Technical Design Document for:

Candyboiz

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1.0 Revision History

Version	Description
1.0	Initial document
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1.3	9.0 Game Flow
1.4	The rest of it

2.0 Development Environment

2.1 Game Engine
Unity 2018.3.12f1

2.2 IDE
2.2.1 Coding Guidelines
Use Microsoft's coding conventions for C#
- https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/inside-a-program/coding-conventions

2.2.2 Naming Conventions
Naming conventions are specified in above section.

2.2.3 Source Control procedures
Perforce

2.2.4 Memory limits per system

2GB

2.3 Other Software

Textures/2D graphics:
- Photoshop
- Paint.net

3D Models:
- Maya

Audio:
- Audacity

3.0 Game Overview

2.1 Technical Goals

2.1.1 60fps

Keeping a consistent 60fps should be prioritised over fancy graphics. A high frame-rate is important for smooth and satisfying experience within a fast-paced game.

2.1.2 Time-based Events

Frequent scheduled updates to the game to give players unique objectives and unlockables for a limited time.

2.1.3 Multiplayer

8 player matches.

2.1.4 Cross-platform Release

The game should be made to run smoothly on PS4, XB1, Switch.

2.2 Game Objects and Logic

2.2.1 Characters

Playable Characters
Components: Character Controller, Colliders, Camera
Scripts: Movement, Stats (Scriptable object), Weapons

Gingerbread Soldiers
Components: Rigidbody, Colliders, Nav Mesh Agent
Scripts: AI, Stats

2.2.2 Weapons

Weapons - Controller script, Stats Script (Scriptable object)
Bullets - Move script, Stats Script (Scriptable object) attached to weapon

2.2.3 Arenas

Basic Arenas - Base Walls, Lanes, Spawn Areas (players, enemies, weapons), Nav Mesh
Event Arenas - Basic arenas, but with events unique to a certain timeframe

2.2.4 UI
HUD - Arena Map, Weapon, Ammo, Health Bar, Special Bar, Match Timer
Menus - Buttons, Option Sliders, Toggles, Currency

2.3 Game Flow

Splash Screens - show splash screens while loading stuff
Login - title screen with login/sign up
Main Menu:

- Quick Match
    - Pick Game Mode
        - Finds other players on server
        - Play game
- Play With Friends
    - Pick Game Mode
        - Create Room
            - Wait for friends to join
            - Button to look for randoms once friends are joined
            - Play game
        - Join Room
            - List of available friends currently playing
            - Play game
- Cosmetics Store
    - Buy cosmetics
    - Buy loot boxes
    - Buy premium currency
- Profile
    - View stats
    - Change Skin
    - Add Friends
- Settings
    - Music/SFX volume sliders and mute toggle
    - Graphics settings
- Log out/switch accounts
- Exit Game

4.0 Mechanics

4.1 Weapons

Weapons spawn randomly in the arena, and as drops from Gingerbread Soldiers. Initially this will be pseudo - random to insure no favouritism towards either side. This will move to a more true random algorithm towards the end of the match.

4.2 Specials

Special abilities unique to each playable character. You need a certain amount of the Special Bar filled to use it. The Special Bar fills slowly over time, and with each kill.

4.3 XP

XP is gained during matches and is used to level up. Upon levelling up, the player is rewarded with a Loot Box. The amount of XP will be stored server side.

4.4 Currency

Regular money for buying cosmetics is earned at the end of each match. The amount gained depends on a bunch of different variables, eg. how many kills, how helpful you were to your team in a match, certain special objectives. Currency like XP will be stored server side

4.5 Loot Boxes

Loot Boxes contain random cosmetics and can be earned by levelling up or can be purchased. Loot Boxes will be mostly random with a built in counter system to guarantee occasionally something worthwhile will drop.

5.0 Graphics

Use shaders/lighting off the Unity Asset Store because the team is inexperienced and there are plenty of good ones already out there. Rendering pipeline is Unity’s thingo.

6.0 Artificial Intelligence

6.1 Gingerbread Soldiers

X amount of Gingerbread Soldiers will spawn in timed intervals at their designated base.

Movement uses Unity’s NavMesh navigation to move toward the enemy base until a target is within follow range. When there is a target, the waypoint will become the target’s position. Once the Gingerbread Soldier is close enough to the target, it will stop

and attack the target until either the target is dead, the Soldier is dead, or the target has exited attacking range.

If the target has died or exited attacking range, the Soldier will check for any other potential targets within follow range and move towards them. If there are none, it will continue to move toward the enemy base.

7.0 Physics

Physics are handled by Unity. Collision detection is handled by Unity. Unity is great.

Collisions:
Player to arena boundaries/objects
Player to minions
Player to opposition bullets/melee weapons
Minions to opposition bullets/melee weapons

Help prevent slowdown by making sure bullet objects have a short lifetime so too many can't be in a scene at once. Maybe even a hard limit?

8.0 Items

Stats are just descriptions until further testing.

Weapon	Damage	Fire Rate	Bullet Speed	Bullet Range	Knockback	Bonus
Hand-Gum	High	Slow	Slow	Medium	None	-
Flossinator	Low	Fast	High	Far	A bit (enemy)	-
Shmak	Low	Medium	-	-	A lot (user)	+speed

9.0 Game Flow

9.1 'Mission' / 'Level' structure

Arena is loaded in the background while in the Main Menu.

9.2 Objectives

Within one match of the standard game mode there are conditions in which either can

be met in order to end the game and win the match:

1. The team's point goal is reached. These points are gained collectively by each team member normally with destroying opponents (both human players and cpu soldiers), or the opposing team's structures.
2. The opposing team's main base structure is destroyed.

Unique objectives will be added as limited-time events in regular updates.

10.0 Levels

10.1 Pseudo-random Spawning of Events and Weapons

Events and weapons will follow a pseudo random algorithm for spawning. This is to issue fairness in there placement and spawn timing.

10.2 Minion Spawning System

Minions will be spawned at the beginning of lanes on a timer system to make sure the spawns are consistent.

10.3 Minions Move Down Lanes

Minions will travel down the lanes only stopping when they meet the wave coming from the opposite base.

10.3.1 Aggro on Players

Minions will aggro on players when players attack other players within a certain radius. They will also aggro on players if players are too near and there are no friendly minions around.

10.4 How Structures are Damaged

Structures can be damaged by both players and minions

10.5 Win Condition

There are 2 possible win conditions listed below. Meeting either will end the game

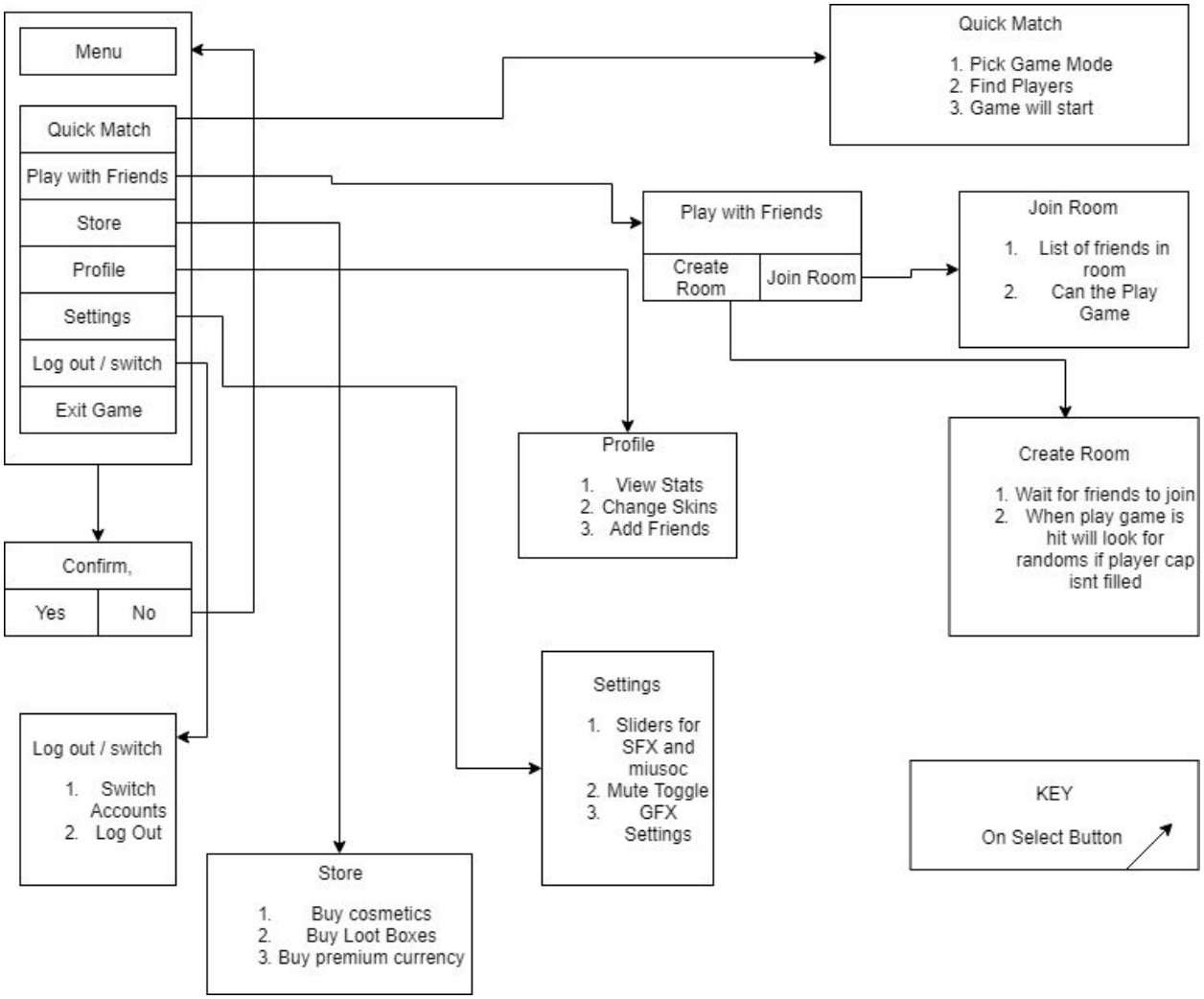
10.5.1 Points

Points are collected from winning events and player kills

10.5.2 Base Destruction

Destroying the enemy base

11.0 Interface



11.1 Menu

Menus will be created with Unity's UI GameObjects. Menu buttons can be selected by using a mouse or the right joystick of a controller.

11.2 Camera

Each player will have a camera following behind their character in a third-person perspective as their main view. A static camera is placed above each arena. This is rendered to a texture in the HUD to be used as the arena map. This camera will see objects hidden in the main camera that are used as markers so the player can easily identify where they are and where their team is.

11.3 Controls

Control	Controller	Keyboard
	IN GAME	
Movement	Left Analog Stick	W,A,S,D
Firing	Right Trigger	Left Mouse Click
Special Ability	Left Trigger	Right Mouse Click
Interact	A button	E
	MENU	
Selecting	A button	Left Mouse Click
Scrolling menu	Left Analog Stick	Mouse over

12.0 External File Formats

Textures: .png
Models: .fbx
Audio: .wav

13.0 Audio

Audio will be handled with Unity's Audio Module. This allows for easy implementation of 3D directional sound and mixing.

14.0 Asset List

14.1 Graphical Assets

Playable Characters (x5):

- Model
- Textures
- Animations
- Stat File (Scriptable Object)

Hand Gum
- Model
- Textures
- Stat File (Scriptable Object)
- Bullet Stat File (Scriptable Object)

Flossinator
- Model
- Texture
- Stat File (Scriptable Object)
- Bullet Stat File (Scriptable Object)

Schmak
- Model
- Textures
- Stat File (Scriptable Object)
- Bullet Stat File (Scriptable Object)

14.2 Audio Assets

Environmental sounds
- Footsteps
- Candy related noises

Sound FX
- Weapons
- Event coming online
- Events expiring
- Menu scrolling/selection/deselection sounds

Background Music
- Track for in game
- Track for menu

15.0 Technical Risks

- Running a number of low-latency servers in each major region