Hello Gamers

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High Concept
"A Hectic Tower Defense-Railway Management Game with Car-Train chases and light-hearted destruction"

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3. Game Overview

3.1 Game Concept/Summarised Premise

As the manager of a newly opened railway company, you are set and determined to send passengers to their respective stations. Unfortunately, your tracks are built on Gang territory, and they are set out to destroy your trains and stations for interloping. Hence, you're going to juggle between delivering commuters and ensuring both their safety and the safety of corporate property to keep your job.

3.2 Genre

Strategy, Tower Defense

3.3 Target Audience

The target audience we are catering to are to the casual audience.

3.4 Unique Selling Points

Amazing, captivating visual effects.
Moving towers on a fixed path that can be redirected.
Not only just strategy, but also includes a small factor of dexterity.
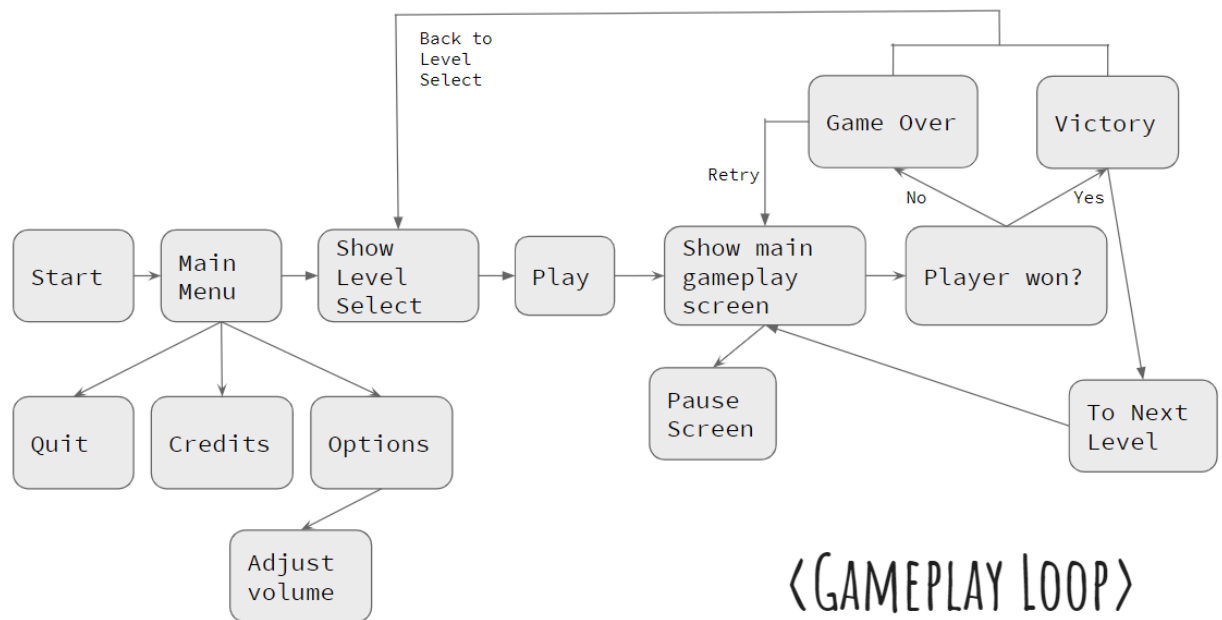
3.5 Feature Set

-   Sending off passengers to earn money
-   Turret building and upgrading
-   Enemy variants
-   Path and time management
-   Defend the point

3.6 Platform(s)

Our game will be released on PC.

3.7 Game Flow Summary

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                          Back to
                          Level
                          Select                              Game Over        Victory

                                                   Retry            No      Yes

  ┌───────┐   ┌───────┐   ┌───────┐   ┌──────┐   ┌───────────┐   ┌────────────┐
  │ Start │   │ Main  │   │ Show  │   │ Play │   │ Show main │   │            │
  │       │──▶│ Menu  │──▶│ Level │──▶│      │──▶│ gameplay  │──▶│ Player won?│
  └───────┘   └───────┘   │ Select│   └──────┘   │ screen    │   └────────────┘
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                        │Adjust │           ⟨GAMEPLAY LOOP⟩
                        │volume │
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3.8 Look, Feel and Visual Style

Our game will be bright and wacky with a simplistic art style that is stylised and low poly.

3.9 Project Scope

For this project, we're aiming for the following:
- We can incorporate different locations of each level through visuals. As our level layout changes for each level, it's a lot more appealing if we have separate props to distinguish the different levels as well as the difficulty.
- We are aiming for there to be 3 different levels, including the Tutorial stage in this game. (Subjected to change)
- If time permits, we're hoping to create an NPC in-charge of the Tutorial/Interaction.
- Interactive items include switch rails, trains, stations, turrets, buttons for upgrades/UI as of now. Props include rocks, trees, rails, stations, land, (possible) rivers and bridges.

4. Gameplay and Mechanics

4.1 Gameplay

MISSION/CHALLENGE STRUCTURE
You control an assortment of trains on a fixed railway. Be it horrible neglect or just plain incompetency, these trains are expected to derail or crash into one another without the Player oversight and control. Thus, it is your job to navigate the trains through increasingly ridiculous railway layouts to deliver commuters to their respective destinations.

Upon arriving at their destinations, the commuters will pay you money that you will use to build Turrets on the train cabins parked at your Train Depot or trigger Rail Switches to direct your trains into alternate paths.

Use the funds you have amassed to arm your Trains with turrets and open fire at the enemies trying to reach your Train Depot.

OBJECTIVE
Your objective and the overall win condition is to survive the defined waves of enemies. Each level may have different amounts of waves and what enemies will spawn in the wave depending on the level's difficulty. Once the Player has survived the last wave without the Train Depot's health falling to zero, the player has cleared the level.

PLAY FLOW
At the start of each level, you will be given a grace period known as "Down Time" to attend to your commuter transportation services and plan out your train routes. After Down Time, waves of enemies will start heading towards your Train Depot. Your Train Depot can withstand up to 14 Enemy goons, but once 15 of them have arrived at your Train Depot, they will breach your Train Control and effectively shut down the whole Railway System, resulting in a game over.

Hence, the supposed flow will be as follows for a player:

- Upon starting the game, earn as much money as the player can before the wave starts.
- Players can also decide to switch whatever rails for the trains to move free of charge, during this phase as well.
- Go on the offensive and pull up near enemies to destroy the cars
- Manipulate tracks to pull up closer to enemies for combat or make a quick detour to drop off commuters at stations
- Once enemy waves start, defeat the enemies while managing your trains, money and their routes to stop the enemies from arriving at the depot. (Switching of rails will have costs during this period)

4.2 Mechanics

MOVEMENT
Right click on trains to make them stop or go. They will only automatically stop at stations, once a train is moving, it will not stop until it has reached the next station.

ACTIONS
General movement of our trains and enemies go on a fixed route from the start of the game. The only movement that the player can influence on the trains are the rail switches placed at certain intersections, directing towards other stations and routes.

There are physically non-pickable objects in our game. The player can only rack money up through delivering passengers, affording for turrets, and moving their cursors over to the trains and place on top of them.

COMBAT
On the player UI, a timer will be displayed at the top part of the screen which will continuously countdown. Once the timer reaches zero, a wave of enemies will spawn, beginning the "Attack Phase". During an attack phase, the counter will reset and rail switches will now have a cost that deducts from your funds.

Enemies may spawn from multiple entrances depending on the map layout and will follow the Road paths towards the Train Depot.

This will continue to loop, until the waves end and the player successfully fended off all the enemies in the level, **or** a Game Over screen appears (which happens once your lives reach 0 or your train/s being crashed into the enemies).

ECONOMY
Money is the main resource the player earns and uses. As such, the way the player spends the money is to afford turrets, upgrading of turrets, and the switching of rails. Money will steadily stream in if players plan out their time usage and routes effectively to their advantage by delivering passengers while defeating enemies. Once the upgrades of turrets are all completed and all the trains are filled with upgraded turrets, there might be an exponential increase of money earned. Players can continue to save money as a way to keep score, or allow themselves to play in a more haphazard manner as they can always recover costs with money, allowing the player to experiment with how they would like to tackle the level in subsequent attempts.

To generate money, as stated, you have to take commuters to their desired destinations. To do your transportation service, you have to direct a train to a train station. Upon arrival, your train will ultimately stop and commuters on the station will enter your cabins and indicate which

station they wish to alight at by changing the colour of the cabin they boarded to the colour of their destination station. How many commuters are at a station will be indicated by an UI next to their respective stations. DESTROYING ENEMIES DO NOT GENERATE FUNDS.

TURRET MANAGEMENT

In order to use Money to build, sell or upgrade Turrets, you need to arrive at the Train Depot with the train you wish to build/modify turrets on.

The different turrets in our game are as follows:
1. Standard Turret → The standard among all turrets. Normal firing rate.
2. Rocket Launcher → Launches an AOE attack on the enemies. Slower firing rate than the rest of the turrets. Heavier damage.
3. Flamethrower → Slows the enemy closest to the turret. Also does a certain damage per second on the enemy.
4. Support Turret → Boosts the fire rate (Standard Turret and Rocket Launcher), boosts the slow rate (Flamethrower).
5. Tesla Coil → Damages the closest enemy and induces a chain lightning effect up to 3 enemies (damages the next enemy and so on)

PHYSICS

Hence, from above, we have to incorporate some kind of physics in order to give the feel of a train simulation. Especially if our trains collide against the enemies we're facing; cars. Collisions, the stopping of trains once it reaches stations to deliver passengers, etc. However, we also do not want too much real physics incorporated from real-life, so as to dissuade the fun the player can experience while playing the game. Thus, our collisions can tend to be over the top and cartoony, accompanied by visual effects to fit our overall game.

STATISTICS

For turrets, they all have a fire rate and build cost. For standard turrets they have the default fire rate and cost, rocket launchers fire slowly but cost more due to its damage, flamethrowers have default fire rate but cost more due to its slowing capabilities, support towers has a high cost as it changes the fire rates of certain towers and tesla coils has a default fire rate and is weaker but it has a chain target ability.

Proceeding after Pitch/Alpha, we are thinking of the following:
- Make enemies late-game more tankier/powerful => map design can be affected so that players can use more strategy rather than brute force/standing in the middle of the track just to attack
- Switching of rails costs much more money as it continues
- Enemies able to target turrets/trains/rails and we have to fix it so that trains can travel to their specific destinations

4.3 Screen Flow

Refer to 3.7 Game Flow Summary.

4.4 Game Options

Players are able to change the volume of the Sound Effects(SFX), the volume of the Background Music(BGM), and alter the Time Scale of the game during gameplay.

4.5 Replaying & Saving

Game Auto-saves for the player unless the player decides to reset their progress. Levels can be replayed once the player cleared the level for the first time. Subsequent levels are unlocked after clearing the previous level.

4.6 Cheats & Easter Eggs

No easter eggs. Pressing the "M" key while holding down Z and X on the keyboard will grant 1000 in-game money for testplaying purposes..

5. Setting, Story and Characters

5.1 Game World

LOOK & FEEL OF THE WORLD
In our game, we are aiming for a wacky, whimsical visual style to keep our game a little bit more lighthearted and fun for our casual audience. Being set in a charming rural Bavarian-Style mountain valley town with quaint cottages, mom & pop-shops, community markets and small leisure complexes; Nestled in a cradle of lush, high-attitude greenery and snow-capped mountains, with rivers and rail tracks weaving into and out of the mountains and town buildings.

GENERAL DESCRIPTION
As you are the manager of the newly opened railway company, you have different tracks and stations in different areas that you have to personally manage by yourself. Different levels will have different track routes, which scales according to difficulty as well.

PHYSICAL CHARACTERISTICS
293 x 200 metres for Tutorial, 80 x 80 metres for Level 1 and 160 x 160 metres for Level 2

LEVEL TRANSITIONS
Each level still takes place in the same location, but in different parts of the town.
There is no theme change.

5.2 Story and Narrative

BACKSTORY
In the largely agrarian mountain county of Teutoburg Valley, the Mayor has been tasked by the country to build up transportation infrastructure to support the area's growing population of out-of-county migrants and the country's rising demand for Teutoburger exports out of the Valley.

As a part of this "Teutoburg Integration Project" industry and housing has been built, attracting 'outsiders' into the valley, much to the dismay of the local Motor Gang "The Hikers" who have called the valley their base of operations, and much rather have Teutoburg remain their rural isolated playground free of any Cops or Trains carrying nosy outsiders.

You work as the manager of a newly opened railway company funded by the Mayor. Unfortunately, The Hikers have caught wind of this and are out to destroy your trains and stations in an attempt to snuff out support for the railway. Juggle between delivering commuters and ensuring both their safety and the safety of corporate property.

PLOT ELEMENTS
- Before a wave starts, a ransom note containing threats from 'The Hikers' will pop out at the bottom right of the screen and after a few seconds, it flies off the screen. We will display enemies that will be spawned in that wave on that ransom note (Subjected to change).
- After the level ends, a front page of the newspaper will appear on the screen. The headline will change depending which win/lose conditions the Player has triggered, before a wipe-left transition obscures the screen and loads in a different scene.
    - Lose due to Train Crash - TRAIN CRASHES ON NEWLY-OPENED RAILWAY! Railway's questionable safety may lead to closure.
    - Lose due to Train Depot destruction - RAILWAY DEPOT OVERRUN BY THE HIKERS GANG! Damages sustained may lead to bankruptcy & closure
    - Win - RAILWAY CONTINUES SERVICE IN FACE OF THREATS! Despite threats from the local Hikers Gang, the railway stays open!

GAME PROGRESSION
In order to progress to the next level, the player
- Defeat all the enemies in the waves of each level
- The health of the Main Depot does not go below 0 (successfully fend off enemies in the level)
- No crashing between trains and cars involved

If the above mentioned are all satisfied, the victory screen will appear, and the player can go to the next level.

5.3 Characters (Prefabs & Interactables)

You, The Player:

BACKSTORY
Before you worked as the manager of the newly opened railway company, you were a typical salaryman with a passion for trains and the industry. Lo and behold, as you quit your job with a plan to start up the train company, the opportunity to volunteer for the "Teutoburg Integration Project" had opened up; and the money funded by the mayor would be sufficient in achieving your dreams of a new train company. Not only that, as there was news of a local Motor Gang residing around the area, but no worry, there's enough money in the project funds to sneak in a few military-grade weapons to help protect the commuters and the transportation system.

PERSONALITY

As the Player insert character, the Manager does not speak or have any personality to speak of except being the eyes and ears of the Manager. Though given his situation, he's apparently the most patient and hardworking salaryman on Earth.

Ultimately the personality of this character is up to the Player's play style.

PHYSICAL CHARACTERISTICS & APPEARANCE

The Manager/Player does not have an in-game model. The Manager is regularly addressed during gameplay by either the enemies and the tutorial messages but aside from gameplay, the Manager does not have any impact outside of gameplay.

The Player can interact with any interactables on screen, if the interaction has a cost it will be displayed.

ANIMATIONS

Not applicable due to reasons given in Physical Characteristics.

ABILITIES

Given how the Player is given responsibility and control of the Teutoburg Railsystems, the Manager/Player can activate and deactivate switch rails. However, due to the implications of an unexpected route switch, every activation comes with a cost to the company's profitability, thus the Player must be prudent and strategic with every decision to activate these rails.

Due to the "Unorthodox" nature of the challenge given to the company, the Teutoburg Integration Project decided to turn a blind eye to the company's legally-grey decision to purchase turrets under "Corporate Use". Using the Project's good will, the Player is able to purchase and equip the trains with turrets to defend the railway from The Hikers gang, under the condition that the equipping process can only be done in the safety of the Train Depot.

The Player can also speed up time if need be.

'The Hikers':

BACKSTORY

The Hikers were angry that their territory was "stolen" from you, and decided that the best way to claim back their piece of land is to attack your station and trains, and remove it completely off the land, thinking to themselves that your trains and railways are defenceless; An easy mission to rid the land of your train transportation system, thus sending in waves of vehicles towards your moving trains. This will not end well for them.

PERSONALITY

While they do not have the high-power gun turrets and Missile Launchers like you do, they more than make up for it in their persistence and fearlessness. The Hikers will not stop until the Outsiders are kicked out of Teutoburg Valley, but perhaps after withstanding waves after waves, you may be able to"convince them" to stop their doggered attempts.

PHYSICAL CHARACTERISTIC & APPEARANCE

Simple Enemy(Common Generic Enemy)
- A common car with a high chassis and blue covering

Fast Enemy
- A cyan car with a streamlined hood and a spoiler
- Car gives off an appearance of being optimised for speed

Tank Enemy
- A purple buggy with high suspension
- Wide and broad body gives off appearance of a heavier and denser chassis

ANIMATIONS

The enemies will not be animated.

ABILITIES

All enemies have the ability to immediately cause a game over by crashing into the player controlled trains.

STATISTICS

Simple Enemy
Health: 100
Speed: 15

Fast Enemy
Health: 50
Speed: 30

Tank Enemy
Health: 400
Speed: 10

"The Turrets"
BACKSTORY

Numerous companies have agreed to provide their Turrets and military grade materials to you at a heavily discounted price in exchange for their participation in the Teutoburg Integration Project.

PERSONALITY
NA

PHYSICAL CHARACTERISTICS & STATISTICS
This section will be dedicated to the turrets that the Player can build. Statistics are subjected to change.

"**Standard Turret**"
COST: 100
RANGE: 25
FIRE RATE: 0.75
DAMAGE: 20
ABILITY: Standard bullets that damage enemies.
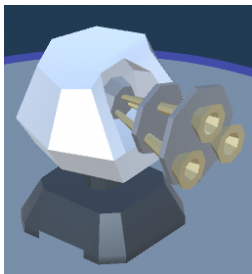
"**Standard Turret Upgraded**"
COST: 150
RANGE: 30
FIRE RATE: 1
DAMAGE: 25
ABILITY: Upgraded standard bullets that damage enemies.

"Missile Mortar"
COST: 250
RANGE: 40
FIRE RATE: 0.5
DAMAGE: 75
ABILITY: AOE Damage

"Missile Mortar Upgraded"
COST: 300
RANGE: 50
FIRE RATE: 0.75
DAMAGE: 75
ABILITY: Larger AOE range and AOE Damage

"**Flamethrower**"
COST: 350
RANGE: 20
FIRE RATE: NA
DAMAGE: 40 per second
ABILITY: Slowdown Target
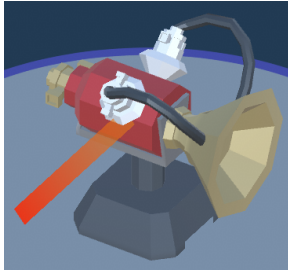
"**Flamethrower Upgraded**"
COST: 400
RANGE: 30
FIRE RATE: NA
DAMAGE: 75 per second
ABILITY: Slowdown Target and stronger slow amount

"**Tesla Coil**"
COST: 250
RANGE: 25
FIRE RATE: 1
DAMAGE: 30
ABILITY: Target damage chaining up to 3 Targets

"**Tesla Coil Upgraded**"
COST: 300
RANGE: 30
FIRE RATE: 0.75
DAMAGE: 50
ABILITY: Target damage chaining up to 3 Targets
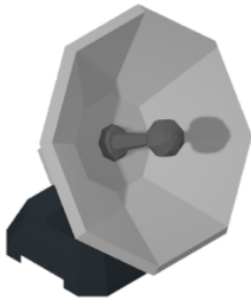
"**Support Tower**"
COST: 250
RANGE: Adjacent turrets
FIRE RATE: NA
DAMAGE: NA
ABILITY: Increases firerate by 20%
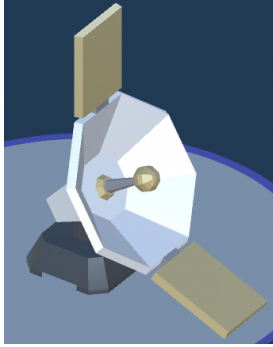
"**Support Tower (Tentative) Upgraded**"
COST: 300
RANGE: Adjacent turrets
FIRE RATE: NA
DAMAGE: NA
ABILITY: Increases firerate by 50%

6. Levels

Tutorial

Synopsis

Starting your new life as a Railway Manager, you take a ride on the service train to your new workplace. While en route, you catch a glimpse of the Hikers Gang threatening to stop the train. The conductor wordlessly does the normal Hijacking procedure - Report to the nearest Train Depot, strap on some turrets and clear the road of Hikers before moving on to the Teutoburg Arrival Station.

Introductory Material

Scene fades into the level.

Objectives

In order to finish the level, the Player should follow instructions given to advance through sections of the stage.

Physical Description

293 * 200m

There will be six passenger stations with different colours, three with different colours of red, blue and yellow in both the first part and the second part of the tutorial. Train cabins will also follow the colours of the stations depending on where the commuters need to be dropped off. This level is much linear so as to have the Player traverse through the tutorial easily.

Map

CONCEPTUAL
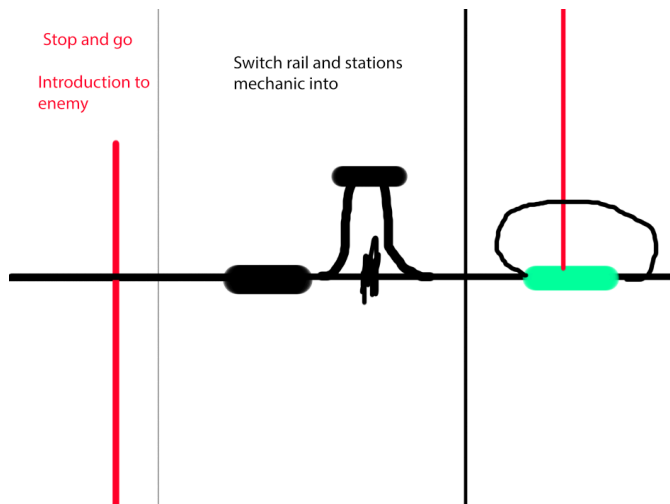
IN-GAME

Critical path that the player and/or A.I. needs to take

NA due to tutorial level linearity.

What encounters are important or incidental
- The Step & Go Introduction gives the player a 5 second window to read and stop the train. The Train can be stopped before the hazard even comes on screen.
- Introduction to mechanics such as switch rails, earning money through sending off passengers to their respective stations and the Depot. The guiding words on the canvas screen showing along the train's journey to help the Player get adjusted to the game.

Level Walkthrough
The tutorial is unique in that the camera follows the Train.
When the Player reaches the Stop & Go mechanic tutorial, a text will fade in telling the player to right click on the train to halt it and another train spawn that will crash if the player does not stop in time.

Afterwards, the Player will be introduced to the Station mechanic, in which a text will tell the player that the Train auto-stops at Stations. The Player will then be introduced to the Switch Rail Mechanic. A text will fade in telling the player to click on the switch rail to proceed.

If the switch rail is pressed, the Train arrives at a train station where they learn that they earn money from dropping off commuters at the correct station. The train will then continue to a road with enemies, reminding the Player that cars, as enemies, will also damage the Player and result in a game over.

The Train will continue to the Main Station where the Player will be prompted to spend all their money to buy/upgrade a turret. A text will then prompt players to continue into a loop where enemies will spawn, moving towards the Station. Because Switching Rails during an attack is costly and the player spends all their money on turrets, the player will have to Stop and Start the train in order to move into turret firing range and avoid areas where the rails intersect with the enemy path.

After the attack wave is over, the Player will be prompted to switch the, now penalty-free, rail to proceed, clearing the level.

Level 1
Synopsis
After successfully protecting your trains and train depot, you are now slowly getting used to your job. However, now that The Hikers have learnt that you are prepared to defend your transportation route, they persist by bringing more cars to affect the business of your company and ruin your reputation. Though the Teutowon line is a relatively quiet service line, losing it would be a great detriment to the company, you help is even more needed than ever.

Introductory Material

Scene fades into the level.

Objectives

You have to transport your commuters to their respective stations while protecting them from The Hikers' cars. Make use of the money earned from transporting your commuters to buy turrets from the train depot and use them to prevent the cars from reaching your train depot. You have to also avoid your trains from getting hit by the cars and other trains to ensure the safety of your commuters.

Physical Description

80m *80m

Map
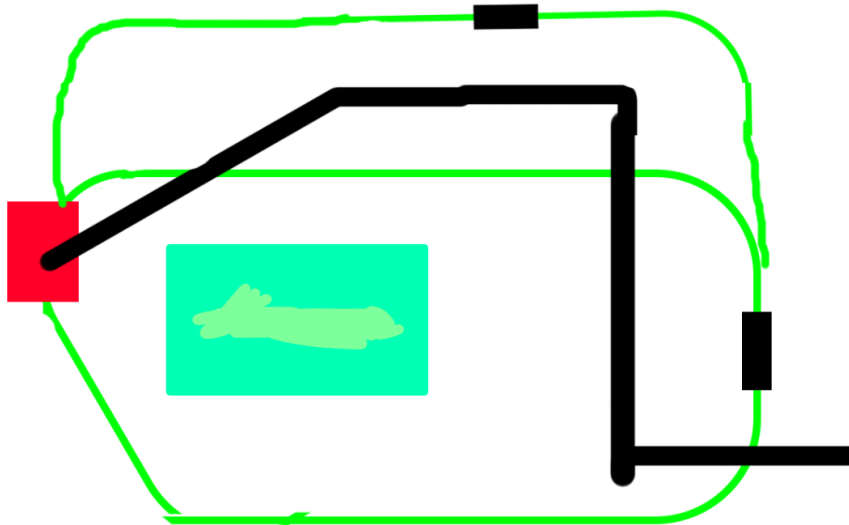
Critical path that the player and/or A.I. needs to take

From the map seen above, the black lines indicate the enemies route aka. A.I. route that they have to take to get to the Train Depot. They only have a straight route in this level.

For the player, the train in this level moves in a fixed direction in a loop around the map. However, they can be clicked on to stop or go, change track according to the players' strategy. There is no definite path that the player can take as they are free to manipulate the track however they like, except with a fee.

What encounters are important or incidental

1) The track switches need to be aligned towards the Train Depot to purchase and equip turrets during the planning phase before level start.
2) The track switches should be used to change the direction for the train to go to the stations to maximise efficiency in income and destroying the enemies.
3) There are certain spots where the player can temporarily camp and shoot the enemies.

Level Walkthrough

The first thing to do is to purchase turrets at the Train Depot with the money provided at the start of the level during the planning phase before enemies are spawned in. Have at least 1-2 standard turrets and either station the train near the enemy spawn or transport passengers. It is possible to focus on transporting passengers yet still be able to intercept enemies in time due to the map size.

If the player has misplaced their turret or purchased the wrong turret, they are able to sell off turrets halved from their original prices.
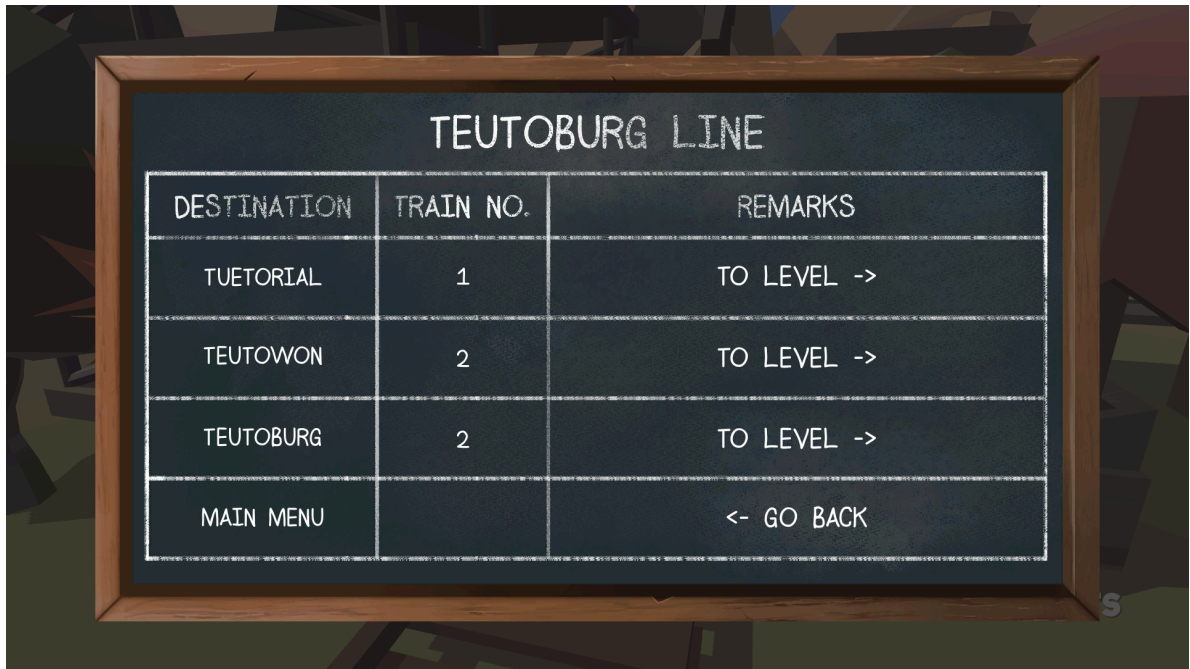
Level 2

Synopsis
Your ability to keep calm and carry on has been awarded another job at attending to the Teutoburg line, a much busier line consisting of two trains instead of one.

Introductory Material
Scene fades into the level.

Objectives
You have to transport your commuters to their respective stations while protecting them from The Hikers' cars. Make use of the money earned from transporting your commuters to buy turrets from the train depot and use them to prevent the cars from reaching your train depot. You have to also avoid your trains from getting hit by the cars and other trains to ensure the safety of your commuters.

Physical Description
160 * 160M
There will be three passenger stations with different colours, and train cabins will also follow the colours of the stations depending on where the commuters need to be dropped off. There will also be three loops of train tracks. The scene would be surrounded with mountains, trees, rocks and other elements surrounding a sub-urban village.

Map

Critical path that the player and/or A.I. needs to take

From the map seen above, the black lines indicate the enemies route aka. A.I. route that they have to take to get to the Train Depot. They only have a straight route in this level.

For the player, the 2 trains in this level move in a fixed direction in a loop around the map. However, they can be clicked on to stop or go, change tracks according to the players' strategy. There is no definite path that the player can take as they are free to manipulate tracks however they like, except with a fee.

What encounters are important or incidental

4) The track switches need to be aligned towards the Train Depot to purchase and equip turrets during the planning phase before level start.
5) The track switches should be used to change the direction for the train to go to the stations to maximise efficiency in income and destroying the enemies.

Level Walkthrough

The first thing to do is to purchase turrets at the Train Depot with the money provided at the start of the level during the planning phase before enemies are spawned in. Once you've purchased turrets which are deployed on the first train, the second train can send off passengers to their respective coloured stations to generate income. The same can be done for the first train with turrets, except that that train has to fend off enemies while bringing their respective passengers to other train stations. After a while, the second train used to generate income will allow you to afford more turrets or turret upgrades to raise their stats to easier defeat the enemies.

If the player has misplaced their turret or purchased the wrong turret, they are able to sell off turrets halved from their original prices.

7. Interface

7.1 Visual System

Main Menu

Lose Screen UI (Different wordings on different outcomes)

Level Select

TEUTOBURG LINE

DESTINATION	TRAIN NO.	REMARKS
TUETORIAL	1	TO LEVEL ->
TEUTOWON	2	TO LEVEL ->
TEUTOBURG	2	TO LEVEL ->
MAIN MENU		<- GO BACK

In-game UI

When the value of Money and Lives changes, the number text pops out to give player feedback according to value change. Colour also changes - Red when the value decreases, Green when it increases

In addition, mousing over UI elements will bring up a tooltip to show any further information.

A wave indicator is located at the bottom right of the screen to show what wave the player is on so they can keep track of their level progression.

CAMERA

We set the game to be in perspective-isometric to take advantage of Unity Post-Processing.

7.2 Control System

Controls

WASD/Moving mouse around borders of the game - Camera panning
Left click - Clicking of buttons, changing train tracks and turret placement on trains upon mouse over
Right click - Toggle movement of trains on mouse over on train cabins
Scroll Wheel - Zoom in and out.

7.3 Audio
MUSIC

Dummy (Main Menu Music)
https://www.fesliyanstudios.com/royalty-free-music/download/dummy/94
Absurd (Level Music)
https://www.fesliyanstudios.com/royalty-free-music/download/absurd/165
Seriously (Level Music)
https://www.fesliyanstudios.com/royalty-free-music/download/seriously/235?src=yt
Option Menu! (Level Music)

https://www.youtube.com/watch?v=krAEJH0SuGY

SOUND EFFECTS

Explosions:
https://www.zapsplat.com/music/bomb-whizz-in-and-impact-close-by-medium-explosion-3/
https://www.zapsplat.com/music/massive-bomb-drop-explosion-with-debris-5/ (explosion)
https://www.zapsplat.com/music/explosion-very-small-explosionpop/ (missile launcher explosion)

Turrets:
https://www.zapsplat.com/music/bow-and-arrow-bow-elastic-release-ping-shoot-3/ (standard shoot)
https://www.zapsplat.com/music/flame-burst-from-gas-pipe-large-and-wide-version-1/ (flamethrower)
https://www.zapsplat.com/music/electricity-spark-sound-design-2/ (tesla spark)

Building/Upgrading:
https://www.zapsplat.com/music/4x-hammer-hits-on-a-nail/ (build sound effect)

Selling:
https://www.zapsplat.com/music/50-and-20-pence-piece-coins-put-down-on-surface/ (money sell sound effect)
https://www.zapsplat.com/music/australian-50-cent-coin-set-down-gently-on-tiled-table-3/ (sell sound effect)

Earning money:
https://www.zapsplat.com/music/small-backpack-containing-coins-place-down/ (money earn)

Trains:
https://www.zapsplat.com/music/mine-train-carriage-roll-and-rumble-along-track-slowly-designed-1/ (train movement)
https://www.zapsplat.com/music/adult-size-mountain-bike-brake-squeak-loud-1/ (train brakes/stop)
https://www.zapsplat.com/music/cordless-drill-battery-clip-on/ (commuter gets on)

Victory fanfare:
https://www.zapsplat.com/music/cartoon-success-fanfare/ (victory fanfare)

7.4 Help System

How to Play

Earn money through delivering passengers to their respective coloured stations by the colour of the trains' cabins.

Your main objective is to defend your depot station situated in the middle of the map. You can only buy turrets in the depot station.
Use the turrets to defend against waves.

You can also switch rails in between waves but it will incur costs when enemies are attacking.

Keys

Left or Right Click to stop trains.
In Main Station, ONLY Right Click to move trains.

WASD or Mouse for camera panning.

You can mouse over turrets to view its range.

BACK

Instructions on controls are accessible via the Instructions Option in the Main Menu.

Alternatively, the player can play the tutorial for examples on how to play.

8. Artificial Intelligence

8.1 Opponent AI

Wave Spawner

The Wave Spawner is fed a collection of variables from a Script called "wave"
The Wave Script contains the type of enemy spawn, how many and if it should be spawned simultaneously with another wave.

These waves are spawned according to a timer which can be edited by the Level Designer.

8.2 Enemy AI

NavMesh

The AI uses Unity Navigation Mesh to follow a baked path (the grey roads) from their Spawn Point to the Train Depot. When it spawns, it will automatically navigate itself to an end point located at the Train Depot.

8.3 Non-combat characters

Commuters

The Commuters spawn at empty spots in their specific parent stations according to a spawn rate timer. Though it can be varied according to the Level Designer, they spawn on an average of 5 seconds after an empty spot is detected.

Once spawned, they will be tagged with a colour. Once a train arrives at the station, the Commuter will be assigned to a cabin based on their Station spot index (Commuter at Spot 1 goes to Cabin 1, commuter spot 2 goes to cabin 2… etc.). The Cabin will then read the Train Station script to see what available receiving coloured stations there are and switch its colour to be the same as one of the receiving station, after which the commuter is destroyed at the empty spot is then freed up for the process to repeat.

8.4 Friendly characters

NA

8.5 Support AI (Player and collision detection; Pathfinding)

Cabin

The movement of the cabins is dictated by the PathFollower script in the first cabin of each set of train cabins. The script tells each cabin registered to it in an array what track to follow and stick to. Upon reaching a switch rail collider, it reads what track path it needs to go to and tells the rest of the cabin assigned to the script what track path to follow.

When the Train reaches the depot, all cabins in the train set will be enabled to facilitate Turret Building. After selecting a turret from the shop, a Cabin will first detect if the mouse's position is over, if it is, it will give visual feedback by darkening its current colour. On click it will spawn the turret on the cabin as a child and for subsequent builds, it will be marked as a Cabin with a turret with a boolean unless sold. Once marked, the Cabin will instead bring up an upgrade panel when clicked on, even if a turret is selected from the shop, and will only become unmarked when the turret is sold.

9. Technical

9.1 Target Hardware

For the PC.

9.2 Development Hardware & Software

PC.

9.3 Development Procedures & Standards

We are using Github as our source control to keep track of our codes and progress into the development.

9.4 Game Engine

We are building this game in Unity Engine 3D.

9.5 Scripting Language

The scripting language we are using for the game C# programming language.

10. Game Art

10.1 Concept Art
Vehicles
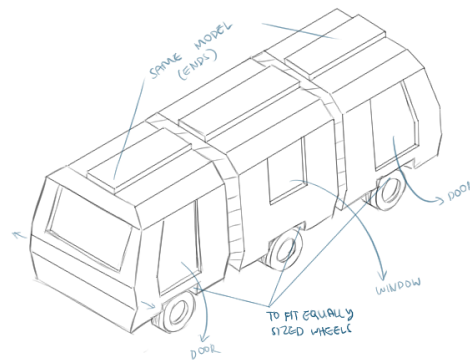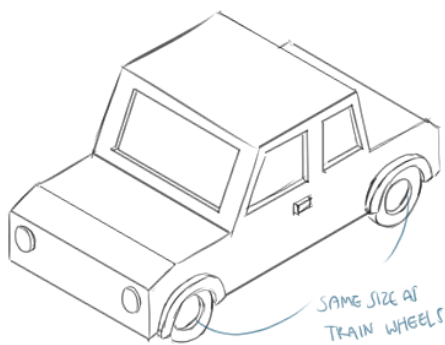
Turrets
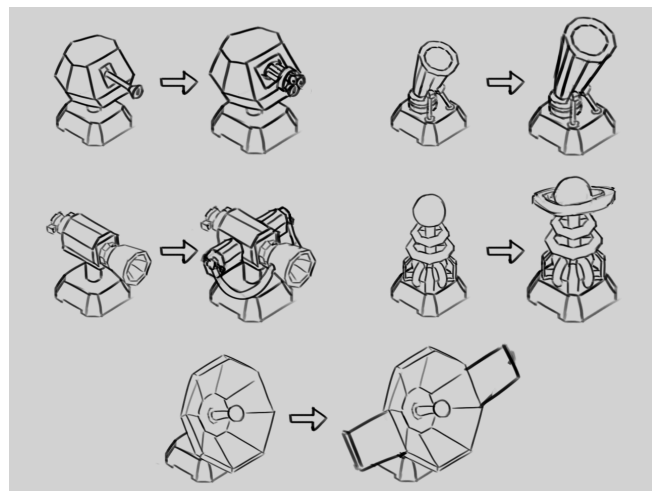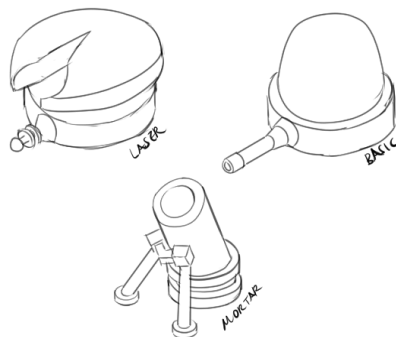
Commuters
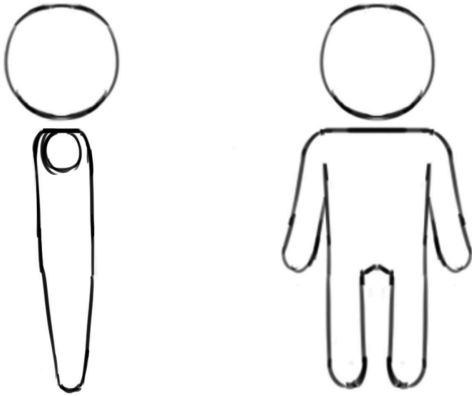
Train Depot
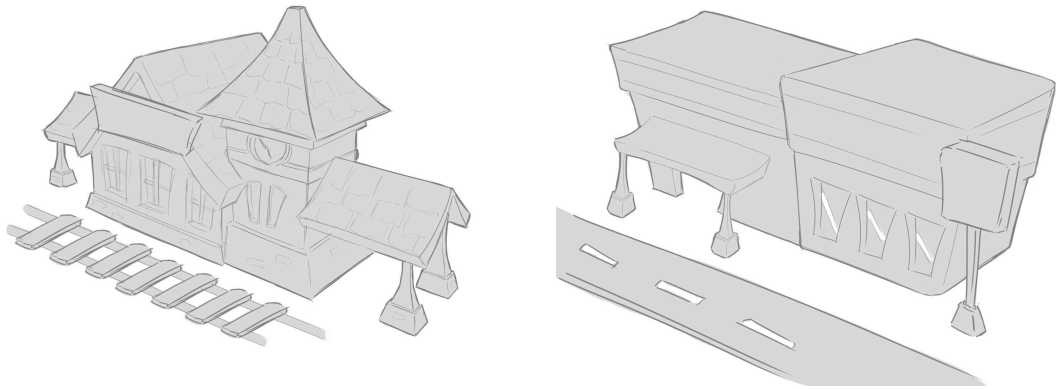
Enemy Base
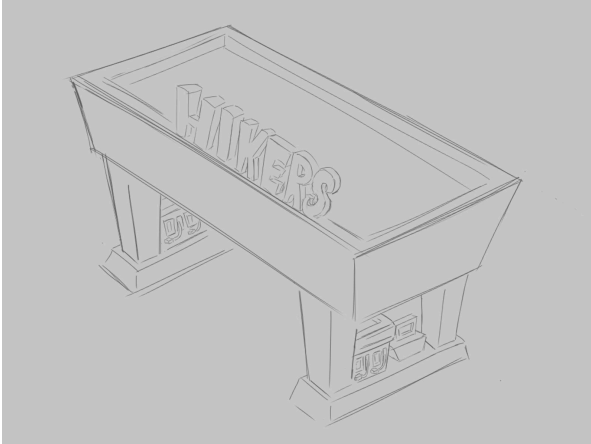
Passenger Station
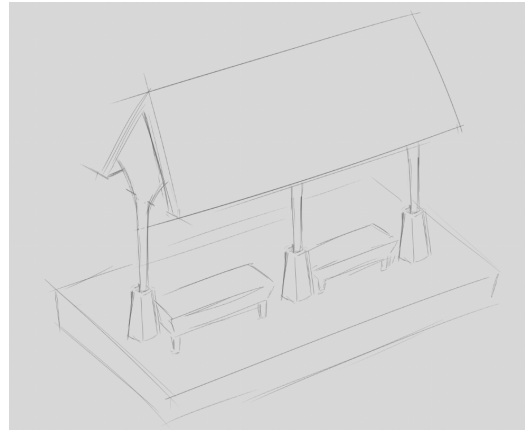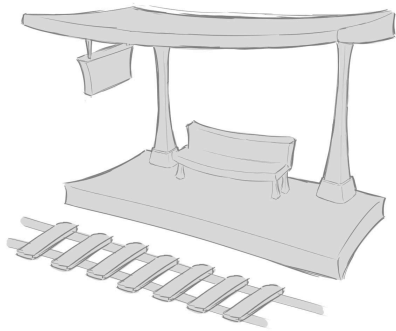
Houses
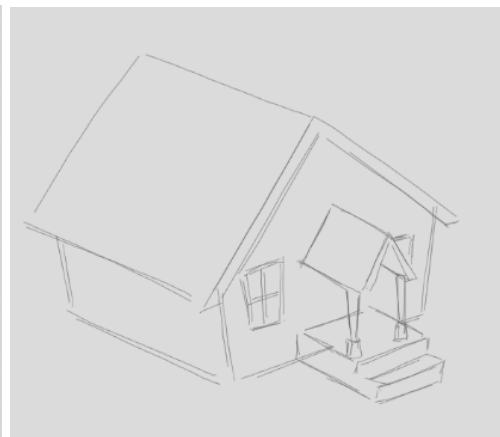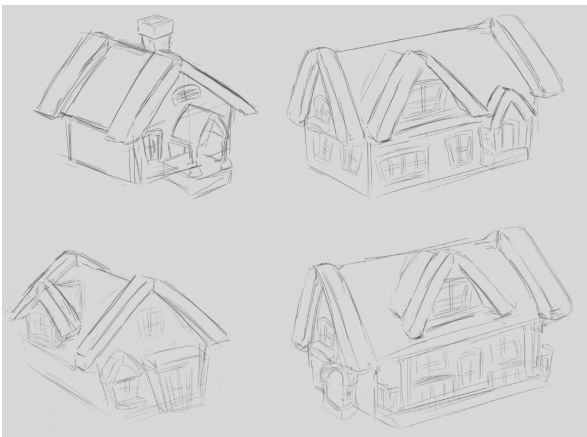
Farmer's Market Milestone
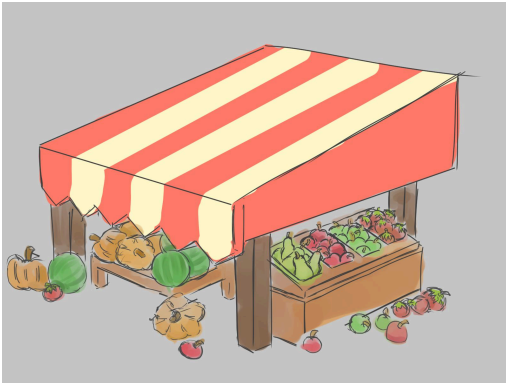
Props
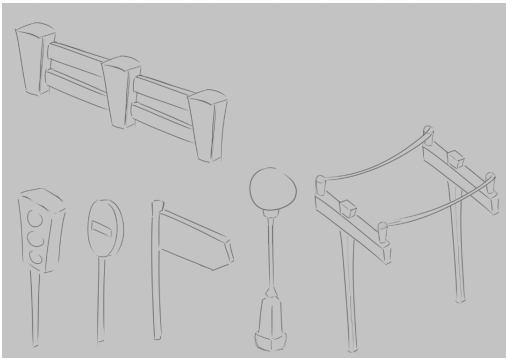
Master Sketch
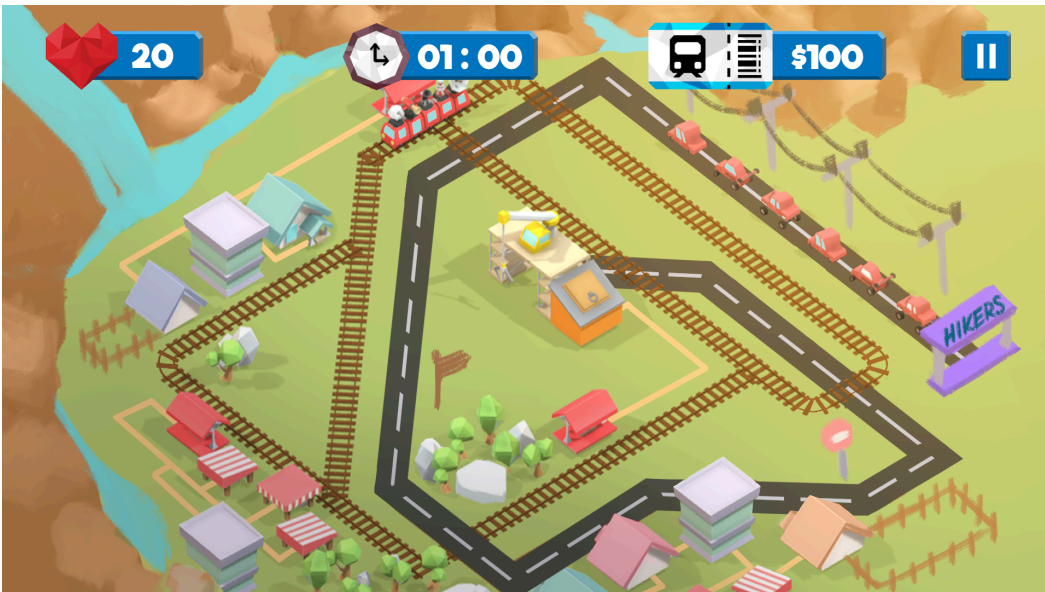
10.2 Style Guides

Main Art Direction

Theme/Setting
Modern, Country-side

Art Style
Low-poly, Minimalistic, Flat colours, Stylised

Colour Scheme
Important elements such as the stations, depot, enemy base and trains will have more saturated colours so that they can stand out. Player elements will be mostly warm colours except for the turrets that have a grayscale colour scheme with some accent colours. On the other hand, enemy related elements will have a cool colour scheme to contrast player elements. Models that are only for decoration will have desaturated colours so that they will not clash with the more important elements.

Scale
Below is the scale sheet for our models:

Stylisation Guide

Turrets
Army-style/Army inspired turrets; Gun part should be bigger than gun base

Vehicles
Windows should be stylised; Roofs should be slanted

Environment/Props
Stylised building, Modern and wacky

Commuters/Animals
More rounded, less cuboid-like

UI
Icons and Menus should mimic the look of low poly models (Add a bevelled-look to the sides)

Animation & VFX
Main Effects
- VFX should incorporate 3D cubes and cuboids

Example of Explosion Feel:

- Smoke can be added if it looks better, just have to be in moderation

Example of Waterfall Feel:
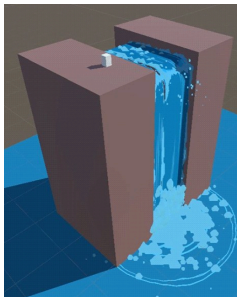
- FX Downstream, Impact & Ripple Effect

Lighting/Ambient Occlusion
- Lighting should have a main direction light (sunlight)
- Fill light
- Ambient occlusion to be made through post-processing

- Lighting should be relatively bright & warm

Animations
- Most animations should be greatly emphasised to add visual clarity
- Organic animations (Commuters & Animals...etc)
- Train Depot Animation should be quick & snappy

Technical Guidelines
Naming of Assets
- File name should be AssetName_AssetType
- 2D Examples would include ShopMenu_UI, InGame_UI
- 3D Examples would include Train_Cabin_Back, Turret_Basic, UpgradedTurret_Basic

Updating Assets
- Make sure that all 3D Assets are optimised (delete by type - history) have their polygon meshes named before exporting as an asset
- Updated Assets should be placed in respective folder type (Gold Assets to be in Gold folder in google drive)
- Outdated Assets should be deleted or put into an archive folder in the google drive.
- Concept Art to be placed in Art Reference Slides rather than in the google drive.

10.3 Characters/Vehicle/Turret
Player Trains
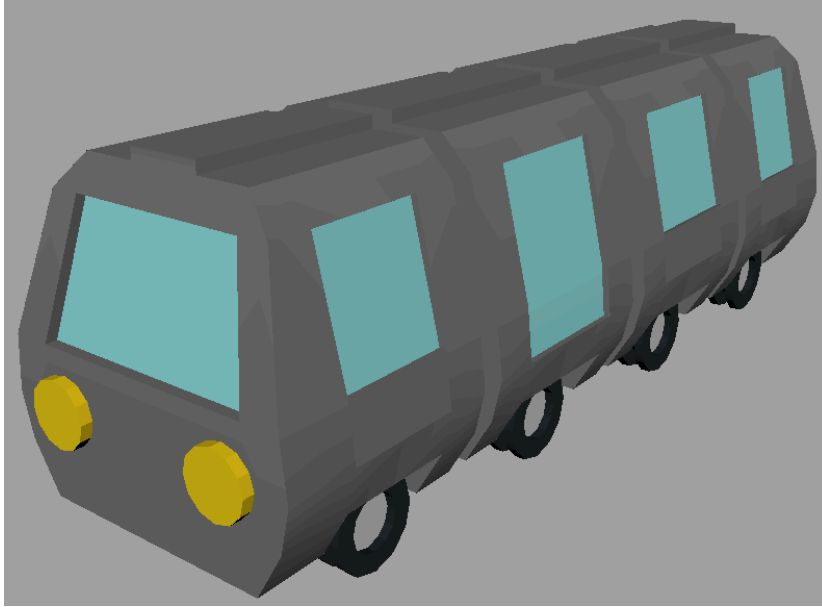
Enemy Vehicles
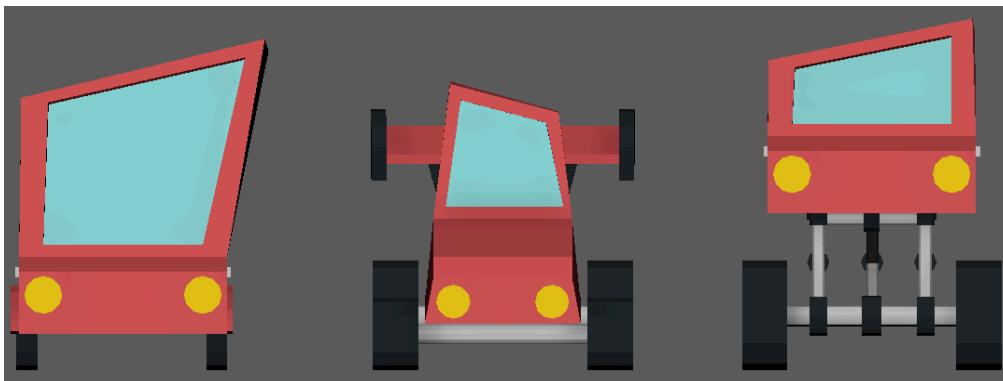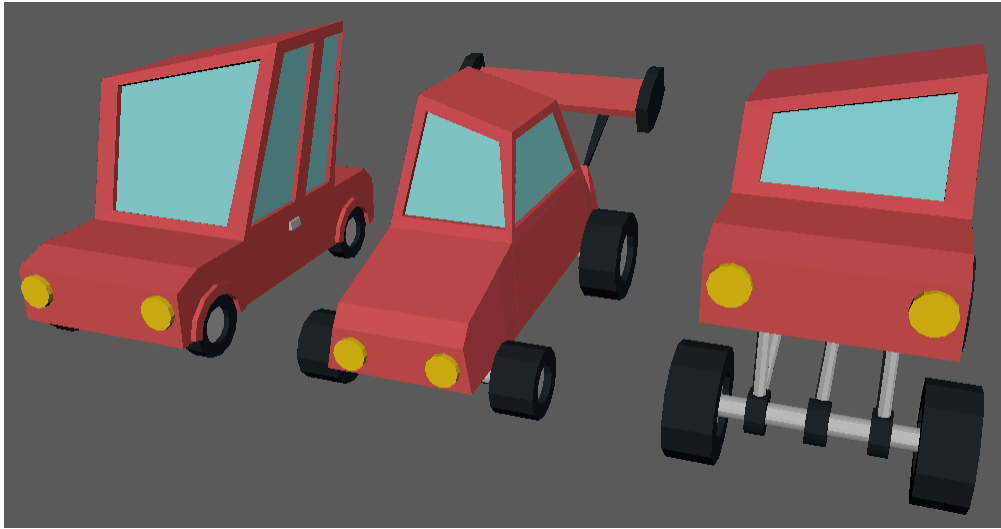
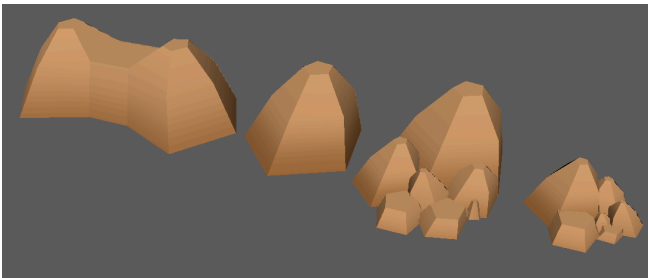## Turrets & Upgraded Turrets
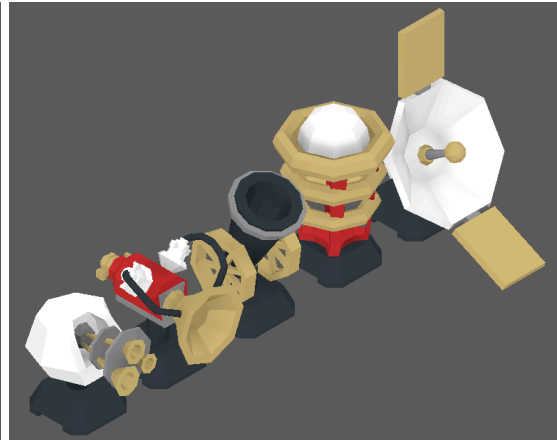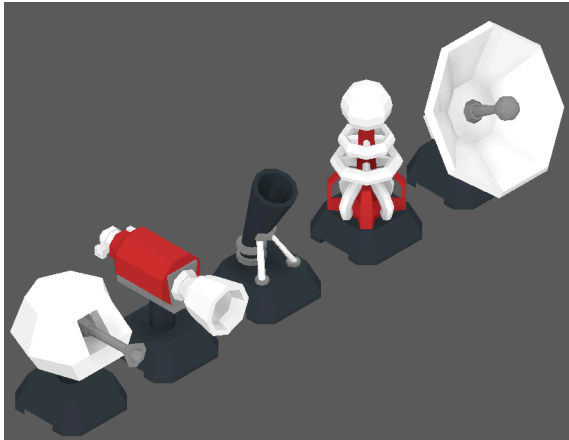
Commuters

Turret Animations
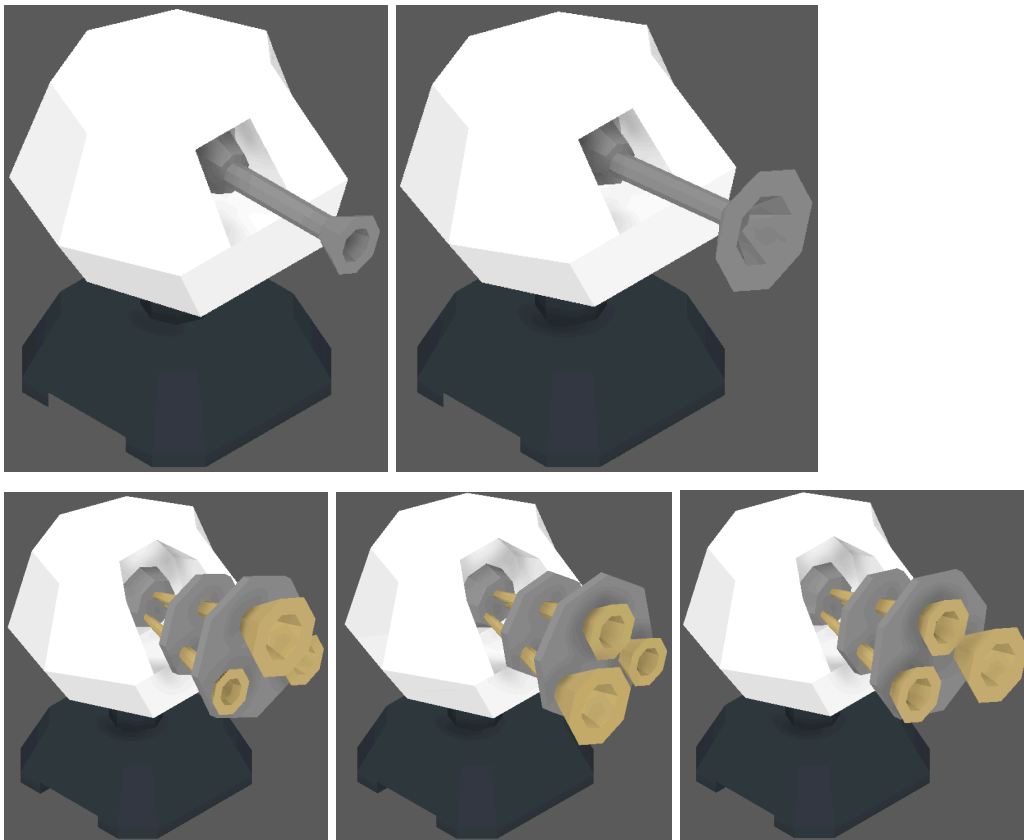
Commuter Animation
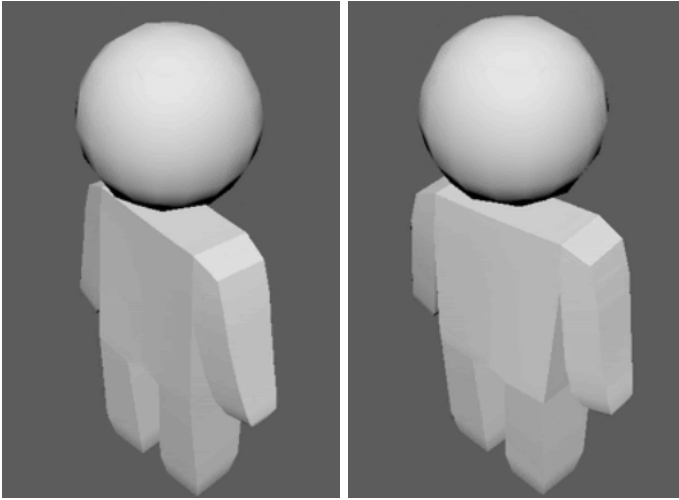
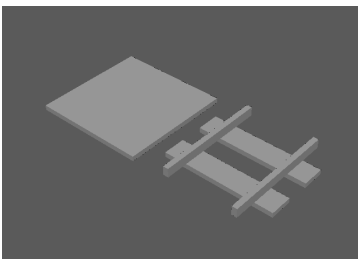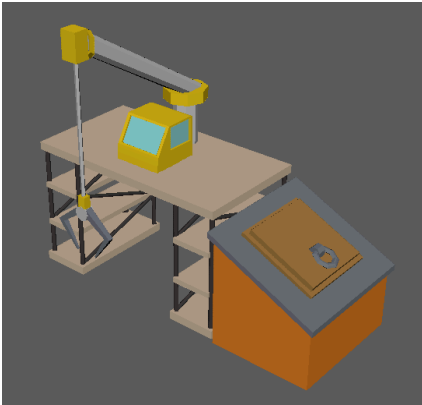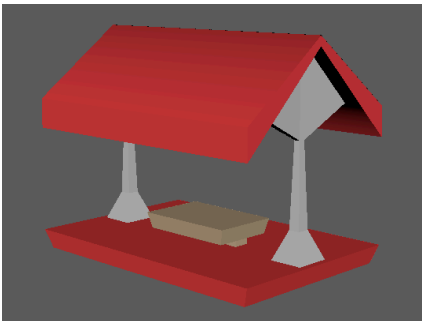# 10.4 Environments

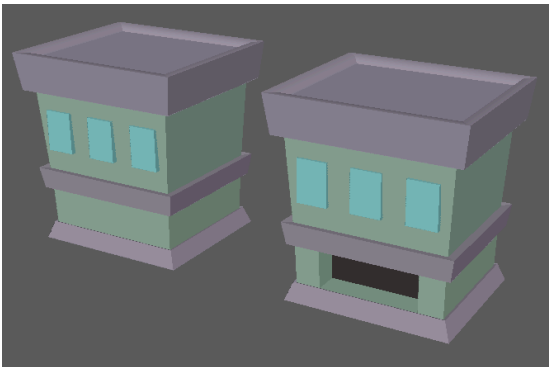**Terrain**
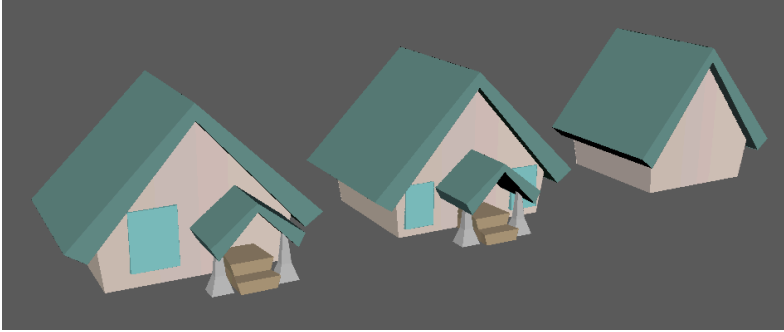

10.5 Props/Equipment
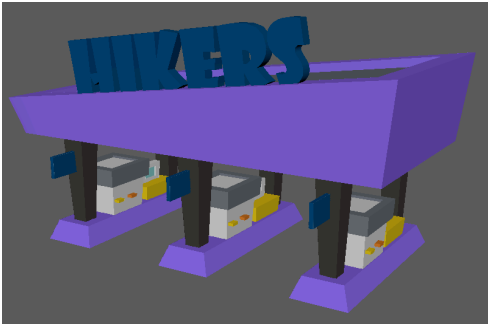
Road and Train Track

Depot
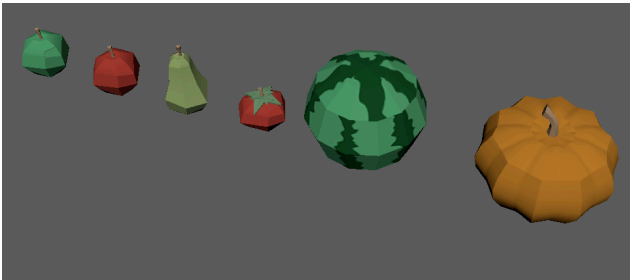

Passenger Station

Shophouse

House
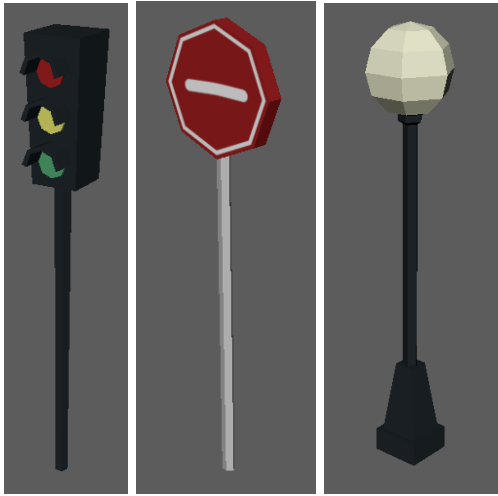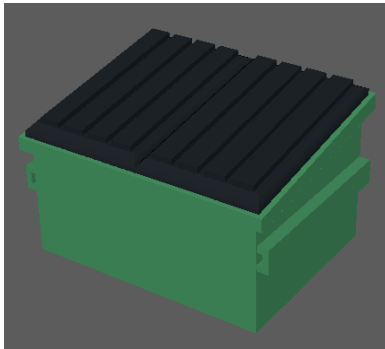

Enemy Base

Fruits
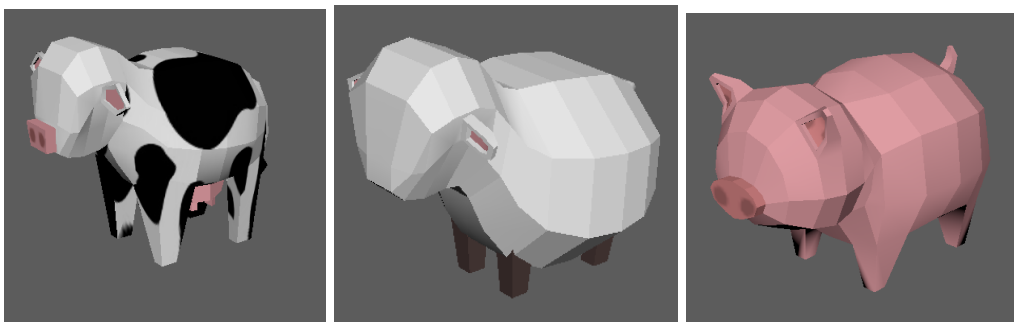

Farmer's Market

Traffic Light/Stop Sign/Lamppost

Dumpster

Cow/Sheep/Pig

Bush/Rocks/Trees
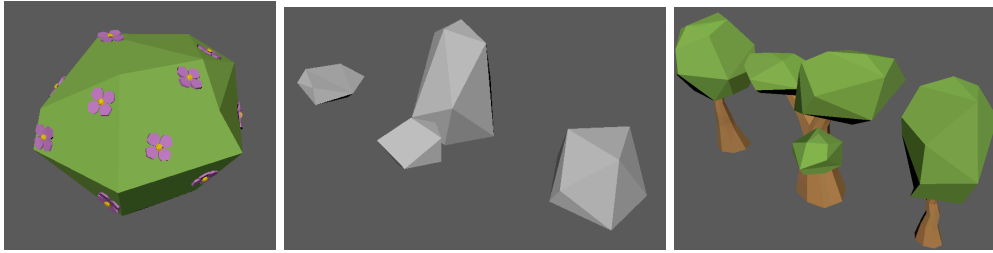
Telephone pole/Fences
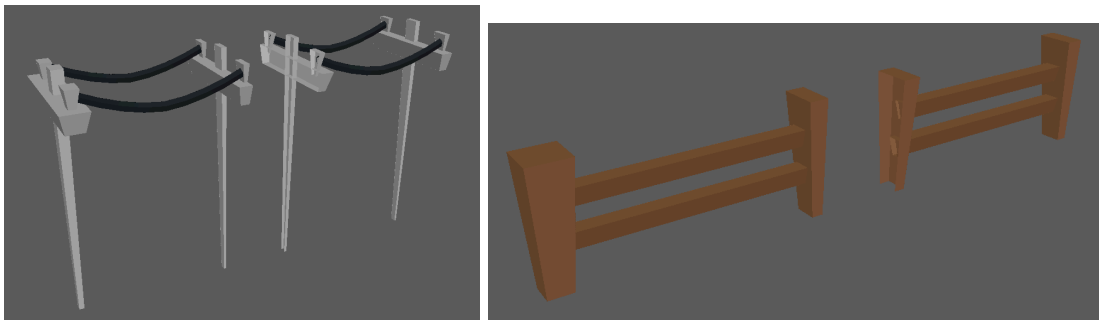
10.6 UI Style/Design

Game Logo

In-Game UI

Level Select Menu

TEUTOBURG LINE

DESTINATION	TRAIN NO.	REMARKS
TEUTOWON	1	GO TO LEVEL ->
TEUTOBURG	2	GO TO LEVEL ->
SAN TEUTOBURG	3	--UNDER CONSTRUCTION--
MAIN MENU		<- GO BACK
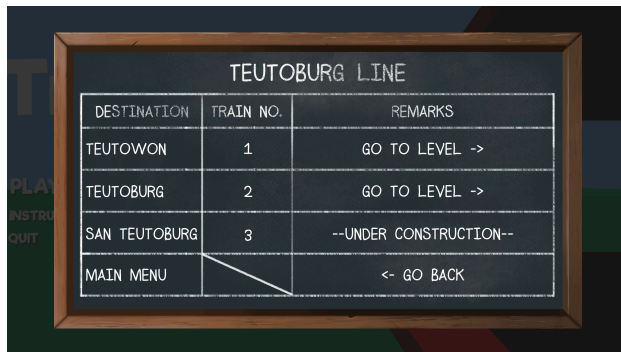
Loading Screen

Win/Lose Screen

WREKT NEWS

RAILWAY DEPOT OVERRUN BY THE HIKER GANG!

Damages sustained may lead to bankruptcy & closure
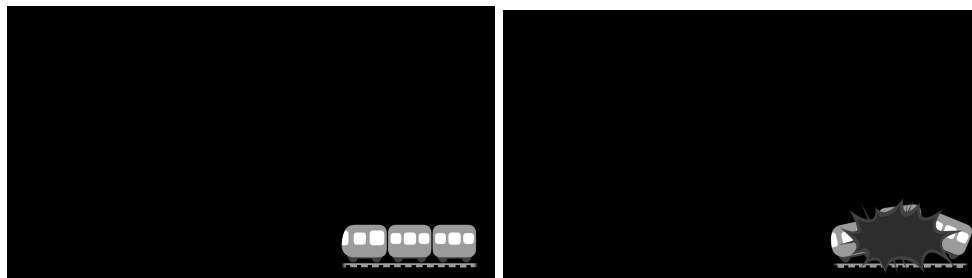
Pause Screen

Shop

8.7 VFX Design

Enemy Death

Basic Turret

Flamethrower

Tesla Coil

Mortar

Crash Explosion

Waterfall

11. Team/Studio Profile

11.1 Team Introduction

We are *Hello Gamers*, a group of 6 students who have done various projects together in the past. The projects we have worked on range from tabletop games, to 2D platformers and more

11.2 Member Profiles

Darren Toh
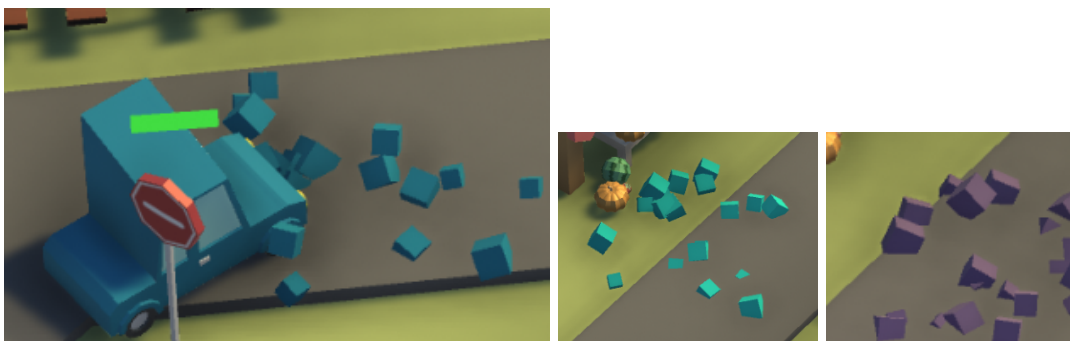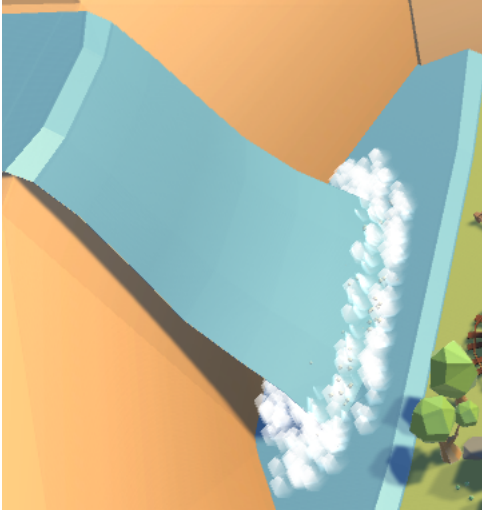**Role**: Team Lead & Programming Lead
Description: I was in charge of managing and designing the game's information architecture as well as coding in and testing of level functionality and screenflow.
Experience: Previously, I've worked on 2D platformers in school projects as well as a handful of assorted 3D games.
Strength/Weakness: Due to my experience with many different games, I have a steady knowledge of programming for Unity and, with the help of online resources, I am not afraid to be experimental with my code which helps me learn as I work. However, I consider myself to be prone to burnout and erratic with my work hours; On average, I can work for 2 hours before needing a short break yet on some days, I can work for 4-5 hours without breaks, thus it is rather hard for me to schedule and coordinate my work. My biggest weakness would have to be my inability to manage stress properly, which leads to time management and procrastination issues.

Lim Si Ying
Role: Programmer
Description: I was in charge of sourcing the music and sound effects for the game as well as helping manage the game's information architecture. I also supervise the importing of 3D models and 2D UI/Artworks made by the art team into our game. In addition, the updating of UI menus and some coding of mechanics, UI, and miscs.
Experience: Previously, I've worked on 2D projects, mainly 2D platformers. I have also worked on personal and school-based 3D projects, such as 3D 1st-person shooter and puzzle game, to adjust myself into Unity Engine.
Strength/Weakness: I tend to prioritise work first before rest/play. I do sometimes plan a schedule on the things that I should do on days. I still consider myself a beginner in terms of C# coding, so I tend to search up solutions for coding what I need online before I try to attempt it myself.

Zachary Yee
Role: Programmer

Description: I did the initial switch rail mechanic, some UI interface implementations and worked on the prototype levels design. Also tried to fix bugs.

Experience: Previously, I've worked on programming a visual novel, a AR minecraft type app, a split screen 3d horror game, basic 3d puzzle game and a basic 2d platformer all as school projects.

Strength/Weakness: I understand most of the basic c# programming principles and, with online resources to reference, I can manage to complete programming tasks. However, I tend to stick to one coding style and find it a challenge to be more experimental in my code which leads me to be concerned about not being able to push my horizons beyond what I already know.

Ashley Ling

Role: Lead Artist & 2D Artist

Description: I was in charge of managing the art team's schedule and deciding on the art direction of our game. My other responsibilities include, the 2D assets in our game, for example, the game UI and textures for the 3D models are all done by me, as well as level building and post processing in unity.

Experience: Previously, I've worked on 2D projects involving minor character animation and mostly rendering environmental assets.

Strength/Weakness: I am more confident in 2D art compared to 3D art and I am a beginner when it comes to post processing in unity, so I take some time to learn about it from scratch.

Nur Haida Binti Hairi

Role: 3D Environment Artist

Description: I was in charge of managing the environment such as buildings and stations. I also manage the props such as vegetations in our game.

Experience: Previously, I've worked on designing 2D character and animation for 2D platformer games. I have also worked on UI design. I have also modelled 3D interior room and mid-poly character.

Strength/Weakness:

I am level headed enough to withstand crunch time if the situation calls for it. However, I tend to procrastinate if the time given to me to do my work is too abundant.

Escabas Joyce Baldos

Role: 3D Artist

Description: I was in charge of managing the turret and vehicle props, alongside props like commuter icons. My other responsibilities would include UV mapping for a couple of props, and animations.

Experience: Previously, I've worked on several 2D game art, mainly character design and animation, as well as some UI. I have also modelled a mid-poly 3D character and a stylised low-poly room for school assignments before.

Strength/Weakness: I am relatively vocal about the welfare of my teammates, and when needed I can voice my opinions. Although I have more experience in 2D art than 3D art, I have a burning passion for both, and would like to improve my skills in 3D art. My biggest weakness would have

to be my inability to manage stress properly, which leads to time management and procrastination issues.

12. References

Anon*., Explosion Burst GIF* [online video]. Twitter. Available from: https://tenor.com/view/explosion-burst-cubes-blowout-split-gif-15826495 [Accessed 19 February 2021].

Carver, N., 2019 [online video]. Twitter. Available from: https://twitter.com/nickdcarver/status/1091658202159157248 [Accessed 19 February 2021].

Ashley, L. S. E., et al, 2021. *Hello Gamers Art Slides*. [Powerpoint presentation]. Available from: https://docs.google.com/presentation/d/16pLV1tT_rXYIcnjQSlHLmEHhau0ONI4A5RAKwZBl_74/edit#slide=id.gbccf1a1669_1_8 [Accessed 19 February 2021].

13. Appendix

13.1 Asset List - Art

3D Models & Texture List:

Player:
- Train Cabin (Front)
- Train Cabin (Back)
- Train Cabin (Middle)
- Turret (Basic)
- Turret (Flamethrower)
- Turret (Mortar) w/ Missile
- Turret (Tesla Coil)
- Turret (Satellite)

Enemies:
- Basic Car
- Buggy Car (Fast)
- Monster Truck (Tanky)

Environment:
- Main Base (Train Depot - To buy & load turrets onto trains)
- Enemy Base (Spawn Point of Enemies)
- Passenger Stations (Source of income when commuting passengers to proper stations)
- Train Tracks
- Roads
- Terrain (w/ mountains)
- Bush
- Trees (w/ multiple variants)
- Rocks (w/ multiple variants)
- Houses (w/ multiple variants)
- Shophouses (w/ multiple variants)
- Farmer's Market Tentages (w/ multiple variants)
- Bridge
- Signs
- Lampposts
- Dustbins
- Fences
- Traffic Lights
- Animals (Pigs, Sheeps, Cows)

Animations:
- Attack for Basic, Flamethrower & Mortar Turrets
- Showcase movement of Vehicles

- Showcase movement of loading turrets (Train Depot)
- Rail Switching

UI:
Main Menu:
- Start Button
- Instructions Button
- Exit Game Button

In-game:
- Health
- Timer to Wave Start
- Income
- Shop
- Ransom Note (At wave start)
- Commuters (Indicative of how many commuters need to go to the specific station)
- Tutorial Text

Victory/Lose Screen:
- Newspaper (Dependant on situation):
    - Lose to train crash
    - Lose to Train Depot destruction
    - Win
- Play Again
- Back To Main Menu

VFX:
- Explosions (Train/Car crash, Mortar Attack)
- Smokes to accompany Explosions
- Lightning-esque effect (Tesla Coil)
- Fire (Flamethrower)
- Upgrading
- Selling

13.2 Asset List - Music, Sound
Music:
- Main Menu music
- Level music

Sound Effects:

Turrets:

- Building/Upgrading
- Selling
- Standard shoot
- Missile launcher explosion
- Tesla Coil Spark
- Flamethrower

Trains
- Train movement
- Train brakes/stop
- Commuter getting on train at stations

Explosions
- Crashing against enemies
- Trains crashing against each other

Enemy
- Crashing against trains
- When destroyed from turrets
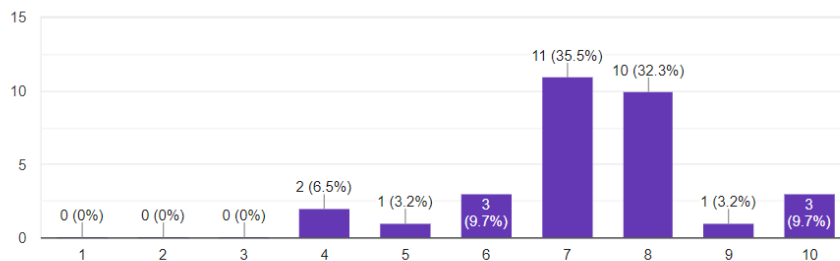
14. Playtest Report

Objectives

We conducted this playtest report for our Beta milestone in order to get more feedback and or suggestions on how we could improve our game even further.

Key Findings

1. Game is too difficult

On a scale of 1 to Dark Souls, how difficult do you find the game?
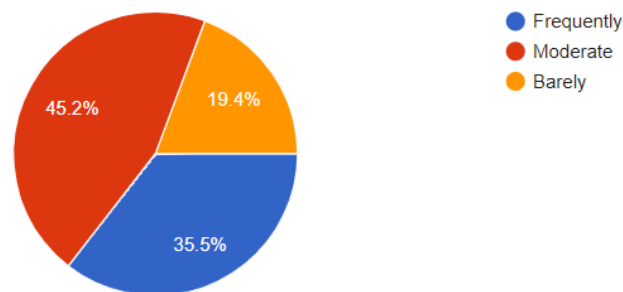
31 responses

As seen in the bar chart above, the majority of the respondents found the game challenging. This could be due to:

2. Money given is too little

How often could you NOT afford the Turrets at the Main Station?

31 responses

One third of respondents could barely manage their money in the game. This could be due to the low amount of money ($20) given for each passenger that is dropped off, in comparison to the high costs of the turrets (The basic turret already costs $100).

3. Tutorial/Game does not have enough information

- *"I only wished the tutorial had more information. It takes a while to learn the game"*
- *"I found that many mechanics were not explained in advance. there were too many things to do and I got easily confused."*
- *"could use more affordance"*

From our observations, most of the respondents had difficulty clearing the first level of our game. This was because they were confused about the mechanics of our game and some affordances were not implemented. The next few points will explain which key information is missing in both the tutorial and in-game.

3.1 UI Feedback

- *"Already mentioned about the tutorial to be improved as well as the UI feedback for buying turrets"*
- *"It was hard to get info on interaction , like where to click and where not to click"*

When the player hovers over the turret icon in the shop, there is no visual feedback that the player is selecting that specific turret. This makes it frustrating for players because they cannot determine which turret they have selected.

3.2 Controls Feedback

- *"camera movements can be faster"*
- *"Make scrolling faster, or add a function to make the camera follow certain trains to make it easier to start and stop them."*
- *"sometimes it's hard to right click some trains"*

Some players have commented that camera panning is slow when they playtested the levels. Since our game is quite fast-paced and relies heavily on time management, players might be frustrated as they could not move the camera to look at trains to stop them in time.

Also, there sometimes happen to be collider issues, or that canvas was blocking the mouse from interacting with game interactables such as the switch rails.

3.3 Lack of Turret Information
- *"Might be better if the tutorial explain more and talk about what different turrets do"*
- *"I couldn't get any turret information"*

We didn't inform the player what each turret does in the tutorial, nor did we have an information menu for the turrets, Hence, most players used the turrets through trial and error.

Conclusions

1. Change level design
We decided to promote our current level 1 to level 2 and scrap our current level 2. We will create a brand new level 1 that only consist of one train so that players can get used to the game before having to deal with 2 trains at the same time

2. Give more money
We have increased the payout given whenever the player drops off commuters from $20 per cabin to $35

3. Improved UI Feedback

Now when the player has selected a turret, the window frame will turn into a darker shade of blue to indicate that the player has selected that specific turret.

4. Increased panning speed
We increased the panning speed from 30 to 60 so that the player can navigate around the map much easier and quicker

5. Providing turret information

Now when the player hovers over each turret, they will be able to view the specific details of the turrets.
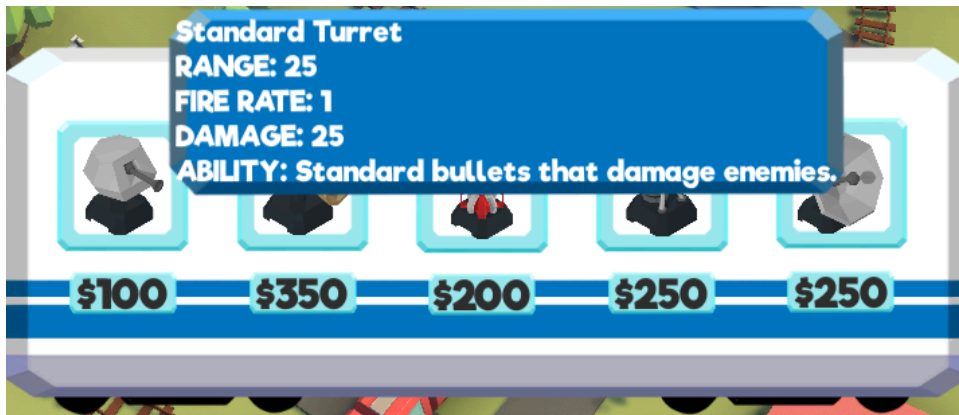
6. Wave Count

We added a wave counter to the bottom right of the screen to allow the player to keep track of which wave they are currently on.