:

Board Functions

- display_board: prints the board of the game in different ways depending on the game.
- update_board: gets the input from the user, prints it on the board while checking its validity.
- Is_win: Containing different conditions depending on the Game to check with the player wins or not.
- is_ draw: Mostly checks if the board is full and there aren't any players sometimes with different conditions depending on the game played.
- Game_is_over: ends the game.

Player Functions

- get_move: literally gets the move from the user, later goes the "update_board" function.
- And some other behind the scenes function such as get_symbol and get_name.

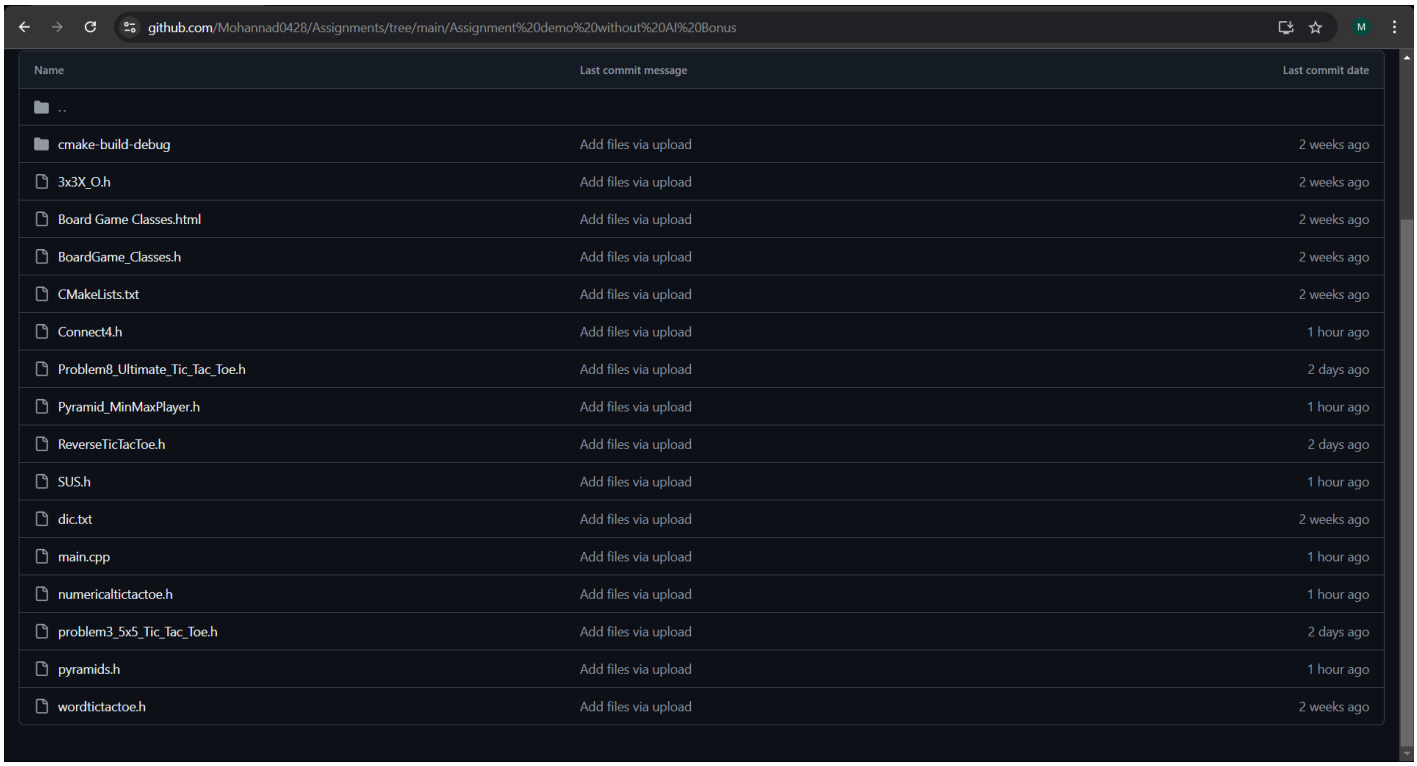
Special functions

- The counter function in the **SUS** game was required to make sure the program keeps track of the player's score.

Conclusion

In conclusion, the code provides a versatile and comprehensive gaming platform, offering a diverse array of eight unique Tic-Tac-Toe variants. By structuring the code into distinct classes—such as Board, Player, Random Player, and Game Manager—it ensures modularity and ease of maintenance. Each class and function is meticulously designed to handle specific aspects of the gameplay, from board display and updates to move validation and game termination. This object-oriented approach not only facilitates the addition of new games but also allows for seamless player experience, whether competing against another person or a basic AI. The thoughtful integration of algorithms and functions across different game types underscores the robustness and adaptability of the code, making it an engaging and dynamic gaming suite.

GitHub Screenshot



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BoardGame_Classes.h	Add files via upload	2 weeks ago
CMakeLists.txt	Add files via upload	2 weeks ago
Connect4.h	Add files via upload	1 hour ago
Problem8_Ultimate_Tic_Tac_Toe.h	Add files via upload	2 days ago
Pyramid_MinMaxPlayer.h	Add files via upload	1 hour ago
ReverseTicTacToe.h	Add files via upload	2 days ago
SUS.h	Add files via upload	1 hour ago
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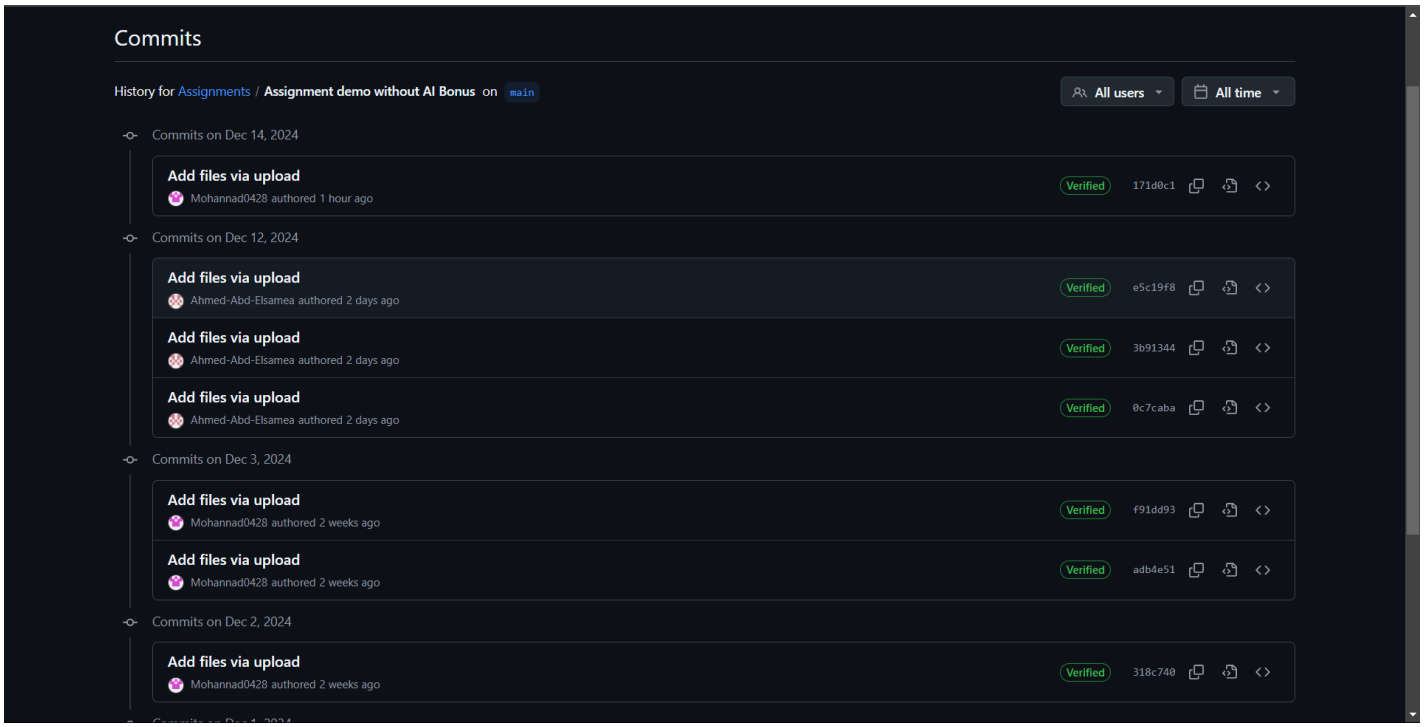

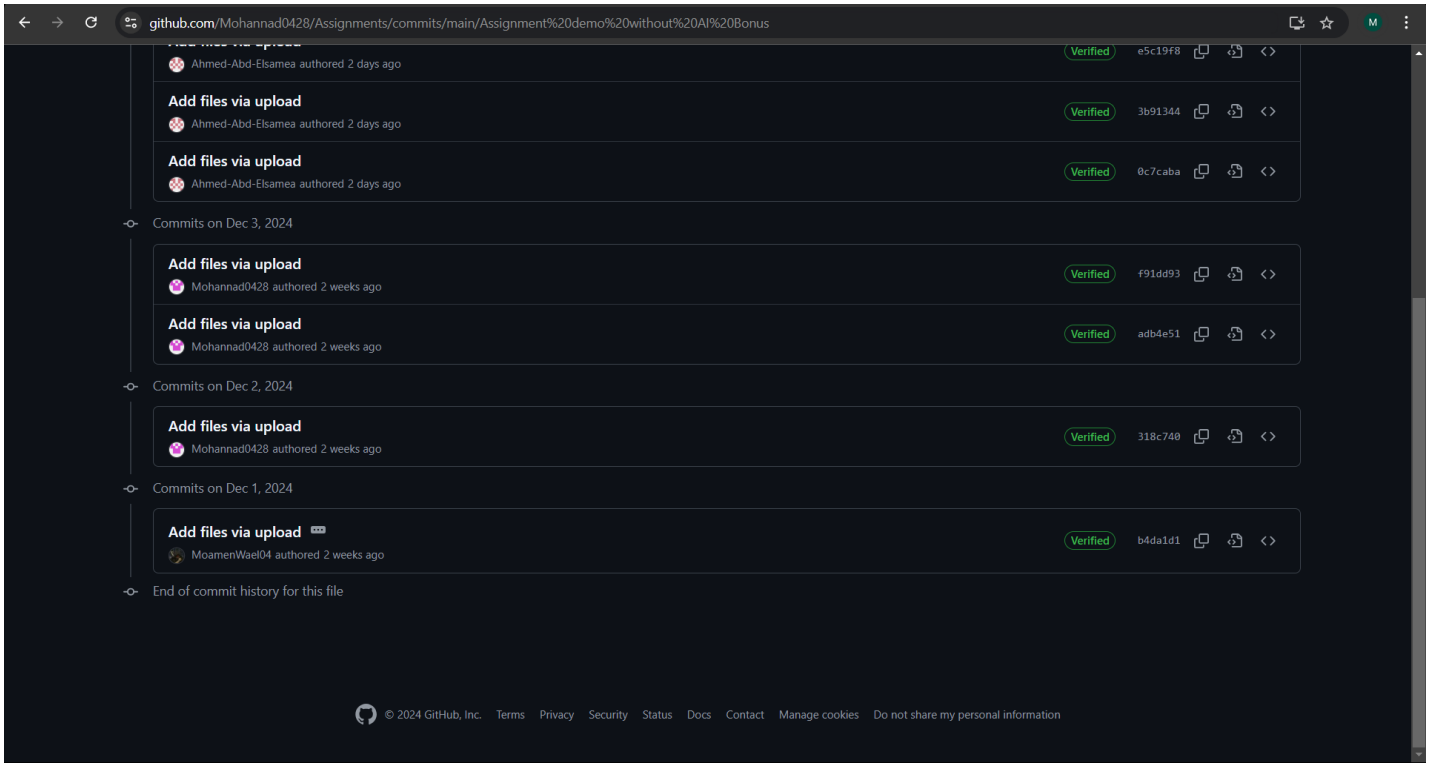
github.com/Mohannad0428/Assignments/commits/main/Assignment%20demo%20without%20AI%20Bonus
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