

# C++ Team Project: Tank War

## **Authors**

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## **Abstract**

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The goal for this project is to recreate the classic NES game Battle War from Nintendo. The original game can be played by one player in different mode and different map.

## **Introduction**

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Tank war project is a multiplayer tank battle game. Each player can control a tank to fight against other player. The game has two different modes, competitive and death match.

In the competitive mode, the player who destroys other player's tank wins the game.

In the death match mode, each player earns one point by killing other player, and the player who scores more points in the limited time wins the game.

## **Requirements**

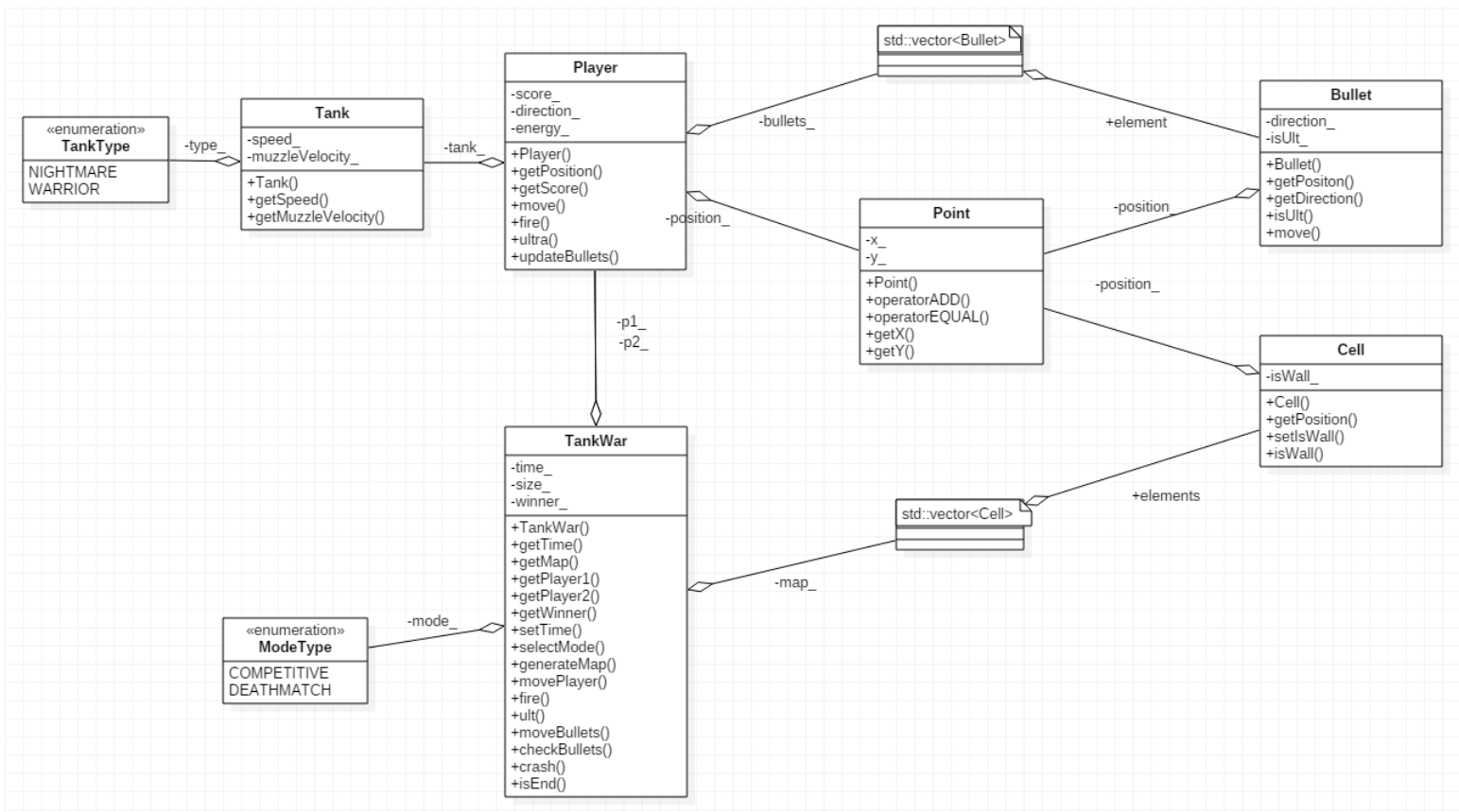
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There are six use cases for this project:

- Mode: User can pick from two different game modes, and the system will generate the game by the mode that the user chooses.
- Tank: There are two types of tank. Each user will be able to choose one type of tank, and the system will start the game by the tank that the user chooses.
- Movement: User can press the key to move the tank. The system will first check if the user is able to move towards to this direction, then react.
- Fire: User can fire the tank by pressing the key. The system will first keep track the movement of the bullet, and remove the bullet after it hit anything.
- Ultimate: Each player can use an ultimate by pressing the key when its energy is 100%. An ultimate can go across the wall and will gain more points if it hits the target. The system will first check if this player be able to use ultimate at this moment, then react.
- Winning Condition: After user firing a bullet or using the ultimate, the system will check if a user meet the winning condition. If so, then end the game.

## Design

### UML diagram



The design decisions we made for this project:

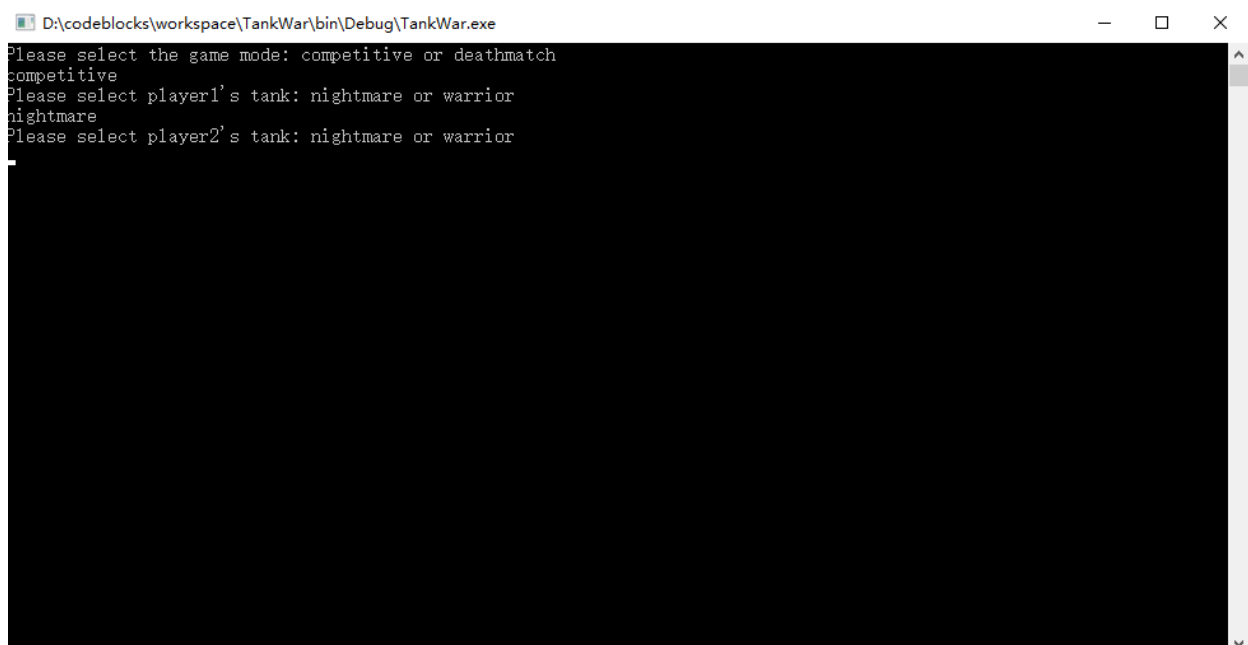
- **Map:** Map is created by list of cells. Each cell has a position, and a Boolean show if this cell represents a wall or ground.
- **Game Mode & Tank Type:** GameType is used to generate two different game mode. Model will check the GameType first, then set a time limit for the game. TankType generate two different tank type. Tank will check the TankType first, then set different speed and muzzleVelocity on this Tank, based on the TankType.
- **Player:** A player contains a chose tank type, a score, a position, a direction and an energy that represent the cold down time for the ultimate, and a list of all the bullets this player fired that still shows on the screen. It basically contains all the information that the system need to identify for different players.

- Display: Display handles everything about display the image on the screen. It will collect information from Tank and Player, then draw it on the screen. All the player's actions will not directly modify anything contains in this class. Display will refresh on each tick, and collect updated information from player, and re draw the image.
- Request: Display handles everything about display the image on the screen. It will collect information from Tank and Player, then draw it on the screen. All the player's actions will not directly modify anything contains in this class. Display will refresh on each tick, and collect updated information from player, and re-draw the image.

## Discussion

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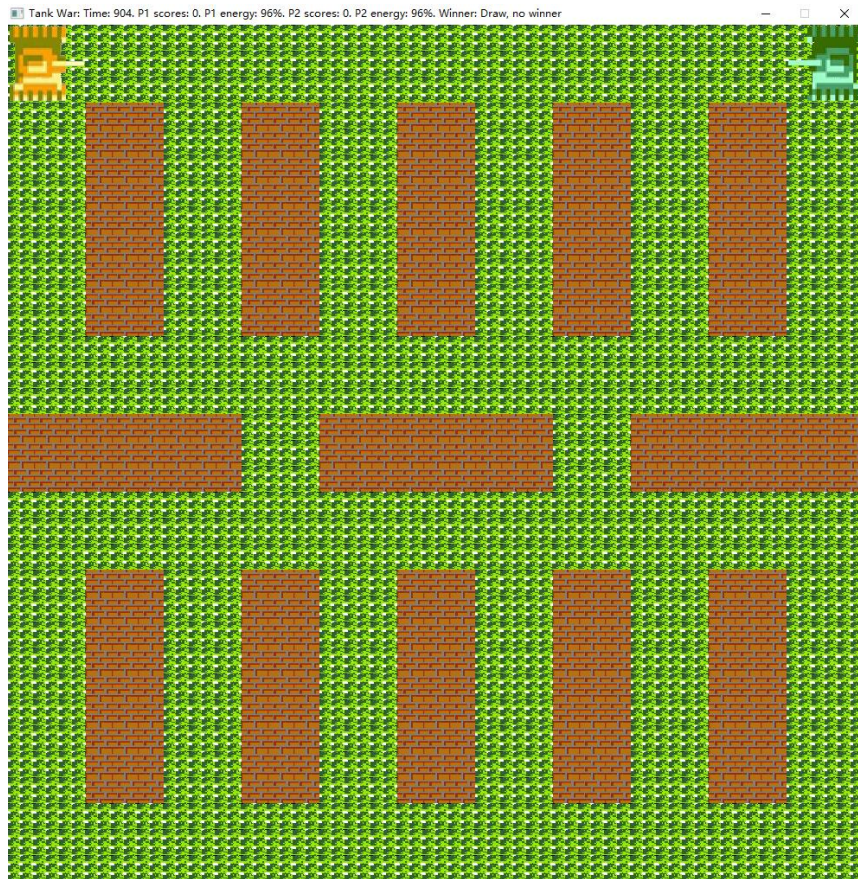
- Start the game  
In order to start the game, the players should select mode type and their tank type by IO stream. They input from console window and the game will be generated by their choices.



```
D:\codeblocks\workspace\TankWar\bin\Debug\TankWar.exe
Please select the game mode: competitive or deathmatch
competitive
Please select player1's tank: nightmare or warrior
nightmare
Please select player2's tank: nightmare or warrior
```

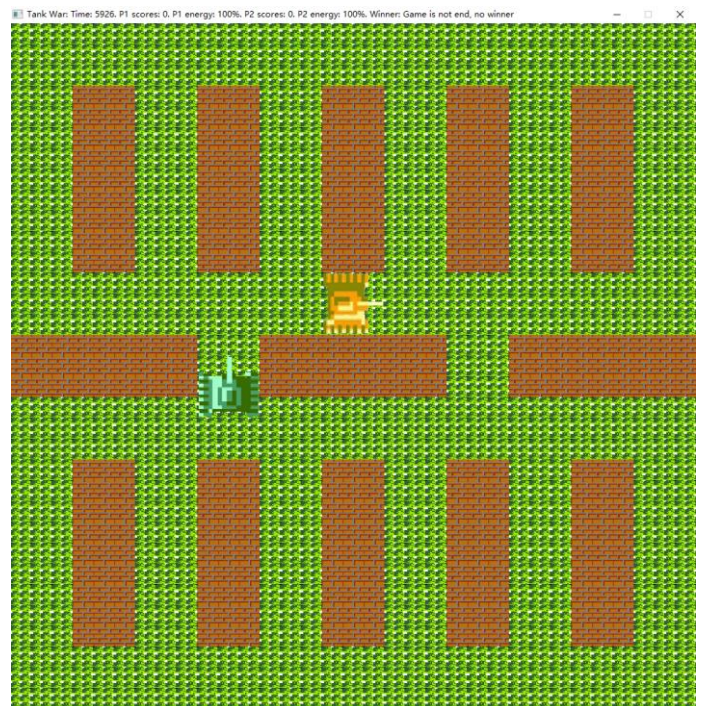
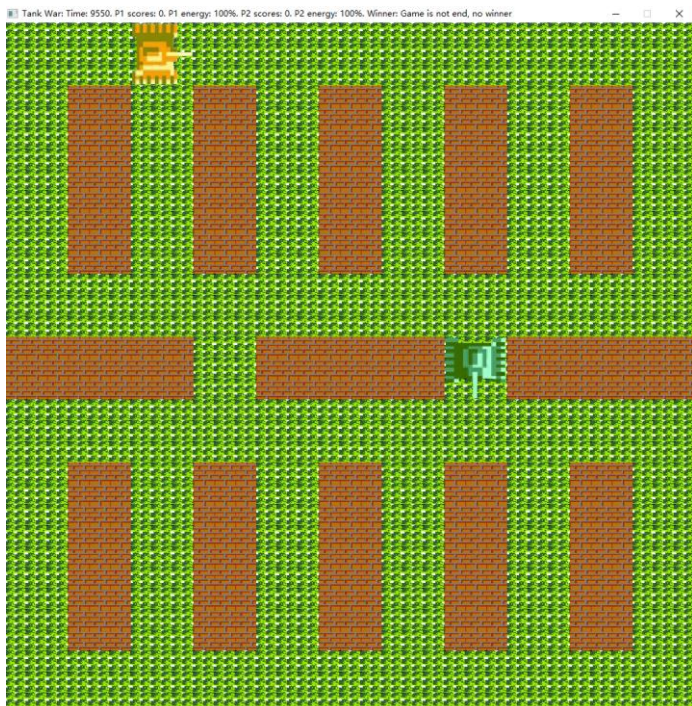
The screenshot shows a console window titled "D:\codeblocks\workspace\TankWar\bin\Debug\TankWar.exe". The window contains three lines of text prompts for game initialization. The first prompt is "Please select the game mode: competitive or deathmatch", followed by the user input "competitive". The second prompt is "Please select player1's tank: nightmare or warrior", followed by the user input "nightmare". The third prompt is "Please select player2's tank: nightmare or warrior". The rest of the console area is black, indicating the program is still running or waiting for further input.





- Movement

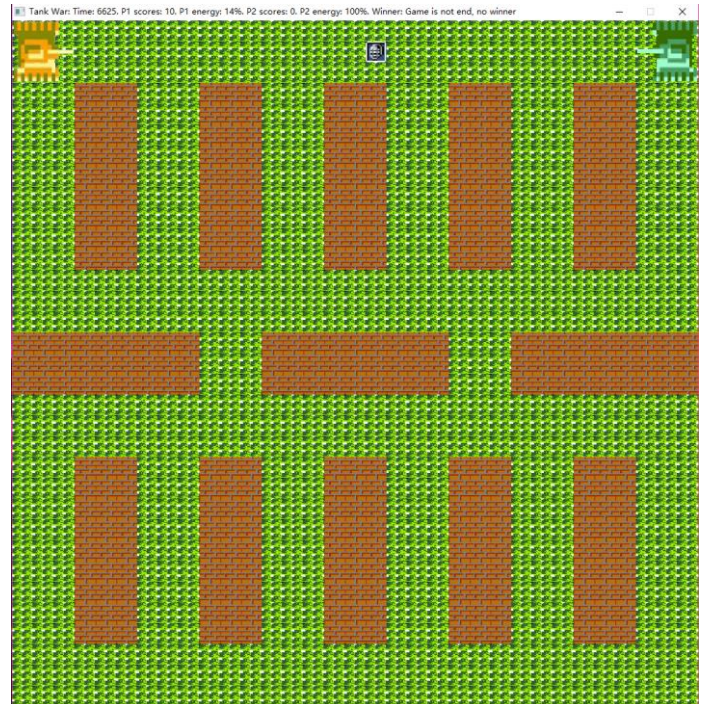
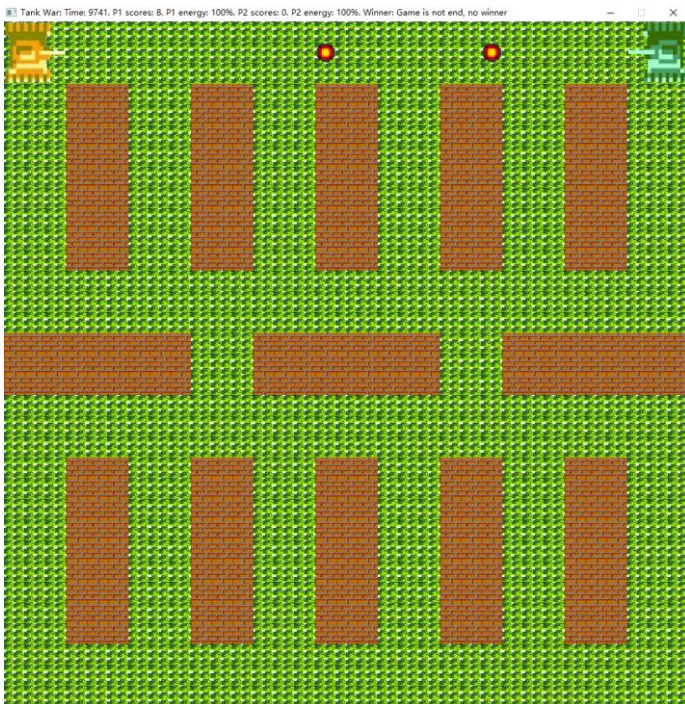
Player1 uses the keys “w”, “s”, “a” and “d” to move and player2 simply uses the arrow keys to move. Players cannot cross walls and go outside the map.





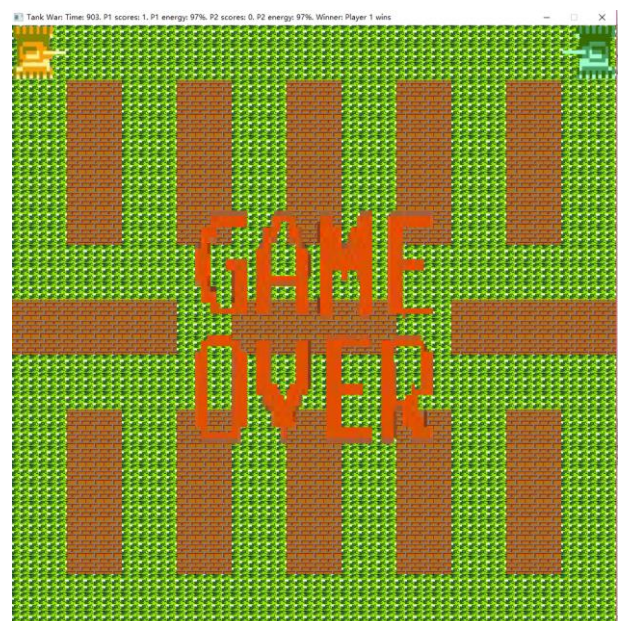
- Fire & Ultimate

A player can fire bullets or use ultimate. Both bullet and ultimate will disappear if they go out of the bound, e.g. go outside map. The difference between bullet and ultimate is that a bullet cannot go across wall but an ultimate can. Besides, ultimate gains more points than bullets. Player1 uses the key “left shift” to fire and “q” to use ultimate while player2 uses the key “right shift” to fire and “p” to use ultimate.



- End the game

When reaching the winning condition, the game will be end immediately and the system will not receive any keyboard requests.



## **Conclusion**

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This is a basic version of the classic Tank War game from Nintendo. It allows two players to compete with each other in two game modes. The game could be improved by adding another mode which allows single player compete with AI. Also it allows players to play in different maps by creating a random map generator, or let players create their own maps.

## **References**

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