CS4303 Video Games: Practical 3
Game: Flagship
Game Guide

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Contents

A   Game Summary

Flagship is an open-world, top-down, single-player, action-adventure pirate/naval-combat game. The player controls a ship avatar tasked with ultimately defeating a final boss - the flagship. Initially, the player is hopelessly outmatched! By exploring the open-world oceans, defeating enemies in naval combat, and collecting loot, the player can purchase valuable upgrades for their ship and develop their naval skills. Only then may the player have a fighting chance at claiming victory over the flagship and winning the game.

B   Gameplay

B.1   Objectives

The overall goal of the game is to defeat the final boss - the flagship antagonist. Thus, the player wins the game when the final boss runs out of health. This final boss is ever-present and constantly hunts the player. Initially, the flagship is over-powered; the player cannot hope to defeat the final boss at the start of the game. However, the final boss is also slow. As such, the player is encouraged to explore the world, defeat enemies, and collect loot to obtain upgrades and progress through the game. It is only through world exploration that the player will be able to stand a chance at defeating the final boss.

B.2   Progression

The game proceeds via open-world exploration. The player must develop their naval combat skills by defeating enemies and upgrade their ship's abilities by collecting loot. The open-world is procedurally generated with difficulty increasing via the scaling of spawned opponents with the player. Bosses within the game have a fixed difficulty and can be used to mark progression; the player understands that they are getting stronger as they notice the difficulty of bosses decreasing.

B.3   Graphical User Interface

There are four main phases the player encounters: the title screen, the game-play screen, the game-paused/shop menu screen, and the game over screen (see Figure 1).

Initially, the game begins at the title screen, which provides an overview of the controls explained in this guide, the name of the game, and instructions to begin. The player presses any key to start the game. The game-play screen is where the player interacts with the game to explore the open-world and challenge various enemies. By collecting loot crates to obtain gold, the player can spend their gold by pausing the game (toggled with the tab key), where a shop menu is presented. The player can interact with the shop to purchase upgrades for their ship. The game over screen will show once the player has successfully defeated the final boss. Pressing any key from the game over screen will return the player to the title screen, where a new game may be started.

Figure 1: Labelled GUI screens: title screen (top-left), game-play screen example (top-right), game-paused/shop menu screen (bottom-left), and the game over screen (bottom-right).

B.4   Game Objects And Mechanics

The following elements comprise the game (Figure 2): the map, the player, loot crates, and opponents (weather, enemy ships, the flagship, forts, mega-forts, sharks, and sirens).

Figure 2: Figure showing the appearances of the entities comprising the game. Friendly objects to the player are in the green box, whilst enemy objects to the player are in the red box.
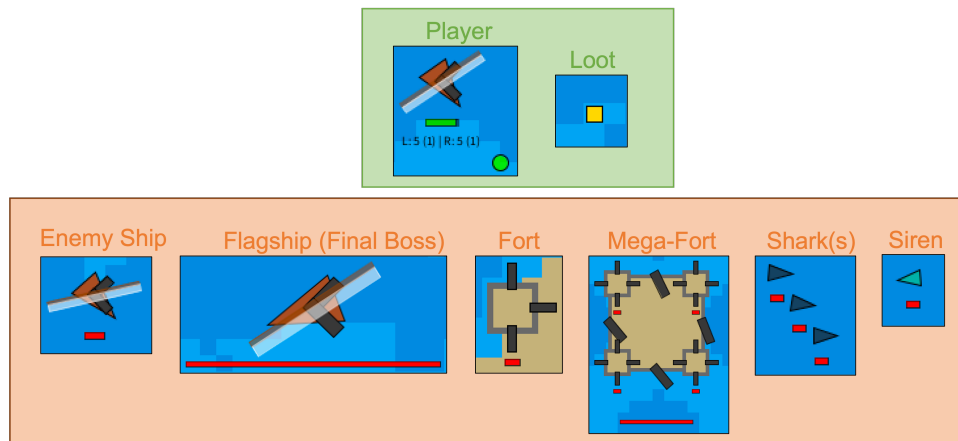
B.4.1   Map

The map is procedurally generated as the player explores the open world and can be panned to change the player's current view (Figure 3). The map consists of tiles of 4 different terrain types: deep water, shallow water, sand, and grass. These terrain types determine the types of enemies that can spawn and be present at a given tile.

Figure 3: Figure showing the appearance of the map within the game. As seen, the map is tile based, with tiles necessarily having a type of terrain. These terrains determine the type of enemies that are spawned and present. For example, forts are spawned on land (centre and upper-left in the screenshot), whilst sharks and sirens operate within the water (right and bottom-centre in the screenshot). The map is 2D Perlin noise based, which is how the natural look of shallow water surrounding land masses before receding into deeper waters is achieved.

B.4.2   Player

The player is represented by an avatar. This avatar is a ship character the player can control. The player can point-and-click within the map to indicate where the ship avatar should move towards. However, ship movements are subject to various physics aspects, such as wind strength, sail alignment, and water drag. The player can mitigate and even take advantage of such effects by aligning their sail with the wind. The player can also fire volleys from their ship's cannons. Additionally, the player can purchase upgrades with collected gold (using a shop menu displayed when the game is paused) to affect their ship avatar. Upgrades consist of providing additional health, cannon volleys, cannon range, cannonballs per volley, and/or damage per cannonball. Initially, the player starts with 50 health points, a single cannonball per volley fired, the lowest cannon range, and 10 damage per cannonball hit.

B.4.3   Opponents

Several different types of enemy are present within the game, which introduce fun and differing mechanics to increase the variety of challenges the player encounters (Table 1).

Table 1: Table summarising the opponents, and their associated behaviours, within the game.

Opponent	Type	Motion	Damage
Wind	Weather	-	-
Description			
The wind pushes the player's ship in randomly changing directions with differing strengths, which the player must account for. Also, the player has to maintain reasonable sail alignment with the wind for their ship to have mobility. The wind direction is shown as an arrow in the top-left corner of the screen. The stroke size of this arrow indicates the strength of the wind in said direction.			

Opponent	Type	Motion	Damage
Enemy Ships	Regular Character	Mobile	Projectile
Description			

If an enemy ship is aware of the player but the player is not in range, then the enemy ship will pursue the player with arrival. This means that once the ship gets sufficiently close to the player, it will start to slow down in order to maintain the player within cannon range and so that shots become increasingly accurate. If the enemy ship is aware of the player and the player is in cannon range, then the enemy ship will fire upon the player. Otherwise, when the enemy ship is unaware of the player, it will wander the map. Note that in all cases, enemy ships are affected by wind and water drag forces; enemy ships will always turn their sail towards the wind though not as immediately as the player is able to do so. Also, enemy ships will always manoeuvre to avoid land. An enemy ship is distinguished from the player ship via their red health bar, whilst the player's is green.

Opponent	Type	Motion	Damage
Flagship	Final Boss Character	Mobile	Projectile
Description			
The flagship is always aware of the player and is, therefore, always pursuing the player (with arrival as described with the regular enemy ships). When the player is within cannon range, the flagship will fire upon the player. The flagship is the largest opponent in the game, has the highest amount of health, the longest range, the highest damage, and the most cannonballs per volley. However, it is also the slowest character in the game.			

Opponent	Type	Motion	Damage
Forts	Regular Character	Stationary	Projectile
Description			
A given fort can possess between 1 and 4 cannons, which is determined at random when spawned. When the player is within the awareness radius of a fort, the fort will aim its cannons towards the player. If the player comes within range of one of the fort's cannons, then said cannon will fire at the player.			

Opponent	Type	Motion	Damage
Mega-Forts	Mini-Boss Character	Stationary	Projectile
Description			
A mega-fort possesses the same behaviour as regular forts except that it has greater health, a greater radius of awareness, and more cannons. Each mega fort possesses 4 large cannons with great range at each of the cardinal directions, and also comprises 4 regular forts at each of the corners of the central fort. Note that each corner fort can be individually destroyed to mitigate the danger of the mega-fort, but destroying the overall central fort irregardless will defeat the entire mini-boss.			

Opponent	Type	Motion	Damage
Sirens	Regular Character	Stationary	Contact
Description			
Sirens are stationary enemies within the water. When they are aware of the player they will look towards the player. With a random probability, a siren may also halt the player (i.e., nullify their velocity and remove the player's point-to-seek given by the mouse) and pull the player towards itself. The player must either kill the siren or repeatedly click away from the siren's area of effect to escape its pulling influence. If the player is touched by the siren, then damage is dealt and the siren 'swims away' (i.e., removed from the game).			

Opponent	Type	Motion	Damage
Sharks	Regular Character	Mobile	Contact
Description			
Sharks are mobile enemies that wander the map area, avoiding land when necessary. When a shark becomes aware of the player, the shark pursues the player but with a lunging capability. Lunging follows the opposite behaviour to arriving; the closer a shark gets to the player (within its area of awareness), the quicker the shark hurls itself toward the player's ship. Sharks deal constant damage while 'biting' (i.e., colliding with) the player's ship, though the inflicted damage per shark is very small. However, sharks will also follow flocking mechanics when they discover each other, travelling as a group separately but cohesively. Larger collections of sharks attacking the player together are more substantial a threat to the player.			

B.4.4   Rules/Mechanics

There are many rules and mechanics present in the game, which are covered in the following list:

- The player is able to explore the open-world map by panning the camera, which is enacted by moving the cursor towards the edges of the screen. The camera view will pan in the relevant direction according to which side of the screen the cursor approaches.

- All characters have health, and are defeated once their health is depleted. Characters do not regenerate health within the game. When the player is defeated, they are re-spawned nearby on the screen but suffer a gold penalty (i.e., a portion of their gold is taken away as a consequence of dying).

- All characters are confined to their relevant terrain types. Thus, water enemies cannot go on land, and land enemies cannot enter the water. However, water enemies that hit the land do not suffer a health penalty; the land as an obstacle is viewed as providing sufficient challenge to the game.

- All regular (i.e., non-boss) opponents are procedurally spawned into the world as the camera view-point is panned. Regular opponents are despawned after a period of inactivity outside the bounds of the map at the camera view-point.

- All character opponents strictly seek combat with the player and do not fight each other; though, their projectiles can harm one another if the player is savvy enough to use this to their advantage.

- Ships are subject to wind and water drag when moving. The degree of alignment between a ship's sail and the wind direction determines how mobile the ship is at moving in a desired direction (e.g., in pursuit of the player for enemy ships, or towards the player's point-to-seek for the player ship).

- Ships simply need to align their sail with the wind to be mobile but this does not deter the direction they can travel; it may be expected that the ships must travel in the direction of the wind.

- Ships possess a port-side and starboard-side cannon, which are implicitly fired based on the side of the ship a target is (relatively). Thus, the player does not need to specify which cannon to fire from. Instead, the player simply aims at a target with the cursor.

- The player's cannons have a limited amount of volleys, whilst enemy cannons have infinite ammunition. All cannons have a range, a number of cannonballs per volley (i.e., spread-shot), and an amount of damage dealt per cannonball. Also, cannons have a cool-down period between firings.

- The player is able to upgrade attributes of their ship: amount of health, volleys, cannonballs per volley, damage per cannonball, and cannon range. However, such upgrades require gold to purchase.

- The player can collect loot by guiding their player ship over loot crates to attain gold. A random amount of gold (between minimum and maximum bounds) is assigned per loot crate collected. Also, a random amount of volleys will be assigned to the player's cannons.

- Cannons in motion (i.e., on ships) impart said motion onto the cannonballs they fire. Thus, cannonballs move as expected and down the barrels of the cannons that fire them, even when the cannon is moving. This replicates real-world physics and introduces a degree of inaccuracy and/or pre-firing that is required for ships at speed. Enemies do not pre-fire the player, making it easier for the player to dodge enemy projectiles (which is especially needed when spread-shot is involved). However, enemy ships will slow down as they approach the player, which causes them to become more accurate with their cannons.

- Cannonballs move as projectiles that are affected by drag. Once drag has slowed a cannonball sufficiently, the cannonball is removed from the game (as though the cannonball sank into the water/ground from the top-down perspective). When a cannonball collides with a character, the amount of damage the cannonball is assigned is inflicted on the character and the cannonball is removed from the game.

B.5   Controls

The following controls allow the player to interact with the game. These controls are also summarised at the title screen.

- **Ship Movement:** The player controls the location of an aiming cursor on the screen by moving the mouse. At any point, the player can left-click with the mouse (whilst no keys are engaged, so ship movement is the default action) to specify a desired location within the map that the player ship should move towards.

- **Sail Alignment:** The player can hold the '1' key to enter a sail alignment mode. Whilst this key is engaged, the mouse cursor (relative to the player ship) is used to specify a direction the sail is facing. When the player is satisfied with their sail alignment, they can simply release the key as confirmation.

- **Cannon Firing:** Similarly to sail alignment, the player can hold the '2' key to enter a cannon firing mode. Whilst this key is engaged, the mouse cursor (relative to the player ship) is used to specify a direction to aim the cannons. Which cannon (port or starboard) is being aimed is implicitly handled based on the relative position of the cursor to the ship (i.e., if the aim is port-side of the ship, then naturally the port-side cannons should be fired). A left-click whilst aiming will confirm the current trajectory and fire a volley from the appropriate cannon. When the player wishes to stop firing their cannons, they simply release the '2' key.
  Note that the cannon firing mode requires a left-click to launch a cannon volley, as opposed to releasing the key (as is the case with sail alignment), so that the player can change their mind and not fire any cannons should they wish.

- **Shop Interaction:** The 'tab' key is used to toggle pausing of the game. Whilst the game is paused, a shop menu will be displayed. The player can use their mouse to hover over upgrade options within the shop. Left-clicking an option will purchase the corresponding upgrade, if the player has sufficient gold.

Development and debugging controls have also been enabled so that the features of the developed game can be verified easier. Typically, these options would be disabled to a standard player.

- Pressing the 'M' key will skip to the game over screen.

- Pressing the 'N' key will toggle a developmental view of the game. In such a view, the following elements are displayed: the bin-lattice spatial sub-division of game objects, the awareness radius of characters, the range of cannons, the size of the various game object data structures, and individual character attributes (e.g., speed, screen position, map grid location, and terrain under character).

- Pressing 'B' toggles pausing of the game but without display of the shop menu so that the state of the game can be better viewed at a particular time.