Figure 1. Smith and Dozer

# Game Design Document

Geoware

Version 1.0

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# Concept

## High Concept

A 2D action platformer for tablets where the players control a pair of space treasure hunters exploring a planet of robot dinosaurs to collect gems.



Figure 2. In-game Screenshot [1]

## Game Pillars

1. Approachable

All mechanics and controls should be intuitive and easy. Keep interactions simple, don't hide information from the player. The theme of the game should be fun and child friendly.

2. Action oriented platforming

Levels should be filled with enemies. Controls should feel good and not be frustrating in combat.

3. Lots of Juice

The game should have plenty of satisfying visual feedback, including particle effects, enemies exploding into gibs, subtle screen shake, knockback, conveyance, compelling art and sound effects.

## Game Description

      *Smith & Dozer* is a 2D action-platformer for Android tablets. Set on an abandoned planet in the farthest reaches of the galaxy, a pair of intergalactic treasure hunters named Smith and Dozer search the ruins of an old civilization for lost riches. The pair must shoot and smash their way through the robot dinosaurs that have taken control of the city. Players navigate through ruins and caves to collect gems while fighting off the aggressive race of synthetic dinosaurs. Each level features the duo fighting towards a treasure chest that contains an extremely rare and large gem. On their way to collecting the treasure, Smith and Dozer also try to rid the planet of the evil dinosaur robots. However, this altruistic act is secondary to their greed and is a secondary objective for them.

      The defining mechanic of the game is that the player can choose to switch between controlling Smith and Dozer at any time to take advantage of each of their strengths. Smith can jump higher and farther with his jetpack and shoot at enemies from a distance with his dual blaster pistols. Dozer can take more damage thanks to his thick armor and smash through the robot dinosaurs with his sledgehammer. Players must constantly swap between the two to face whatever challenge is presented to them. Switching between the two characters is tied to one of the four gameplay buttons on the screen and is a core mechanic. Players ideally will switch between the two characters as often as they jump and kill enemies.

      The game also features the typical action-platformer mechanics of jumping and attacking, though how the player uses these mechanics depends on which character is active. The levels are designed to challenge the player's platforming and health management skills. However, we have designed the swapping mechanic in a way that these more typical mechanics are dependent on swapping often. The player will need to shoot, smash and jump in different situations, some of which may require swapping multiple times within a few seconds in harder areas.

      The game features five levels with achievements and high scores in each to encourage repeated plays through the game. Each level provides roughly the same experience with different sections aimed more at platforming or more at combat. The difficulty escalates appropriately between levels to keep the player challenged but not frustrated. Overall, the levels should feel somewhat easy to experienced gamers as the game is supposed to be accessible to younger players as well. Optional extra challenge is added through high scores, target times and achievements.

      *Smith & Dozer* attempts to capture a retro aesthetic, featuring pixel art and an 80's inspired theme. The character designs of Smith and Dozer are based on action figures from the 80's. The aesthetic primarily invokes a sense of nostalgia and fun, with a silly but cool feel that should appeal to gamers of various ages. We have put a large emphasis on player feedback, especially on the act of destroying the dinosaur enemies. Killing enemies causes a huge explosion of dinosaur body parts, giving the game a ridiculous, over-the-top feel as well. All of these elements give the game a fun, lighthearted and retro feel above anything else.

## Gameplay Loops
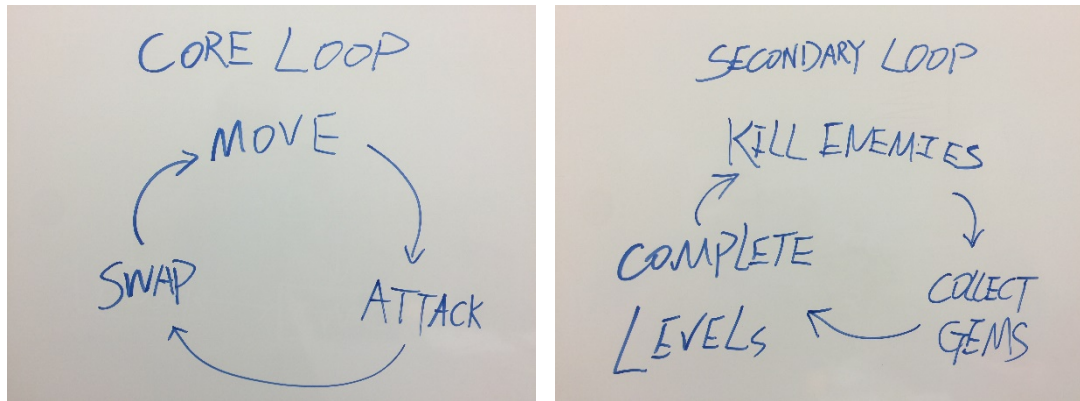


Figure 3. Loops [2]

## Target Player



Figure 5. 15 to 30 year old gamers [3]



Figure 4. 8 to 14 year old boys [4]

### 15 to 30 year old gamers

- Played similar games when younger
- Enjoys nostalgia themed games
- Wants more of a challenge

### 8 to 14 year old boys

- Enjoys action figures
- Wants to blow stuff up

## Gameplay Minute



1. The player is currently using Smith and spotting enemies behind a breakable wall.

2. The player then swaps character to Dozer, which can break the wall and deal high melee damage.

3. The player walking through the cave and smashing all the enemies on the way.

4. The player swaps character again and chooses Smith, which can jump higher to reach the elevation.

5. The player is using Smith who can shoot while jumping in air. The player shoots to kill the ranged enemy and then go for the gems.

Figure 6. Game Minute [2]

## Gameplay
### Hierarchy of Epics (Core Gameplay Mechanic Breakdown)

```
As a player, I want a character to          Animations for both Smith and
control.                          ───────►  Dozer

                                            Input system and UI
                          ───────►          Informative elements
                                            Buttons

                          ───────►          Player behaviors
                                            Movement
                                            Attacking

As a player, I want levels to      ───────► Five levels with the first being a
complete.                                   tutorial.

                          ───────►          Menus.

                          ───────►          Achievements and score

As a player, I want enemies to     ───────► Enemy animations
fight.
                                            Enemy behavior
                          ───────►          Patrolling behavior for melee
                                            enemies
                                            Shooting patterns for ranged
                                            enemies

As a player, I want feedback with  ───────► Particle effects
every interaction.
                          ───────►          Screen shake

                          ───────►          Hit flashing

                          ───────►          Knockback

As developers, we want to          ───────► Sound effects
playtest the game.
```
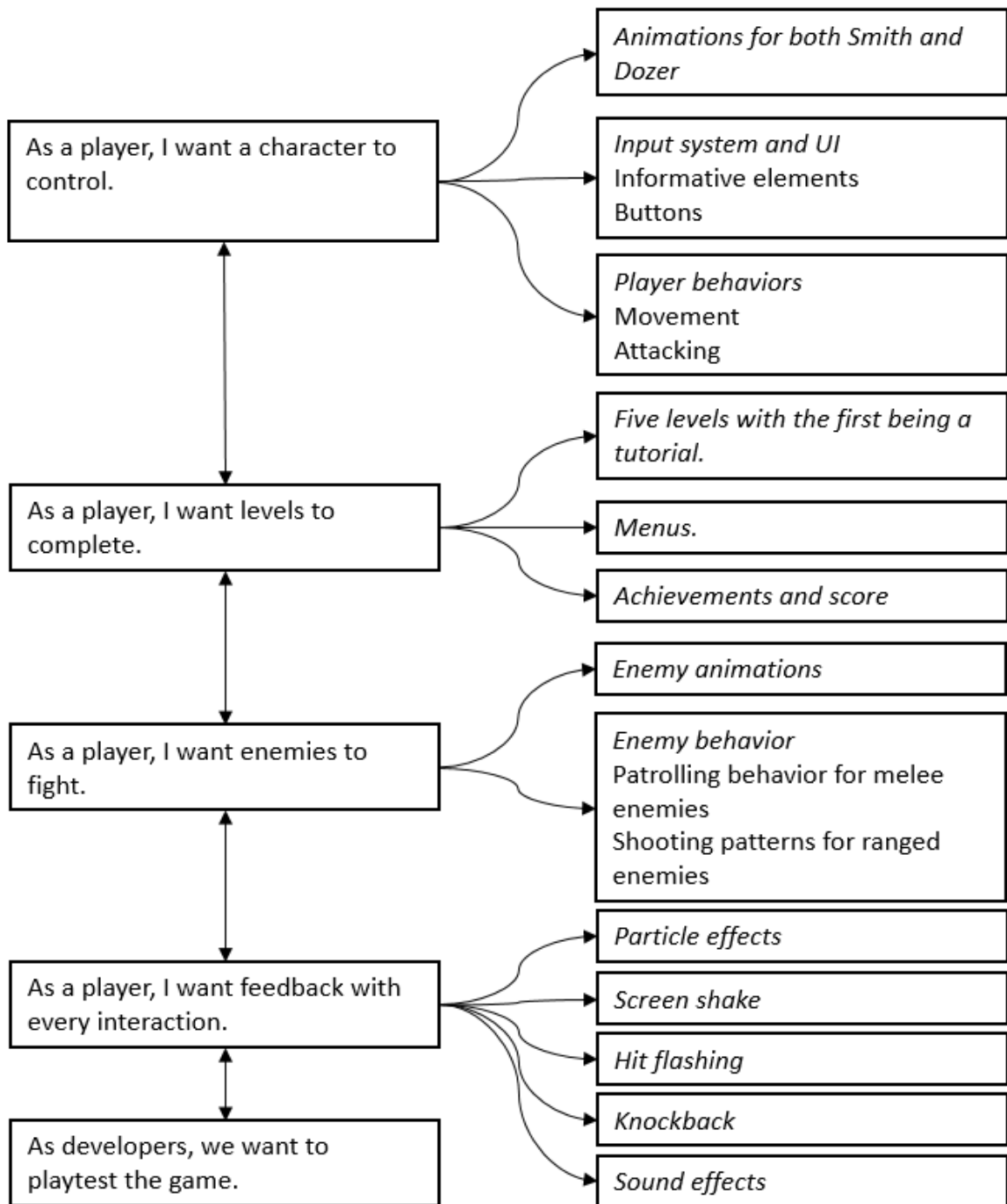
Figure 7. Epics [1]

## Player's Objective

The player's main objective is to collect a treasure chest found at the end of every level. The secondary objective is to explore the level, defeat enemies and collect gems scattered around levels to increase the player score. These secondary objectives are tied to unlockable achievement badges.

## Camera/HUD

The camera in the game is positioned so that it smoothly follows the main character i.e. Smith and Dozer. It is slightly off-centered forward relative to the player so that the player's field of view is greater on the side the main character is facing than the back side. The camera has an orthographic half-height of 2.7 units in Unity.



**Figure 8. HUD Introduction**

## Controls

| Number | Element |
|---:|---|
| 1 | Player's health bar element |
| 2 | Player's current score element |
| 3 | Move left button |
| 4 | Move right button |
| 5 | Swap character button |
| 6 | Jump button |
| 7 | Pause button |

Table 1. Control [7]

**Move character left/right:** Press the left or right arrow buttons

**Jump:** press the button with an arrow pointing upwards to make the character jump. When using Smith, this button can be pressed again while the character is jumping to perform a double-jump.

**Attack:** Dozer attacks as he runs left or right, Smith shoots laser beams while in air (i.e. jumping or falling)

**Swap:** tap the swap button to change characters

## Game Metrics

| | Health | Attack Damage | Damage Resistance | Default Walk Speed | Attack Delay | Jump Units (1 unit = 16 pixels) | Score Value | Extra notes |
|---|---|---|---|---|---|---|---|---|
| Dozer | 10 | 3 for each swing | 1 for each hit | 3 | 0.5 | Vertical = 3 Horizontal = 4 Jump Force = 6.2 | N/A | Knockback = 40 Damage delay = 1 |
| Smith | 10 | 1 for each bullet | 3 for each hit | 3 | 0.12 | Single Jump = 7 Double Jump = 14 Jump Force = 8.5 | N/A | |
| Patrol enemy | 3 | 1 to Dozer 3 to Smith | 0 | 2 | N/A | N/A | 300 | Walking speed is varied by different environmenets. |
| Ranged enemy | 3 | 1 to Dozer 3 to Smith | 0 | 0 | 2 | N/A | 300/600 | Projectile and attack settings are customized. |
| Armored melee enemy | 5 | 1 to Dozer 3 to Smith | 0 | 1 | N/A | N/A | 1000 | Walking speed and health are varied by different environmenets. Mass changed to have a huge knockback. |

Table 2. Game Metrics [1]

| Pickups | Score Value | Health restore |
|---|---|---|
| Yellow gem | 100 | N/A |
| Red Gem | 300 | N/A |
| Purple Gem | 500 | N/A |
| Green Gem | 2000 | N/A |
| Health Pickup | N/A | 3 |

Table 3. Pickup values [1]

## Communication/Conveyance Mechanisms

- Color
  - Enemy bullets and spikes are red to indicate they hurt the player.
  - Gems and health pickups are purple and yellow.
- Sound
  - All player interactions produce sound effects
  - Dozer has a lower pitched jumping sound effect to show that he cannot jump as high
  - Sounds trigger when the player attacks as Smith or Dozer
  - Collecting pickups triggers pleasing sound effects
- Player receiving damage
  - Player sprites flash white for 0.2 seconds
  - The player is knocked back and can't move for 0.1 seconds
  - The player becomes invincible for 0.2 seconds
  - A red HUD overlay flashes briefly
- Particle effects
  - Player bullets cause small explosions when they hit something
  - Enemies explode with a large sprite
  - Enemies break into six gibs when killed
  - Gibs remain until the level is completed to give a sense of permanence to the player's actions

- o   Gems emit white particles and bounce to attract the player's eye to them.
- Changing health bar size
  - o   The health bar expands when the player switches to Dozer to reinforce that he can take more damage than Smith.

## Player Movement/Interactions

The player has three direct interactions with the world:

- Left and right movement
- Jump
- Swap characters

The player triggers the attack interactions in two ways, depending on which character they are controlling at the time:

- As Dozer, the player attacks every 0.75 seconds while moving left or right
- As Smith, the player shoots every 0.2 seconds while in air after jumping

Dozer's attack has a secondary function of smashing open doors when he hits them.

The player also can pick up collectibles and health items when they touch them.

## Health System/Checkpoint System

Players receive damage in the following ways:

- Touching an enemy
- Touching an enemy's bullet
- Touching spikes
- Falling down pits

Falling down pits instantly kills the player. The other three ways of receiving damage do a consistent amount of damage. While Smith is the active character, the player receives three points of damage. While Dozer is the active character, the player receives one point of damage. Health hits regenerate three points of health. The player has a maximum of ten health points.

There are checkpoints around the middle of each level. They are triggered invisibly with no indication to the player. When the player dies after triggering a checkpoint, they respawn with full health. The level does not reset after respawning. All previously killed enemies remain dead, their gibs remain in place, the player does not lose points, and the clock continues. This means there is very little punishment for dying, a decision made under our approachability pillar. Players would get frustrated when dying near the end of a level, and in some cases quit playing. Adding this very forgiving checkpoint system meant more players were able to complete the game.

# Gameplay Details

## Main Character

| Photo | Name | Age | Gender | Height | Nationality | Ability |
|---|---|---|---|---|---|---|
|  | Mister Smith | 30 | Male | 5.8 | English | Shoot and jump |
|  | Dozer Ball | 45 | Male | 6.2 | American | Smash and smash |

Table 4. Main Characters [1]

## Enemy/Secondary Characters
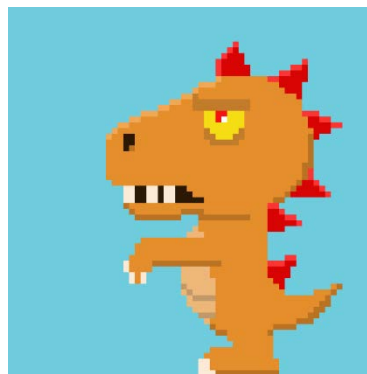
### Small Patrolling Dino



Figure 9. Small Dino [5]

These enemies are the most common enemies in the game, often appearing in groups of three or more. Their purpose is primarily to provide fodder for the player to smash. They are only worth a small number of points when killed but have a satisfying death reaction, exploding into smaller pieces. Killing multiple of these enemies in a short period of time got some of the most positive reactions from our playtesters, so we will try to fill levels with small areas with many of these enemies to kill for fun.

### Large Patrolling Dino



Figure 10. Large Dino [5]

Unlike their small counterparts, these dinosaurs take multiple hits to kill with Dozer. They sometimes move fast enough to hit Dozer between swings and will require a bit of skill from the player to defeat without being hurt. They have the same patrolling behavior as the Small Patrolling Dino. Visually, the large dino is much larger and has armor plating added.

### Shooting Dino



Figure 11. Shooting Dino [5]

Shooting Dinos have guns attached to their shoulders. They do not move on their own and act as stationary turrets. Their bullets act as moving obstacles for the player, forcing them to time their jumps. They are easily killed by Smith if they are within range and are generally not going to be hit by Dozer.

### Enemy Movement/Interactions

#### Patrolling Dinos
The patrolling behavior involves the enemy moving in one direction until it hits a wall, a ledge or another enemy. It then reverses direction and continues moving until it hits something. They do not react to the player's presence and act as an obstacle to destroy or jump over.

#### Ranged Dinos
Ranged enemies fire a set bullet pattern at a set interval. The patterns and intervals may vary based on the instance of each ranged enemy in a level. Some may fire a single bullet in a straight line while some may fire three bullets at varying angles. The interval between shots can vary between enemies

as well. Ranged enemies cannot move on their own, though they may be knocked back by Dozer's attack if they are hit.

## Objects

Breakable doors are placed throughout the levels to force players to switch to Dozer. They are sometimes used as a conveyance mechanism to show the player that they should be using Dozer in the next segment. They are destroyed by being hit by Dozer's attack. When they are hit, they explode into pieces that remain on the ground until the level is over.
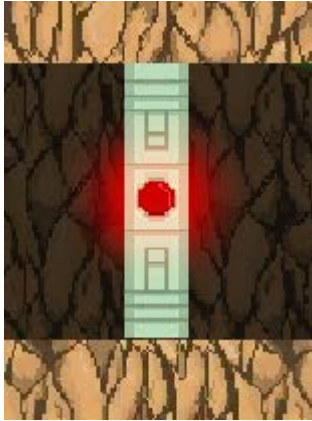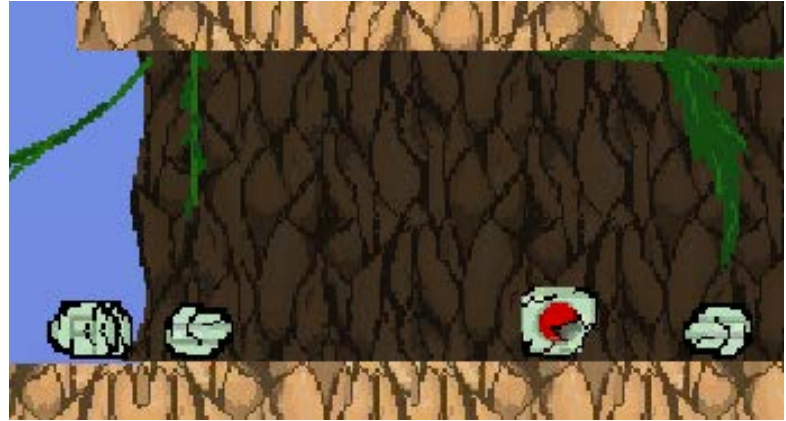


Figure 13. Breakable Wall [1]



Figure 12. Demolished Wall [1]

## Pickups System

There are two types of pickups: gems and health

### Gems
- Yellow - 100 points
- Red - 300 points
- Purple - 500 points

Gems bounce in place and have a sparkling particle effect



Figure 14. In-game Gems [1]

### Health
- Health pack - 3 health points

Health packs have a spin animation.



Figure 15. Health pickup [5]

## World Layout
### Level Details

Level 1 - Suburb Area



**Figure 16. Level 1 [1][2]**

Level Details:

- 8 enemies total: 5 patrol enemies, 2 range enemies, and 1 armored melee enemy
- 10 gems total: 6 yellow gems, 2 red gems, and 1 purple gem
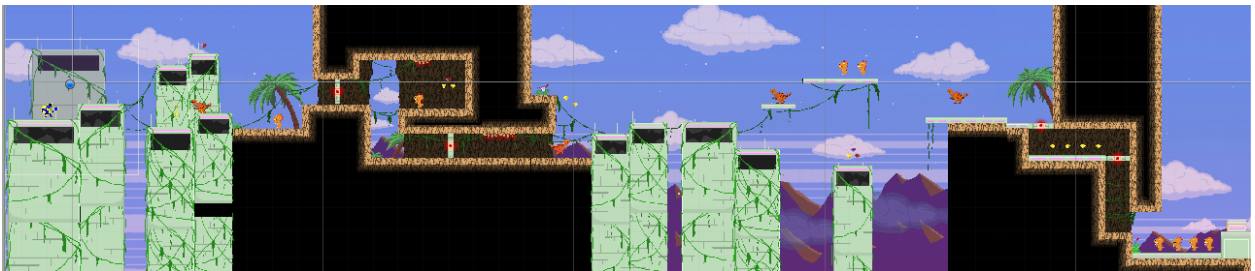- 0 health pickup

Level 2 - Abandoned City



**Figure 17. Level 2 [1][2]**

Level Details:

- 12 enemies total: 8 patrol enemies, 3 range enemies, and 1 armored melee enemy
- 15 gems total: 11 yellow gems, 3 red gems, and 1 purple gem
- 1 health pickup

Level 3 - Cave



**Figure 18. Level 3 [1][7]**

Level Details:

- 23 enemies: 15 patrol enemies, 5 range enemies, and 3 armored melee enemy
- 16 gems: 13 yellow gems, 2 red gems, and 1 purple gem
- 4 health pickups

Level 4 - Secret Base



**Figure 19. Level 4 [1][2]**

Level Details:

- 14 enemies: 9 patrol enemies, 4 range enemies, and 1 armored melee enemy
- 18 gems: 13 yellow gems, 2 red gems, and 1 purple gem
- 1 health pickup
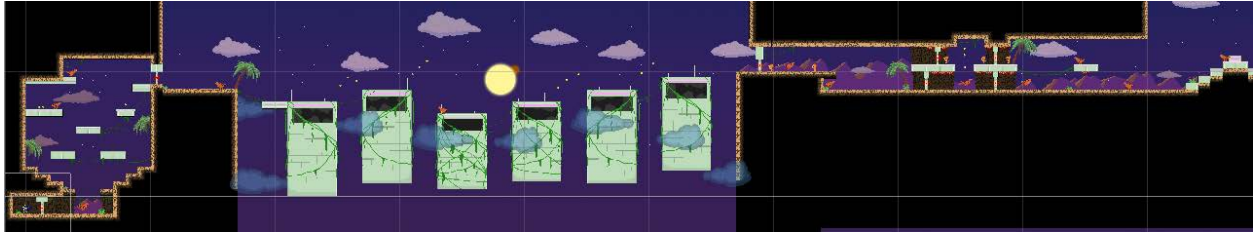
Level 5 - Final Platform



Figure 20. Level 5 [1][7]

Level details

- 26 enemies: 10 patrol enemies, 11 range enemies, and 5 armored melee enemy
- 15 gems: 14 yellow gems, 1 red gem, and 0 purple gem
- 4 health pickup

## Level Progression

| | | Level | | | | |
|---|---|---|---|---|---|---|
| | | Level1 | Level2 | Level3 | Level4 | Level5 |
| **Mechanics** | Jump | Teach | Reinforce | Repeat | Repeat | Repeat |
| | Move | Teach | Reinforce | Repeat | Repeat | Repeat |
| | Swap | Teach | Reinforce | Repeat | Repeat | Repeat |
| | Attack | Teach | Reinforce | Repeat | Repeat | Repeat |
| | Double Jump | Teach | Reinforce | Reinforce | Repeat | Repeat |
| | Break Barrier | Teach | Reinforce | Reinforce | Repeat | Repeat |
| | Collectible | Teach | Reinforce | Repeat | Repeat | Repeat |
| | End Goal | Teach | Reinforce | Repeat | Repeat | Repeat |
| | Jump Shoot | Teach | Teach | Reinforce | Repeat | Repeat |

Table 5. Level Progression [2]

## Environments

Level 1 - Suburb Area

The first level of the game takes place in the suburbs at night. It is the shortest level of the game, and it serves as a gentle introduction of the game mechanics to the player. The level features a few signs near the beginning that gives implicit instructions of how to play the game and how to use each character to prepare the player for the next levels.

Level 2 - Abandoned City

After traversing through the suburb areas, Smith and Dozer reach the core city of a lost unknown civilization during daytime. In this level, structures such as buildings and metal constructions are more prevalent. These buildings, like all other buildings encountered in other levels, are covered by earth-like vegetation such as vines.

Level 3 - Cave

On level 3, Smith and Dozer find an abandoned hidden cave during dusk. It is a secret entrance to the secret base, and it is mostly made with earth-like rocks and soil with some vegetation scattered around such as plants and vines. The level layout is set so that the player starts from the top entrance of a cave and goes its way to the bottom right the level where the player encounters the outer area of the secret base.

Level 4 - Secret Base

Smith and Dozer encounter the secret base during daytime. The base is set far away from the city, so it resembles the suburb area from level 1 but has more enemies guarding the area from outsiders.

Level 5 - The Final Platform

This is the last level of the game. It is the hardest and the longest level among all 5 levels and is set at nighttime. It features plenty of platforms and buildings for the player to jump around. It has the most number of enemies of all level, and it features plenty of traps such as death pits and ceiling spikes, thus making it the most dangerous level of the game.

## Menu System
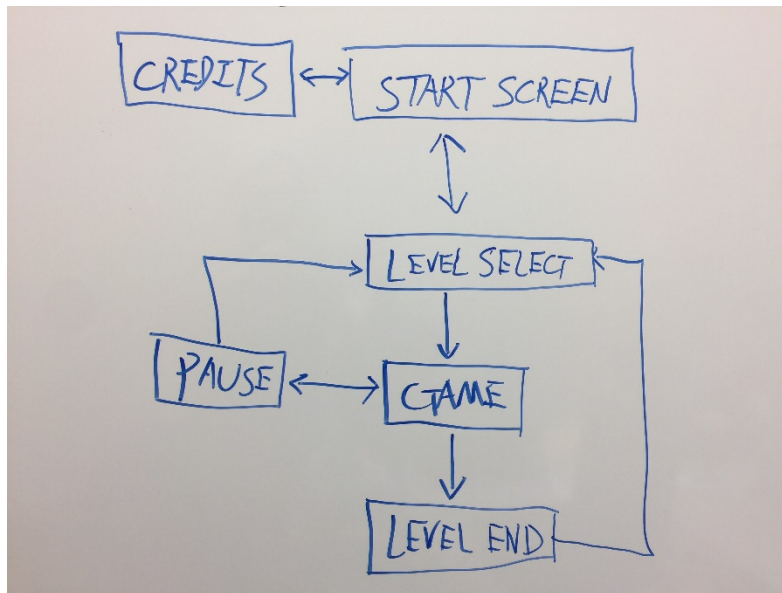### Menu Flow

### Menu Descriptions

| Screen | Selection | Description |
|---|---|---|
| Main Menu | Level Select | Goes to the level select screen |
| Main Menu | Credits | Goes to the credits screen |
| Main Menu | Red X | Quits the game |
| Level Select | Level Buttons | Starts the selected level |
| Level Select | Red X | Goes to the main menu |
| Level Complete | Level Select | Return to the level select screen |
| Pause | Resume | Resumes the game |
| Pause | Exit | Returns to the main menu |
| Credits | Reset Progress | Resets the game to the initial state with all levels locked and no high-scores |

Table 6. Menu Descriptions [6]

## Menu Details

### Title Splash Screen(s)



Figure 22. SMU splash screen [8]



Figure 23. Geoware splash screen [1]

**Main Menu**



Figure 24. Smith and Dozer Main Menu [1]

**Level Select Screen**



Figure 25. Level Select Screen [1]

Levels two through four are locked when the player loads the game for the first time. After completing levels, the high scores will be displayed and any unlocked achievements will not be faded out.

## Credits Screen



Figure 26. Credits [1]

The reset progress button is put in a place where players are less likely to accidentally hit it. Rather than create an extra menu screen for resetting progress, we decided to stick it in the credits.
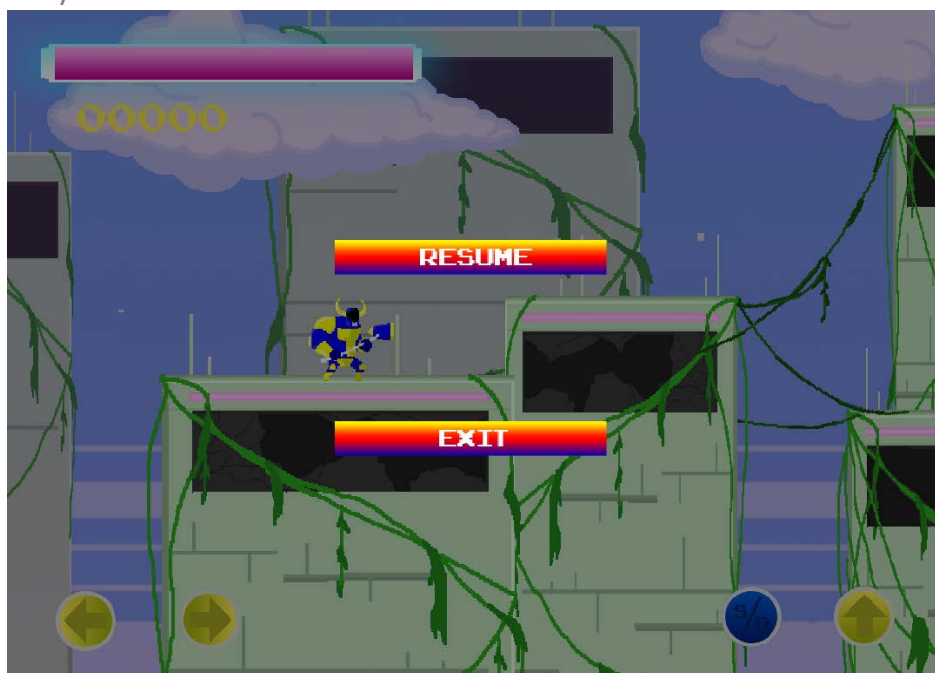
## Exit/Pause Screen



Figure 27. Pause Menu [1]

The pause screen overlays on top of the current game screen but fades it out.

**Level Complete Screens**



Figure 28. Level Complete Screens [1]

The level complete screen shows the progress on achievements the player may have unlocked, the time completed and their score for the level.

**References**

[1] Geoware

[2] Yiwen Tang

[3] The Onion - "7-Year-Old Unable To Maintain Single Cohesive Storyline While Playing With Action Figures"

[4] Media Psychology Review - ""Person Perception and Enjoyment of Video Game Competition"

[5] Ryan Gomez

[6] Mitchel Pederson

[7] William B.Blok

[8] SMU Guildhall