Tank War

A 2D AI Confrontation Game

Present by Xi Zhu

lives: 10   score: 0   Pause: False

Agenda

- Team Member Roles and Responsibilities
- Problem Statement
- Project Description
- Team working agreement
- Personas
- MVP (Minimal Viable Product)
- Technologies
- Algorithms
- Diagrams
- Product Backlog
- Sprint 1 Backlog
- Test Cases
- Metrics
- Retrospective
- Sprint 2
- MVP Project Demo & GitHub link

Team Member Roles and Responsibilities

Responsibilities:

- Define the Product Vision and Strategy
- Create a Product Roadmap
- Prioritize Product Backlog
- Write and Test Codes
- Collect User Feedback
- Measure Product Success

Xi Zhu
Product Manager

Problem Statement

The problems of simple playability, uneven quality, and inoperability of traditional 2D Battle Games, it is difficult for players to obtain a satisfactory game experience.

Project Description

Project Name:	Tank War
Team:	Xi Zhu
Project Description:	**For** players
	who enjoy intense combat and customizable gameplay
	the Tank War
	is a 2D AI Confrontation Game(should be a Web App)
	that introduces Machine Learning techniques to enhance gameplay and strategy
	unlike traditional 2D Battle Games
	our application offers a unique experience to players by allowing them to pick up in-game items, change their custom look, fight with escalating AI opponents, and develop different strategies against different levels.
Benefit Outcomes:	1. Enhanced gameplay experience: The use of Machine Learning techniques in Tank War provides players with a unique and challenging gameplay experience. Players can develop different strategies to defeat increasingly difficult AI opponents, making the game more engaging and exciting.
	2. Customizable gameplay: Tank War offers players the ability to customize their tank's appearance, which adds a personalized touch to the game. Players can choose from various tanks and maps, providing a diverse and unique gaming experience.
	3. Improved player satisfaction: By addressing the issues of simple playability, uneven quality, and inoperability of traditional 2D Battle Games, Tank War is designed to provide a better and more satisfying gaming experience for players who seek challenging and exciting gameplay.
Github Link:	https://github.com/htmw/2023S-zhu/wiki

Team Working Agreement

- Communication
- Goals and Objectives
- Time Management
- Accountability
- Professionalism
- Confidentiality

Team Working Agreement

Communication: I will keep a regular schedule for checking and responding to emails, and will communicate any changes to my availability or work priorities as necessary. I will also communicate progress updates on my work to any stakeholders as appropriate.

Goals and Objectives: I will establish clear goals and objectives for my work and keep them visible as a reminder of what I am working towards. I will regularly assess my progress towards these goals and adjust my approach as necessary.

Time Management: I will create a schedule that balances my work with my personal life and ensures that I am able to meet my deadlines. I will also prioritize my work effectively and avoid procrastination.

Accountability: I will hold myself accountable for meeting deadlines and completing high-quality work. I will seek feedback and support from others when needed, and be open to constructive criticism that helps me improve.

Professionalism: I will maintain a professional demeanor in all of my communications and interactions with others, and will represent myself and my work in a positive and respectful manner.

Confidentiality: I will maintain the confidentiality of any sensitive information or data related to my work, and will follow any relevant policies or guidelines related to data security and privacy.

By agreeing to these guidelines, I am committing to creating a productive and effective working environment for myself, and holding myself accountable for my work and its impact on others.

Signed
Xi Zhu U01697998 (xz79622p@pace.edu)
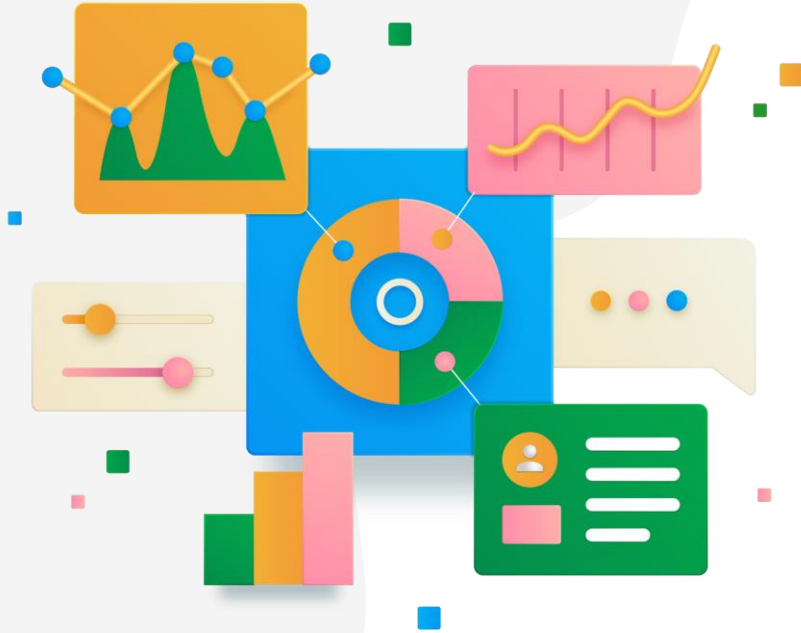
Personas

Persona 1 – Gaming Enthusiast Gary

Name: Gary Carlos
Age: 22
Job: College Student

Profile:
Gary is a 22-year-old college student who is a passionate gamer. He spends most of his free time playing video games and loves games that offer a challenging and rewarding experience.
Frustration and Goals:
Gary is frustrated with games that are too easy or lack replayability. He is always looking for new games that provide an engaging and immersive experience.
His goal is to find a game that he can play for hours on end and continue to enjoy.

Persona 2 – Busy Bee Brianna

Name: Brianna Mary
Age: 32
Job: White-collar Employee

Profile:
Brianna is a 32-year-old working professional who enjoys playing games in her downtime. She has a busy schedule and often finds herself with limited free time.

Frustration and Goals:
Brianna is frustrated with games that require a lot of time commitment or are too complex to understand quickly.

Her goal is to find a game that she can pick up and play for short periods of time and still enjoy. She likes games that are easy to learn but still offer a challenge.

Persona 3 – Competitive Cam

Name: Cameron Nguyen
Age: 26
Job: Game Anchor

Profile:
Cam is a 26-year-old gamer and game anchor who loves playing competitive games. He livestreams his games on YouTube everyday.
Frustration and Goals:
Cam is frustrated with games that don't offer a fair playing field or are too easy to win.
His goal is to find a game that he can compete in at a high level and feel challenged by. He likes games that have a competitive scene and allow him to measure his skills against other players.
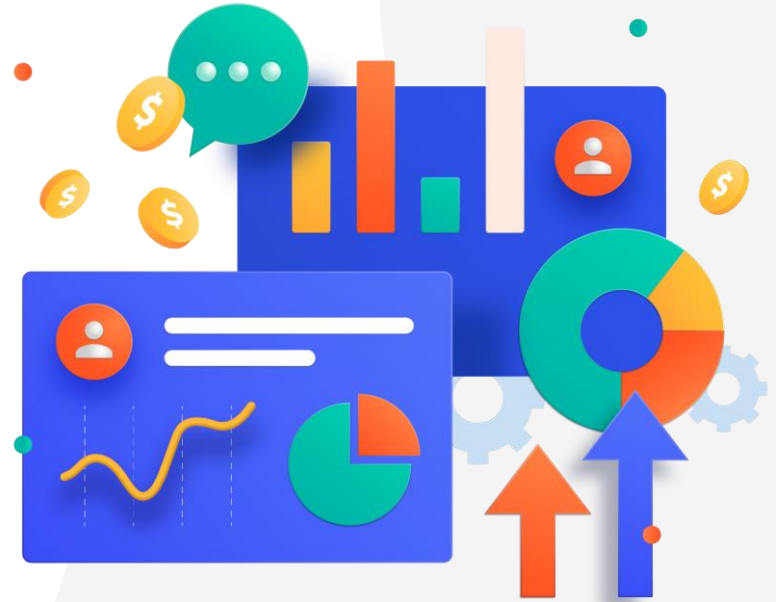
MVP (Minimal Viable Product)

Technology Tools

Diagrams

```
+----------------------------------------------------+
|                        Game                        |
+----------------------------------------------------+
| +window: Window                                    |
| +canvas: Canvas                                    |
| +player_tank: Tank                                 |
| +enemy_tanks: List[Tank]                           |
| +player_bullets: List[Bullet]                      |
| +enemy_bullets: List[Bullet]                       |
+----------------------------------------------------+
| +start() -> None                                   |
| +game_over() -> None                               |
| +create_enemy_tank() -> None                       |
| +create_bullet(source: Union[Tank, Bullet]) -> None|
| +move_player_tank(dx: int, dy: int) -> None        |
| +move_enemy_tank(tank: Tank) -> None               |
| +move_bullets(bullets: List[Bullet]) -> None       |
| +check_collisions() -> None                        |
+----------------------------------------------------+


+-------------------------+  +-------------------------+
|          Tank           |  |          Bullet         |
+-------------------------+  +-------------------------+
| -x: int                 |  | -x: int                 |
| -y: int                 |  | -y: int                 |
| -direction: str         |  | -direction: str         |
| -speed: int             |  | -speed: int             |
+-------------------------+  +-------------------------+
| +move(dx: int, dy: int) |  | +move() -> None         |
+-------------------------+  +-------------------------+
```

Conceptual Diagram

Sequence Diagram

Use Case Diagram
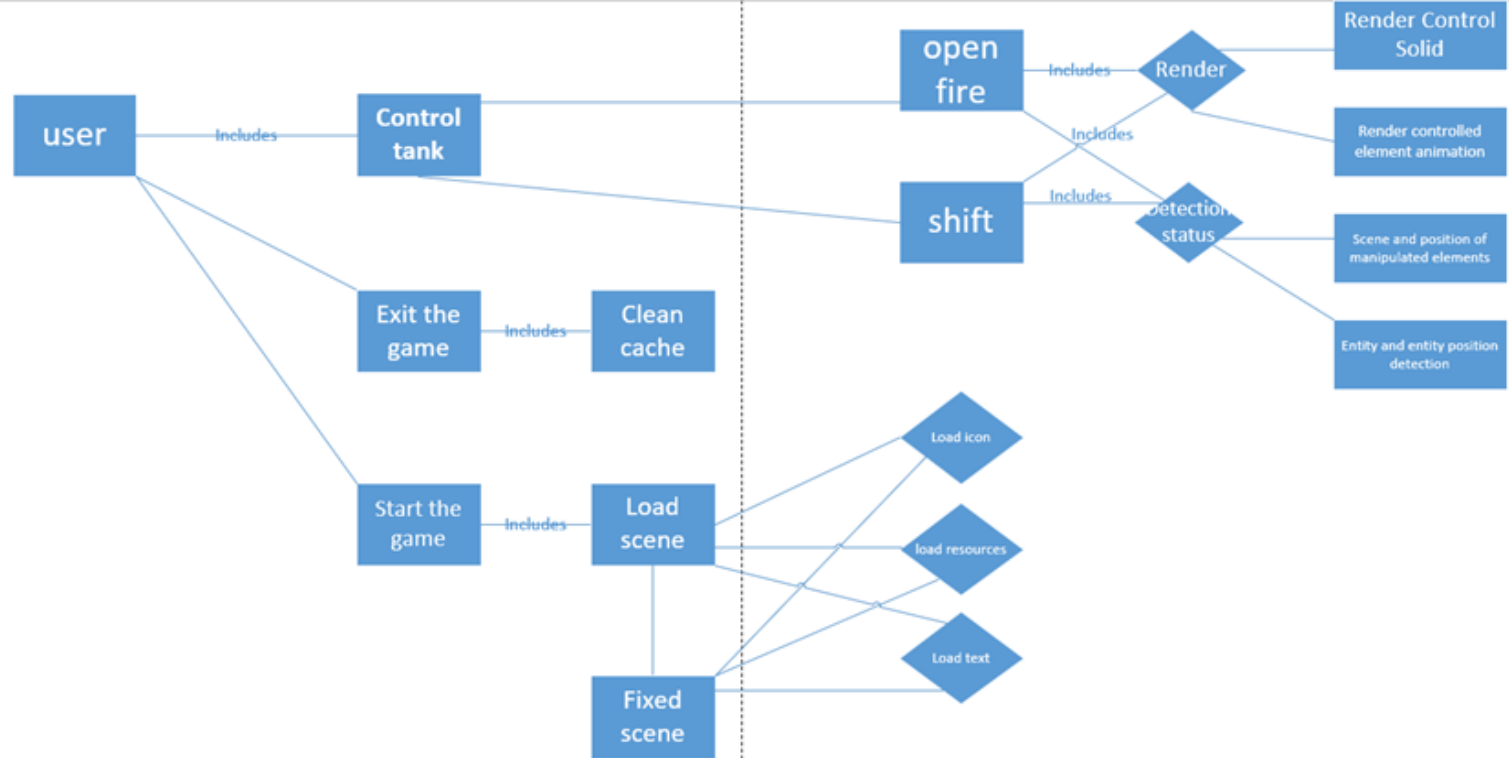
Class Diagram

instance//Instance variable
of single instance mode
#istance_ Lock//lock to ensure
synchronous access
−Init tlag//Initialization
completion flag
+Sounds//getter
+Screen//game form instance
(Eetten)
+Config//game configuration
file (getter)
+Level//Current level (getter)
+Levelfield//Current level file
(eetter, return random level
file)
+auit game flag
1 Exit game flag (Eetter t
setter)
+ multiplayer_ mode
1 Multiplayer game mode
(getter+setter)
+Is win//game victory sign
(getter t se tter)
−Starto/1 starts the game, and
calls
Init game ()//Load game
−init_ Sounds0//Load audio
file
−Load JeveL templates0//Load
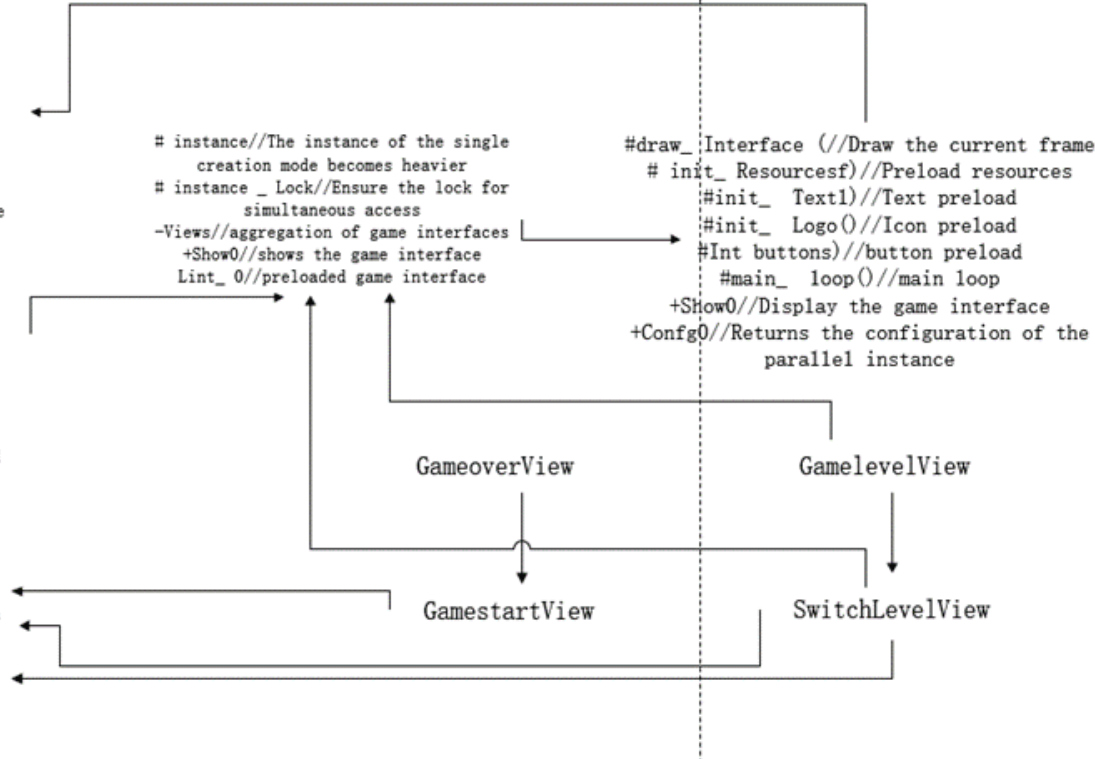level template
−enter_ Loop0//Enter the main
loop
−_ Init0/volume
initialization+call start1
+Nit Beme windox/0//Load the
game form

instance//The instance of the single
creation mode becomes heavier
instance _ Lock//Ensure the lock for
simultaneous access
−Views//aggregation of game interfaces
+Show0//shows the game interface
Lint_ 0//preloaded game interface

#draw_ Interface (//Draw the current frame
init_ Resourcesf)//Preload resources
#init_ Text1)//Text preload
#init_ Logo()//Icon preload
#Int buttons)//button preload
#main_ loop()//main loop
+Show0//Display the game interface
+Confg0//Returns the configuration of the
parallel instance

GameoverView

GamelevelView

GamestartView

SwitchLevelView

Product Backlog

			User Stories And Acceptance Criteria			
ID	As a	I want to	So that	Acceptance Criteria (format: use keywords Given, When, Then)	Status	Sprint
US 1	Player/ Customer	control a tank with a keyboard	I can move around the battlefield and engage in combat with other tanks.	Scenario: Tank Movement Given: The player is on the game screen When: The player presses the arrow keys on the keyboard to control the tank's movement Then: The tank moves in the direction of the arrow key that was pressed.	Done	1
US 2	Player/ Customer	fire my tank's cannon	I can destroy enemies' tanks.	Scenario: Firing the Cannon Given: The player is on the game screen When: The player presses the spacebar on the keyboard to fire the cannon Then: The tank fires a shell in the direction it is facing.	Done	1
US 3	Player/ Customer	have a single-player mode	I can practice my skills and strategies against AI-controlled tanks.	Scenario: Single-player mode Given: The player is on the game screen When: The player selects the Game Start option Then: The game starts in single-player mode, with AI-controlled tanks as enemies and allies.	Done	1
US 4	Player/ Customer	have a variety of maps to choose from	I can experience different terrains and battlefields.	Scenario: Choosing a Map Given: The player is on the game screen When: The player selects the map selection option Then: A list of available maps is displayed, and the player can select one to start the game on that map.	To be Done	
US 5	Player/ Customer	have enemies and allies	I can experince different situtations and have more fun	Scenario: Enemies and Allies Given: The player is on the game screen When: The game starts Then: Enemies and allies are present on the battlefield, and the player can differentiate between them.	Done	1
US 6	Player/ Customer	have a scoreboard that shows my score	I can see how many score I get.	Scenario: Scoreboard Given: The player is on the game screen When: The game is in progress Then: The scoreboard displays the player's score	Done	1
US 7	Player/ Customer	have multiple lives	I'm not gonna let one mistake end the game	Scenario: Multiple Lives Given: The game is in progress When: The player's tank takes damage Then: The tank loses a life, and the player can continue playing with the remaining lives.	Done	1
US 8	Player/ Customer	have different language options	fit my language preferences.	Scenario: Language Options Given: The player is on the game screen When: The language selection option is available Then: The player can select a language preference, and the game's language will be changed accordingly.	To be Done	
US 9	Player/ Customer	pause the game at any time	take a break or attend to other matters.	Scenario: Pausing the Game Given: The game is in progress When: The player presses the pause button Then: The game is paused, and the player can resume playing or exit the game.	To be Done	
US 10	Player/ Customer	play on different difficulty levels	I can challenge myself and get different experiences.	Scenario: Difficulty Levels Given: The player is on the game screen When: The player selects a difficulty level Then: The game's difficulty is changed, and the player experiences a different level of challenge.	To be Done	

Product Backlog

US 11	Player/ Customer	my shells to score differently when they hit friendly and enemy forces	affecting my strategy and scoring.	Scenario: Shell Scoring Given: The player's tank fires a shell When: The shell hits an enemy tank Then: The player scores points. If the shell hits a friendly tank, the player loses points.	To be Done	
US 12	Player/ Customer	have different kind of enemies	enrich my game experience	Scenario: Different Types of Enemies Given: The game is in progress When: The player encounters different types of enemy tanks Then: The player experiences a variety of gameplay challenges.	Done	1
US 13	Player/ Customer	customize my game's graphics, such as resolution and quality	I can get the best game experience	Scenario: Graphics Customization Given: The player is on the game screen When: The graphics customization option is available Then: The player can adjust the game's graphics settings, such as resolution and quality.	To be Done	
US 14	Player/ Customer	collect power-ups such as health boosts, speed boosts	I can increase my chances of survival and progress through the game.	Scenario: Power-Ups Given: The player is on the game screen When: The player collects a power-up Then: The player's tank gains a benefit, such as increased health or speed.	To be Done	
US 15	Player/ Customer	see the lives status of my tank	I can know how much damage I can sustain	Scenario: Lives Status Given: The game is in progress When: The player's tank takes damage Then: The lives status of the tank is updated to reflect the remaining health.	Done	1
US 16	Player/ Customer	be able to hide behind obstacles such as walls and rocks	I can avoid enemy fire and ambush them.	Scenario: Obstacle Hiding Given: The player's tank is near an obstacle, such as a wall or rock When: The player presses the hide button Then: The tank moves behind the obstacle and is hidden from enemy fire.	To be Done	
US 17	Player/ Customer	be able to customize my tank's appearance with different skins and colors	I can personalize my gameplay experience.	Scenario: Tank Skin Customization Given: The user is on the main menu When: The user selects the "customize tank" option Then: The system displays the customization options, including skins and colors And: The user can select a skin and color And: The system applies the selected skin and color to the tank	To be Done	
US 18	Player/ Customer	have access to different types of tanks with different stats, such as speed, health, and firepower	I can choose the one that suits my playstyle the best	Access to Different Types of Tanks Scenario: Tank Selection Given: The user is on the main menu When: The user selects the "choose tank" option Then: The system displays the available tanks, including their stats such as speed, health, and firepower And: The user can select a tank that suits their playstyle the best And: The system applies the selected tank and its stats to the gameplay	To be Done	
US 19	Player/ Customer	want enemies and friends to respawn constantly	I can constantly encounter new situations to enrich my experience	Scenario: Enemy respawn Given: The player starts a game When: The player destroys an enemy tank Then: A new enemy tank immediately appears on the battlefield When: The player's ally tank is destroyed Then: A new ally tank immediately appears on the battlefield	Done	1
US 20	Player/ Customer	have access to different sound effects for different actions, such as firing a cannon or collecting a power-up	enrich my game experience	Scenario: Sound Effect Customization Given: The user is on the main menu When: The user selects the "sound options" option Then: The system displays the sound options, including different sound effects for different actions And: The user can select a sound effect for each action And: The system applies the selected sound effects to the gameplay	To be Done	

Sprint 1 Backlog

Sprint 1 Backlog – Completed & Uncompleted US

| ID	As a	I want to	So that	Acceptance Criteria (format: use keywords Given, When, Then)	Status
			Sprint 1 Completed User Stories		
US 1	Player/ Customer	control a tank with a keyboard	I can move around the battlefield and engage in combat with other tanks.	Scenario: Tank Movement. Given: The player is on the game screen. When: The player presses the arrow keys on the keyboard to control the tank's movement. Then: The tank moves in the direction of the arrow key that was pressed.	Completed
US 2	Player/ Customer	fire my tank's cannon	I can destroy enemies' tanks.	Scenario: Firing the Cannon. Given: The player is on the game screen. When: The player presses the spacebar on the keyboard to fire the cannon. Then: The tank fires a shell in the direction it is facing.	Completed
US 3	Player/ Customer	have a single-player mode	I can practice my skills and strategies against AI-controlled tanks.	Scenario: Single-player mode. Given: The player is on the game screen. When: The player selects the Game Start option. Then: The game starts in single-player mode, with AI-controlled tanks as enemies and allies.	Completed
US 5	Player/ Customer	have enemies and allies	I can experince different situtations and have more fun	Scenario: Enemies and Allies. Given: The player is on the game screen. When: The game starts. Then: Enemies and allies are present on the battlefield, and the player can differentiate between them.	Completed
US 6	Player/ Customer	have a scoreboard that shows my score	I can see how many score I get.	Scenario: Scoreboard. Given: The player is on the game screen. When: The game is in progress. Then: The scoreboard displays the player's score	Completed
US 7	Player/ Customer	have multiple lives	I'm not gonna let one mistake end the game	Scenario: Multiple Lives. Given: The game is in progress. When: The player's tank takes damage. Then: The tank loses a life, and the player can continue playing with the remaining lives.	Completed
US 12	Player/ Customer	have different kind of enemies	enrich my game experience	Scenario: Different Types of Enemies. Given: The game is in progress. When: The player encounters different types of enemy tanks. Then: The player experiences a variety of gameplay challenges.	Completed
US 15	Player/ Customer	see the lives status of my tank	I can know how much damage I can sustain	Scenario: Lives Status. Given: The game is in progress. When: The player's tank takes damage. Then: The lives status of the tank is updated to reflect the remaining health.	Completed
US 19	Player/ Customer	want enemies and friends to respawn constantly	I can constantly encounter new situations to enrich my experience	Scenario: Enemy respawn. Given: The player starts a game. When: The player destroys an enemy tank. Then: A new enemy tank immediately appears on the battlefield. When: The player's ally tank is destroyed. Then: A new ally tank immediately appears on the battlefield	Completed
US 10	Player/ Customer	play on different difficulty levels	I can challenge myself and get different experiences.	Scenario: Difficulty Levels. Given: The player is on the game screen. When: The player selects a difficulty level. Then: The game's difficulty is changed, and the player experiences a different level of challenge.	Not Completed
US 11	Player/ Customer	my shells to score differently when they hit friendly and enemy forces	affecting my strategy and scoring.	Scenario: Shell Scoring. Given: The player's tank fires a shell. When: The shell hits an enemy tank. Then: The player scores points. If the shell hits a friendly tank, the player loses points.	Not Completed

Sprint 1 Backlog – Test Cases

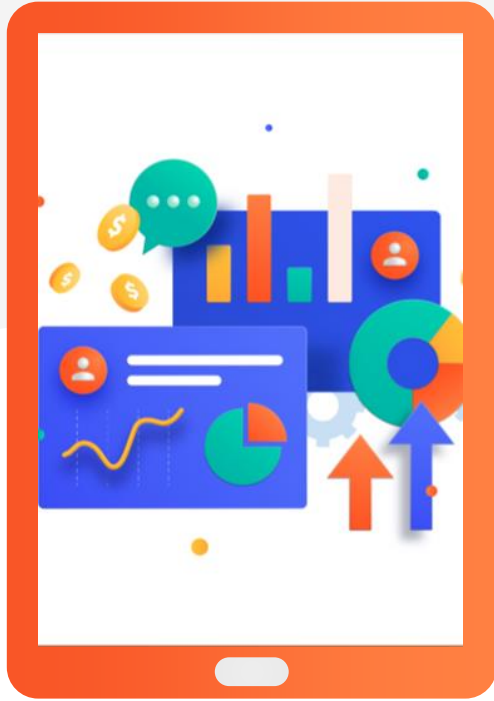|					
			Test Cases		
User Story ID	**Test Description**	**Assumptions**	**Action**	**Actual Output**	**Test Result (Pass/Failed)**
1	Control the tank with arrow keys	The tank will move in the direction indicated by the arrow key	Press the four arrow keys on the keyborad	The tank dose not move	Failed
1	Control the tank with arrow keys	The tank will move in the direction indicated by the arrow key	Press the four arrow keys on the keyborad	The tank move in the direction indicated by the arrow pad	Pass
2	Fire tank's cannon	The player presses the spacebar on the keyboard to fire the cannon	Press the spacebar on the keyboard	Program unresponsive	Failed
2	Fire tank's cannon	The player presses the spacebar on the keyboard to fire the cannon	Press the spacebar on the keyboard	Program unresponsive	Failed
2	Fire tank's cannon	The player presses the spacebar on the keyboard to fire the cannon	Press the spacebar on the keyboard	Tank successfully fire the cannon	Pass
3	The Game successfully run	The Game successfully run	Run the game in Pycharm	The Game successfully run	Pass
6	Scoreboard	The Scoreboard successfully occur and it will change when player hits allies or enemies	Run the game and hits an friendly tank or enemy tank	The Scoreboard successfully occur and it will change when player hits allies or enemies	Pass
7	Multiple Tank Lives	the number of lives will decrease 1 when player tank gets a hit	Run the game and hits by a friendly tank or enemy tank	The game directly end and shows "you lose"	Failed
7	Multiple Tank Lives	the number of lives will decrease 1 when player tank gets a hit	Run the game and hits by a friendly tank or enemy tank	the number of lives will decrease 1 when player tank gets a hit	Pass
12	Different kind of enemies	Different kind of enemies successfully occurs	Run the game	Different kind of enemies successfully occurs	Pass
19	Enemies and allies respawn	Enemies and allies will respawn by getting hit from player's tank	Control player's tank to hit an enemy or friendly tank	Enemies and allies did not respawned	Failed
19	Enemies and allies respawn	Enemies and allies will respawn by getting hit from player's tank	Control player's tank to hit an enemy or friendly tank	Enemies and allies respawned	Pass

Metrics

Team velocity – this sprint

Team Velocity(Jan 23,2023 – Mar 10,2023)

Legend: User Story Planned, Completed, Incompleted
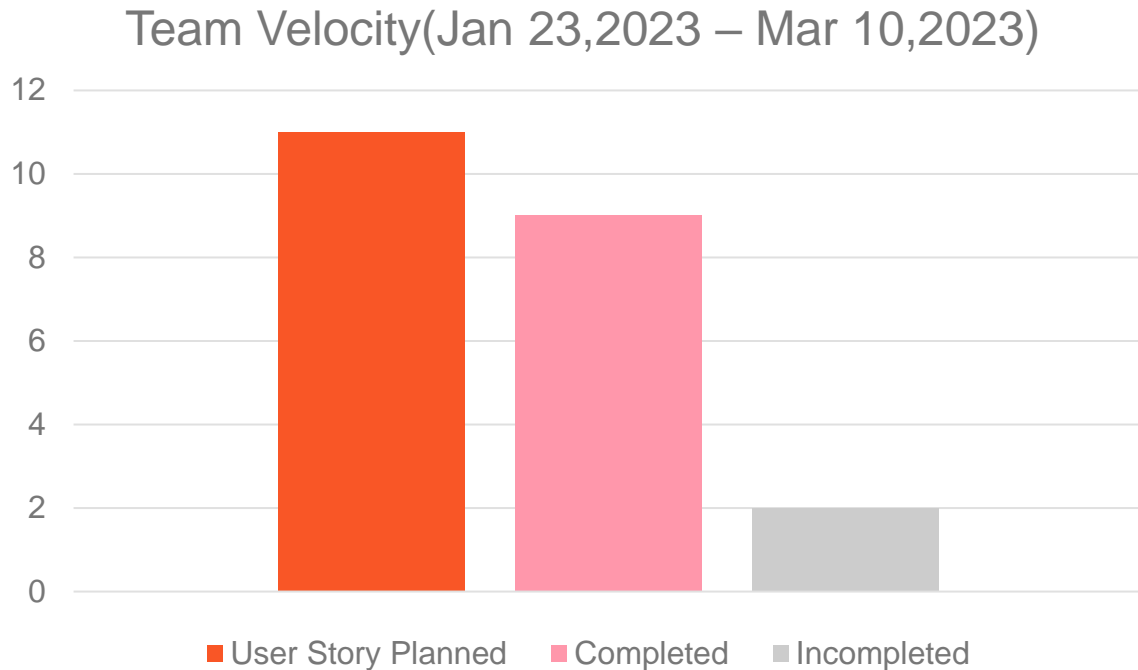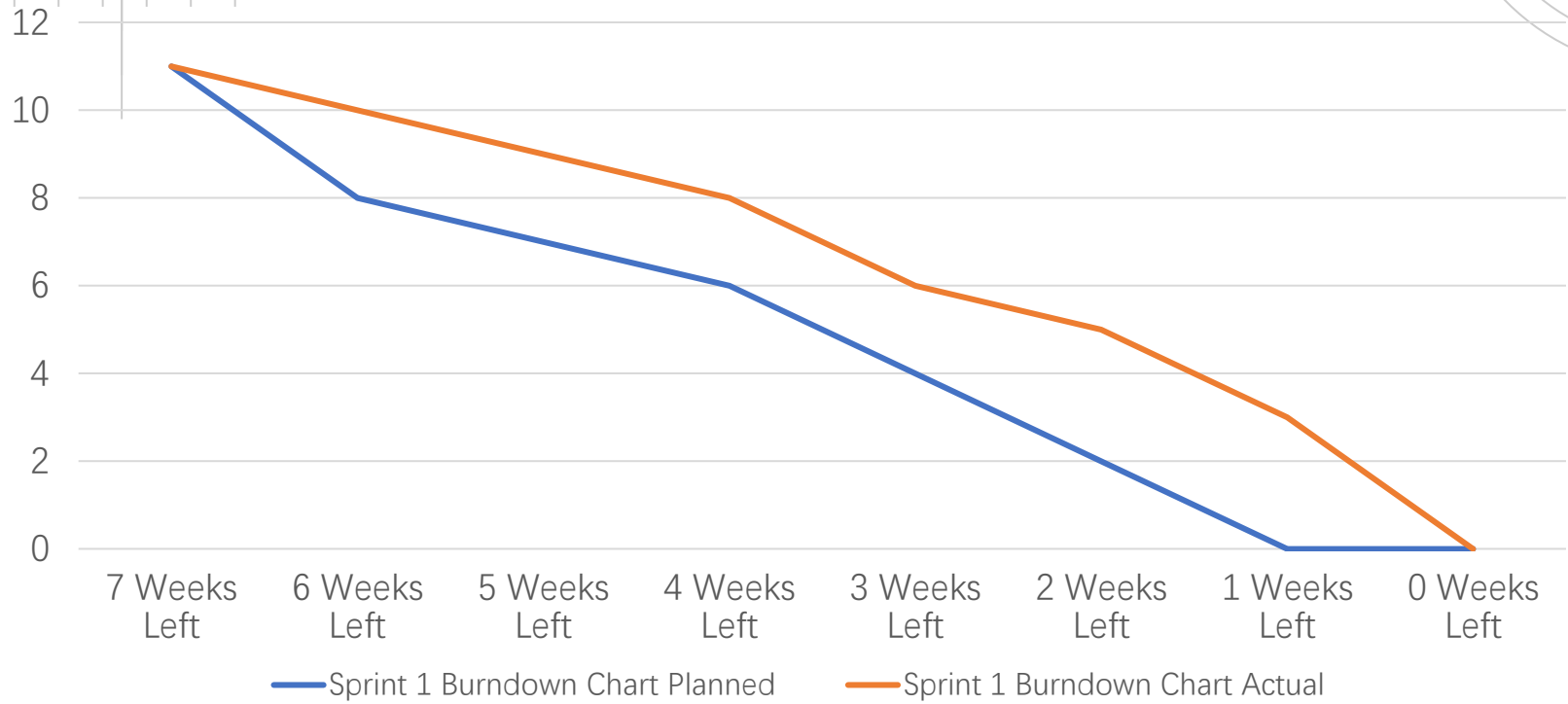
Committed/Completed Ratio

Sprint 1
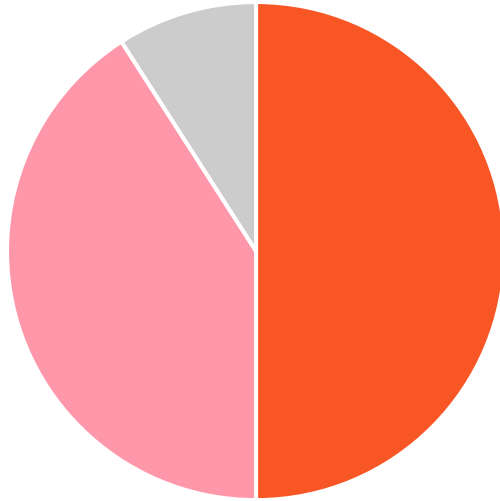
$$\frac{9}{11} = 0.818$$

■ Committed ■ Completed ■ Incompleted

Retrospective

What Went Well

- 81% of the planned tasks Completed

- The roadmap for this sprint was created and executed successfully

- MVP (Minimal Viable Product) was successfully created

What can be improved?

- The commitment to completing all the planned tasks needs to be increased, as the 19% of tasks that were not completed may have caused delays in future sprints.

- We need to improve our time management skills, as some tasks took longer than expected, which may have impacted other tasks in the sprint.

- Better planning is needed, such as breaking down tasks into smaller, more manageable parts, and estimating more accurately how long each task will take.

Next Steps

- Spend some time planning sprint 2's roadmap

- Finish the tasks left in sprint 1

- Complete all the tasks of sprint 2
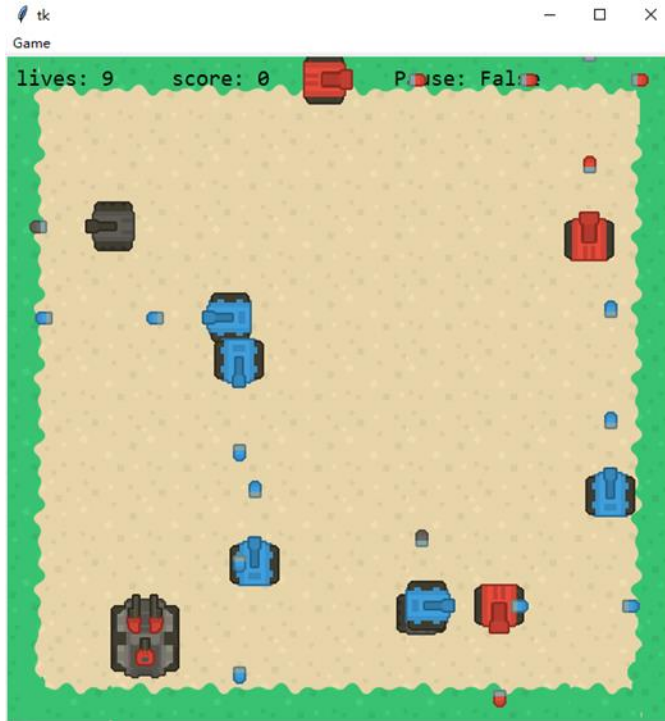
- Optimized project UI

Sprint 2 Backlog

Sprint 2 Backlog

ID	As a	I want to	So that	Acceptance Criteria (format: use keywords Given, When, Then)	Status	Sprint
US 4	Player/ Customer	have a variety of maps to choose from	I can experience different terrains and battlefields.	Scenario: Choosing a Map Given: The player is on the game screen When: The player selects the map selection option Then: A list of available maps is displayed, and the player can select one to start the game on that map.	To be Done	2
US 8	Player/ Customer	have different language options	fit my language preferences.	Scenario: Language Options Given: The player is on the game screen When: The language selection option is available Then: The player can select a language preference, and the game's language will be changed accordingly.	To be Done	2
US 9	Player/ Customer	pause the game at any time	take a break or attend to other matters.	Scenario: Pausing the Game Given: The game is in progress When: The player presses the pause button Then: The game is paused, and the player can resume playing or exit the game.	To be Done	2
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US 11	Player/ Customer	my shells to score differently when they hit friendly and enemy forces	affecting my strategy and scoring.	Scenario: Shell Scoring Given: The player's tank fires a shell When: The shell hits an enemy tank Then: The player scores points. If the shell hits a friendly tank, the player loses points.	To be Done	2
US 13	Player/ Customer	customize my game's graphics, such as resolution and quality	I can get the best game experience	Scenario: Graphics Customization Given: The player is on the game screen When: The graphics customization option is available Then: The player can adjust the game's graphics settings, such as resolution and quality.	To be Done	2
US 14	Player/ Customer	collect power-ups such as health boosts, speed boosts	I can increase my chances of survival and progress through the game.	Scenario: Power-Ups Given: The player is on the game screen When: The player collects a power-up Then: The player's tank gains a benefit, such as increased health or speed.	To be Done	2
US 16	Player/ Customer	be able to hide behind obstacles such as walls and rocks	I can avoid enemy fire and ambush them.	Scenario: Obstacle Hiding Given: The player's tank is near an obstacle, such as a wall or rock When: The player presses the hide button Then: The tank moves behind the obstacle and is hidden from enemy fire.	To be Done	2
US 17	Player/ Customer	be able to customize my tank's appearance with different skins and colors	I can personalize my gameplay experience.	Scenario: Tank Skin Customization Given: The user is on the main menu When: The user selects the "customize tank" option Then: The system displays the customization options, including skins and colors And: The user can select a skin and color And: The system applies the selected skin and color to the tank	To be Done	2
US 18	Player/ Customer	have access to different types of tanks with different stats, such as speed, health, and firepower	I can choose the one that suits my playstyle the best	Access to Different Types of Tanks Scenario: Tank Selection Given: The user is on the main menu When: The user selects the "choose tank" option Then: The system displays the tank options, including their stats such as speed, health, and firepower And: The user can select a tank that suits their playstyle the best And: The system applies the selected tank and its stats to the gameplay	To be Done	2
US 20	Player/ Customer	have access to different sound effects for different actions, such as firing a cannon or collecting a power-up	enrich my game experience	Scenario: Sound Effect Customization Given: The user is on the main menu When: The user selects the "sound options" option Then: The system displays the sound options, including different sound effects for different actions And: The user can select a sound effect for each action And: The system applies the selected sound effects to the gameplay	To be Done	2

MVP Project Demo

Slides App Screenshot

Thanks

GitHub link: https://github.com/htmw/2023S-zhu/wiki

Live Application Demo: https://youtu.be/GmpB100vSpg