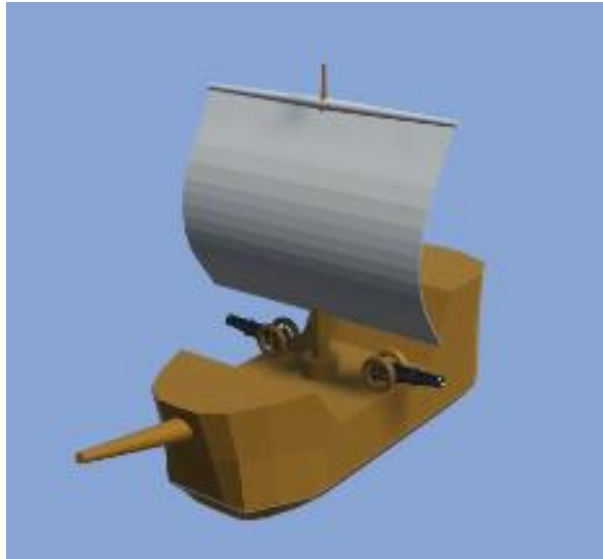


Buccaneer Game Design Document (GDD)



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Contents

1 Game Overview	3
2 High Concept / Genre	3
3 Unique Selling Points	3
4 Platform Minimum Requirements	3
5 Competitors / Similar Titles	4
6 Synopsis	4
7 Game Objectives	4
8 Game Rules	4
9 Game Structure	4
10 Game Play	4
10.1 Game Controls	4
10.2 Game Camera	5
10.2.1 HUD	5
11 Player	5
11.1 Player Mechanics	5
11.2 Metrics	6
12 Ship Line-up	7
13 NPC	7
13.1 Enemies	7
13.1.1 Enemy Metrics	7
13.1.2 Enemy States	8
13.1.3 Enemy Spawn Points	8
14 Art	9
14.1 Setting	9
14.2 Level Design	9
14.3 Audio	9
15 Minimum Viable Product (MPV)	9
16 Wish List	9
17 Bibliography	10

1 Game Overview

Title: *Buccaneer*

Platform: PC Standalone

Genre: Arcade top-down shooter

Rating: (10+) ESRB

Target: Casual gamer (aging from 12 - 30)

Release date: 2022

Publisher: Your Company Name

In *Buccaneer*, the player controls a pirate ship from a top down perspective. The game world is mostly ocean with small islands scattered around. Islands can have ports, which NPC merchants travel between. The player can shoot and loot the merchant ships to collect gold. Navy ships will also patrol between the island ports, and will attack the player if they get too close. There is also one island that has the player's "pirate hideout," where the player can deposit collected gold and purchase upgrades for their ship. The player's goal is to collect and deposit a total amount of gold (depending on the difficulty selection) into their hideout. As the player collects gold, the difficulty increases and more merchant and navy ships will spawn. Navy ships will also spawn as more difficult variants as the difficulty increases.

2 High Concept / Genre

Our primary goal was to make a pirate-themed game with arcade-like pacing. Arcade games are typically fast-paced and action-focused, as they are meant for shorter play sessions. Players are constantly engaged with the action and making decisions with the goal of prolonging the play session and/or obtaining a high score. In *Buccaneer*, the goal is to survive and collect enough gold to win the game. Like many arcade games, when the player dies it is game over and they must restart to continue playing.

The shooting element was conceived early on as the player's primary means of attack. The idea of charging up shots and seeing the shot trajectory was inspired by the many physics-based shooting games, like *Shellshock Live*.

The upgrade mechanic was inspired by roguelikes like *Risk of Rain*, where the player gets dramatically more powerful over the course of a play session in order to keep pace with the enemy difficulty scaling. Just like these games, *Buccaneer* has enemy encounters that scale in difficulty and a system for the player to become more powerful in order to keep pace.

3 Unique Selling Points

There have been ZERO video games based on pirates made ever.

4 Platform Minimum Requirements

A modern computer with an integrated graphics card is sufficient to run this game smoothly.

5 Competitors / Similar Titles

6 Synopsis

7 Game Objectives

The main objective of *Buccaneer* is to deposit a total amount of gold into the pirate hideout. Sub objectives on the way to that goal are:

- To survive, as if the player dies it is game over.
- Attack and pillage merchant and navy ships
- Upgrade your ship at the pirate hideout to survive against the increasing difficulty of the navy ships

8 Game Rules

If the player ship dies, the game ends and progress is lost. If the player reaches the target amount of gold, they win and may continue in an endless mode if they desire.

The player ship automatically begins repairing itself when it floats completely still in the water. Ship upgrades have increasing cost as they level up.

9 Game Structure

The player starts next to their hideout with zero gold. They must sail into the open sea and pillage merchant/navy ships to amass gold. Once they have enough gold for upgrades they want or just want to rest and repair, they can return to the hideout and upgrade their ship. The ship upgrades are split up into specific stats like movement speed, turning speed, charge speed, and multishot. The player then ventures back out to pillage/plunder and repeats this process until the target gold amount is reached. At this point, a victory screen is displayed and the player may choose to return to the main menu or continue their run in an endless mode.

10 Game Play

10.1 Game Controls

W/S : raise/lower sails (controls ship forward movement)

A/D : turn ship

Left/Right arrow keys

- Hold : charge port/starboard cannon
- Release : fire port/starboard cannon

Up/Down arrow keys: Pitch cannons up/down

E : interact (to open shop)

Esc : open pause menu

Mouse control : interact with menus (shop, main menu, pause menu, etc.)

10.2 Game Camera

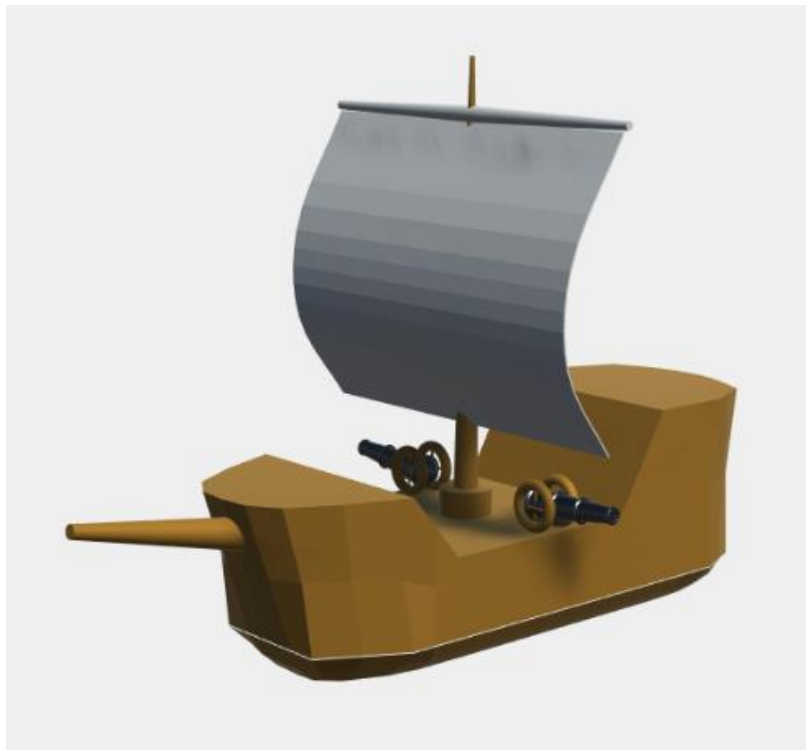
Camera follows the player from a top-down perspective (with a slight angle towards the player)

10.2.1 HUD

Health bars of all ships are invisible when their ship is at full health. If damaged, they will appear above their ship and follow it. Gold carried by the player ship is displayed above the ship along with its healthbar (this counter is also invisible when the player ship has 0 gold). Gold hoarded at the player hideout is always displayed at the top of the screen.

11 Player

11.1 Player Mechanics

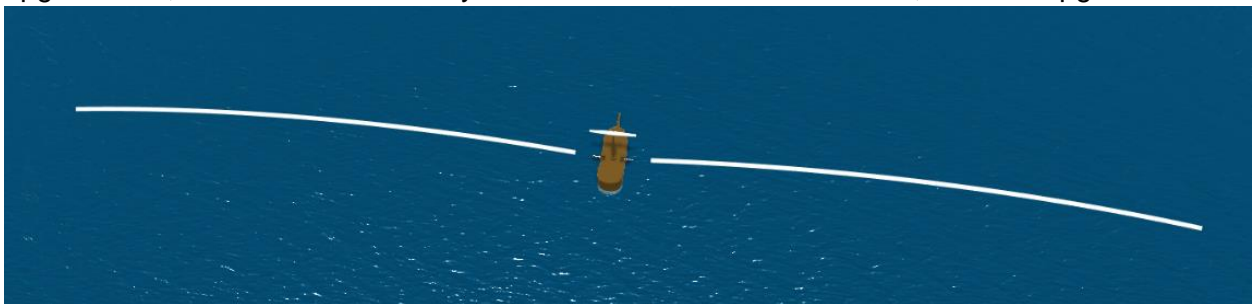


The Player ship

The player controls one pirate ship, which they view from a top-down perspective. Player movement is comprised of three mechanics: ship “throttle” (stylized as the sails), which controls forward movement. When throttle is fully lowered, the player ship stands still. When it is at max, the player moves forward at whatever maximum speed they have. Movement is controlled with forces (as opposed to direct velocity control). Maximum speed can be upgraded. The player cannot move backwards. The second mechanic is the ship’s turn, which is simply controlled as spinning on its center vertical axis clockwise or counterclockwise (by torque). Turning speed can be upgraded. The third is a boost, which when activated, adds a large impulse (scaled off of maximum speed) to the ship, propelling it forward past its normal maximum speed. Boost has an associated strength and cooldown, both of which can be upgraded.

The player can attack by “charging” one or both of their port/starboard cannons. A visual indicator of the projectile’s trajectory is displayed as the initial velocity of the cannonball is gradually charged up to max. If the trajectory intersects with an enemy ship, it will turn red for clarity. Additionally, to adjust the projectile arc even more, the player can also pitch their cannons up and down (minimum 0 degrees and maximum 15 degrees). The charge rate of the cannons can be upgraded. The maximum number of shots loaded into the cannons can also be upgraded. When the cannon reached maximum charge and an additional shot can be loaded, an additional projectile trajectory arc appears and displays the additional cannonball’s arc/charge. This repeats until the number of cannonballs loaded is equal to the max, or the player fires their cannon, in which case each cannonball is fired at its charged velocity in a fast burst.

Damage as a whole is very hard to avoid in combat, so the player is able to repair themselves at any time by remaining completely still. The rate at which they repair is not upgradeable, but does automatically scale off of their maximum health, which is upgradeable.



The player charging both port and starboard cannons, showing the projectile trajectory

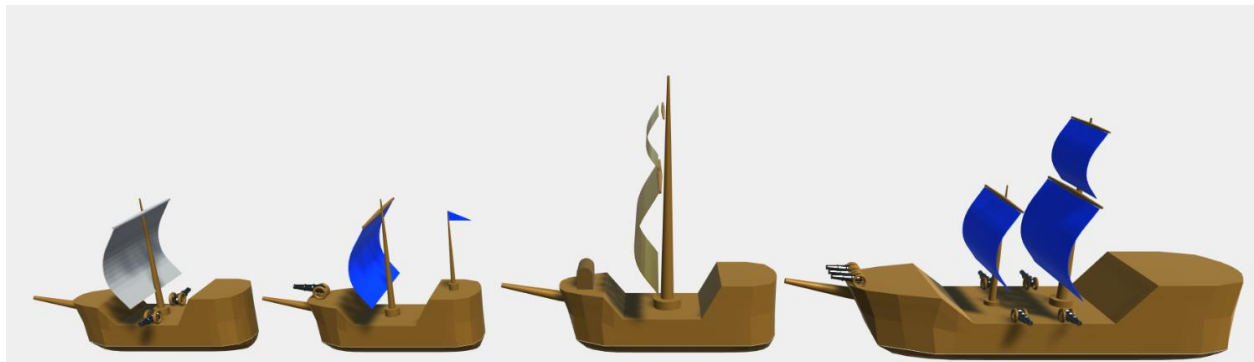
Another way of attacking is by ramming enemy ships. When a ship collides with another ship, damage based on the collision velocity is dealt to both ships. A ship can also collide with an island or rock and have damage dealt to it. The player can have “ramming armor” that decreases the amount of ramming damage taken by a percentage. The player starts with 15% ramming armor (so they take 85% of any collision damage). This value can be upgraded.

11.2 Metrics

Shown below is a table containing the player ship’s stats, as well as the upgrade functions. Note that every upgradeable stat starts at level (lvl) 0.

Stat Name	Value Function	Cost Function (gold)
Health ("Hull")	$5 + 3(lvl)$	$250 \times lvl$
Max Speed ("Sails")	$2.5 + 0.5(lvl) \frac{units}{s}$	$250 \times lvl$
Turning Speed ("Rudder")	$0.75 + 0.25(lvl) \frac{rad}{s}$	$250 \times lvl$
Ramming Armor ("Armor")	$0.15 \times 1.15^{lvl} \text{ dmg reduction}$	$250 \times lvl$
Boost	$2.5 + 0.3(lvl) \text{ boost strength}$ $5 \times 0.9^{lvl} \text{ boost cooldown (s)}$	$250 \times lvl$
Multishot ("Loader")	$1 + 1(lvl) \text{ max shots loaded}$	$250 \times lvl$
Cannon Charge rate ("Gunpowder")	$0.375 + 0.2(lvl) \frac{max \text{ charge}}{s}$	$250 \times lvl$

12 Ship Line-up



From left to right: Player (Pirate) ship, Navy Cutter, Merchant ship, Navy Galleon

13 NPC

13.1 Enemies

There are three enemy types in *Buccaneer*: Merchant ships, Navy Cutter, and Navy Galleon. Of the three, only the Navy ships will engage, pursue, and attack the player. Merchant ships are non-hostile and are more of a target for the player than an enemy.

13.1.1 Enemy Metrics

Presented below is a table with the three enemy types' stats.

Stat Name	Merchant Ship	Navy Cutter	Navy Galleon
Health	5	5	12

Max Speed (units/s)	1	2	1
Turning Speed (rad/s)	1	0.75	0.25
Ramming Armor	0	0	0
Number of Cannons	0	1	7
Gold Dropped	1000	250	5000
Alert Radius (units)	N/A	10	10
Pursuit Radius (units)	N/A	20	20

13.1.2 Enemy States

The two navy ships have two states.

1. Patrol: The navy ship has a random list of islands that it visits in sequence. When it reaches the last island, it despawns and another enemy of the same type spawns in at a random different port with a random patrol path.
 - a. If the player ship enters unobstructed line of sight within the navy ship's alert radius, the navy ship will enter the Aggro state.
2. Aggro: The navy ship approaches the player, and if it gets close enough, stops a short distance away. If the player gets closer than this short distance, the navy ship will attempt to increase the distance between them. The navy ship activates its cannons, any and all of which will fire at the player if the player ship crosses in front of it and within its firing range. All cannons have a maximum fire rate of 2 shots per second.
 - a. If the player breaks line of sight or exceeds the pursuit radius of the navy ship, the navy ship will resume its patrol state.

The merchant ships do not react to the player in any way. They simply travel from one island to another and dock (despawn) at their destination island. Merchant ships are meant to be easy, primary targets, with navy ships as something to avoid.

13.1.3 Enemy Spawn Points

All NPC ships spawn at points near island called Ports. Merchant ships will have one destination port and disappear when they reach it, while navy ships in their patrol state will travel from port to port until they, too disappear when they reach the last port in their patrol path.

The number of NPC's in the world depend on the game's current difficulty, which scales based on the total amount of gold the player has collected. The rate at which difficulty scales with player gold depends on the selected difficulty setting of the game (Easy, Medium, or Hard). Each type of NPC is tracked independently by the game manager. There is a maximum number of Merchants, Navy Cutters, and Navy Galleons that can be in the world at any given time. This maximum number increases as difficulty increases. When a number of any type of ship is lower than the max, the game manager will attempt to spawn one at a port (which will only fail if that port is occupied).

14 Art

14.1 Setting

14.2 Level Design

14.3 Audio

15 Minimum Viable Product (MPV)

The MVP of *Buccaneer* will include:

- Controllable player ship, with functioning cannons and trajectory visualization
- Merchant ships for the player to sink and loot
- At least 1 enemy ship type for the player to fight
- Loot system
 - NPC ships drop gold
 - Player can pick up gold, hoard it on ship
 - Player can go back to their hideout and stash gold
- Upgrade system
 - Gives player something to spend gold on
 - Upgrade player ship to stay competitive with scaling game difficulty
- Scaling difficulty
 - Difficulty scales up as the game progresses (with player-collected gold)
- Customization
 - Player can input their name, preferred sail color, and difficulty setting in the menu
- Art assets
 - Multiple island models for variety
 - Ship models for every ship type
- Audio
 - Functioning game music
 - Functioning sound effects

16 Wish List

- Effects
 - Splash, ship wake, explosion effects
- More enemy types
- Map
- Layable mines (explosive barrels)

- Custom ammo (incendiary, explosive, chainshot)
- Grappling hook/harpoon
- Speed boost (dash)
- Purchasable allied ships

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