

CLAM presents:
Tank Terror

Description

Our game is based off of the Flash game AZ Tanks. In this game, the objective is to control a tank that can shoot bullets in order to eliminate all opposing tanks. The map that you and your enemies are spawned in is randomly generated. It is a maze with walls that you cannot pass through. The bullets are able to bounce off walls. Thus, you want to dodge existing bullets while also approaching and shooting bullets at your enemies. You can be damaged by your own attacks, but NPCs cannot be damaged by their own attacks. It will be a 1-2 player game in which you can play against someone else and even add up to 3 NPC (non-playable characters) enemy tanks. In addition, there will be power-ups that spawn on the map in regular intervals. These power-ups can modify the base attack of your tank, giving you an advantage. The goal of this game depends on whether you are playing on the single-player or two-player modes. For the single-player mode, the goal is to survive as many rounds as possible, with each round defined by a new maze and respawned enemies. You lose when your tank is eliminated and win each round when all enemies are eliminated. For the two-player mode, the goal is to beat your opponent. Whoever reaches 5 wins first is the victor. If a round is completed with no players alive (only NPCs remain), there is a tie.

Functionalities:

- Score tracker
 - We will utilize a global instance variable that will increase by 1 for every round won by the corresponding player. There will be two of these variables, one for each player in the two-player mode, in which only one will be used in the single-player mode.
 - The score(s) will be displayed on the screen after each round.
- Win Screen
 - For the single-player mode, the score will be displayed on an end screen after the player's tank is destroyed and the game ends.
 - For the two-player mode, the victor will be displayed depending on who wins 5 rounds first.
 - Both of these will be displayed in processing using the instance variables from the score tracker.
- Maze generation
 - Using a set maze size, we can use recursion to randomly generate mazes.
- Tank spawning

- Player and NPC tanks will spawn in random valid positions.
- Player movement
 - We will have instance variables to track the location of player tanks at all times, updating them every time the tanks move. For multiplayer, there will be two sets of these variables, one for each player.
 - By changing these variables, we can easily create the forward and backward movements. If a tank is rotated, we can utilize trigonometry to change these variables such that they work.
 - Using the rotate() method in processing, we will rotate the tanks through the A/← and D/→ inputs on a set angle interval.
 - Tanks cannot occupy the position of a maze wall.
- Player shooting
 - By pressing the corresponding shoot button, a bullet will be created directly in front of the tank and travel forward continuously in correspondence with the initial direction of the shooting tank until a boundary or tank is reached.
 - If a boundary is hit, the bullet will bounce off at an angle equal to its incidence angle relative to the normal of the boundary and continue moving until the timed duration of the bullet is reached.
 - The time duration of the bullet is stored in an instance variable with a method that updates its value.
 - If a tank is hit, both the tank and bullet are destroyed.
- NPC movement
 - Using the position of the player tanks, each NPC tank will move toward the nearest player tank. Similar instance variables compared to player tanks will be used to store the locations of the NPCs.
 - NPCs have slower speeds compared to that of players
 - NPCs can only move in the middle of maze units
- NPC shooting
 - NPCs will have a set range in which they can detect a player tank.
 - If a player tank is within that range, an attack will be fired in a random direction.
 - Bullet will work the same as in player shooting except a NPC tank cannot kill itself.
- Power-ups
 - In an instance variable that stores the timer for each power-up's spawn time, a random powerup will be spawned periodically in a random valid position, starting when a set amount of time passes after the start of each round.
 - If a tank occupies the same space as a powerup, that tank will gain that power-up. The player's base attack is then modified and the power-up disappears from the map.
 - 3 power-ups we can implement are:

- Laser (one-time use): the attack travels the path that it would take within a set (and longer) lifespan of a bullet instantly
- Phasing bullet (one-time use): the attack can travel through walls but not through outer boundaries of the maze.
- Machine gun (one-time use): reduces the attack downtime for a set amount of time
- Power-ups, unless specified, last indefinitely until used.
- Power-ups will be stored in instance variables for each player tank.
- Power-ups can be stacked.
- NPC tanks CANNOT pick up power-ups.

How does it work?

Objective: The goal of this game depends on whether you are playing on the single-player or two-player modes. In both cases, you want to shoot bullets towards your enemies while avoiding your enemies' bullets. For the single-player mode, the goal is to survive as many rounds as possible, with each round defined by a new maze and respawned enemies. You lose when your tank is eliminated and win each round when all enemies are eliminated. For the two-player mode, the goal is to beat your opponent. Whoever reaches 5 wins first is the victor. If a round is completed with no players alive (only NPCs remain), there is a tie and no player is awarded points.

Running the game:

- 1) The game will prompt the player(s) to select either the single-player or two-player mode.
- 2) Next, the game will prompt the player(s) to select the number of desired NPCs on the map.
- 3) A randomly generated map of standard size will be created.
- 4) The players (and NPCs if selected) will be spawned in random valid positions within the maze.
- 5) Powerups will start spawning 12 seconds after the start of the round and continue spawning on 8 second intervals
- 6) The round ends when only 1 or 0 players are alive for both modes and the score is updated accordingly
- 7) After a round is over, a new random map is generated and the game proceeds to a new round
- 8) In single-player, the game ends when the player tank dies
- 9) In two-player, the game ends when a player reaches 5 points (5 won rounds)
- 10) Victor messages are displayed

Controls:

Mouse to select prompts from the game

1) Single-player mode

- W Moves the tank forward in the direction it is facing
- A Rotates the tank counterclockwise
- S Moves the tank backward from the direction it is facing
- D Rotates the tank clockwise
- Q Fires attack (typically a 5 second cooldown for base attack)

2) Two-player mode

- Player 1: WASDQ keys
- Player 2:
 - ↑ Moves the tank forward in the direction it is facing
 - ← Rotates the tank counterclockwise
 - ↓ Moves the tank backward from the direction it is facing
 - → Rotates the tank clockwise
 - / Fires attack (typically a 5 second cooldown for base attack)

Log

- Start Screen: Eileen Xu
- Maze Generation: Gary Jiang, Bin Lin Zhou
- Player Tank Movement: Bin Lin Zhou, Gary Jiang
- Player Tank Shooting: Eileen Xu
- Powerups: Bin Lin Zhou
- NPC Movement: Bin Lin Zhou
- NPC Shooting: Gary Jiang
- Win/Score Screen: Eileen Xu
- Round Logic: Bin Lin Zhou

UML Diagram

