

## PROJECT STARTED MAY 2020

**Title:** "Behemoth Bulldozing"

- "Don't really have any bulldozers after that monster attack... name's a work in progress"

### Win/Lose Condition:

- Destroy the most buildings by the time the timer ends

### Backstory:

- Play as giant monster working in demolition; need to destroy a lot of old buildings
  - Gold and Silver wolf
- Rampaging monster being integrated into society
  - "Rampaging Monster Rehabilitation Program"
  - Working at "Behemoth Bulldozing"
- Silly Cartoony game

### Gameplay

- 2 player multiplayer game; competing against each other for points against timer
  - Players work in demolition; Competing for pay
    - "As long as those buildings are gone at the end of the day, the company could care less what you guys do to each other"
  - Limited number of buildings to destroy in level
- Players get points for each building they destroy
- Whoever has the most points once the timer ends wins
- Can't hurt the other player, but can stun/slow them

### Core Mechanics:

- Player shrinks a short time after not attacking a building; player gets points and grows from destroying a building; the bigger the building destroyed, the more points and bigger they get
  - Score is kept in units of property damage; whoever has the most at the end of the game wins
- Players can kick/attack each other, pushing them back a bit (kicks push back more than punches)
- Player walks around top-down 2D level
- Player attacks and destroys buildings with either of 3 attacks (punch right/left and kick)
- Player can do damage to any building, but their damage is greatly decreased if they are smaller than said building
- Attacks can move the player forward a little bit
- Comboing attacks properly gives enhanced mobility by chaining the displacement from multiple attacks; little to no delay between attacks if comboed properly
- Power Ups:
  - Supercharged: Your next attack is enhanced

- Punches: do MUCH more damage and causes more displacement to enemy player; if enemy player hits building, they become stunned briefly
- Kick: does more damage and causes MUCH more displacement to enemy player; if enemy player hits building, they become stunned briefly
- Crunch Time: Attacks and Movement are significantly faster for a short duration; no cooldown for combos very briefly
- Over Time: Adds time to the level timer and resets the shrink timer
- Iron Skin: Unable to be displaced by other player and do a bit more damage for a short duration, but are also a bit slower in movement and attacks

### Entities:

- Player
  - Has:
    - Rigidbody
    - 2D Box Collider
    - Size
    - Speed
    - Max size
  - Can:
    - Move up and down screen (x and y)
    - Attack
      - Punch
    - Grow (when it destroys a building)
      - Depends on level of building destroyed
      - Update sprite
- Building
  - Has:
    - 2D Box Collider
    - Scale (1, 2, 3)
    - Health
  - Can:
    - Take damage
    - Be destroyed
      - Disable, grow player

### UI Design:

- What the player needs to see clearly:
  - Their points
    - Have player points and icon in the bottom left corner of the screen, opponent's above that?
  - Time left in the level
    - At the top of the screen (duh)
  - What buildings they can destroy (what scale are they?)

- Options: color code buildings and have color coded numbers for the player's scale?
  - 1, 2, 3, 3+
- Combo progress
  - icons lining up on bottom of screen filling up three boxes? (Think minecraft inventory)



- Three of these centered at bottom of screen
- What the player can see hints of:
  - They are about to shrink
  - They are doing damage to a building
  - They reached a new scale
    - Pulse edges of screen with a color representing that scale (ties in with color of buildings)
- End of Level Screen:
  - Players can:
    - Replay the same scene
    - Play the next scene in order
    - Go back to main menu

### Level Design:

- <https://youtu.be/UWhXS6iVsUM>
- Buildings are slightly bigger in scale than their literal "scale" field (+- 0.50)
- Randomly generated maps if possible (locations of buildings)
- Level Design Ideas:
  - If you spread out the buildings → add more time between shrinks
  - Two Options:
    - Small maps with limited amount of buildings to destroy
      - Encourages players to interact
      - Remove the timer? End game when the last building is destroyed?
      - Keep timer but also end game when the last building is destroyed?
    - Or make progressively generated maps with unlimited buildings to destroy
      - Players get enough interaction from prioritizing large buildings/shrinking each other?
      - If the buildings are not limited, what's the point in prioritizing the larger buildings immediately?
- Three Maps:
  1. Daytime Suburbs
    - a. Inspiration:



2. Sunset Beach Front
  - a. Shore to walk along in addition to big beach houses further in from shore
3. Night(time) City

### Main Design Themes:

- Key theme: speed
  - Get slower in movement and attacks the bigger you are, but deal way more damage with bigger opportunities (buildings) for points
    - Slow down *recovery* from attacks
  - Small guys are really fast/mobile
  - Start to shrink a short time after not destroying a building
    - Attacks add time to shrink timer equal to delay between attacks
  - Time before shrink greatly decreases the bigger you are
  - Have to rely on combos for mobility
  - Add weight to movement at big sizes
- Attacks:
  - *First half of all attack animations should be extremely fast, almost immediate, but second half (recovery) can have a bit of delay depending on the player's size*
  - Left punch
  - Right punch
  - Kick
  - Make attacks have weight behind them; good sound design
- Combos
  - Left punch, right punch, kick
- stepping on cars adds extra time before you shrink and a little bit of size
- Race against clock; players get as many points in a certain time frame as possible
  - ADD TIMER!
- Mobility options - punches/combos swing your character forward a bit
- Power Ups that can be picked up around map for bonuses

## Scripting To Do:

- Remove combos for now (unnecessary)
- Add small amount of forward movement from attacks; all attacks move player a little bit, combo is just a way to chain it fast; anything can make a combo
  - Reduce max movement speed
- Add attacks displacement
  - Punches push other player back a tiny tiny bit, but kicks push them back a decent amount
  - Amount of displacement depends on the difference between the two players sizes
    - Add force to the other player's rigidbody?
- Issue: how will shrunk players make a come back late game if there are only large buildings they can't hurt left?
  - Solution: just make smaller players deal significantly less damage to buildings larger than them, and maybe increase min attack delay
    - Flat 50% damage reduction if player is smaller than building
  - Buildings give player a certain amount of points upon death
    - Idea: player gets points each time they damage a building, but final hit that destroys building gives the most points
  - Lessen growth multipliers for buildings a little bit
  - Give player a points tracker script or smthn
  - Scrapped Cash Idea
    - ~~Buildings have different tiers with different health, but give different amount of Cash (points) when destroyed~~
      - ~~Building destroyed → update player's cash → update player's scale~~
    - ~~Tie player scale to CASH they have!!~~
      - ~~When players shrink, they are shrinking because they're losing money!~~
        - ~~Ties in great with the possible mechanic of beating other players up to shrink~~
      - ~~Use a log function to determine growth?~~
      - ~~There is a cap to growth, but not Cash (points)~~
      - ~~Buildings have a public field determining how many points they give the player upon being destroyed~~
    - ~~Idea: make attacks from other players make target player drop some of their money, shrinking them~~
      - ~~Other players can pick up this money~~
      - ~~remove shrink timer or make it waaaaay longer~~
      - ~~Reset shrink timer when getting hit by other player~~
      - ~~Can only be done once~~
    - ~~Idea: make buildings drop cash pickups when destroyed instead of giving it to the player that destroyed it?~~
- Add level timer / end trigger

- Game ends when timer runs out or there are no buildings left
  - Standard timer of 3 minutes?
- Add points tracker
- Add UI canvases
  - Pause Menu
  - Level Hud (player's points with dollar sign, time left, etc)
  - End of Level Pop Up ("Shift Complete!")
  - End of Level Results Menu (Who won?)
  - How many points?)
- Sketch Level 1 and add placeholder assets to scene
- Implement Multiplayer: Use photon (3rd party) and NOT UNet  
(<https://www.photonengine.com/PUN/Pricing>)
  - <https://doc.photonengine.com/zh-cn/pun/v2/demos-and-tutorials/pun-basics-tutorial/intro> ← tutorial
  - [https://www.youtube.com/watch?v=02P\\_mrszvzY](https://www.youtube.com/watch?v=02P_mrszvzY) ← video tutorial
- Add destructible behavior
- Add power ups - [https://youtu.be/CLSiRf\\_OrBk](https://youtu.be/CLSiRf_OrBk)
  - Supercharged:
    - Stun Mechanics: Player gets knocked back a certain distance for a CONSTANT amount of time (distance varies, but time to reach that distance should not); during that constant time, if player collider hits a building collider, the player should be *stunned* for a certain amount of time, i.e. unable to attack and move
      - Idea: impact can damage building hit
    - Actual Stun: can use IEnumerator to "pause" scripts:
 

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'''
There are a couple ways of stunning something, and it also depends on your definition of stun. Let me list off the ways.

You can use IEnumerator's to yield the script, which will halt the script for 3 seconds like your friend did.

You could isolate your script into a void, so it will only cycle through one void until a variable reaches true (in this case until the time stunned has been reached).
'''

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- Need to pause PlayerController

## Art To Do:

- New Menu Buttons



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- Old fashioned arcadey
- Sketch player sprite
  - Player 1: Golden wolf-man
  - Player 2: Silver wolf-man
- Make custom cursor
- Sketch building sprites
  - Multiple sprites for each level showing different stages of destruction
  - draw buildings at an angle, not just top down
  - Level 1, 2, 3, buildings
    - Level 1: small
    - Level 2: medium
    - Level 3: large
- Sketch bg tiles
  - streets, sidewalks, grass, sand, water, etc
- Sketch main menu buttons and title art
  - Make menu buttons light up
- Sketch main menu bg
  - Players running through city
    - Extra animation: player1 sprite snoozing for a few seconds, player 2 waking them up and then running to work when camera starts scrolling
  - Alternative: moving aerial view of city, cycling through different maps
    - Extra: players destroying city
- Main menu scrolling bg
  - <https://m.youtube.com/watch?v=3UO-1suMbNc>
  - Tweak button color
- Fix hitboxes so player can walk a bit behind buildings
  - <https://youtu.be/Cry7FOHZGN4>
- Building destruction animation
  - Buildings shake
- Eight direction moving animation

- <https://www.youtube.com/watch?v=32VXj5BB7wU>
- Rotate sprite to face where cursor is
  - \* Assume the cursor is to the west of the player, and the player sprite is facing it. Need:
    - Move forward (towards cursor), backwards (forward reversed) animations
    - Move sideways up (North), sideways down (up reversed) animations
    - Move NW and SW (NW reversed) animations
    - Move SW and NE (SW reversed) animations
- Different animation for larger sizes
  - Heavier walks, striding
- Attack animations
  - Punch animations depend on button clicked, but end up in front of player
- Points gain popup/animation
- Player idle animation
- Colored screen edges for everytime player reaches new scale
- Scene Transition Animations - <https://www.youtube.com/watch?v=CE9VOZivb3I>
- Make Music
  - Don't need to restart game when swapping audio devices
  - <https://youtu.be/6OT43pvUyfY>
- Make SFX
- Optimize game for different systems! Different refresh rates, resolutions, aspect ratios, etc
  - Unless it's just on itch.io I guess
  - Multiply by Time.deltaTime for stuff?
    - Update movement
      - Do movement in fixedUpdate()?
      - Multiply by Time.deltaTime?
  - Tie combo system to Time.deltaTime? Update() makes the check depend on frame rate I think

#### **Extras:**

- Combos
  - Investigate combo timer behavior
    - I don't think it's behaving properly
    - The merge from github might have messed something up
    - Use debugger
    - ABSTRACT how combos should work and whether the timer accomplishes that
  - Make combo time sensitive?
    - Could make it last forever so you can complete it at the ideal time
      - Downside: player might accidentally use combo



- Upside: chance of surprising other player
- Could make it time sensitive
  - Downside: Harder to implement
    - Just have combo timer that resets if another move is added
    - Make combo timer be disabled if combo is not started (have bool field that decides whether TikTok() should be called in Update())
  - Upside: Less of a random chance for player to activate it
- MAKE TEST CLASS
- Make tutorial
- Slightly different player sprites for different scales; bigger scale players are more monstrous (horns, etc)
- For random building placement, place down large buildings first and then place medium buildings near those. Small buildings can be near medium buildings
  - Try random distribution on a grid