Computer Games Laboratory - WS 2019/2020

Team Kaijū

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1. Formal Game Proposal

1.1. Game Description

The game will follow the theme of destruction, by enabling a player to destroy a city as Kaijū Monster.

1.1.1. Game Idea

Whereas the Japanese word Kaijū can be translated to strange beasts and was used to describe legendary creatures and the concept of paleontology, in pop culture it refers to unstoppable powerhouses of nature such as Godzilla or King Kong. For the theme of this year's Games Laboratory: destruction, our team plans to develop a game, in which the player takes the role of a Kaijū to destroy a whole city. The goal in our game is going to be to destroy a massive landmark, such as a radio tower or skyscraper in an urban area. The monster won’t be able to do so right from the beginning. Rather we are planning to have multiple stages of growth for our beast. To be big enough to reach that target, the Kaijū has to destroy smaller objects around the city to grow. With increasing size, its power to destroy will grow too, until finally the target can be reached and destroyed. Of course, there will be efforts from humans to stop that monster. Therefore the player needs to act strategically, by planning a route of destruction through the city while avoiding enemies.

1.1.2. Graphics and tone

While usually Kaijū movies are themed as catastrophic and correlate to a sense of threat, we do not aim for a serious tone for our game. Rather we want to emphasize an almost childish experience of destruction, similar to destroying a sandcastle or Lego built city. Therefore, we are going for friendly graphics, cartoonish designs, and brighter colors.

(See 1.1.5)

Choosing voxels for our visual representation of our world is going to support that playfulness. It will give our world a sense of a playground for our Kaijū to have some fun smashing buildings and cars. It also helps us with the creation of 3d assets and their destroyed representations. While the city will be aligned on a grid, dynamic objects like cars, helicopters and the monster itself.

1.1.3. Gameplay

The player controls the Kaijū from a third-person perspective. To thresh through objects, he is able to move the monster freely through the voxelated city, which will consist of static (e.g buildings, bushes, park seats ...) and dynamic objects (e.g cars), with relative different sizes. At the beginning of the game, the Kaiju is rather small. Therefore, the player needs to navigate in streets and other urban places to destroy objects that are of similar height. By destroying objects the character grows, most likely implemented in discrete steps, after certain thresholds of destruction are reached. He will need to undergo levels of growth until he can take on the target landmark, the final objective of the game.

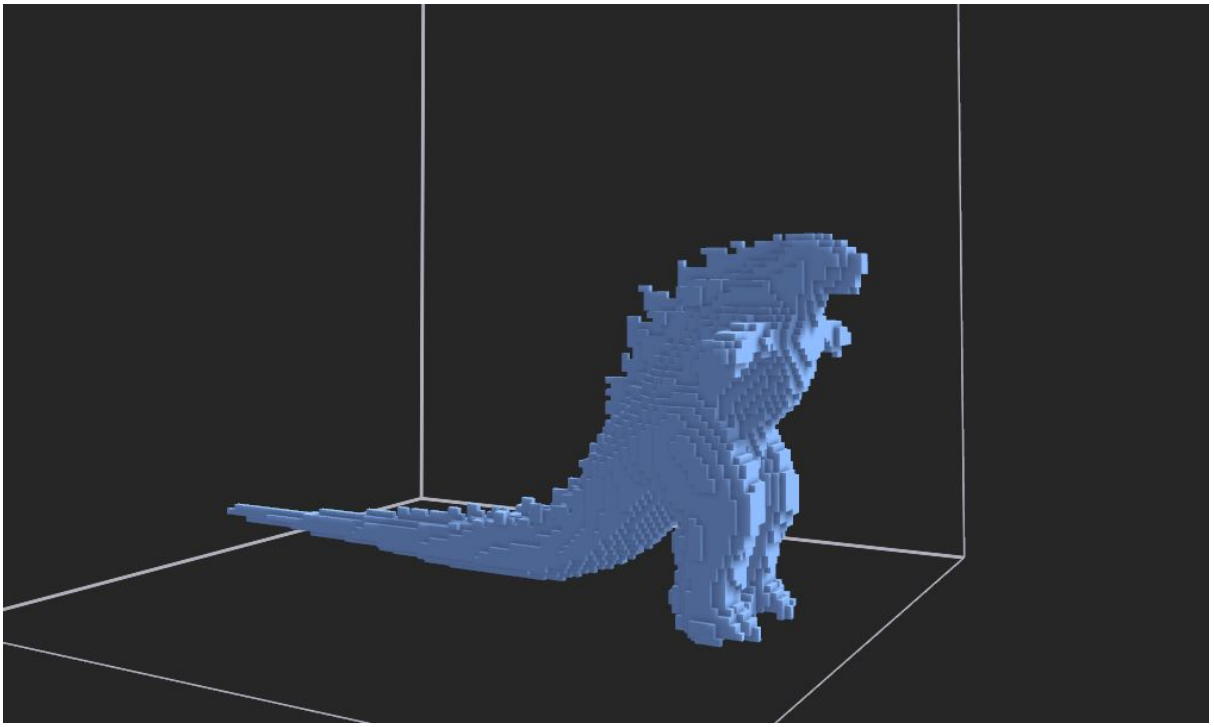
The playthrough will be constrained by time since the presence of the creature will alert more and more security over time. Security will try to disable the monster on his rampage. While in the low-level phase of the game, the player only is limited by a true time counter, the high target aims for a system, in which damage to the character causes the beast to shrink again. With more and more enemies approaching overtime, the player needs to be ahead with destruction, so that he is able to reach the height necessary for destroying the objective.

To destroy objects, the game provides a set of attacks and movement abilities that are triggered by pressing keys in the right order and timing. We want to aim for a game flow that feels dynamic. We want the player to be able to destroy objects in proximity in destructive combos. To reward this, the amount of growth while maintaining a combo is going to be greater than destroying single objects. Additional points are also scored to create an incentive to replay the game, optimize the previous performance and compare his/her self to other players. The goal is going to be a fun destructive flow here.

1.1.4 About the background

From a historical perspective, the first Godzilla movie (1954) is often interpreted as allegory of the trauma caused by the loss of WW2 and the nuclear strike against Hiroshima and Nagasaki. It is necessary to say that our game does not claim to represent anything meaningful besides a playful take on the destruction of a voxel cartoonish city. We had some considerations to weave a simple story about a little Kaijū child that has been separated from his mother, but we decided to discard that idea for now and to focus on gameplay experience.

1.1.5 Concept Art and sketches



This voxelized godzilla model could be a first take on how the playable character might look like. We are planning on creating all 3D models on our own in a 3D voxel modelling software called MagicaVoxel. It is necessary to set a specific scale for objects that can easily be translated into Unity units. For the color scheme we will define a certain color palette that all artists can work with in order to share the common tone.

After final stages of growth, the monster is going to outsize the skyscrapers. With the growth there will be a unique camera shift that the player might not notice at first. While at the beginning the camera is tilted upwards, the player will feel small amongst all of the tall buildings. When growing, the camera will tilt downwards more and more until the player has the feeling of looking down onto the miniature city. This change of perspective should emphasize the immersion of the player actually being part of the monster he is controlling.

This is how we envision our level: A bright voxel city that awaits its destruction. For simplicity of map generation, the city will be split into prefab modules that all look different from each other. The modules will be squares of housing blocks that can be put next to each other and combined into a new city with totally different layout. For the low target, cities will have a predefined layout enforced by roads. However, our desired target is to implement an algorithm that generates the complete city including the infrastructure network from scratch.

Cool voxel destruction effect visualized by Daniel Hoyos. Our current method of destroying objects will be a separation of the model into multiple smaller model pieces that can fall apart. These can easily be worked with and with additional voxel particle effects the satisfaction of destruction will come fast.

1.2. Technical Achievement

1.2.1. Core technical feature

To add a bit of a technical challenge to an otherwise rather design-focused game we will procedurally generate the level, consisting of a city full of destroyable objects. This adds additional replay value to the game since the layout of the map will change with every new round. Additionally, we can increase or decrease the size of the city a lot easier, as we do not have to redesign the map every time. It also takes away some of the design work, since it is not necessary to hand-place every object onto the map.
Procedural generation is also easily scalable depending on the available time and the progress of the project. In the beginning, we might only stitch the map together from a few predefined chunks, made of a piece of street, some buildings, and a few smaller hand-placed destroyable objects. Later we might also procedurally generate the contents of each chunk, allowing for a greater variety and overall more content for the game. Finally, we might even randomly assign certain parameters to each object, such as color, size or rotation.
It is important to note that, while we want to implement this procedural map generation, it is not the main focus of our project. Gameplay and getting the player in the flow are more important for the final game.

1.2.2. Challenges

Of course all of this comes with several technical challenges, otherwise it wouldn't make much sense to include this as a core technical feature in this project.
First of all, there is the usual problem with procedural generation: humans are very good at recognizing patterns. This means that even though we might be able to generate millions of different objects solely by randomly assigning a handful of parameters, most players will pretty quickly notice the patterns behind it. This will make the game feel more repetitive. The best solution for that is to use many different generation techniques and combine them with hand-designed content.
Another problem that it is difficult to find bugs in procedurally generated maps since many of them might only happen in a few rare instances. This can only be solved by doing more tests. Testing can, however, be made easier by using a different seeded random generator for each procedurally generated feature.

And lastly probably the greatest challenge of this project: it will be difficult to get the player in the flow, which is our main goal. It's already difficult to achieve when hand-designing the level, as all destroyable objects have to be placed conveniently for the player to reach, neither too far apart, since this would break too many combos, nor so close that it is to easy to get points. This is made a lot harder when the computer places the objects since we do not have the same amount of control. This problem can only be solved by putting a lot of time and effort into the fine-tuning of the procedural generation.

1.3. "Big Idea" Bullseye

The main goal of our game is to create a fun experience for the player. Through an intuitive character controller and a well designed combo system, the player should be able to experience flow.
To allow replayability on a high level, the destroyable cities are going to be procedurally generated, so that each playthrough is different from the last. Generating authentic and completely destroyable cities will be our main technical achievement for the game.

1.4. Development Schedule

1.4.1. Plan in Layers

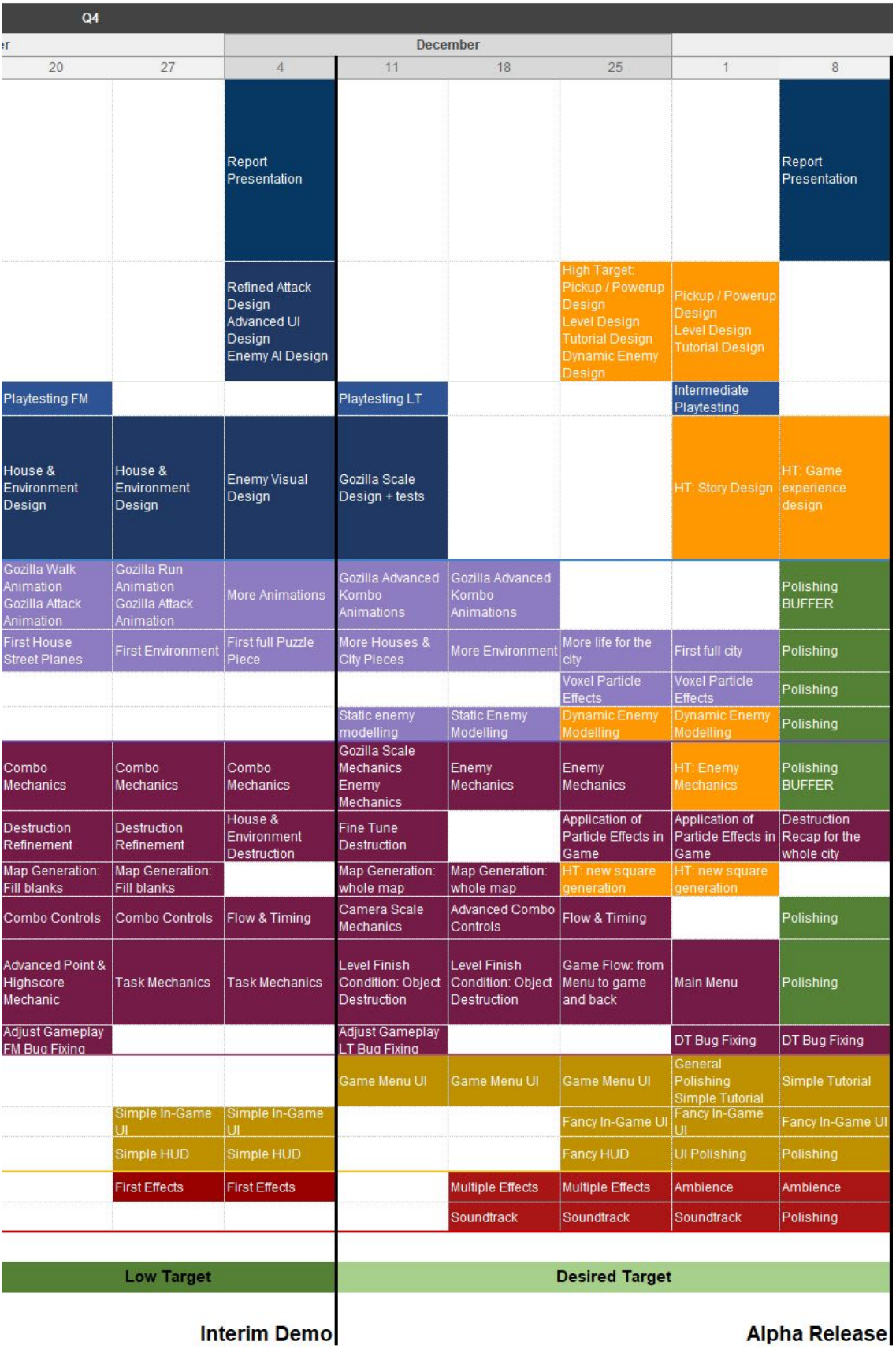
- Functional Minimum:
    - Basic character movement, attack and camera control
    - Input with controller
    - Attack timing and chain timing
    - Standard voxel plane as city module foundation
    - First destructible environment objects

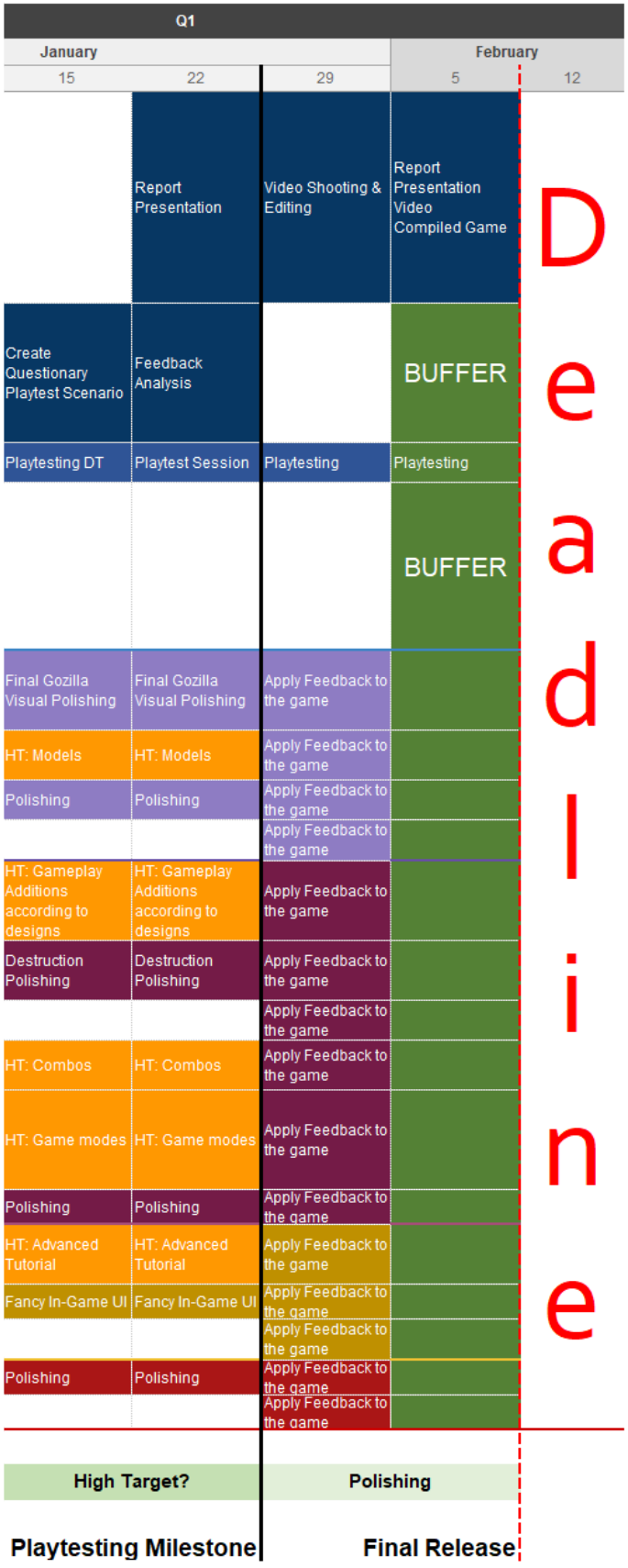
    - Timer and Highscore as game goals
    - => First basic minimal level against the time
- Low Target:
    - Advanced set of attacks
    - Inclusion of combos and chaining of attacks with the right timing
    - Walk and basic attack animations for the character
    - Multiple destructible environment objects such as houses and streets to form a residential area
    - Destruction refinement
    - Simple user interface and HUD for in-game operations and information display
    - Task based goals (e.g. destroy object X)
    - Map generation: Fill given layout with prefab city modules
    - First in-game sound effects for hits & environment
    - => First city-like level, destroy sensibly and in flow
- Desirable Target:
    - Character growth and new attack mechanics for larger character
    - Camera adjustment to support feeling of growth
    - Combo refinement and additional possibilities for large character
    - Model additions and refinement for the environment, make the city lively and good looking
    - Static enemy models like cars in the streets, enemy mechanics
    - Map generation: Generate whole maps from scratch with prefab city modules
    - Voxel particle effects for environment & character actions
    - Addition of background music and advanced sound effects
    - Fancy in-game UI and HUD, menus
    - Flow coordination for a bigger city
    - Small control tutorial
    - => Full city level with destruction objective after certain growth, playable game rounds
- High Target:
    - Advanced game tutorial for step by step introduction to game mechanics
    - Addition of Power Ups and “Time Ups”
    - Multiple levels (either different difficulty level during generation or premade levels without generation, e.g. for the tutorial)
    - Enemies with custom behavior, attacking the character
    - Dynamic object reactions
    - Small story with introductory narration and images
    - Map generation: Generate new prefab city modules
    - Increased game complexity, e.g. destruction gains health
    - Additional game modes (Time trial, objective)
- Extras:
    - Inhabitants for the city as visual enhancement
    - 2D map of all explored areas
    - Character skins
    - Enemy Kaiju

- Statistics screen
- Port to Iphone/Android

1.4.2. Task Timeline

PHASE		DEV	DETAILS	October 23	October 30	November 6	November 13
			PROJECT WEEK:				
1	Game Design	Everyone	- Deliverables	Project Setup	Report Presentation	Critiques	Report Presentation Mutual Critiques
		Everyone	- Components	Game Concept Game Idea Game Design Technical Achievements Development Schedule	Paper Prototype Design Paper Prototype Building	General Code Structure Design Controls Design General Attack Design Kombo Attack Design Simple UI Design	Refining Paper Prototype Checking setup for presentation
		Everyone	- Playtest		Playtesting Paper Prototype		
		Evgenija	General Design	Draw Concept Arts		Define Color Scheme Test building / object scale Gozilla Model Design	Obstacle Model Design Gozilla Walk Animation
2	Modelling / Animation	Evgenija	- Gozilla Model			Gozilla Basic Model	Gozilla Rigging
		Evgenija/ Maxi/Tim	- Environment			Floor Plane	Basic Obstacles
		Tim	- Special Effects				
		Evgenija	- Enemies				
3	Scripting	Lukas	- Gameplay				Attack Timing
		Tim	- Destruction		Basic Destruction Tests	Basic Destruction	Basic Destruction
		Tim	- Level Generation				
		Lukas	- Camera & Character			Basic Controls Implementation	Basic Controls Implementation
		Maxi	- Game Systems			General Scene Structure General Object Structure Timer & Highscore	General Scene Structure General Object Structure Timer & Highscore
		Everyone	- Bugfixing & Polishing				
4	UI	Everyone	- Menus				
		Everyone	- In-Game				Only necessary In-Game UI
		Everyone	- HUD				Only necessary HUD
5	Sound	Maxi	- Effects				
		Maxi	- Soundtrack				
						Functional Minimum	
				Game Idea Milestone		Prototype Milestone	


Q4
December
20
27
4
11
18
25
1
8
Report Presentation
Report Presentation
Refined Attack Design
Advanced UI Design
Enemy AI Design
High Target: Pickup / Powerup Design
Level Design
Tutorial Design
Dynamic Enemy Design
Pickup / Powerup Design
Level Design
Tutorial Design
Playtesting FM
Playtesting LT
Intermediate Playtesting
House & Environment Design
House & Environment Design
Enemy Visual Design
Gozilla Scale Design + tests
HT: Story Design
HT: Game experience design
Gozilla Walk Animation
Gozilla Attack Animation
Gozilla Run Animation
Gozilla Attack Animation
More Animations
Gozilla Advanced Kombo Animations
Gozilla Advanced Kombo Animations
Polishing BUFFER
First House Street Planes
First Environment
First full Puzzle Piece
More Houses & City Pieces
More Environment
More life for the city
First full city
Polishing
Voxel Particle Effects
Voxel Particle Effects
Polishing
Static enemy modelling
Static Enemy Modelling
Dynamic Enemy Modelling
Dynamic Enemy Modelling
Polishing
Combo Mechanics
Combo Mechanics
Combo Mechanics
Gozilla Scale Mechanics
Enemy Mechanics
Enemy Mechanics
HT: Enemy Mechanics
Polishing BUFFER
Destruction Refinement
Destruction Refinement
House & Environment Destruction
Fine Tune Destruction
Application of Particle Effects in Game
Application of Particle Effects in Game
Destruction Recap for the whole city
Map Generation: Fill blanks
Map Generation: Fill blanks
Map Generation: whole map
Map Generation: whole map
HT: new square generation
HT: new square generation
Combo Controls
Combo Controls
Flow & Timing
Camera Scale Mechanics
Advanced Combo Controls
Flow & Timing
Polishing
Advanced Point & Highscore Mechanic
Task Mechanics
Task Mechanics
Level Finish Condition: Object Destruction
Level Finish Condition: Object Destruction
Game Flow: from Menu to game and back
Main Menu
Polishing
Adjust Gameplay FM Bug Fixing
Adjust Gameplay LT Bug Fixing
DT Bug Fixing
DT Bug Fixing
Game Menu UI
Game Menu UI
Game Menu UI
General Polishing
Simple Tutorial
Simple Tutorial
Simple In-Game UI
Simple In-Game UI
Fancy In-Game UI
Fancy In-Game UI
Fancy In-Game UI
Simple HUD
Simple HUD
Fancy HUD
UI Polishing
Polishing
First Effects
First Effects
Multiple Effects
Multiple Effects
Ambience
Ambience
Soundtrack
Soundtrack
Soundtrack
Polishing
Low Target
Desired Target
Interim Demo
Alpha Release


Q1
January
February
15
22
29
5
12
Report Presentation
Video Shooting & Editing
Report Presentation Video Compiled Game
Create Questionary Playtest Scenario
Feedback Analysis
BUFFER
Playtesting DT
Playtest Session
Playtesting
Playtesting
BUFFER
Final Gozilla Visual Polishing
Final Gozilla Visual Polishing
Apply Feedback to the game
HT: Models
HT: Models
Apply Feedback to the game
Polishing
Polishing
Apply Feedback to the game
Apply Feedback to the game
HT: Gameplay Additions according to designs
HT: Gameplay Additions according to designs
Apply Feedback to the game
Destruction Polishing
Destruction Polishing
Apply Feedback to the game
Apply Feedback to the game
HT: Combos
HT: Combos
Apply Feedback to the game
HT: Game modes
HT: Game modes
Apply Feedback to the game
Polishing
Polishing
Apply Feedback to the game
HT: Advanced Tutorial
HT: Advanced Tutorial
Apply Feedback to the game
Fancy In-Game UI
Fancy In-Game UI
Apply Feedback to the game
Apply Feedback to the game
Polishing
Polishing
Apply Feedback to the game
Apply Feedback to the game
Deadline
High Target?
Polishing
Playtesting Milestone
Final Release

1.4.3. Task List

PROJECT DETAILS								HOURS	
STATUS	PRIORITY	START DATE	END DATE	DURATION	TASK NAME	ASSIGNEE	DESCRIPTION	ESTIMATED HOURS	ACTUAL HOURS
Game Idea Milestone								**62**	**0**
Complete	Functional Minimum	23.10.2019	29.10.2019	6	Tools Setup	Lukas	Setup and build all tools needed for the project	3	0
Complete	Functional Minimum	23.10.2019	29.10.2019	6	Project Setup	Lukas	Set everything up to start the project	3	0
Complete	Functional Minimum	30.10.2019	05.11.2019	5	Report	Everyone	Write the Report for the milestone and upload to the wiki	10	0
Complete	Functional Minimum	30.10.2019	05.11.2019	5	Presentation	Everyone	Make the Presentation for the milestone and upload to the wiki	3	0
Complete	Functional Minimum	23.10.2019	29.10.2019	6	Game Concept	Everyone	Crate the basic game concept	5	0
Complete	Functional Minimum	30.10.2019	05.11.2019	5	Draw Concept Arts	Everyone	Draw concepts arts and sketches of the basic mechanics in the game	3	0
Complete	Functional Minimum	23.10.2019	29.10.2019	6	Game Idea	Everyone	Define the basic game idea	5	0
Complete	Functional Minimum	23.10.2019	29.10.2019	6	Game Design	Everyone	Define the game in more detail	5	0
Complete	Functional Minimum	22.04.2019	28.04.2019	6	Technical Achievements	Everyone	Define the technical achievements of the game	1	0
Complete	Functional Minimum	30.10.2019	05.11.2019	5	Paper Prototype Building	Everyone	Build the Paper Prototype and test play it	5	0
Complete	Functional Minimum	30.10.2019	05.11.2019	5	Paper Prototype Design	Everyone	Design the Paper Prototype	3	0
Complete	Functional Minimum	23.10.2019	29.10.2019	6	Basic Destruction Tests	Tim	Implement some basic destruction with objects from MagicaVoxel	5	0
Complete	Functional Minimum	30.10.2019	05.11.2019	5	Study MagicaVoxel	Everyone	Download MagicaVoxel and get familiar with it	4	0
Complete	Functional Minimum	30.10.2019	05.11.2019	5	Development Schedule	Maxi	Define the tasks and development schedule for the game	10	0
Prototype Milestone								**110**	**0**
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Critiques	Everyone	Written critiques of all other projects as an email to the supervisors	3	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Report	Everyone	Write the Report for the milestone and upload to the wiki	8	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Presentation	Everyone	Make the Presentation for the milestone and upload to the wiki	5	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Mutual Critiques	Everyone	Submit mutual critiques on the wiki (every team member separately)	1	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Controls Design	Everyone	Design the control scheme of the game	1	0
Not Yet Started	Functional Minimum	06.11.2019	19.11.2019	13	Controls Implementation	Lukas	Implement the control scheme of the game	10	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Refining Paper Prototype	Everyone	Refine the paper prototype and finalize for presentation	5	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	General Code Structure Design	Everyone	Define the structure that every programmer has to stick to	5	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	General Attack Design	Everyone	Define basic and advanced attacks by the character	2	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Kombo Attack Design	Everyone	Define the basic and advanced combos of the character	2	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Simple UI Design	Everyone	Mockup a simple UI and define all necessary parts, draw concept sketches	3	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Define Color Scheme	Evgenija	Set the final color scheme for character and environment, make MagicaVoxel palette	2	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Design Gozilla	Evgenija	Design the main character Gozilla	1	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Test object scale	Tim	Test the scale of small vs big objects in MagicaVoxel and define a base scale	2	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Gozilla Basic Model	Evgenija	Build the first iteration of the Gozilla character with MagicaVoxel	10	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Floor Basic Model	Tim	Build a floor of 1 voxel height to put houses and objects on top	1	0
Not Yet Started	Functional Minimum	06.11.2019	19.11.2019	13	Basic Destruction	Tim	Research more about destruction and implement the destruction interface	10	0
Not Yet Started	Functional Minimum	06.11.2019	19.11.2019	13	Basic Controls	Lukas	Implement the main controls of the character	10	0
Not Yet Started	Functional Minimum	06.11.2019	12.11.2019	6	Timer & Highscore	Maxi	Add simple win conditions/limitations	2	0
Not Yet Started	Functional Minimum	06.11.2019	19.11.2019	13	General Structure	Maxi	Define and implement a general game loop structure with necessary object structures	8	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Design basic obstacles	Evgenija	Design basic obstacles for this milestone	1	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Gozilla Walk Animation Design	Evgenija	Design the walk animation of Gozilla	1	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Gozilla Walk Animation	Evgenija	Rig Gozilla	5	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Basic Obstacles	Tim/Maxi	Build the basic obstacles designed by Evgenija	5	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	Attack Timing	Lukas	Build core mechanics for attack timing	5	0
Not Yet Started	Functional Minimum	13.11.2019	19.11.2019	6	In-Game UI	Maxi	Add simple necessary UI and HUD for the game	2	0

Interim Demo Milestone

								147	**0**
Not Yet Started	Low Target	04.12.2019	10.12.2019	6	Report	Everyone	Write the Report for the milestone and upload to the wiki	8	0
Not Yet Started	Low Target	04.12.2019	10.12.2019	6	Presentation	Everyone	Make the Presentation for the milestone and upload to the wiki	5	0
Not Yet Started	Functional Minimum	20.11.2019	26.11.2019	6	Playtesting FM	Everyone	Playtest the functional minimum game from the previous milestone	2	0
Not Yet Started	Functional Minimum	20.11.2019	26.11.2019	6	Adjust Gameplay	Tim, Lukas	Adjust the functional minimum gameplay based on the findings in the playtest	6	0
Not Yet Started	Functional Minimum	20.11.2019	26.11.2019	6	FM Bug Fixing	Everyone	Fix any bugs found during the playtest and polish the gameplay	10	0
Not Yet Started	Low Target	20.11.2019	03.12.2019	13	House & Environment Design	Evgenija	Design how the environment and houses should look like and prepare a paper	3	0
Not Yet Started	Low Target	04.12.2019	10.12.2019	6	Enemy Visual Design	Evgenija	Design the visuals of static enemies	2	0
Not Yet Started	Low Target	04.12.2019	10.12.2019	6	Advanced Attack Design	Everyone	Design advanced attacks that might have to be altered after FM	2	0
Not Yet Started	Low Target	04.12.2019	10.12.2019	6	Refine UI Design	Everyone	Design a refined UI after testing the FM design	1	0
Not Yet Started	Low Target	04.12.2019	10.12.2019	6	Enemy AI Design	Everyone	Design the static Enemy Ai	1	0
Not Yet Started	Low Target	20.11.2019	10.12.2019	20	Gozilla Animations	Evgenija	Gozilla Walk/Run/Attack Animations	20	0
Not Yet Started	Low Target	20.11.2019	03.12.2019	13	House/Street Models	Everyone	Model houses, streets according to Evgenijas design	20	0
Not Yet Started	Low Target	20.11.2019	03.12.2019	13	Environment Models	Everyone	Model the environment in MagicaVoxel	10	0
Not Yet Started	Low Target	04.12.2019	10.12.2019	6	City tile prefab	Everyone	Build a first city tile piece with the models and make a prefab	3	0
Not Yet Started	Low Target	20.11.2019	10.12.2019	20	Destruction Refinement	Tim	Refine destructions and adjust to bigger scale (houses)	6	0
Not Yet Started	Low Target	20.11.2019	10.12.2019	20	Combo Mechanics	Lukas	Implement the combo mechanics for the character attacks	10	0
Not Yet Started	Low Target	20.11.2019	10.12.2019	20	Combo Controls	Lukas	Fit the attacks to the combo mechanics and check for flow & timing	5	0
Not Yet Started	Low Target	20.11.2019	03.12.2019	13	Map Generation 1	Tim	Build simple layout and fill blocks with prefab tiles	10	0
Not Yet Started	Low Target	20.11.2019	26.11.2019	6	Advanced Points & Highscore	Maxi	Adjust Points and Highscore according to bigger buildings	2	0
Not Yet Started	Low Target	27.11.2019	10.12.2019	13	Task Mechanics	Maxi	Implement a task mechanic system	10	0
Not Yet Started	Low Target	27.11.2019	10.12.2019	13	Simple UI / HUD	Maxi	Adjust the in-game UI and HUD, improve to advanced state	6	0
Not Yet Started	Low Target	27.11.2019	10.12.2019	13	First Soundtracks	Maxi	Create and add first effect samples for the game	5	0

Alpha Release Milestone

								222	**0**
Not Yet Started	Functional Minimum	08.01.2020	14.01.2020	6	Report	Everyone	Write the Report for the milestone and upload to the wiki	8	0
Not Yet Started	Functional Minimum	08.01.2020	14.01.2020	6	Presentation	Everyone	Make the Presentation for the milestone and upload to the wiki	5	0
Not Yet Started	Low Target	11.12.2019	17.12.2019	6	Playtesting LT	Everyone	Playtest the low target game from the previous milestone	5	0
Not Yet Started	Low Target	11.12.2019	17.12.2019	6	Adjust Gameplay	Lukas, Tim	Adjust the gameplay based on the findings in the playtest	6	0
Not Yet Started	Low Target	11.12.2019	17.12.2019	6	LT Bug Fixing	Everyone	Fix bugs encounterd during the playtesting	10	0
Not Yet Started	Desirable Target	11.12.2019	17.12.2019	6	Gozilla Scale tests	Evgenija, Tim	Test scaling Gozilla to a bigger version, incorporate destruction	3	0
Not Yet Started	Desirable Target	11.12.2019	24.12.2019	13	Advanced Animations	Evgenija	Create animations for advanced attacks and combos	15	0
Not Yet Started	Desirable Target	11.12.2019	31.12.2019	20	Advanced Asset Creation	Everyone	Create more houses, environment, city pieces	10	0
Not Yet Started	Desirable Target	01.01.2020	07.01.2020	6	Full city	Everyone	Build a first city from prefab tiles	1	0
Not Yet Started	Desirable Target	11.12.2019	24.12.2019	13	Static Enemy Models	Evgenija	Model the static enemies like cars etc.	10	0
Not Yet Started	High Target	11.12.2019	24.12.2019	13	Dynamic Enemy Models	Evgenija	Model the dynamic enemies like soldiers etc.	X	0
Not Yet Started	Desirable Target	11.12.2019	17.12.2019	6	Gozilla Scale Mechanics	Lukas	Implement the Gozilla scale mechanics and increased damage etc.	5	0
Not Yet Started	Desirable Target	11.12.2019	31.12.2019	20	Enemy Mechanics	Lukas	Implement static enemy mechanics & interaction with the character	12	0
Not Yet Started	High Target	01.01.2020	07.01.2020	6	Dynamic Enemy Mechanics	Lukas	Implement dynamic enemy mechanics	X	0
Not Yet Started	Desirable Target	11.12.2019	17.12.2019	6	Camera scale mechanics	Lukas	Make the camera move up with the scale of Gozilla	3	0
Not Yet Started	Desirable Target	11.12.2019	17.12.2019	6	Advanced Combo Controls	Lukas	Implement advanced combo controls + finetung flow	8	0
Not Yet Started	Desirable Target	11.12.2019	17.12.2019	6	Finetune destruction	Tim	Fine tune the destruction for big scale Gozilla	3	0
Not Yet Started	Desirable Target	07.01.2020	14.01.2020	7	Destruction Recap	Tim	Recap the destruction for the now first final city	3	0
Not Yet Started	Desirable Target	11.12.2019	24.12.2019	13	Map Generation 2	Tim	Implement map generator for creating a whole city from scratch	10	0
Not Yet Started	High Target	25.12.2019	07.01.2020	12	Map Generation 3	Tim	Implement map generator that creates new city modules	X	0
Not Yet Started	Desirable Target	11.12.2019	14.01.2020	33	Fancy In-Game UI	Maxi, Everyone	Implement fancy in-game UI, for better usability of our game	10	0
Not Yet Started	Desirable Target	25.12.2019	07.01.2020	12	Visual Effects	Tim	Voxel Particle Effects for the environment and the character	8	0
Not Yet Started	Desirable Target	25.12.2019	07.01.2020	12	Effect Inclusion	Tim	Include Voxel Particle Effects into the game	2	0
Not Yet Started	Desirable Target	25.12.2019	07.01.2020	12	DT End Condition	Maxi	Implement the DT end condition: main objective destroyed and include in game cycle	8	0
Not Yet Started	Desirable Target	11.12.2019	24.12.2019	13	Game flow	Maxi	Implement a full game cycle from menu to game and back with fancy visuals	10	0
Not Yet Started	Desirable Target	18.12.2019	14.01.2020	26	Soundtrack	Maxi	Add more soundtracks to the game	10	0
Not Yet Started	Desirable Target	18.12.2019	14.01.2020	26	Sound Effects	Maxi	Add different soundeffects + ambience to the game	10	0
Not Yet Started	Desirable Target	01.01.2020	07.01.2020	6	Playtesting DT	Everyone	Playtest the almost final version of the desirable target game	5	0
Not Yet Started	Desirable Target	01.01.2020	14.01.2020	13	Add Simple Tutorial	Everyone	Add a simple tutorial for the upcoming playtests	10	0
Not Yet Started	Desirable Target	07.01.2020	14.01.2020	7	Bugfixing & Adjusting	Everyone	Adjust the gameplay based on the findings in the playtest, bugfix	12	0
Not Yet Started	High Target	25.12.2019	07.01.2020	12	Powerup Design	Everyone	Design Power ups for the character	X	0
Not Yet Started	High Target	25.12.2019	07.01.2020	12	Dynamic Enemy Design	Everyone	Design dynamic enemies	X	0
Not Yet Started	High Target	25.12.2019	07.01.2020	12	Advanced Tutorial Design	Everyone	Ddesign an advanced Tutorial	X	0
Not Yet Started	High Target	25.12.2019	07.01.2020	12	Level Design	Everyone	Design new playable levels e.g. for the tutorial	X	0
Not Yet Started	High Target	01.01.2020	14.01.2020	13	Story Design	Everyone	Design a story for the game and increase game experience	X	0
Not Yet Started	Desirable Target	07.01.2020	14.01.2020	7	Polishing	Everyone	Polish the game desired target	20	0

Playtesting Milestone								130	0
Not Yet Started	Functional Minimum	22.01.2020	28.01.2020	6	Report	Everyone	Write the Report for the milestone and upload to the wiki	8	0
Not Yet Started	Functional Minimum	22.01.2020	28.01.2020	6	Presentation	Everyone	Make the Presentation for the milestone and upload to the wiki	5	0
Not Yet Started	Desirable Target	15.01.2020	21.01.2020	6	Playtesting DT	Everyone	Playtest the desirable target game	6	0
Not Yet Started	Desirable Target	15.01.2020	21.01.2020	6	Adjust Gameplay	Tim, Lukas	Adjust the gameplay based on the playtest	10	0
Not Yet Started	Desirable Target	15.01.2020	21.01.2020	6	DT Bug Fixing	Everyone	Fix any bugs encountered during playtesting	10	0
Not Yet Started	Desirable Target	15.01.2020	21.01.2020	6	Gameplay Polishing	Tim, Lukas	Polish the gameplay for the playtest session	5	0
Not Yet Started	Functional Minimum	15.01.2020	21.01.2020	6	Create Questionary	Everyone	Create the questionary for the the playtest session	2	0
Not Yet Started	Functional Minimum	15.01.2020	21.01.2020	6	Playtest Scenario	Everyone	Define the playtest session and what the participants are suposed to do	2	0
Not Yet Started	Functional Minimum	22.01.2020	28.01.2020	6	Playtest Session	Everyone	Playtest the game with external players	20	0
Not Yet Started	Desirable Target	15.01.2020	28.01.2020	13	Visual Polishing	Everyone	Final Gozilla, asset and effect visual polishing	10	0
Not Yet Started	Desirable Target	15.01.2020	28.01.2020	13	Sound Polishing	Maxi	Polish the sound of the game	5	0
Not Yet Started	Desirable Target	15.01.2020	28.01.2020	13	UI Polishing	Everyone	Polish the UI of the game	5	0
Not Yet Started	High Target	15.01.2020	28.01.2020	13	Advanced Tutorial	Everyone	Create an advanced and more detailed tutorial	X	0
Not Yet Started	High Target	15.01.2020	28.01.2020	13	HT models	Everyone	Create high target models (environment, power ups etc.)	X	0
Not Yet Started	High Target	15.01.2020	28.01.2020	13	Gameplay Additions	Lukas, Tim	Add designed high target gameplay additions to the game	X	0
Not Yet Started	High Target	15.01.2020	28.01.2020	13	New Game Modes	Maxi	Add new game modes	X	0
Not Yet Started	High Target	15.01.2020	28.01.2020	13	New Combos	Lukas	Add high target combos to the controls	X	0
Not Yet Started	Desirable Target	22.01.2020	28.01.2020	6	Apply Feedback to Game	Everyone	Apply the feedback from the playtest to the game and fix any complaints	20	0
Not Yet Started	Desirable Target	22.01.2020	28.01.2020	6	Bug Fixing	Everyone	Fix any bugs encountered during playtesting	10	0
Not Yet Started	Desirable Target	22.01.2020	28.01.2020	6	Polishing	Everyone	Polish any unpolished aspects encountered during playtesting	10	0
Not Yet Started	Functional Minimum	22.01.2020	28.01.2020	6	Feedback Analysis	Everyone	Analyse the feedback from the playtest session	2	0

Final Release Milestone								142	0
Not Yet Started	Functional Minimum	05.02.2020	11.02.2020	6	Report	Everyone	Write the Report for the milestone and upload to the wiki	15	0
Not Yet Started	Functional Minimum	05.02.2020	11.02.2020	6	Presentation	Everyone	Make the Presentation for the milestone and upload to the wiki	10	0
Not Yet Started	Functional Minimum	29.01.2020	11.02.2020	12	Video	Everyone	Make a video that highlights exciting aspects of the game	15	0
Not Yet Started	Functional Minimum	05.02.2020	11.02.2020	6	Compiled Game	Everyone	Compiled final version of game with sources	2	0
Not Yet Started	Desirable Target	05.02.2020	11.02.2020	6	Bug Fixing	Everyone	Fix all known bugs for final version	40	0
Not Yet Started	Desirable Target	05.02.2020	11.02.2020	6	Polishing	Everyone	Polish everything for final version	40	0
Not Yet Started	Desirable Target	05.02.2020	11.02.2020	6	Playtesting	Everyone	Playtest the whole game to find any rough edges	20	0

1.5. Assessment

A main incentive for players picking up video games are the unreal worlds that they can dive into in which things are possible that would never come true in reality. Our game lets players control a Kaiju and destroy a city which is unimaginable elsewise. We want to give players the power of the Kaiju and let them freely roam inside a cartoon city. The game should be abstract enough to ridicule itself with bright colors and environment designs. The world should depict an imaginary place of fun, a playground for the young and grownups. Different landmarks can show relations to real buildings to increase the feeling of power by giving a comparable example that the player knows.

The voxel graphics intend to keep a childish look and open up the game for all ages of players. The main audience will be casual players who enjoy a quick match with a low time limit. There does not need to be complex story or gameplay elements for casual players, as long as the core concept is fun. Thus, the focus is completely on the flow of wildly running through a miniature city and randomly destroying it. By providing objectives and different levels, a short term game flow is targeted at. We want the players to pick up our game and try another round to beat their former highscore in a level they have already completed. With the combo and timing mechanics in addition we try to include an increasable skill level that players can reach by practicing for many times. The game should quickly be rewarding for beginners but also leave some space to improve oneself.

Overall the design can be called a successful design if after the release players want to play “just one more round”. The main factor is the game flow that is tightly connected to the character controls, the combo mechanics and the city design and placement of destructible objects. What is going to be destroyed and how does not really matter, but having fun destroying it is the main criteria for our game. We will try to support the flow and fun feeling

with sound effects, challenging music, nice visual and particle effects for players to enjoy destroying a city.

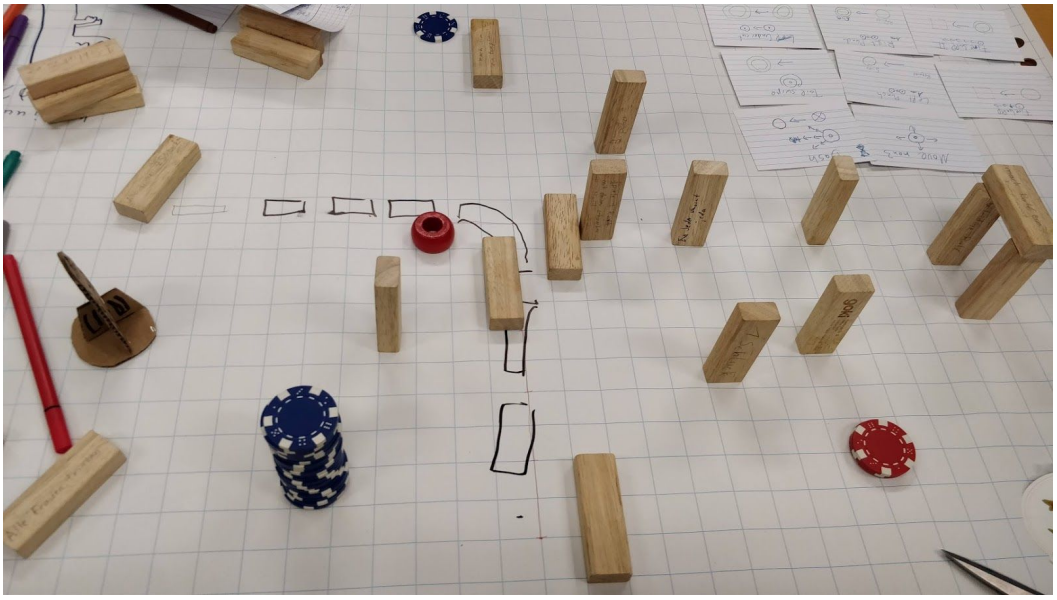
2. Prototype

2.1. Overview

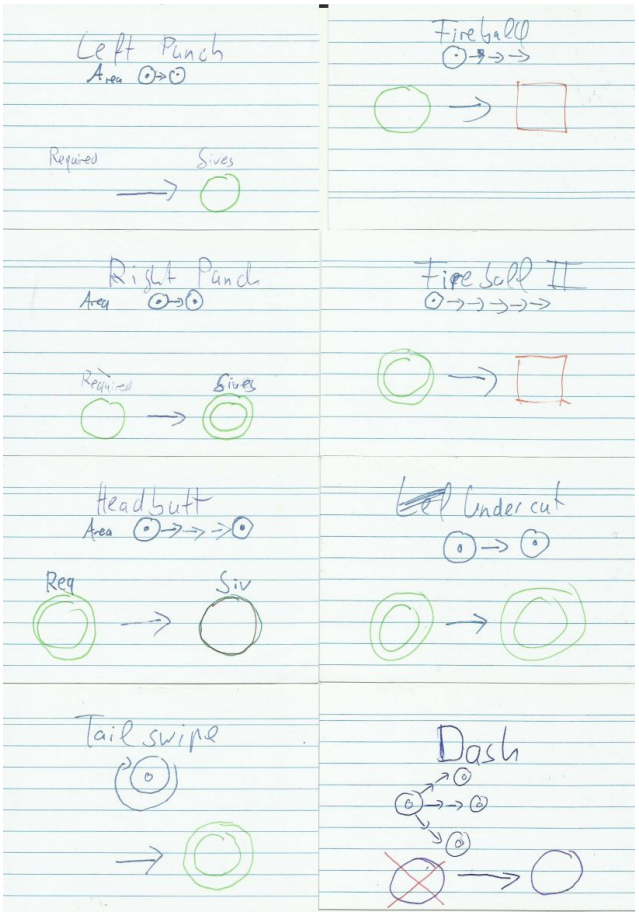
The paper prototype is a method to evaluate certain core features of a game early on. Referring to the Kaiju game, it is based on two core features: the idea of a Godzilla destroying cities that will never look the same due to procedural map generation and a fun and flowing experience while chaining attacks. With our prototype we are trying to incorporate the generation feature by random placement of bricks on a map that are symbolizing houses or small obstacles of the game. The main focus, however, is the playability and the fun we can create by combo attacks. This aspect is our “big idea”, therefore, it is also the central topic of our paper prototype. Without a perfect control system and attack set that would make the player feel an immersive flow, destroying houses could not even be half the fun. Thus, we decided to create a move pool that a player can choose one per round which should resemble the possible attacks later in the game. It is very important to note that the paper prototype was designed as a round based game. Testing distances and timings on paper has to be precise and each move has to be thought about thoroughly. The timer planned to be in the game that would represent a perfect combo timing was replaced by counting the rounds that an attack could be continued. That way we could decide whether the combo system would be engaging, although it felt more like a puzzle game on paper.

2.2. Gameplay

The Gameplay of our prototype is centered around the playable character, the Kaiju. With the mindset to explore possible player actions, we set up a playing field on a big square sheet:



Next, we set up some wooden blocks, that should represent objects which need to be destroyed, and a plastic dinosaur, representing the playable character. Later the toy was replaced with the red torus for convenience. Whereas our video game is going to have a target objective, for the prototype we decided that we want to test the players short term objective to maintain an attack combo.
An attack combo is considered as a chain of attack actions that we defined beforehand. While the player can move his character freely on the playing field grid, he is required to use one of the actions that form the attack action set:



2.2.1. Attacks

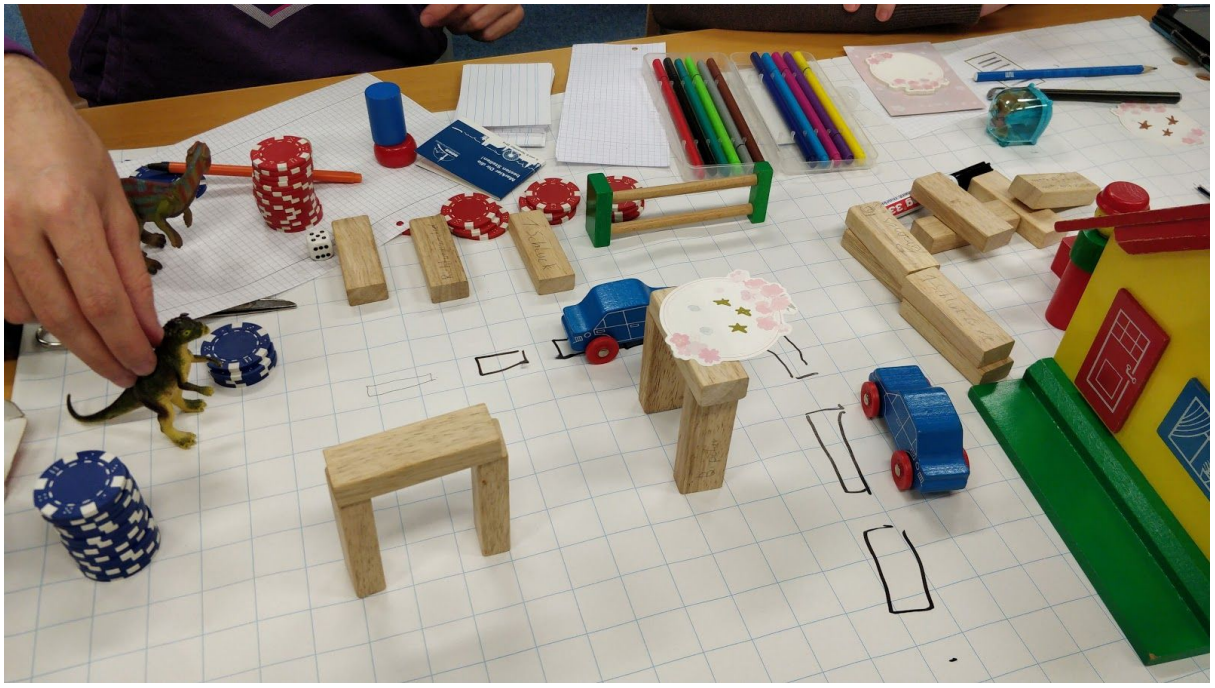
On the left you can see the attack actions that the player can use. Some of them require the player to be in a state depicted by the colored sign. Under the name, a drawing describes the area covered by the attack.
For instance: The Left punch requires nothing and can be performed anytime. It covers one field forward. After it is used by the player it yields the green circle state.
From there the player can choose Fireball, Right Punch, since he is in the green circle state.
The fireball attacks throw projectiles forward, and won't move the character.
Finally we introduced the Dash ability that maintains the combo, moves the player forward 2 tiles forward or diagonal. It's only requirement is that it can't be used repeatedly.

2.2.2. Games Rules

After some experimentation, the paper prototype plays as follows:
The goal of the game is to score as much points as possible in a given level/scenario. Points are rewarded if objects, represented by wooden blocks are destroyed.
Before the game a scenario is constructed by placing the player figure and the objects to destroy at positions, defined by the grid of the squared playfield.
At each turn the player can choose one action, either he moves three tiles freely, or uses one of the attacks in the attack actions. Objects are destroyed only if the area of an attack actions covers a grid position. For instance, the Left Punch attack covers the field in front of the player character. Each destroyed objects yields one point. If objects are chained in attack combos, they reward additional points: the second destruction rewards 2 points, the third 3 points and so on. In total, a destruction chain of three objects reward 6 points. Therefore, maintaining the combo is important to score the most points.

To maintain an attack combo, the player has to use one of the attacks, if he moves freely the chain breaks. The chain also breaks after 3 turns without any destruction.
The scenario can have cars. Cars move 2 tiles forward after each player's action. If they collide with the player's character, they disrupt the attack combo immediately.

2.3. Experiences and Learnings



As we started to explore our newly set rules, we quickly realized how important a versatile and flowing combo system was. Due to the given combo timer and setting of "destructible" blocks it could happen that the combo chain would end before the player managed to finish to hit his last obstacle, which might be not the optimal path for the player.

Therefore, we adjusted the combo system by adding a "gap closing" "Dash"-Ability, which allowed the player to move rapidly forward without breaking the combo chain. Additionally, a "fireball" ability, which allowed the player to destroy far off targets without using any movement, was added.

In addition, we realized that random placement of objects could prevent the player from finding an optimal route through the city. If the placement of objects is too scattered, even a gap-closing ability will not help. The conclusion from this learning is that we still have to care about the alignment of destructibles and program the map generation in a way, that from a level design perspective there is no flow breaker. We will have to care about intended gaps and perfect alignment of fitting obstacles so that the player will always have the possibility to find sections on the map for well flowing combos.

After those adjustments we found the game to be engaging. It was fun to try to carefully map out the path in which the destruction is most efficient and earns more points, leading to a higher highscore. This was the first confirmation that our game idea was actually fun to play.

Beside the importance of the combo system, we also could tell that “enemies” can add to the game. As cars in the prototype are a potential risk of losing a combo streak, the player has to think around them to get to his goal. This adds an additional layer of complexity to the gameplay.

2.4. Revisions to the Game Idea

Before trying out our game idea with this prototype we had multiple open questions, which we tried to answer during these playtests, because we could not decide on them during the idea finding phase.
One of the most important of them is what the goal of the game should actually be. We had several different options to choose from. The goal could be that the player has to destroy a certain amount of objects or reach a highscore in a limited amount time, survive waves of ever more difficult enemies or reach a predefined milestone, such as destroying a building of a certain size. All of them have upsides and downsides. After testing our prototype we decided to start with a time-based approach, since it is easy to implement, and then switch to a milestone oriented playstyle later in the development, as this gives the player a feeling of progress. This approach also means that the character growth mechanic is an important aspect of the game.
The other option we heavily discussed beforehand, and could only decide on after extensive tests, was whether or not to add enemies to the game. We tried adding enemies that follow the player and are able to attack over distance, and realised that we would need a complex system for the player to defend against them. So we decided to focus on destruction of objects, and instead of adding enemies, only to implement dynamic obstacles such as cars. These are able to hurt the player on touch, but won’t try to follow the player.

3. Interim

Having concluded this milestone, we are supposed to have arrived at our low target for the game. At first we are going to give an overview of which targets we met and which still need more focus. Here are all low target bullet points:

- Advanced set of attacks MISSING
- Inclusion of combos and chaining of attacks DONE
- Walk and basic attack animations for the character DONE
- Multiple destructible environment objects DONE
- Destruction refinement DONE
- Simple user interface and HUD DONE
- Task based goals DONE
- Map generation: Fill given layout with prefab city modules PARTLY
- First in-game sound effects for hits & environment MISSING
- => First city-like level, destroy sensibly and in flow PARTLY

Addressing the missing or partly declared bullet points, one has to say, that the basic attacks are now implemented and a general structure has been set up. Therefore, future inclusions of further attacks will be available faster and will be added soon.
For map generation we have been trying out different ways that proved to not be efficient enough, thus, we are slightly behind the time plan.
First in-game sound effects were pushed to the next milestone, instead, we already started working on static enemy AI that was planned for the next milestone. As enemies were widely requested by the reviewers, we are intending on putting more focus on this topic.
All in all we can say that good progress has been made with some alterations of the plan and foundations have been laid for the next milestone.

3.1. Feedback review

After the last milestone, we received a lot of positive feedback by the other teams and their members, especially about the idea of growth throughout the game cycle. The difference in between feeling weak as a small character at the beginning while growing and becoming stronger towards the end was received positively and mentioned a couple of times. The perspective change we imagined from below houses to above them clicked with the other developers and all of them could right away imagine a cool scenario. We conclude that this idea is interesting enough to be a main feature of our game and we will leave it unchanged. In addition, one student supported the combo system as a mechanic that adds depth to the gameplay, which is another hint that the character design is fulfilling.
On the contrary side, 80% of the developers criticized the lack of a challenge that only a time constraint is trying to enact. The highly suggested addition of enemies will now be strongly considered by us and put as priority for our high target goals. We are striving to deliver a smooth flowing character in the first place, but making the game more exciting will come right after. Thus, we won't proceed any thoughts about multiplayer as it would blow up the

scope of the project too far.
Concluding it can be said that the challenge of the game in the end will be a combination of time restriction, highscore chasing and enemy gameplay. This should hopefully satisfy all critics.

3.2. Game Development

On a general level, a full game loop has been implemented that makes it possible to start and end a game including leaving the application and reloading the level. A very basic UI informs the player of highscore, timer and tasks that are yet to be fulfilled. The background structure for scene changing and data consistency has also been set.

3.2.1 Level and Task System

The level and task system reads and evaluates .json files which can easily be expanded with the predefined structure. Each level includes multiple tasks that have to be executed in order. As the final task of a level the objective (e.g. high skyscraper) will be set. Each task receives information about destroyed obstacles and checks, whether these are contained in its description. Once all necessary objects are destroyed, the follow-up task will be loaded. This task system is expandable and can also support events like reaching a certain highscore or combo. Moreover, it will be used in the future to include a task based tutorial that introduces the player step by step to the controls.
It's clear advantages are the scalability once the foundations have been implemented. New levels and tasks can easily be included by adding to the .json file and different types of tasks are quickly implemented, too.

3.2.2 Static Enemy AI

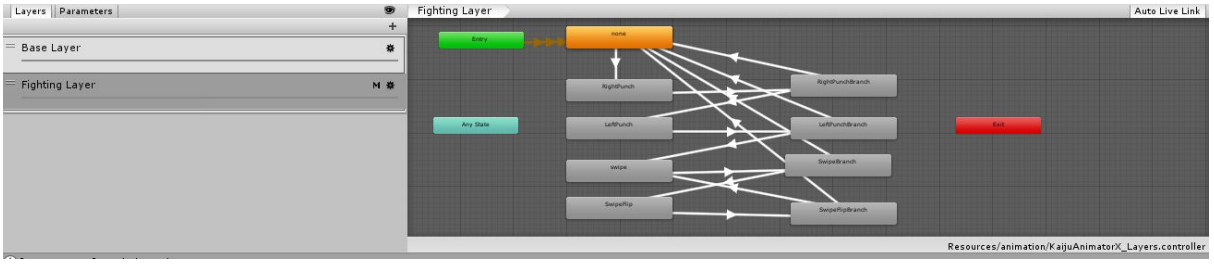
Because of the reviews, we decided to start design and implementation of the first basic static enemies, in our case cars, earlier than planned. The car AI has to conform with the map generation code as it is basically traversing the streets that are procedurally generated and it needs to work for whatever layout outcome. After first tests, cars are now able to randomly traverse a street graph with crossings as nodes and edges as streets. Cars will take a turn at crossings and turn around once they hit a dead end. However, there is no car collision yet and cars do not interact with each other or the character. These will be the tasks to address next for the desired target milestone.

3.3. Character Development

3.3.1 Character : Camera & Actions

The third person controlled character has been implemented by us. The main camera follows the character and can be rotated around its center target freely. Vertical rotations affect the distance to its target, so that the camera is able to move away from the player as it approaches a top down perspective. We're planning to utilize this feature with our narrative of a growing Kaiju, so when he reaches bigger sizes, the camera looks with a downward angle on him. The character can run freely and features two attacks so far. A light attack that

resembles a punch, and a heavy arm swipe attack. The light attack currently deals 25 damage and the heavy one 50. These attacks are mapped to two buttons. The light attack can be triggered anytime, while the heavy attack requires the light attack to be triggered twice before. Triggering an attack will cause the character to play an animation. During this animation, the attack collision with a destructible object causes this object to take damage depending on the type of attack. In summary, the basis controls, a basic attack sheme and damage dealing have been implemented. Even if the fundamentals for our Kaiju have been established, there is a lot of more work to be done. However, to make the game a fun experience, more attacks need to be designed and developed.
To animate the character smoothly and transition between animations turns out to be most challenging, and it takes quite some time to time the interval and effect area of the collision during an attack animation. To make things easier, the character includes a human rig, which has the advantage, that any human rig animation can be mapped onto its rig bones. Therefore, it is possible to use free animations from the internet. Of course, these require fine tuning to work with our Kaiju. For the interim demo, our attacks are animated and the full animation graph is layered to the upper body for attacks and lower body to transition between idle, walking and running.



The character animator: A two layered state machine that plays animations for the upper body and the base.

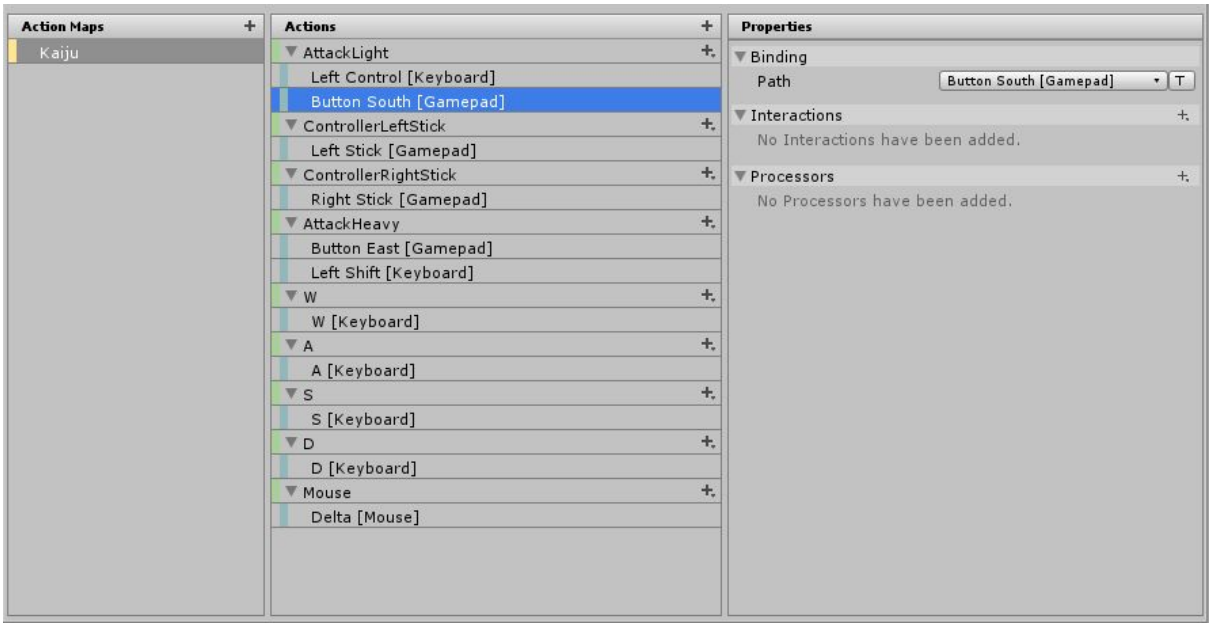
3.3.2 Chaining Destruction

For our game we want to establish flow by creating an incentive for the player to stay in a combo as long as possible. This is essentially maintaining destruction without breaking the action. For now, a basic system is implemented, so that every successful attack refreshes the current combo. We are planning to reward good timing with a increasing multiplier on the total points of a finished combo. The combo itself broadcasts to the game core if it runs out, so that the points can be given properly.
The player will be rewarded with more points, if he's able to destroy more objects in sequence. There are already first considerations for the player on how he destroys the object in scene and which attacks to use.

3.3.3 Input System

For the process of mapping device keys to actions, we are using Unity's new input System that has been introduced this year as an alternative to the default input system. It provides a set of actions that can map to multiple key or axis bindings. For example, moving the character can not only be mapped to an analog stick of a controller, but also the WASD keys of the keyboard. By understanding and implementing the new input system for our project

we gain the advantage, that different controller types can be supported easily and reconfiguration of key bindings should yield low effort.

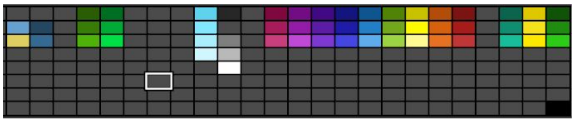


Unity's 2019 Input system allows excellent action -> key or axis binding, universal for any gamepad device or keyboard + mouse configuration

3.4. Design

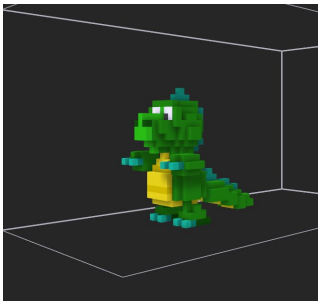
As established in the other chapter, our goal is to create a colourful and fun experience in a 3D voxel environment. The vision was to distance our game look and feel from the expected "Godzilla-game-experience", which typically is more grim and dark. Adjectives that should describe the look and feel of our game should be: Colorful, Sweet, Fun, Different.

3.4.1 Color Scheme



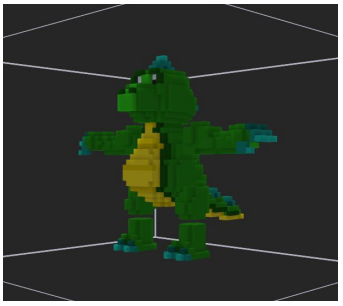
Even though our game was planned to be "colourful", it's still had to have a colour scheme that would fit everything together. Because we already knew that many events and impressions (e.g. rising high-score numbers, particle effects, etc.) will occur during the game, it was important not to overwhelm the player with an overly powerful colour scheme. Therefore, more saturated colours shall be used. Additionally, Godzilla itself has his own primary colours, emphasizing the player character.

3.4.2 Character



It was challenging to create a mesh that resembled godzilla, but still made him look cute enough to fit into out concept. Choosing brighter colors and making the head and body shape rounder helped in this endeavor.

After finishing the first version of Godzilla and revisiting the design, the design was changed. The initial design was too round and was missing the needed body parts to efficiently destroy a house.

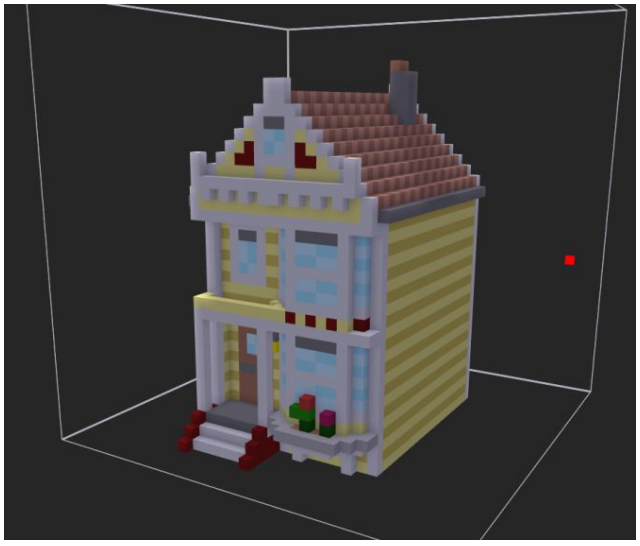


The second version is at the moment the most promising one. Adding limbs and making the figure bigger, helped in persuading a “strong” character. Also, by having longer arms, our Godzilla gained a little bit of reach, so his animation have a greater impact.

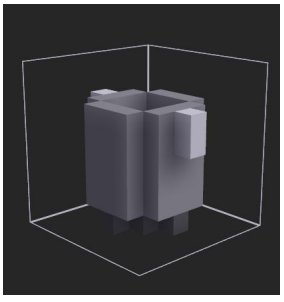
As we explored the medium of voxel graphics, we quickly realized that animation is not easy task. As traditional animation methods (using a rig adjusted with bone weight) seemed to fail, due to voxel “stretching” as the body itself moves. Therefore, the godzilla mesh was “sliced” to allow the limbs to glitch into another without the risk of the voxels losing its shape. As we looked into other voxel games (e.g. “Cube World”), we realize that the brief intersection of limbs had little impact on the overall game experience.

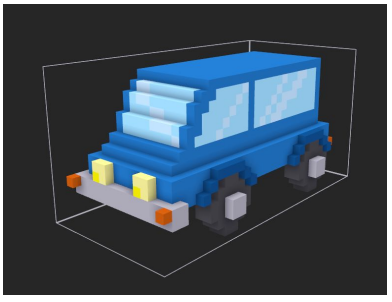
3.4.3 Environment and Obstacles

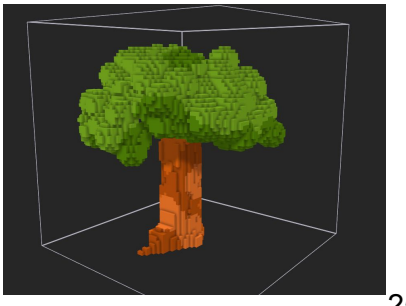
For the design of the city, we decided to take San Francisco as reference. The overall aesthetic and colorscheme of the city blends well with our initial design idea in mind. (See our version of the “Painted Lady”).



For the first obstacles we decided to go with smaller to medium objects, therefore ranging from a simple trash can to one-family houses. The goal remains to Godzilla being able to destroy skyscrapers and the highest landmark in the city, but we decided to establish an “easier” obstacle course first, before adding bigger assets into the game.







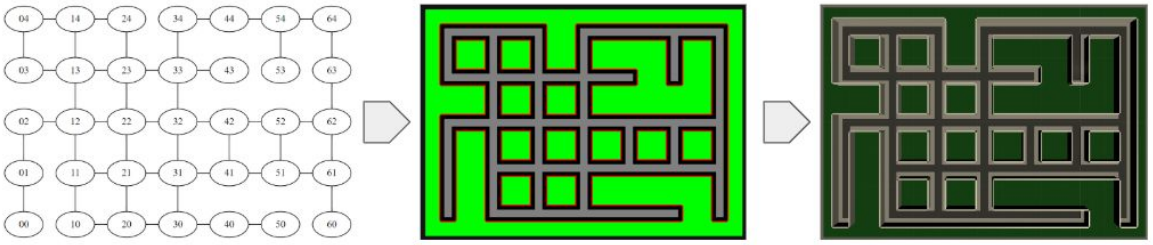
3.5. Environment & Destruction

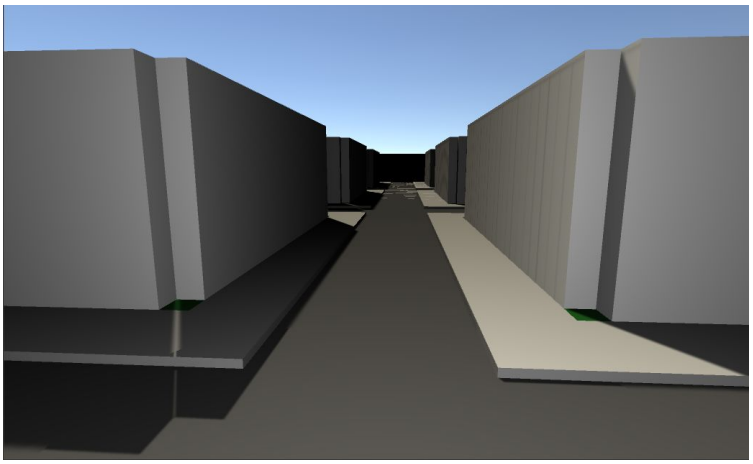
3.5.1 Procedural Generation

Development on the procedural generation has already started, even though it is not part of the first playable prototype. A street map can already be generated and some fasades are being placed. But due to performance concerns it is not ready to be included in the prototype.

The generation process so far goes through three different steps. The first is to generate a graph in which every node represents an intersection and every edge represents a connection between two intersections. At the beginning the street network represented in the graph is just a grid, but step by step edges are removed without disconnecting the graph to generate a more organic street map. The next step is to translate the graph into a two-dimensional array, where every cell contains roughly one square meter of the final map. this is to later place smaller objects. In this array places for buildings next to streets are marked. The last step is to initialize the map with premade ground and building tiles so the unity engine can display it.

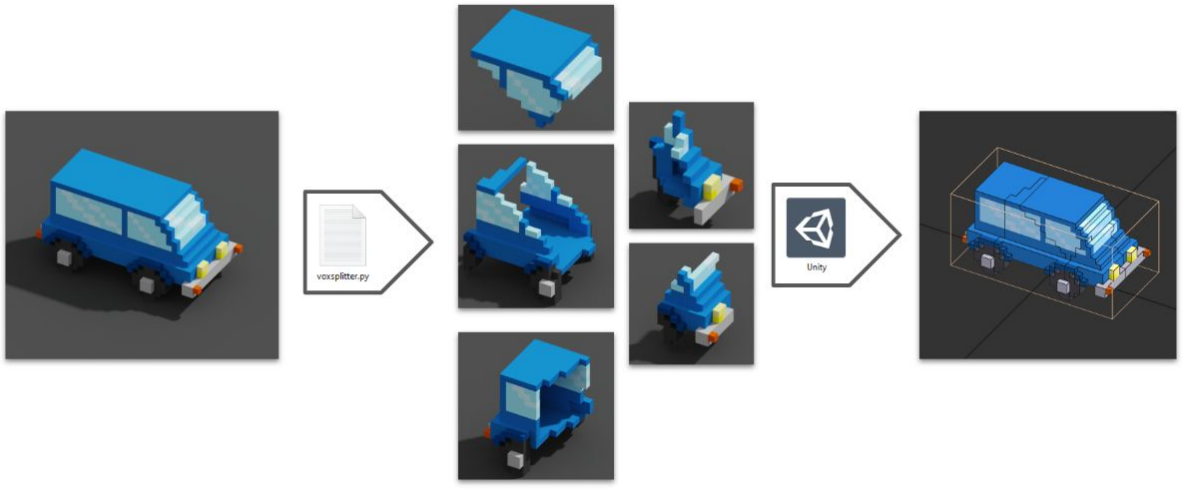
Due to the high amount of tiles initialized the performance dropped drastically. We hope to circumvent this by using significantly bigger tiles for the streets.





3.5.2 Asset Pipeline

We quickly realized that our original plan on how to create the destructible environmental assets was way to time intensive. It required us to not just model the asset, but also to then split them up by hand into smaller pieces, which turned out to be an extremely time consuming process. The splitting of the models into smaller pieces is necessary in order to create the debris parts which are left after the destruction of an object. To solve this problem we developed a python script, that reads files in the .vox format used by MagicaVoxel, our modeling software, and automatically generate a broken up version of the model. This sadly means that we lose some control on how the models are broken up, but gain a lot of time we can utilize on other more important parts of the project.



3.5.3 Destruction

The destruction script that served us as proof of feasibility during the concept phase has since been extended by a health counter that determines the amount of damage, and therefore the number of hits, an object can take before being destroyed. The health of an object also slowly regenerates, creating a threshold of damage that has to be done in a certain amount of time before an object can be destroyed. Destroyed objects are replaced with broken versions of the object, generated through our asset pipeline. Other smaller tweaks and bug fixes were also done.

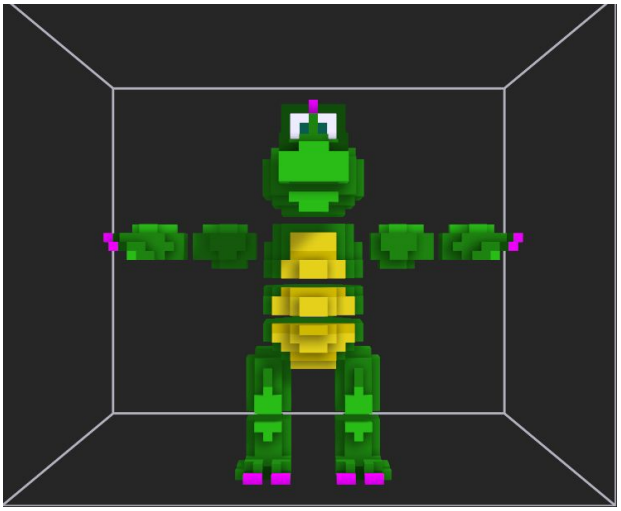
4. Alpha Release

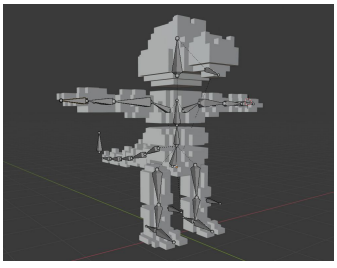
4.1 Design and Changes

During the development process, we could recognize which design ideas were actually useful and which needed to be revisited. Changes and new features are explained in the following paragraphs.

4.1.1 Godzilla

As seen in the interim presentation we already have changed the look of Godzilla once, but through the development of the last few weeks, the design was changed again two times. The design presented at the last milestone still felt very clunky and therefore had to be changed.
Taking the inspiration from puppeteering puppets, the model was segmented into more parts, allowing the rigid voxel model to move more freely. This process was iterated a second time resulting in the actual model.





The animations we used are not self-made but are taken from different sources (like the Unity Asset Store and Maximo Animations). Even though this is the case, the model is hand-rigged using different IK-constraint that would allow a smooth creation of different animations. Those are planned to be created in the last phase, due to the fact that not all animations are yet fitting for the game.

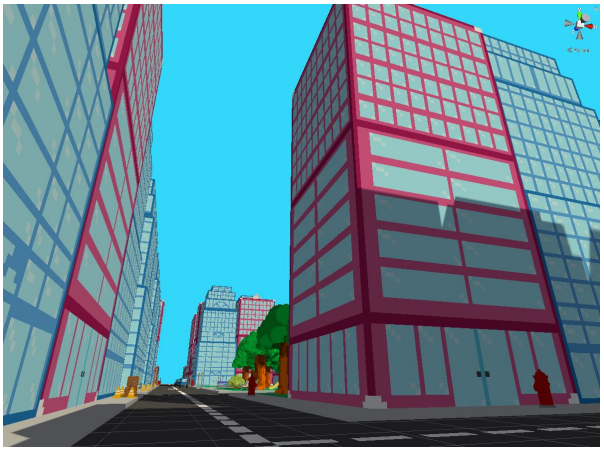
4.1.2 The City

The city consists of three big asset groups: suburb, the outer city, and the inner city.

The suburb is the “beginning” area for Godzilla. There the player will be able to find small objects that are easily destroyable and therefore allow a fast growth. Benches, traffic cones, but also small houses are considered as “small” obstacles.

As Godzilla grows he will be able to then destroy obstacles in the inner city. The landscape there consists of “medium” height houses and taller trees. Cars that posed a threat for small Godzilla now become destroyable, but still not completely harmless.

In the last category, we find skyscrapers “protecting” the main goal: the TV-Tower, which resembles the one in Tokyo. Those buildings are not only especially tall, but are also placed pretty too close to each other so that big Godzilla literally has to punch his way through.



The TV-Tower is placed in the middle of the city with only small obstacles around it. Giving the player enough space to fulfill his combos to destroy the goal.

4.1.3 Cars as enemies

A highly requested gameplay feature that is both breathing life into the city and enhancing the challenge of the game is cars. Cars are supposed to fill the streets with self-steering and moving objects that pose obstacles for Godzilla. When hit or run over by a car, Godzilla will lose energy and precious time, because it is immovable for a short amount of time. Cars also serve as small to medium size obstacles that will reward a suitable amount of highscore points for Godzilla to grow after reaching level 2. When skilled, a player might already be able to take cars out while still at smallest size. Besides normal cars there will be patrolling police cars that watch the happenings in the city. In case Godzilla destroys objects while being watched, a manhunt will be started, and police cars will increasingly be aggressive towards Godzilla. The following paragraphs will give an overview of features and difficulties of the car implementation.

When a city is procedurally generated, a street network will be spawned that consists of many intersections, straight roads and Tunnels. Tunnels are spawned wherever there is a dead end of a street. These are then used for cars to spawn throughout the level to keep the number of cars on the road stable and to feed the streets with more police cars, if necessary. The preset number of cars will be calculated to be the size of road map width times height. One after the other cars will be spawned in the tunnels. On the contrary, when a car enters a tunnel it will also be removed from the map. Moreover, each intersection is internally handled as a Node whose neighbors the cars use as orientation points for where to go next.

The cars themselves are powered by Unity Wheel Colliders that allow fine tuned physics to apply in realtime. Each wheel is properly simulated and touches the street while driving, which allows cars to overcome small obstacles, too. Each wheel collider's rotation is mapped to the car wheels and makes for a nice animation. Raycasts straight out the front of the car check, whether another car is driving ahead. This mechanism will slow down the car, if it gets too close to a slower car in front. In case this does not prevent a collision with another car, cars take damage and might even be destroyed. Most of the time navigate from node to node by slowing down before entering a crossing and accelerate again when leaving the crossing. At the moment, cars randomly choose which turn they will make. However, for the future a more sophisticated logic will replace it. I am planning on a function that calculates the traffic density on the map which will then return a decision for the car to head to a less crowded area. This should erase congestion issues that still appear after a while at more frequented crossings.

The most challenging part was coming up with a logic for the crossings. It is necessary for cars to check the other traffic members and their route. This could not be solved by additional raycasts. Therefore, I implemented a manager that the car will register to, once it is shortly before the crossing. The car notifies the manager about its desired turn. Then the manager will run through every queuing car and add up the desired turns by calculating the crossing sections that will be blocked by a car. By using a flag enum the manager can sum up the sections starting from the first queuing car until the last car that still fits on the

```
/// <summary>
/// Enum saving the occupied lanes in 4 bits: 0000; each bit can be set to 1 to indicate that the street section is occupied.
/// ----------
/// |0001|1000|
/// |----|----|
/// |0010|0100|
/// ----------
/// </summary>
[Flags]
14 references
public enum OccupiedLanes
{
    None = 0,
    LeftTop = 1 << 0,
    LeftBottom = 1 << 1,
    RightBottom = 1 << 2,
    RightTop = 1 << 3
}
```

crossing. To all these cars a drive instruction will be sent, others will be denied. Whenever a car leaves the crossing or enters it, a recalculation of the sections takes place. This system is working well at the moment, but too many cars might break the logic and accidents can still sometimes happen. I will need to look into refinements for the logic, faster and quicker updates and more time saving instructions.

The AI that will be a threat to Godzilla are the police cars. The average number on a map is currently set to 10% of all cars. However, this number can increase once the hunt is on for Godzilla. Police cars will all be set on duty and use a path finding algorithm to calculate the shortest way to the Godzilla position. When close enough, diverting from the road is allowed in order to hit Godzilla and stun it. When on duty, traffic rules might not apply anymore for the police cars and in collisions they are usually stronger than others. Speed also increases to catch the evil as fast as possible.

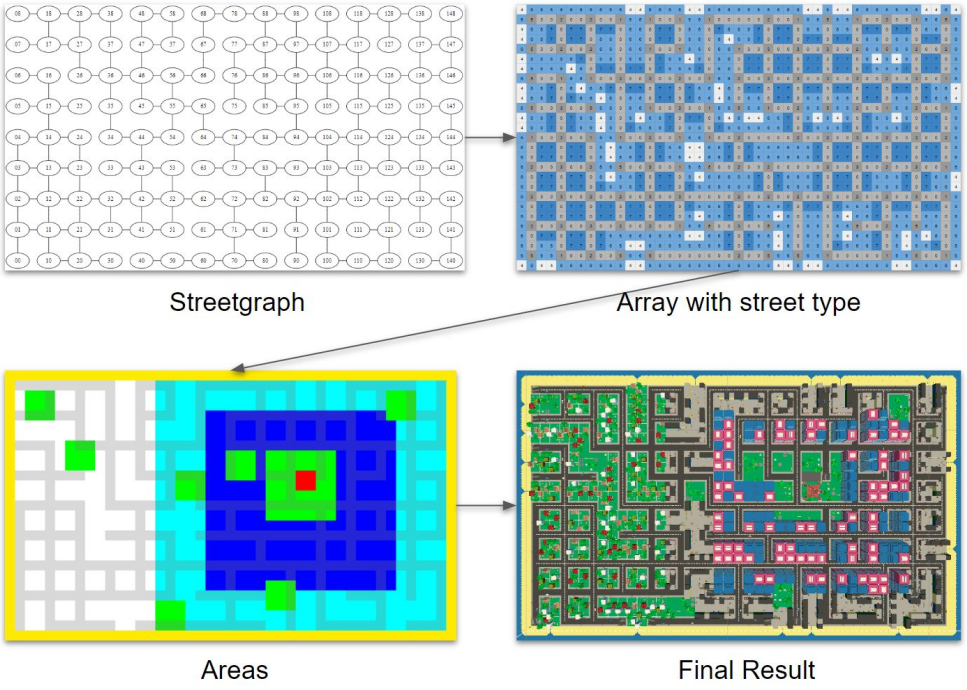
4.1.4 UI

Due to the fact that everything is rather colourful and overwhelming, the UI should be fairly simple.
Regarding the last week of bug-fixing and putting everything into the game, we just finished the core elements of the UI. Still, we will explain the finalized version in the next lines.
The energy bar on the left side indicates that the player has enough resources to use special attacks. Above, you can see the remaining time and the “voxel” count, the number of voxels you successfully destroyed. This UI is planned to be implemented during the next weeks before the demo day.

4.2 Procedural Map Generation

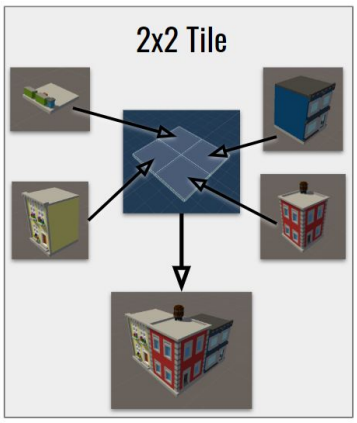
The map generation has been greatly expanded and changed since the last milestone. The basics ideas behind the three-step process described in chapter 3.5.1 are still in use but some things had to be changed to increase the performance of the game. The process now looks like the following:

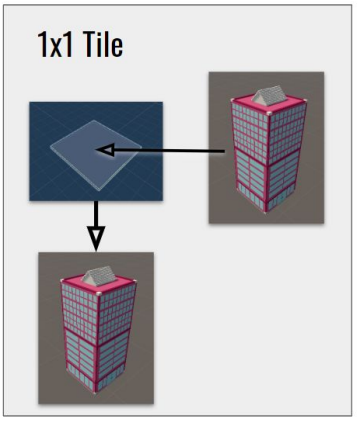
1) Generate a graph containing a grid (each node represents a street intersection, edges represent streets)
2) Delete a few edges of the graph but keep it connected
3) Translate graph into an array (each cell represents a 12x12 meter tile)
4) Define different city areas (Suburbs, City, Skyscrapers, Park, Beach, Goal)
5) For each cell in the grid generate a tile corresponding to the area and the type of the cell (Street [Curve, Straight, Intersection, T-Intersection, Tunnel], Building, Corner Building)
6) Place the tile in-game



The first steps are still the same as during the last milestone. We still generate a grid-shaped graph as basis for our street network. This makes it resemble the grid style of Manhattan. Next, we delete edges, which represent the street, to make the city feel more organic.
Step three is where this generator differs from the previous version. We still translate the graph into an array, but instead of each cell representing a 1x1 meter tile, each tile is now 12x12 meter. This greatly increases performance, since we do not need as many objects, and makes designing the level easier, but comes at the cost of less control over the final result.
Each cell gets than assigned one of the following areas: Suburb, City, Skyscrapers, Park, Beach, Goal. This makes the city feel more realistic and is a great way of guiding the player through a kind of journey where they start out as small Godzilla destroying smaller objects in the suburb and end up as big Godzilla destroying giant buildings.

Lastly, the array has to be initialized. For each cell a tile is randomly generated corresponding to the type of cell and area it is placed in the game. A tile can either be made of 4 smaller sections, each of which gets randomly chosen from a selection of premade sections, or consist of only one section in case bigger objects, like skyscrapers have to be placed.





With this, the whole city is initialized and ready for the game to start.

4.3 The Game

With the full playing world generated, the game can finally begin. The following sections describe how our game developed from the fundamental implementation during the interim to its Alpha Release state.

4.3.1 Stages of Growth

The game in its current stage features three stages. At the beginning of the game, the controllable Godzilla is the size of a car. If you observe the image of the generated city above, the player spawns on the left side of the map, meaning he begins in the suburb area. In this area, there are small houses, gardens and parks that feature small properties that can be destroyed. The player can explore the map now, find objects to destroy, such as benches, cones, and traffic lights. If he exceeds enough points, he undergoes a surge of growth. He expands to the size of smaller houses and the preferred targets of destruction

change to buildings of equal size. At this point, it is a good idea to traverse in the world towards the right, where the city is located. Again, if enough points are collected in phase two, the character will grow to its final stage in which he is able to take down skyscrapers and the objective: the red and white TV-Tower in the middle of the level.

4.3.2 Balancing the Game

Given a procedural level with three stages, a random configuration of objects to destroy and a timed objective, it is necessary to bring structure into the game, by designing and balancing the values of each entity. The following sheet shows the stats of the objects in terms of hit-points and reward-points. Also, there are notes regarding the purpose of each object.

In the graphic below, level refers to the stage of growth, that is ideal to be in while attempting to destroy an object. Especially in the early stage, the player needs to explore for good objects since the variety of targets is the biggest currently. We are planning, that players in the alpha release will spend the biggest time of their sessions in this stage. Between level 1 and level 2, there is an area that is overlapping. This indicates that there are objects that can be destroyed early using powerful attacks. They reward more points, therefore, they are favourable. More on hit points and the damage each attack deals in the next section. Cars and police cars, the enemies in the Alpha Release are destructible too and a good target while being in the second stage. Finally, the last object of the list is the TV_Tower, which is the target objective to complete a level.

	Time ? : 0:05 h				
Level 1	Destructables	Hitpoints	Reward	Point Multiplier	Idea
1	Barrel	40	16	1.0	two hit/kick
1	ExplosiveBarrel	40	16	1.0	two hit/kick
1	Crate	25	10	1.0	one punch
1	Cone	20	8	1.0	one kick
1	Trashcan	40	24	1.5	two hit/kick
1	Bench	50	20	1.0	two punches
1	hydrant	50	25	1.25	two punches
1	vase	20	12	1.5	one kick
1	TrafficLight	40	16	1.0	two hit/kick
1	Trashbin	100	40	1.0	combo or charge attack
1	Bush	100	40	1.0	combo or charge attack
1	fountain	200	160	2.0	very sturdy and much points
1	MerryGoAround	200	160	2.0	very sturdy and much points
1	Slide	100	80	2.0	two hit/kick and much points
2	Tree_small	250	100	1.0	inbetween item
2	suburban_1	400	160	1.0	two hit in level 2
2	suburban_2	400	160	1.0	two hit in level 2
2	house 1	500	200	1.0	combo or charge attack in level 2
2	house 2	500	200	1.0	combo or charge attack in level 2
2	house 3	500	200	1.0	combo or charge attack in level 2
2	"Yellow house"	500	250	1.25	combo + additional attacks in level 2
2	house_blue	500	300	1.5	house that rewards more points
2	house_c1	700	280	1.0	more sturdy house
2	car	500	200	1.5	Enemy : collision interrupts!
2	police_car	500	200	1.5	Chasing Enemy
3	sky_scraper_1	2500	1000	combo or charge attack in level 3	
3	sky_scraper_2	3000	1200	combo or charge attack + additional attacks in level 3	
3	TV_Tower	15000	4000	once	Destroy to complete the level , Firestorm at level 3

4.3.3 Player's full Action Set

Attack	Buttons [XBOX]	Damage	Growth Stage	Growth Scale
Punch	A	25	1	1
ChainSwipe	A -> A -> B	25 + 25 + 50	2	5
Kick	X	20	3	10
StrikeKick	X -> X -> B	20 + 20 + 60		
Headbutt	A -> A -> Y	25 + 25 + 100		
ChargeAttacks				
Charge	Hold R			
JumpAttack	R + Y	100		
ChargedStrikeKick	R + X	100		
Special Attacks			Special attacks cost energy	
Fireball	Hold L + B	200 - 600	20 - 60	
Firestorm	Hold L + Y	100 * seconds	60 + s	

Now since every object has their hitpoints. Let's have a look at the tools the player has to destroy objects in this world. As he plays our Kaiju monster, he can move around freely, and use attacks to inflict damage on his environment.
The full list of attacks can be seen on the left.

The regular attacks are moves that can be performed at anytime. Punch is the most regular attack, kicks are especially useful against small objects. Attacks can be chained together and ended with strong finishers. Such as the StrikeKick.

There are also Charge attacks that require the character to be charging. While charging, the character becomes faster and less easy to control. Charge attack stop the assault with some good damage.

Finally there are special attacks that require spending your energy. Energy is a concept we introduce in the Alpha Release. Every successful attack on a object in similar size creates energy. Good timing while pressing the buttons will reward even more energy. It can stack up to a value of 100. Special attacks are very powerful and most likely necessary to win the game.
Finally each attack damage is multiplied by the growth Scale that is based on the size of the character.

We are looking forward to seeing how the playtesters will play our character and how challenging it is to destroy the tv tower in a given time of 5 minutes.

5. Playtesting

5.1 Playtest Setup

Our Playtest was organized as follows. One of the team members was present at all times during a session. He/She not only observed the player and wrote down remarks and immediate feedback, but also assists, if intervention is really necessary. That is the case for game breaking bugs or if the player is stuck caused by technical difficulties, such as display and input problems. Information about the objective in the game and explanations regarding player control or what to do, has not been provided. The player was only informed about the game via an information screen that was displayed at the beginning. The infoscreen contained information about: The objective to destroy the TV Tower, how to control the character, and that he'll eventually grow by destroying objects of similar size. In some cases we carried out the session by letting the player stream from their computer and talk to them via voice chat.

A play session with one person contained at least one playthrough or more, if the player wanted to attempt the game again. Each game generates a new map and has a duration of 5 minutes maximum to complete the objective. Players were provided a gamepad, Xbox 360 preferred, but Dualshock 4 (PS4) and XBOX One has been used too. The PC device used vary from high-end gaming devices to less stronger laptops, at least with a designated graphics card.

More about the questionnaire in the next chapter. Finally when the player announces that he/she is done playing, we asked them to fill out the questionnaire, whose contents are discussed in the next chapter. Afterwards, questions about the game were answered.

5.2 Questionnaire

The questionnaire was provided online via google forms and could be filled out on a laptop, tablet or smartphone which we provided for the testers.
The questions were split into four categories, starting with general questions about the testers and their gaming habits, followed by questions about the game, questions about the controls/interface and finally questions about performance and visuals with space for additional notes.

In the general section we asked the following questions:

- Please select your age group: [18-25, 26-30, 31-40, 41-50, 51-65, 65+]
- Please select your gender: [Female, Male, Diverse]
- I love to play games in my free time. [Strongly Disagree (1) … Strongly Agree (5)]
- Please select all game genres you enjoy playing in your free time: [Action, Action Adventure, Adventure, Role Playing, Simulation, Strategy, Sports, MMO, Hack & Slay]
- How familiar are you with Fighting/ "Punch'n'Destroy" games? [Not familiar (1)... Very familiar (7)]

The “Game“ section contained these questions:

- I found the objective clear at all times. [Strongly Disagree (1) … Strongly Agree (5)]
- Additional space for feedback for the games objective: [Free form]
- What was your strategy for winning? [Free form]
- How many rounds did you play? [1, 2, 3, 4+]
- Did you complete the game? [Yes, No, I don’t know]
- How do you feel about the difficulty of the game? [Too easy(1)... Too hard(5)]
- What do you think about the cops? [They improved the overall game feeling., They made the city lifely., I felt challenged., I was bothered., I did not mind., Sonstiges: (Free form)]

The “Controls and Interface” section tested for:

- Did you get stuck during any parts of the playtest? [Yes, No, Maybe]
- I found the controls of the gameplay very intuitive. [Strongly Disagree (1) … Strongly Agree (5)]
- The control schemes were logical and easy to remember. [Strongly Disagree (1) … Strongly Agree (5)]
- Which things would you change/add about the interface and/or controls of the game. [Free form]

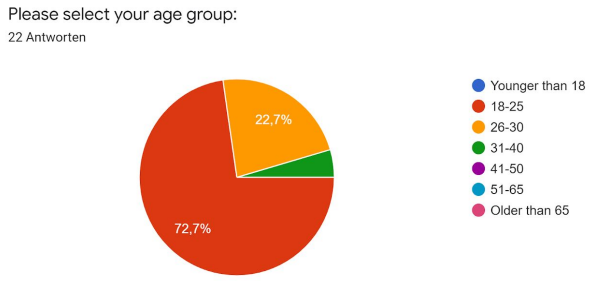
And finally in the last section we have:

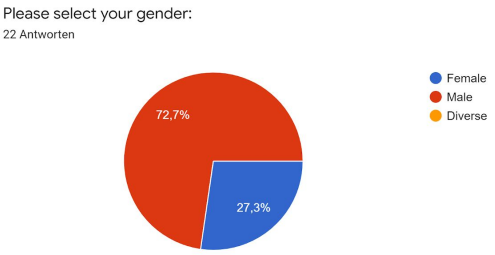
- The performance of the game was very smooth during my play-test and I had no frame stuttering or other issues. [Strongly Disagree (1) … Strongly Agree (5)]
- I found the overall appearance of the game very appealing [Strongly Disagree (1) … Strongly Agree (5)]
- If you could change just one thing, what would it be? [Free form]

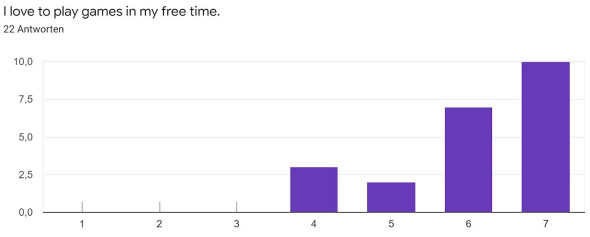
5.3 Results

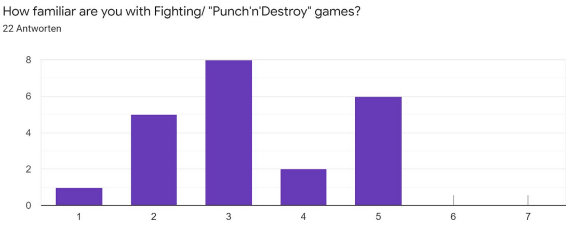
5.3.1 General Information

The test demographics are mostly as expected: an almost exclusively young, majority male group of people that love to play videogames in their free time. No real surprises here.

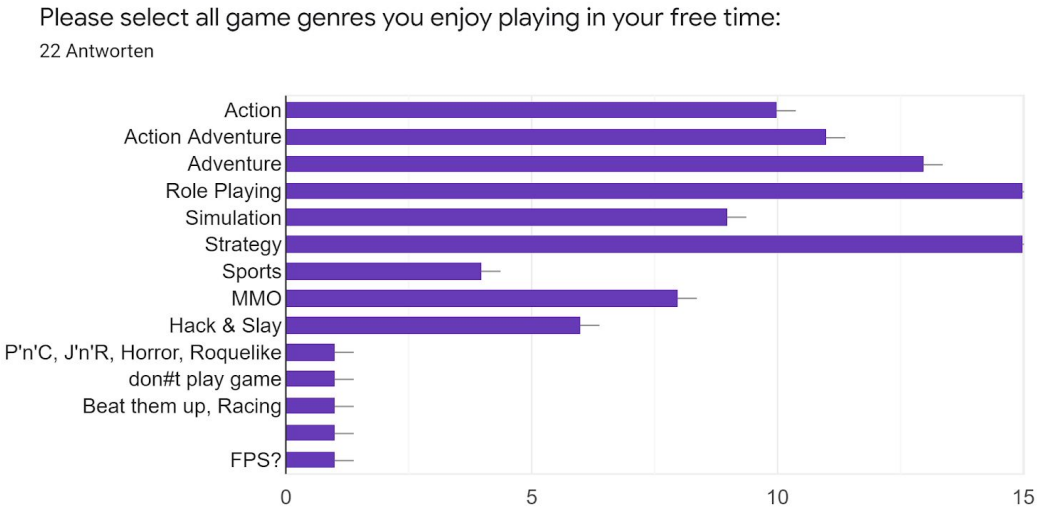






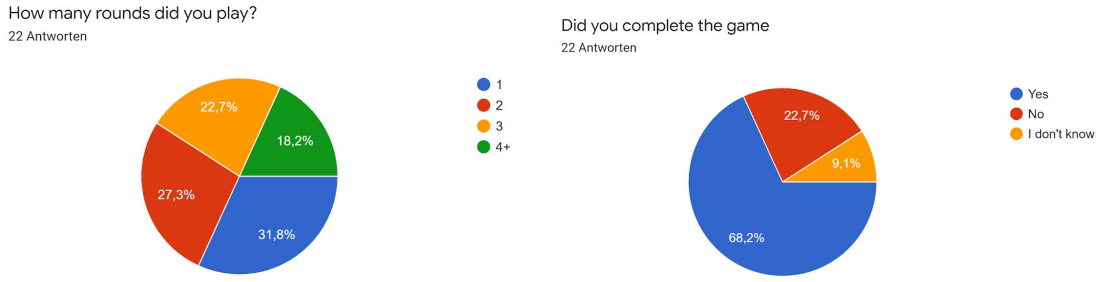


The games our testers play in their free time are hard to summarize in a few sentences. For us it is mostly interesting that a lot of them like to play action (45,5%) or action adventure (50%) games, and are, therefore, at least somewhat used to the controls and mechanics of our game. The questionnaire also showed that our testers where only medium to slightly familiar with fighting games.

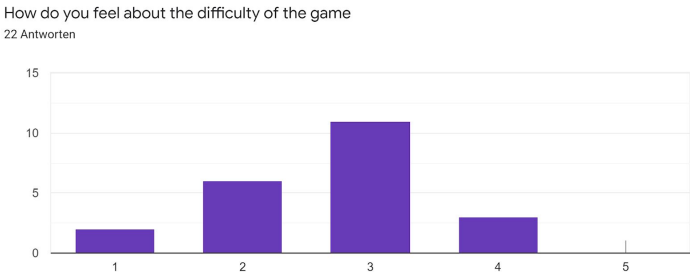


5.3.2 Game Questions

In this section we asked testers how many rounds they played and whether or not they completed the game. We asked these questions so we can understand how much time the players invested in the game and how successful they were, and use that to put their answers into perspective.



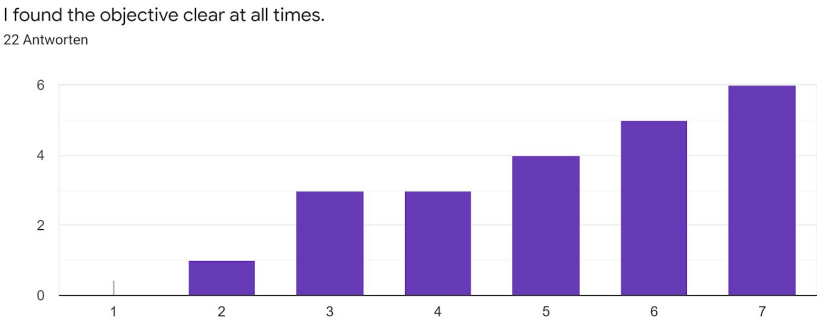
The questionnaire also showed us that most players liked the difficulty of the game, finding it neither too easy nor too hard.



An additional question about the police cars in the game revealed that these were a nice addition to the game, adding a bit of challenge, even though quite a few players were bothered by them.

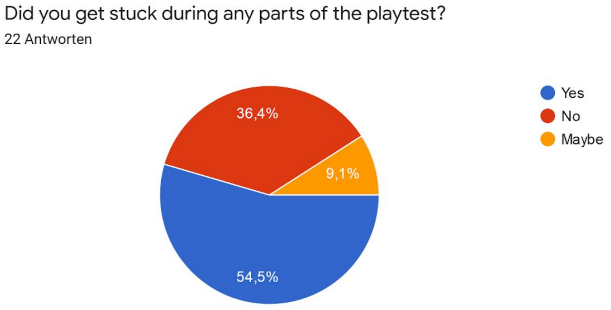
The optional question about the testers strategy for winning the game could be answered freely. This resulted in some great insight into the players behaviour and their understanding of the game. It revealed that most players, once they have found a working combo, would use this single combo repeatedly to destroy as much objects as fast as possible as they could. It also showed that, while some were a bit lost, others understood the game and devised a working strategy.

Lastly, we asked two questions about the game objective: whether or not the goal was clear at all times on a scale from 1 to 7, and one that could be answered freely. While the scale showed that the overall objective was clear, the second question revealed that there is still room for improvement, especially when indicating the growth progress of the player character. Also the tutorial screen needs to be enhanced.



5.3.3 Control and Interface

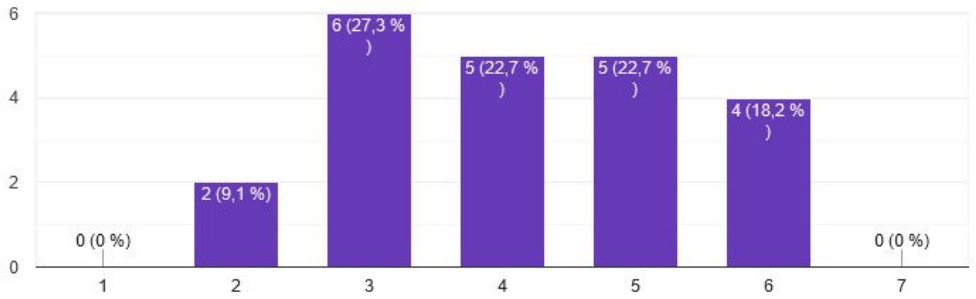
In this section, we wanted to know, what our testers thought about the controls and interface. These questions were added because we wanted to make sure that our controls and the feedback they gave were efficient enough to feel intuitive. We also wanted to understand if the player was stuck during the game, so we could avoid unnecessary frustration regarding the controls. The result would help us to understand whether or not those needed to be revisited.
We asked our player whether or not they got stuck during any part of the playtest. Unfortunately, more than half of our testers got stuck in some kind of way during the game. Different colliders from the debris of destroyed objects hindered the player to continue their playthrough. Additionally, the controls turned out to be not as responsive as planned. More time has to be invested in those topics.



Asking the players to rate the intuitiveness of the controls by the numbers 1 to 7, we tried to understand if the players were satisfied with our current control-settings. The player found the controls to be not very intuitive as they encountered situations in which controls seemingly had no effect.

I found the controls of the gameplay very intuitive.

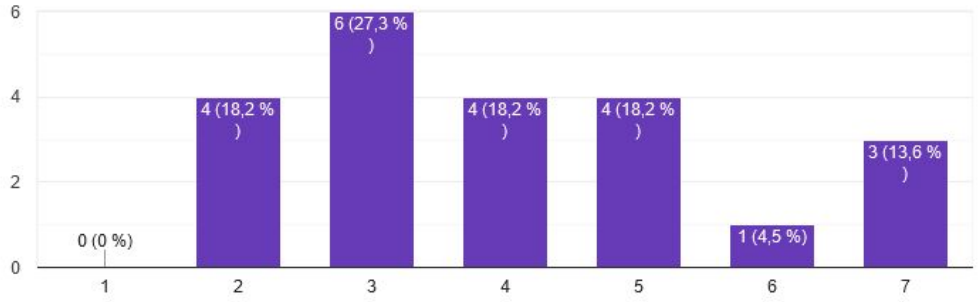
22 Antworten



The intuitiveness of the controls can be also explained by the fact that players couldn't remember control schemes that easily, as can be recognized by the next question. Rating the simplicity of the control schemes we could tell that current schemes did not work well for our players. They were too complicated and required too many different button presses for the players to be truly easy.

The control schemes were logical and easy to remember.

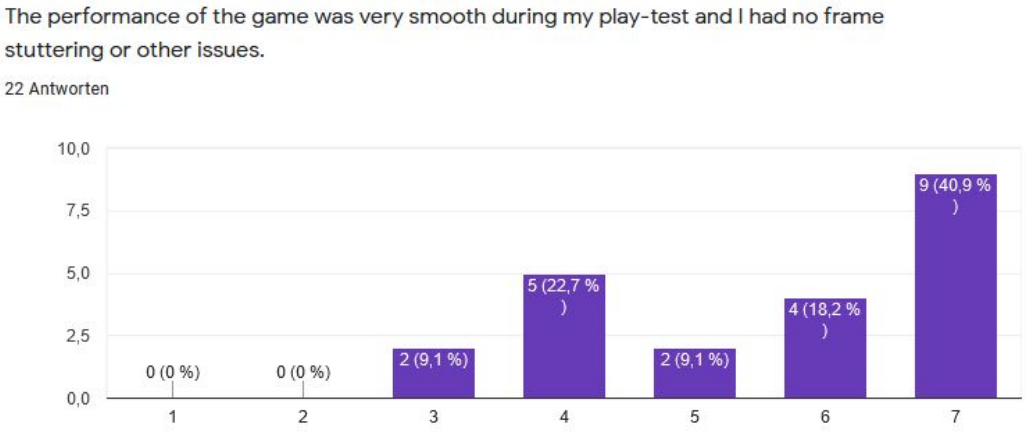
22 Antworten



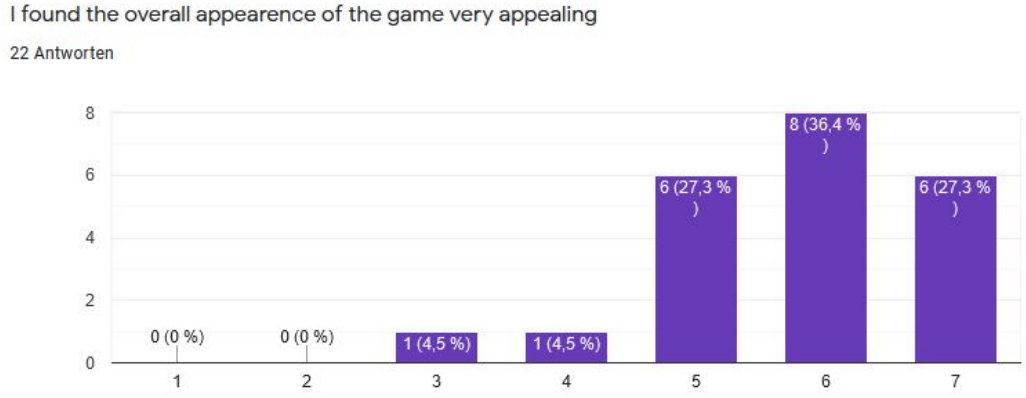
Being asked what we could improve regarding the controls and the interface, we got several different answers. The player asked for more guidance during the game, as the combos weren't easy to learn and also gave little feedback when the combo was done correctly. An overlay screen with the controls or a detailed tutorial was suggested. Also, the lack of feedback when hitting a house or an object was mentioned. Players, moreover, criticized the lack of responsiveness for the attack as in the camera control, as the camera could get stuck between different object, not showing what is going on. The testers also asked for more feedback regarding the police and the growth. It was hard for them to understand how long a police car will be chasing them and when it will be destroyed. In addition, they were confused about what parameters had to be achieved to make Godzilla grow. More UI features explaining this were asked for.

5.3.4 Final Questions

The final questions were needed to fill the gaps on the overall player experience. We wanted our players to rate their gameplay regarding the technical performance. The performance was surprisingly good for almost all our testers so that a smooth course of the game could be provided.



Wanting to know more about the overall appeal of the game we asked to rate the appeal, meaning UI, graphics and general “look and feel”. Regarding the design and the general appeal of the game, the player seemed satisfied. The players liked the look and feel of the game, providing only little critic. Details like missing designs on the back of some structures were mentioned regarding this topic.



Lastly, we asked our tester what they would change if they got to change one thing. Most of our player wished for better control and visual feedback. More indicators for the growth of Godzilla were also wished for. Additionally, they would allow Godzilla to walk through the debris as they would often get stuck for a few seconds during the gameplay. Some players also wished for less police as they were highly bothered by those.

5.4 Changes

After analyzing the results of the questionnaire, individual feedback and notes that we have taken during the playtests, there are many minor and major changes that need to be addressed.

5.4.1 Gameplay/-design

Gameplay-wise we are very pleased with the playtesting results. Without problems, each tester was able to understand the main objective of destroying the cities landmark. Therefore, only smaller quality-of-life improvements will be implemented.
First of all, once the character grows, smaller objects will be automatically destroyed by Godzilla when walking over them. We recognized that fences or trees could block Godzilla from a smooth journey through the city which does not make sense in the first place and hinders the game flow.
Similarly, the debris of houses will no longer collide with either character or cars as it was an additional obstacle blocking the player from navigating properly. This will also slightly increase the overall performance of the game.
A suggested change to the growth system, namely changing the procedure into a continuous growth, has been considered. Despite being evaluated as game improving, we will not be able to implement it in the time left. As a result, we will focus on improving the gaming experience with the current growth system to make it as satisfying as possible.

5.4.2 Controls

For better learning results we already have implemented an additional demo tutorial that explains controls step by step. However, unfortunately this has not been finished for the playtests. The tutorial is taking place on a very small scale map that introduces the player to the basic game concepts. It is making use of the task system that is used during a normal game run as well. This tutorial will certainly be helpful for teaching controls at the demo day.

Besides, we are going to rework the control scheme completely. Simplifying the combos is the main goal which we will achieve by changing the two main combos from an A -> A -> B or X -> X -> B to a way easier A -> A -> A and X -> X-> X respectively. This should be more intuitive and support the “rewarded” feeling of players as timing a combo is not very obvious in the first place. In addition, visual and audio feedback is being considered for correct inputs. This has already been part of our desired target milestone but did not make it into the build due to complex logics.
Moreover, the special attacks, such as the fireball and firebreath, have not been used at all by players in their playthroughs. Thus, we will move the controls to the Y button that will now not be in use anymore due to the reworked main combos. This further simplifies the control scheme and should make all actions executable just by using the main four buttons A, B, X, Y and the shoulder button for sprinting.
Another greater issue is the handling of camera movements. We will address the camera being stuck by removing collisions with smaller objects such as trees, which quite often caused the player to struggle when walking through an in-game park for example. We are also considering working on the camera in general and adding other ways that could make camera collision checking obsolete or we consider to sway the camera softly behind the character.

5.4.3 UI

Regarding the UI a few changes will be made. The UI size will be adjusted as it seems to be too small at this moment. Due to the fact, that the players found the tutorial screen to be overloaded and complicated, it will be reworked. Firstly, button descriptions will be rewritten to be more precise. Secondly, the combo-sheet will be made easier to read by replacing “+” with “->” as it will be easier to understand that buttons are needed to be pressed successively. The overall design will be changed to be easier readable.

As we provide several different combos, which can be easily forgotten in the first play runs, a controls/combos menu will be added to the game. It will be possible to press a button during the game to get a quick overview of attack combinations and general controls.

The already implemented task box will add an additional layer of explanation, as a new task will be added to aid the player in his playthrough. Through simple milestones, we will guide the player so that he can achieve his goal more easily. Therefore the player should understand then he will reach his new height and when it is the best moment to destroy the goal.

5.4.4 Bugs

The most severe bugs found during playtesting will be addressed in the following paragraphs.
For starters, the character’s growth animation is stopped when being run over by a car in the meantime. This lead to players not knowing that they actually gained strength and were now able to destroy bigger obstacles. This is not a game-breaking bug, but highly confusing and will be dealt with as soon as possible.
When shooting a fireball while standing too close to a house, the fireball would skip the first house and not deal any damage to it. We already know a solution to this problem and will have it fixed by the next build.
Regarding the cars there are a couple of issues that need to be dealt with. For one, after cars hit a player, the character is stopped at exactly that position. This leads to the car waiting for the player to get up which possibly causes another stun right after regaining control. Pushing the player away in the collision direction will grant more visual feedback and prevent the car from waiting right in front of the character. Secondly, while the game is paused, cars and police continue driving. This in the engine unfortunately coupled with the input system which makes it difficult switching off the rigidbodies. Quite possibly we need to come up with a work around that saves previous values and reinitiates them when resuming.

5.4.5 Appeal/Graphics/Feedback

Continuing the topic about cars, the stun animation, played when the character is being hit by a car, will be reworked. This should go in conjunction with the possible changes about Godzilla being pushed away from the car in driving direction. As an optional addition, controller vibration might be added for collisions with cars.

Another main issue of the playtest build was the lack of visual and auditory feedback for the players actions. These were due to time constraints in our last milestone, but will have priority until the final release. Most players were confused about what they could do and what would be destroyable. We will add additional audio feedback for punches, hits, destructions, special attacks, footstep sounds, background music and ambient noise. Also, reworking the police siren sound and remastering the mix of all sounds and effects is necessary.
On a visual perspective, the voxel particle effects appearing when punching an object will be enlarged and increased for more user feedback. This also has to scale with Godzilla's growth to stay visible all of the time.
A main reason why players did not dare to destroy houses was that it was not noticeable whether it was taking damage or not. As a solution, the destruction texture shader will be adjusted so that from the first punch damage is visible. The same applies to cars that were lacking a similar shader up until now.

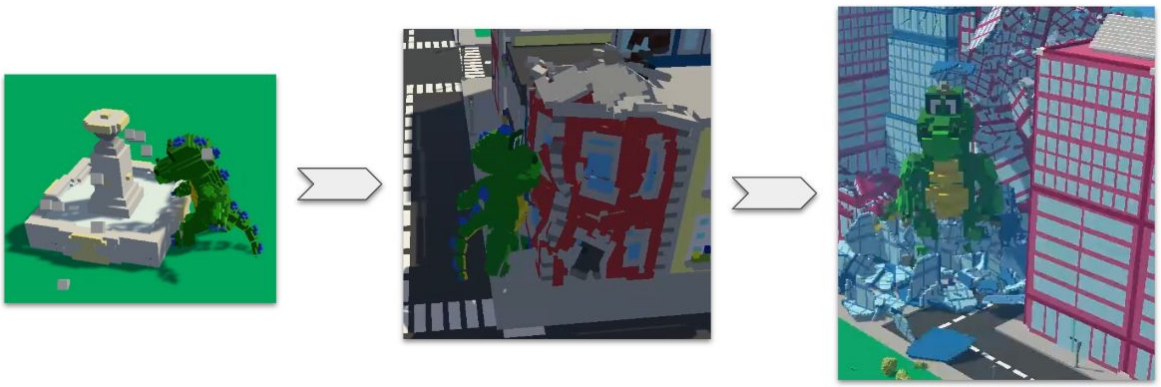
With all these changes in mind, we hope to be able to implement as many as possible until the final release and improve the overall game experience significantly.

6. Conclusion

6.1 Final results

6.1.1 Summary

With this chapter concluding this project, it is time to look back at what we achieved in the past few months.
We created an action packed "punch'n'destroy" style game in which the player takes on the role of a tiny Godzilla whose main goal it is destroying Tokyo Tower. But before that task Godzilla first has to grow to a bigger size by destroying as many smaller objects as possible. Since the whole game is timed, the player has to use a clever combination of punches and kicks to unlock stronger attacks and deal as much damage as possible.



While Godzilla is wreaking havoc over the city, enemies in form of police cars try to hinder its progress by hitting and stunning it for a short while and, thus, costing the player valuable time. The police cars' AI reacts to Godzilla destroying objects in their sight and while not stop pursuing him until it either escapes or destroys all police cars.

For the environment we created a procedural generator that builds an entire city from ground up. The city's style is based on Manhattan with its grid like structure and its skyscrapers, but also includes influences from San Francisco's suburbs and of course Tokyo, where the original Godzilla movie takes place. The whole map is split into three different areas, each providing obstacles of the optimal size to destroy for our character.

The suburbs are where the players start their journey. They provide many small obstacles, that are easy to destroy and reward many points in the first stage.

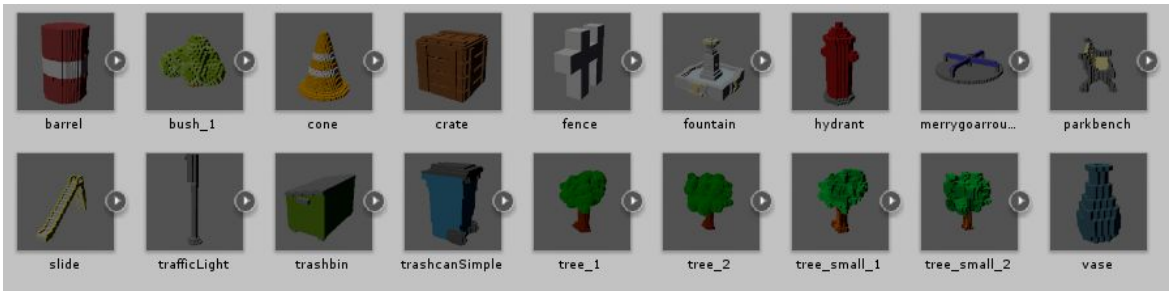
The outer city is full of smaller buildings that are perfect in size for the second growth stage.

The skyscrapers provide the player with the opportunity to gather many more points and increase their final score for a chance to beat the highscore once they have reached the last stage. This is also where Tokyo Tower, the main target of the game, stands.

The whole game is kept in a cute and colorful voxel style. With 11 different fully destructible buildings, 18 smaller hand-modeled obstacles, 2 types of enemy behaviours, 3 main areas and 3 additional areas, many particle effects and one fully animated main character the game offers a lot of variety and fun to any player.

Buildings:

Smaller obstacles:



Enemies:

6.1.2 Changes to prepare for the demo day

After the playtest, we summarized changes (in section 5.4), that we planned for the final release in consideration of our playtest. So in this section, we want to point out our last minute features that we implemented having the the Demo Day in mind and which supported our presentation there.

To get the attendees of the Demo Day engaged in our game, we started a competition. The player with the highscore at the end of the demo day, won our prize, a 3D printed replica of our character model.

Therefore, a highscore feature was implemented, so that the competition could happen. The UI has been updated with a small conversation, which asks the player for his/her name. Then, the top five players are displayed on screen, before a new game can be started.

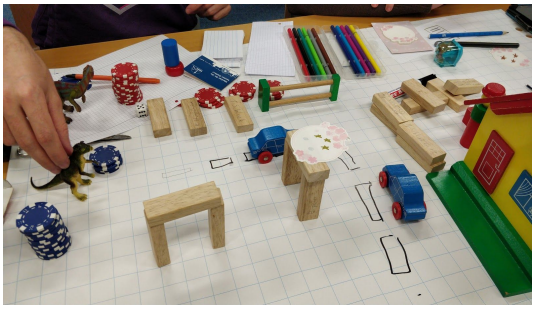
Throughout the Demo Day, we would see people bringing friends to challenge themselves with their highscores. Therefore, we count this as a big success.

In addition, we noticed that previous builds were wrongly configured in their graphic settings. Builds were lacking shadows, thus we resolved it for the final demo, too.

Also, in consideration for the Demo Day, we added a Demo/Tutorial level. We have mentioned this already in the last chapter as well. For our game presentation we used the following setup: We had two monitors, one featuring the main level with a fully procedural generated city and the main objective to destroy. On the second screen we featured the demo scene that includes a much smaller, pre-designed world and objectives to learn the controls of the game. For instance, the player is asked to destroy some cones with the kick attack. So in general, the next player in line would have the opportunity to make himself familiar with the controls and his/her game character while waiting for the other to finish the main level. This procedure worked pretty well during the Demo day. Almost all of the players were able to finish the game! In comparison to our playtest, the rate of first-time successes increased drastically.

6.2 Experience during the development cycle

6.2.1 How the initial idea turned out



Our initial idea was creating a fun experience that had an appealing aesthetic and had a nice flow to it. The game should be short enough to be easily completed in five minutes, but also have enough challenging features for a high replayability score. For the most part, this goal was achieved.
As we started this project, we went through an excessive first planning stage, discussing back and forth about different aspects of the game. What is the goal? How does the player achieve it? What is the fun part of it? How can we achieve high replayability? Those questions were answered and set as goals during the development process.

After this process, we did not change too much of our initial goals. The project went well and we were able to achieve most of our goals. Godzilla is a short fun game with an appealing aesthetic that has some replayability. The flow aspect was partially achieved as the “satisfaction of destruction” grows with Godzilla’s growth.
Still, there were a few features that we weren’t able to implement into our game.

6.2.2 Unfulfilled milestones/features

As mentioned there a few features that we weren’t able to implement to our game and there had to be changed or left out. Firstly, we changed our idea for the growth system from continuous to discrete growth. This was easier to implement and test during development. Secondly, many high target ideas had to be left out because of lack of time. We had planned for different levels and game modes, being different cities with other obstacles and levels having a slightly different goal. Another goal was to add additional gameplay elements, like more dynamic enemies (e.g. policemen, tanks, and helicopters), items and powerups and additional combos and custom animations. More advanced missions (“Find the green police car and destroy it!”) and events (“Traffic jam! Get rid of it and gain more time!”) were also planned to add more to the replayability aspect.

6.2.3 Impact of project structure on the development progress

With the first presentation of our game idea early after two weeks of the project, we were forced to make up our minds pretty early. Especially, since we planned to begin with the

paper prototype earlier which was one week into the project. Nevertheless, we all liked the idea of making a game with Godzilla destroying a city. Therefore, we quickly found our game idea. Moreover, very helpful has been the commentary of the other team members after the game pitch. It induced us to implement enemies into our game and, thus, we started planning the police cars quite early.
The paper prototype gave as a first impression how our game might turn out. We had quite heated discussions, whether the game should have an objective or would be about survival only. It helped us to envision our game and our character: how it moves around and what abilities it could have. During the prototype, we also generated first ideas in regard to game strategy. We came up with the idea that the player is rewarded with more points, if he destroys the city without interruption. These considerations were absolutely necessary for the competition we held at the Demo Day.
Towards the interim milestone, we could see that our game started to gain shape. We had first representations of objects in our world, we started to have a player input scheme and a third-person character, a basic level with a task system and first generated content for the city. As it being the midpoint of the intended development time, it helped us realize that there's still a lot to be done until we would be able to present a game. At the Alpha release, we were able to present our game the first time. So after the alpha, we still continued to polish our game and executed the playtest in the second week of the phase. The playtest has been huge for us, we saw that our game idea seemed to be broadly accepted, that the game provoked fun and was visually appealing. But also our weak points were mentioned. In general, it is a known fact that this kind of feedback is crucial for building a game. For us, it gave an overview over which issues in our development needed to be fixed. From the mutual feedback we came up with the demo/tutorial scene and the competition that shaped our demonstration at the demo day to the big success it was.

6.3 Personal impressions

6.3.1 Lukas Goll

1. What was the biggest technical difficulty during the project?

Besides the complexity of the animated character, I underestimated the difficulty to implement the third-person camera. Since it follows the player through the city, and should be freely moveable, there a quite some pitfalls you can fall into. Since we integrated the third person character into the game world late, the problems arose late, too. The camera follow did stutter, and the camera moved inside objects. So we were forced to restrict the camera movement. Of course, restricted control is experienced by players as nuisance. Towards the Demo day we found a good solution between restriction and freedom and the most players had no big obstructions during their game.

2. What was your impression of working with the theme?

I had no problems to adapt the theme what so ever. We formed our group at the same day as the theme was revealed, and that shows how engaging the theme was. I believe that something abstract, such as destruction is, really invites to be creative.

3. Do you think the theme enhanced your game, or would you have been happier with total freedom?

During a teamwork project, compromise is key. So you could argue that a fixed theme restricts the outcome of the full project, so there is already the first element everybody has to compromise with. Therefore, I believe having a theme is good. Not regarding the result but in regards to the team members around.

4. What would you do differently in your next game project?

For my next project it would get everyone in the project involved in every aspect of the project. Usually, projects in university are very time-limited, and the most efficient approach is to split the workload in distinct modules that are designed to integrate later. Of course the great picture is discussed together, but the problems are solved by the singular student. This makes the most sense from the time perspective. People become experts in their field. But if time allows it, I would mix it up. It would make mistakes faster visible, it would start a conversation about details, and the problem solving becomes more creative, as more members contribute to solving it.

5. What was your greatest success during the project?

Since I was heavily involved into the development of the Kaiju and also the game design and game balancing, my success rendered before me during the demo day. As people were watching the game, waiting for their turns and discuss what strategy to use, I felt proud. From my perspective, the players had fun using our Kaiju monster, they explored what abilities they can use and the enjoyed the competition to score the most points in the given scenario. That was a big success for me and the team.

6. Are you happy with the final result of your project?

Yes.

7. Do you consider the project a success?

As mentioned above, yes.

8. To what extent did you meet your project plan and milestones (not at all, partly, mostly, always)?

Of course we had a project plan. That is the plan with all the tasks sorted in, functional minimum, desired target and so on. We were mostly able to complete these, if you look at it that way. Sometimes tasks would take longer than expected. And from my experience, that is normal. Therefore good project organisation does not plan problem time ahead, it rather is flexible and adaptive to them.

9. What improvements would you suggest for the course organization?

This is now my second time participating in this course. In general I would like to thank the organisers for this opportunity to do it twice. It really helps you to get a grip on small team game development and I believe that everybody participating gains a lot from it. That being said, I would like to see more time, in which the whole group, meaning the practicum members get involved in open conversation.

6.3.2 Tim Kaiser

1. What was the biggest technical difficulty during the project?

I had the biggest difficulties with creating broken version of the voxel models we had made. Our original plan to just make the by hand turned out to be just way to time consuming. So I had to make a tool that creates these automatically. This required

me to research and understand the .vox file format, in which these models are stored, in order to write a python script that reads these files and breaks the models apart.

2. What was your impression of working with the theme?

The theme was fun, since it wasn't too restricting and allowed for some creativity, which I think is evident by the three completely different games that were made in this course.

3. Do you think the theme enhanced your game, or would you have been happier with total freedom?

I think giving a theme actually results in better ideas. The restrictions help channeling the flow of ideas better. With complete freedom there are just too many possibilities to consider.

4. What would you do differently in your next game project?

For the next game I would try to connect the different parts everyone was working on earlier. We only started doing that shortly before the playtesting prototype, which left us very little time to test the game ourselves and lead to some issues in the development.

5. What was your greatest success during the project?

My greatest success during this project was the creation of the procedural generator. The way it generates a street system out of a graph and then adds more and more features to the map until the final result is a beautiful organic city is something I am quite proud of.

6. Are you happy with the final result of your project?

While this is not the style of game I personally enjoy I think that the game we made is something that others might have fun playing, and I learned a lot during the process.

7. Do you consider the project a success?

Yes, I would consider the project a success.

8. To what extent did you meet your project plan and milestones (not at all, partly, mostly, always)?

I think we achieved most of our goals, except some of the more high level nice to have features, even though my personal priorities changed at the beginning of the project, since we had to deal with unforeseen problems in the asset creation process, as I have mentioned in the first question.

9. What improvements would you suggest for the course organization?

I am overall very happy with the course organization.

6.3.3 Evgenija Pavlova

1. What was the biggest technical difficulty during the project?

As I worked mainly on design and the creation of assets and Godzilla and his rig, the most challenging part was to create a working rig for the stiff voxel-mesh of Godzilla. Also, Godzilla has different rig requirements as a humanoid rig, having a different body type and an additional tail. It had to be readjusted a few times as the animations we used were designed for humans but not for a Kaiju. But it worked out fine.

2. What was your impression of working with the theme?

Challenging! The topic was easy to understand but challenging to find a good and creative solution. I liked it.

3. Do you think the theme enhanced your game, or would you have been happier with total freedom?

I, personally, am a fan of topics and simple rules. It allows more freedom and directness during the creative process as you have to try to think out of the box or find something new inside of it.

4. What would you do differently in your next game project?

I would like to be able to put more time into the development and creation process. As a fulltime student, working as a working student, it is hard to put more time into it. Time management could have also been more refined on my side.

5. What was your greatest success during the project?

The Godzilla and object meshes! Also, the look and feel of the game, as it was my personal goal to achieve an appealing “look and feel” of the game, which we achieved in end. I’m also very happy that my teammates helped a lot in achieving this goal.

6. Are you happy with the final result of your project?

Most definitely! I was very pleased with the positive response of the players during the demo day. Many were amazed by the game and seemed to genuinely enjoy themself while playing it. For me, it was a huge success.

8. To what extent did you meet your project plan and milestones (not at all, partly, mostly, always)?

Regarding the core requirements for our goal, I would say I achieved most of them, adding more assets to the game and helping to integrate them into our system. I would have been more satisfied if I had been able to create more additional animation for the combos.

9. What improvements would you suggest for the course organization?

I would suggest starting the course a little bit earlier, allowing students to have more time for the creation of the game idea at the beginning and for the last polishing of the game during the end. Due, to the fact that we managed to start a little bit earlier with the game planning, we had a huge advantage during the development process. I think this would also help other students a lot.

6.3.4 Maximilian Mayer

1. What was the biggest technical difficulty during the project?

Personally, as I was working on the police car AI and the general car traffic system I struggled most with the wheel collider system of Unity3D which powers the cars. The system is not necessarily perfect for precisely controlling how much a car moves because forces are applied to the wheels which are then further calculated by the Unity physics system. Making a car stop at an exact spot would have required me to know the formula of how wheel brake friction is applied by the physics system in order to leverage it and make a car stoppable anywhere I want. However, this formula is somewhere hidden inside the Unity code and probably too complex to easily reverse it. Thus, some work around was necessary and making both parts work in conjunction took some time.

2. What was your impression of working with the theme?

I greatly enjoyed working with the theme due to its simplicity yet strong expressiveness. “Destruction” immediately formed a clear image in my mind, still all projects turned out vastly different in gameplay and interpretation of the concept. One team would use destruction as a support for gameplay, the other as a logical puzzle and us as the main objective. Therefore, I believe that the theme was utterly perfect for the course and was able to yield creative projects.

3. Do you think the theme enhanced your game, or would you have been happier with total freedom?

The theme surely enhanced the game as it gave a direction that the game needed to head towards. Without it, quality of the projects would likely have suffered as there were no standard for comparison. In addition, it started the creative process of including such a theme and turning it into a game idea which is necessary for later projects during the job. Already in last semester’s lab course I stated that this course should stick to one theme per semester and I gladly express my opinion once more.

4. What would you do differently in your next game project?

I was very happy with the organisation of our team and the task balance between each member. Only scheduling on paper and keeping up with task management online suffered throughout the development process. Surprisingly, this did not affect the outcome and effectiveness of the team. I suppose this is due to each team member’s long term experience during the studies with team projects. However, I also believe it was strongly supported by the fact that there was almost no overlap of tasks between members. So for the next project, may it be of larger scope than the current project, I would prefer more task management just to be safe to not run into troubles with completing the same task twice or working on same code but developing it into a different direction.

5. What was your greatest success during the project?

Implementing the logics for the car traffic system and it working properly was definitely the most fulfilling moment. With the input of a more experienced friend of mine, who suggested a specific code structure, I was able to build a system that would manage multiple cars approaching a crossing by giving them instructions on whether to drive or not to. Being able to look at the cars driving around the city autonomously rewards me with a positive feeling.

6. Are you happy with the final result of your project?

I am very pleased with the outcome of our project. It has even slightly surpassed my expectations that I had at the beginning. I was able to improve my programming skills and could show it with the car AI also in the game. On top, all other members did a great job as well and contributed with creative ideas and excellent crafts(wo)manship to the game. The outcome looks visually splendid and we were able to capture the spirit of our initial idea.

7. Do you consider the project a success?

As obvious by the previous question, I do consider the project a great success. This is one of the projects that I can count on and show during job interviews and to friends. Also, in terms of teamwork we were able to collaborate without issues which makes the game a social success, too.

8. To what extent did you meet your project plan and milestones (not at all, partly, mostly, always)?

There are only few parts of the plan that we did not get to or decided against in the end. I think we implemented some of the high target goals as well which proves that we could finish all desired points. During the process though there has been some delay to few goals which had to be pushed back because we decided to shift priorities to the enemy implementation. Fortunately, these decisions were made early on and the moved inclusion of music was then done at the end of the implementation cycle. Thus, I would state that we mostly met the project plan, yet I think that restructuring is not negative and has helped us to make the game more fun to play.

9. What improvements would you suggest for the course organization?

Now that I have taken part in two semesters of the Games Laboratory, I have experienced the ways both professors handled the course. In one semester I found the course to be slightly too pressuring with too much focus on bureaucratics, management tasks and so on. The other semester was a bit too relaxed with less competition. Concluding, I would like to suggest a mixture of both styles to take the best of the best from both semesters: Relaxed classes but with teaching content and slight competition amongst project teams.