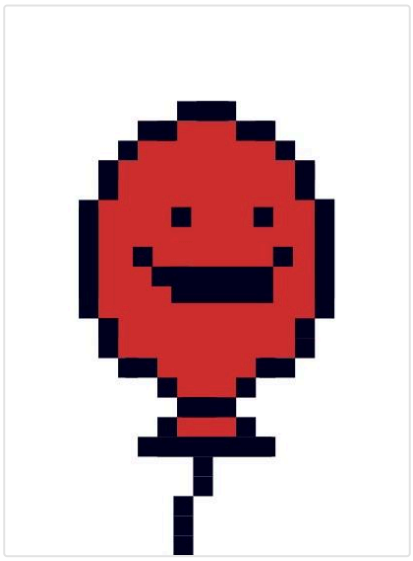
Design Document



Binary Bit Studio

Design Document For: Losers Weepers

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Version #1.0

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Game Overview

Philosophy

Inclusive Multiplayer Experience

We strive to create a gaming environment where players from diverse backgrounds and technological capabilities can come together and enjoy shared experiences. By allowing both VR and mobile players to interact within the same virtual world.

Common Questions

What is the game?
Team vs Team cross platform multiplayer shooter game topdown(mobile) and first person(VR).

Why create this game?
VR devices are a luxury that not everyone can afford and being left behind from a social event such as gaming is unfair and while not everyone has a phone most people do and can join the social experience without having to invest in a pricey headset.

What platforms will the game be available on?
Meta Quest, iOS, and Android

What are advantages and disadvantages being a mobile vs VR player and vice versa?
The biggest difference is perspective, mobile players have a top down view of the world while VR players are inside that world viewing it in 3D space. Mobile players could see past obstacles while VR players can't. VR players can see far in any direction while mobile players are limited to a set area.

Where does the game take place?
The game takes place in a castle where a birthday party is being hosted

What do I control?
Players control their movement and are able to fire weapons. The interfaces will be different depending on platform but the available actions are the same.

What is the main focus?
Team work is the focus of the game, in order to win you have to make sure more team members make it to the party than the enemy team.

What's different from other online games like Brawl Stars?

Main difference is it supports VR players. Also while theres not yet a library of different game modes we wanted the main game mode to promote teamwork between players.

Feature Set

General Features

2D graphics
3D graphics

Multiplayer Features

Up to 50,000 concurrent online users
Cross-platform capabilities mobile and VR
Text and voice chat

Gameplay

Team vs Team
Multi Perspective
2D top down mobile interface
3D first person VR interface
Fun party themed everything
Weapons and power ups
Time constrain
Teamwork

The Game World

Overview

A half acre big castle with different rooms, hiding spots, and a party theme.

Castle Layout

3 rotating layouts each with their party themes. Each layout reuses assets such as walls and floors but they are not the same.

- Birthday (main)
- Halloween
- Winter ball

Blind Spots

Since there are players with multiple perspectives interacting in the same world their are blind spots.

- Trees, piñatas, chandeliers can cover a player from the top down, however first person players can see mostly around it.
- Top down players can see past walls while first person players can't.
- Bushes/tall grass covers all directions being a complete blindspot.

The Physical World

Overview

The game takes place in a castle thats half an acre with different rooms and outdoor areas.

Key Locations

- Spawn: two spawn locations placed at opposite ends of the map this is where players first get placed at the start of the match
- Party: Located between spawn points, this location is unavailable until Last call for decorations
- Blind Spots: places where players could hide

Locations (Not all may make it to the final game or in the same map)

- Ball Room

- Backyard forest
- Frontyard
- Garden
- Dining Room
- Bed Rooms
- Bath Rooms
- Dungeon

Travel

- Mobile
  - Speed
    - 2 meters a second
  - Interaction
    - digital joystick
- VR
  - Speed
    - 1.2 meters a second
  - Interaction
    - joystick on VR controllers or 3d party locomotion devices.
- ~~If enough time, Play test the following for fun and motion sickness~~
  - ~~VR players can grab other player strings to travel as a Bouquet of balloons, traveling faster when Mobile players are leading~~

Scale

- Map:
  - The map is half an acre
  - Map dimensions are between '45X45' 1 meter tiles to '90X90' 0.25 meter tiles
    - a tile on mobile devices is a 16X16 pixel image
  - Mobile layout is TBD
    - Vertical or Horizontal orientation
    - How many tiles are shown horizontally

      How many tiles are shown vertically

- Player
  - **Mobile representation of players are calculated based on tile dimensions and mobile map layout
  - Balloon Head
    - 0.4 meters average length, width
    - height 0.5
  - Balloon String
    - 0.7 meters
  - Floor to bottom of head:
    - VR
      - player's real life height - .5 meters
    - Mobile
      - 1 meter

Objects

- Power ups:
  - speed+
  - damage+
  - immunity+
- Cover:
  - walls
  - solid objects
- Blind Spots
  - bushes
  - trees
  - chandeliers
- Weapons:
  - bubble gum sling shot
  - Confetti cannon ***
  - Piñata stick ***
  - streamers as whips

- candles
- silly string in a can ***
- darts/ donkey

playtest 12 total weapons 2 weapons

cardboard cut out of princess == hiding spot

Rendering System

Overview

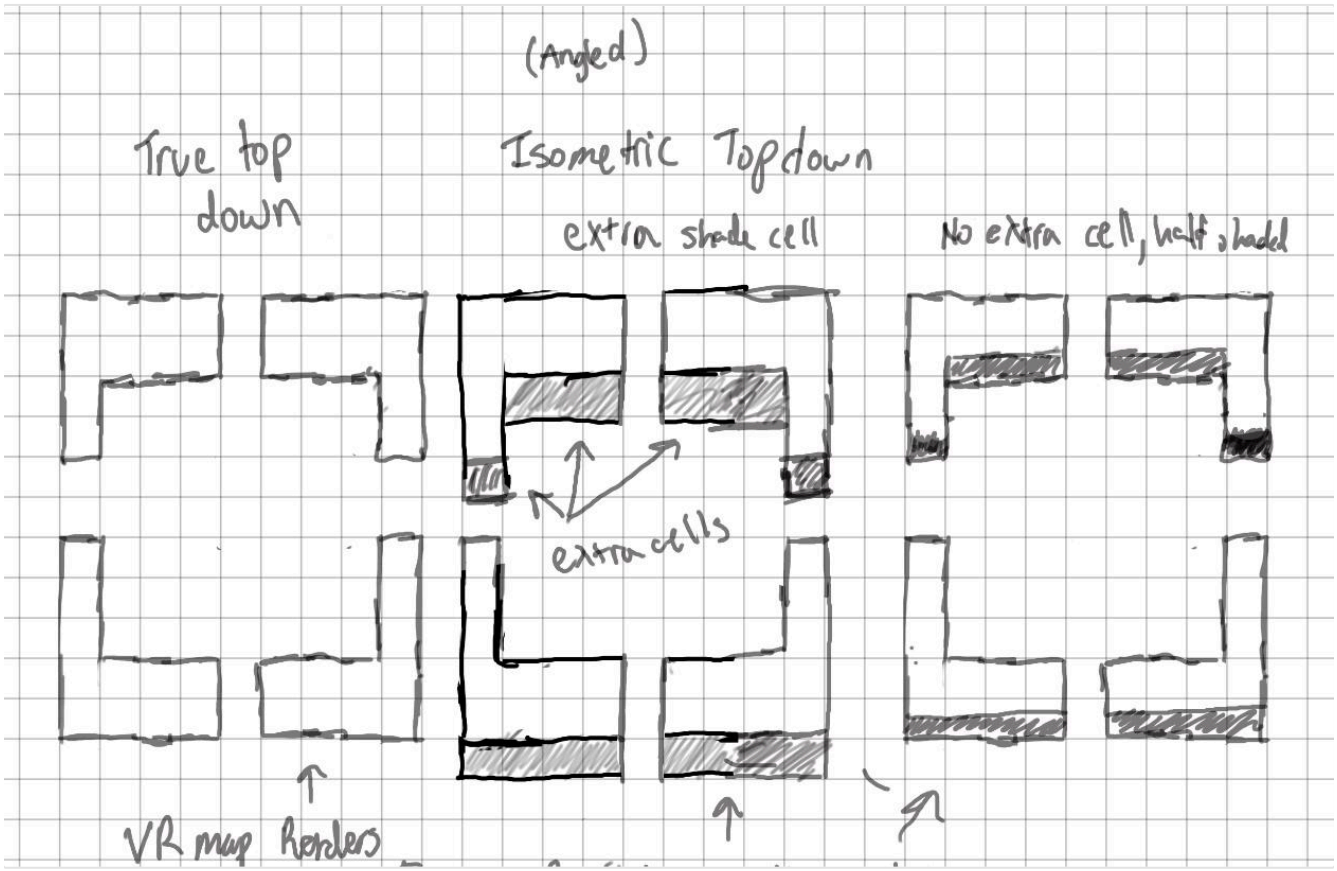
We use both our in house custom 2D React Native and Unity's 3D game engine to render the game for the two platforms. We sync the games using PhotonEngine as our multiplayer cloud provider.

Camera

- 2D top down Isometric
- 3D first person, camera attached to player head

Perspective

Consistency must be kept with VR renderings of map with mobile devices in order to keep player positions and collisions in sync.



Left

The map on the left shows how the VR map renders when viewing it top down

~~Implementing this on Mobile is easier but doesn't give depth to the player.~~

~~Middle~~

~~The middle image shows how the Mobile map looks if we add a cell under certain walls, it shows the map at an isometric top down, where its mostly top down but slightly angled. However handling position and collisions between devices can get complicated.~~

Right

The map on the right shades half a cell under certain walls like the middle image but only uses the collide able cells from the first image. No cells are added.

If you compare the true top down in the VR device and the one rendered on mobile it will look similar but not the same, some walls would seem a little thinner on mobile. Since no

extra logic needs to be added for position and collision handling, and aesthetically looks better this one is the best option.

Game Engine

Both engines use same logic to stay synced, such as Ray casting for projectiles, object sizes, player size, position data.

- Custom in house 2D React Native game engine
- Unity's 3D game engine

Rendering Map (Mobile)
Using object pooling optimization we pre-render a set of assets and tiles before only show what player can see.

Rendering Map (VR)
Render the whole map before joining a game.

Synchronization

- Events: are broadcasted from players with a timestamp. If there is no confirmation from half the players within '80ms' the event is rolled back (aka lag).
- Animations: player movements, projectiles, and any other action events that are received are attached to animation handlers

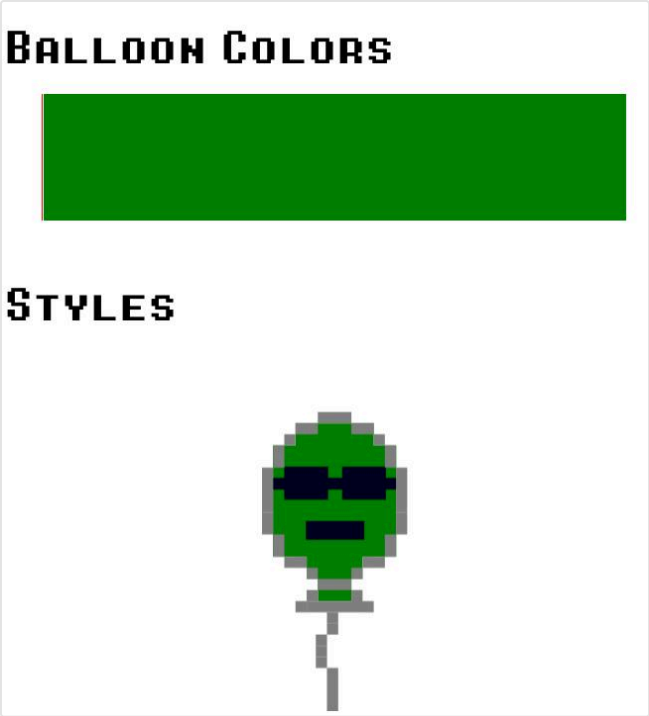
Game Characters

Overview

Players have a set balloon outline but they have the freedom to change their balloon color, facial expression, and cosmetics.

Creating a Character

The main menu contains the customization menu for players.



Color
16 preset colors

Facial Expressions
Dozens of facial expressions

Cosmetics

- hats
- shirts
- ties
- wigs

Enemies

This is a PvP game so enemies have the same balloon base just with a red outline to differentiate between allies

Princess

The reason the party even exists, this character is a generic princess

Weapons

- bubble gum sling shot: single shot weapon (~pistol)
- TBD automatic weapon: fast consecutive shots fired (~AR)
- Confetti cannon: shoots multiple projectiles simultaneously in given direction, shorter range (~shotgun)
- Piñata stick: close combat (melee)

Power ups:

- speed+: faster mobility
- damage+: increase damage on weapons equipped
- immunity+: take less damage dealt from opponent

Musical Scores and Sound Effects

Overview

The theme is celebration/parties so a lot of the sound effects are balloon pops, confetti, birthday song

Music

A remix of the OG birthday song and the other party themes. For now focus on birthday as main map theme.

Sound Effects

- Balloon Pop
- Confetti poppers
- Piñata swing
- Balloon squeaking

3D Sound

- VR voice chat
- Sound effects

Multiplayer Game

Core Game

Overview

A Team vs Team online multiplayer game where the team with most players that make it to the party wins.

Players

- 2 teams
- 4-6 per team
- 8-12 total players in match
- No more than 3 VR players per team

Story

A party is being hosted for the princess's birthday, you and your gang of balloons need to make it to the party before a rival group of balloons get picked to be the decorations of the party. Navigate through the castle, find and use weapons/power-ups to pop rival balloons, hide, and get to the party.

Victory Conditions

The team that with most balloons that made it to the party on time gets to be part of the celebration. The loser team gets popped 🤫 .

Minutes of Gameplay (4 minutes)

- Party Preparations (duration 3min) →
  - Match starts here
  - Most of the battling takes place at this time
- Last call for decorations (duration 1 min)→
  - This is when players are allowed to enter the party room
- Party Starts (duration 0 min)
  - Match ends, team with most players in the party room are picked to be decorations

Voice Chat
Only available for VR users, multiplayer cloud provider doesn't allow voice chat on JavaScript clients.

- If we ask Contact PhotonEngine for an exception?
  - Pros:
    - All players have an option to communicate with each other
    - Text chat can be removed
  - Cons:
    - **Mobile device performance goes down**
    - **Uses up more battery**
    - Network communication could become overwhelmed causing lag
    - Extra configuration needed

Text Chat
Available for both Mobile and VR users.

Backend

Max Players
50,000 concurrent players.

Authentication
Hopefully Facebook is the only authentication provider, Apple may be a pain in the butt and require Apple auth as an option

- **Facebook**
- Apple

Database
- Player
  - ID
  - email
  - username
  - leaderboard points

    - [friend ids]
    - [cosmetic ids]
- Cosmetic
    - ID
    - group number (frontend reference)
- Report Player
    - Player ID
    - Reported Player ID
    - type
    - reason
- Play Session Text Chat
    - ID
    - [players]
    - [chats]

Servers
PhotonEngine: Peer-to-Peer

Customization
- Add/remove friend
- Play with friends
- User name

Persistence
Handled by PhotonEngine

Saving and Loading
While in match PhotonEngine handles if user is possibly temporarily disconnected and waits or kicks them. All other saving systems are handled through device storage or database.

Monetization

- Cosmetics (Mobile and VR)
    - $1-$3 per pack
        - packs:
            - cosmetics
            - facial expressions
- Banner ads on home screen (Mobile)
    - $???
        - use to keep servers running