

Tenacious

Mark Krutik and Chris Mino

Table of Contents

Artist Statement.....	4
Section 1 - Game Overview.....	5
Elevator Pitch.....	5
Game Concept.....	5
Genre.....	5
Narrative Driven, Point and Click, Disability Representation Games, Renovation, and City Building.....	5
Target Audience.....	6
Core Pillars.....	7
Puzzle-Based.....	7
Game Flow Summary.....	8
Game Length.....	8
Points Depending on Challenges:.....	8
Difficulty Levels:.....	9
Section 2 - Gameplay and Mechanics.....	10
Gameplay.....	10
Identifying Locations That Are Inaccessible.....	10
Navigating the City Map.....	13
Tutorials.....	13
Game Mechanics.....	14
Puzzle-Solving.....	14
Point-and-Click.....	17
Section 3 - Art.....	18
Colour Palette.....	18
Art Style.....	18
Section 4 - Story, Narrative and Settings.....	19
The Story.....	19
Game World.....	19
Life Stages and Levels.....	19
Setting.....	28
Environment.....	29
City Level Map.....	29
Characters (Characters are made using: https://www.cartoonize.net/avatar-maker/).....	30
Section 5 - User Interface.....	36
Screen Flow.....	36
Menus.....	37
Title Screen.....	37
Level Completed Screen.....	37

Level Map.....	38
Credits Screen.....	38
Options Menu.....	38
Accessibility Settings.....	39
HUD.....	40
Section 6 - Animations.....	40
Section 7 - Music and Sounds.....	41
Sounds.....	41
SFX.....	42
Character.....	42
Environment.....	43
UI.....	44
Ambience.....	44
Dialogue.....	45
Section 8 - Settings.....	46
Audio.....	46
Master Volume.....	46
SFX.....	46
Ambience.....	46
Music.....	46
Dialogue.....	46
Visual.....	46
Resolution.....	46
Refresh Rate.....	47
Vertical Sync.....	47
Aspect Ratio.....	47
Brightness.....	47
Contrast.....	47
Gamma.....	47
Texture Quality.....	47
Shadow Quality.....	48
Bloom.....	48
Depth of Field.....	48
Anti-Aliasing.....	48
Safe Zone Settings.....	48
Controller / Keyboard.....	48
Button Remapping.....	48
Mouse or Controller sensitivity (depending on which the player is using).....	48
Dead zone (For controller).....	49
Vibration.....	49
Saving Options.....	49

Section 9 - Accessibility Options.....	50
Accessibility (Software).....	50
Audio.....	50
Visual.....	50
Cephable.....	51
Accessibility (Hardware).....	51
Xbox Adaptive Controller.....	51
Quadstick.....	51
Section 10 - Technical Specifications.....	53
Middleware.....	53
FMOD.....	53
Unreal Engine Version Control.....	53
Unreal Engine Blueprint.....	53
Houdini.....	53
3DS Max.....	53
Adobe Substance Painter & Designer.....	54
Adobe Creative Suite.....	54
Section 11 - References.....	55

Artist Statement

Disability is an important topic for Chris and I as both of us are disabled with Muscular Dystrophy, which is a muscle wasting disease. We face many challenges on a daily basis, however we still overcome these obstacles in any way we can. It's hard for many people to understand this since they are not disabled themselves and that makes it harder to empathize. This leads to many stereotypes like pitting, making fun of, or assuming they can't go out into the community and other ableist behaviour. Chris and I are honestly tired of this and I am pretty sure we are not the only ones. The goal of this game is to show people in a video game how people like us live and just like able-bodied people we have feelings as well and can live normal lives regardless of the hardships. We hope that with *Tenacious* we can touch people emotionally so that they at least get a better understanding. It will educate people to not listen to those bullshit stereotypes that the media presents. That way they will learn to look at us as genuine people. Honestly, people take a lot of things for granted when anyone can become disabled whether you are born with a disability, old age, or if you get into an accident that paralyzes you. I think this ties with game criticism as we cover the topics of representation. However, it's the representation of people with disabilities. Since there are not really many games that exist with disabled people. It will be excellent information for gamers and game scholars to look at and analyze since there is not enough research being done in regards to representing physically disabled people in video games.

Section 1 – Game Overview

Elevator Pitch

Imagine being isolated with no one to talk with or hang out with because of societal, economic, and political pressures. It can be quite a depressing feeling and leads to loneliness. Follow the path of a fellow named Tyler who is diagnosed with Muscular Dystrophy and help him create a more accessible environment while engaging in life similar to an able-bodied person regardless of the factors that prevent them from having a full-life. A rich life experience awaits as he goes through his daily life. From friends, to intimate relationships, to family life, nothing will stop him from achieving the goals that he set. If you want to understand what people with disabilities go through then this will be an empathetic experience for you.

Game Concept

The game is a point-and-click rich narrative, puzzle-solving, renovation game that follows the story of a person who is disabled. The player will solve puzzles and make environments more accessible for them by finding inaccessible locations, as well as engage in the narrative of the story. The game map will include procedurally generated cities that become more and more accessible over time, until all the places are accessible. In order for the city to look more accessible the player must progress through the game by playing levels and solving puzzles.

Genre

Narrative Driven, Point and Click, Disability Representation Games, Renovation, and City Building.

A narrative-driven disability representation game that features people with disabilities as it goes over how a disabled person overcomes multiple challenges imposed by society and barriers such as; communication, culture, policy, the system, social and accessibility barriers. Additionally, it follows the genre of point-and-click, renovation, and city-building. The whole point is to turn an inaccessible location into an accessible one depending on the player's progression. The player will be able to learn to understand what non-accessible locations look like. After each level, the

player solves a puzzle, and locations on the map become more accessible. Once the puzzle is completed players are taken to a level map that lists all the levels, where they can see the city becoming more accessible.

The story will be heavy as it shows the hardships the character has gone through to accept who they are as a person as well as their relatives, friends and their significant others. There will also be discrimination and acts of ableism to show the problems the main protagonist faces. It includes factors such as; social, political, accessibility barriers, and many others.

Target Audience

This game is made for people with and without disabilities who are interested in puzzle, renovation, and rich narrative games, in order to teach people how to positively represent people with disabilities in video games. Additionally, it will be for audiences who are aged 14 and older due to the heavy themes that are explored in the game.

% of people that are disabled

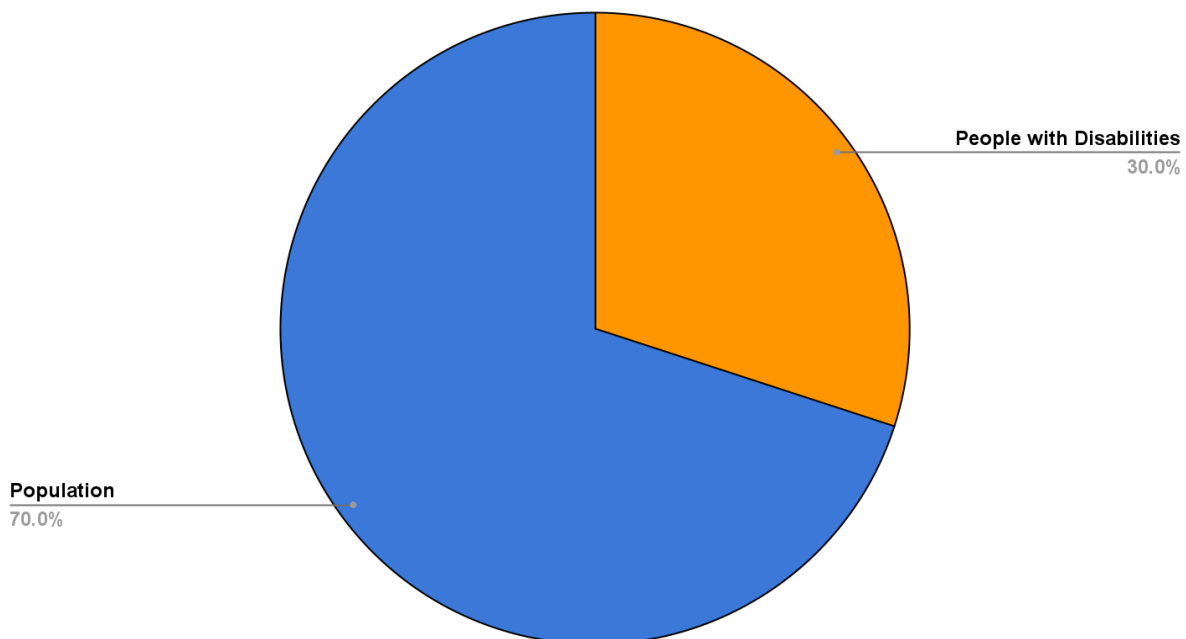


Image 1.1: Pie Graph with Disability Demographics

According to able gamers, a population of 30% has some sort of disability whether it's physical or mental, and that 70% of the population is able-bodied.

Anyone can become disabled whether it's an accident, a disease like diabetes, cancer, or ALS that occurs later in someone's life. We sometimes take things for granted because unless it happens to the person, most people don't care. Therefore this game would be for anyone regardless if 30% of people are disabled with something.

Core Pillars

The game will feature 5 Core Pillars that are a vital piece of the game, which are:

Puzzle-Based

The majority of the game requires the player to solve puzzles in order to advance to the next level.

Renovation

The player is required to use the items collected from the finding hidden objects stage to make a place that is inaccessible, accessible.

Accessible Gaming

The game features many accessibility features that allow people with many different types of disabilities to play the game.

Story

The story is rich and full of interesting narratives of overcoming hardships and barriers, and learning to accept who you are as a person.

Representation of People with Disabilities

This is the most important pillar as this game is based around representing people with disabilities in video games as not many

games feature this. The game mainly revolves around this specific pillar.

Game Flow Summary

The game flow is as follows:

The player is in a 2.5D world, in a point-and-click game. The objective is to find accessible items in the environment while going through difficulties in life whether it is an accessibility, cultural or political barrier. Depending on the barrier the player is given [challenge points](#), these points add up to set the [difficulty level](#) for a puzzle that the player will solve at the end of the level. Some puzzles will be extremely difficult to solve and will therefore need to be skipped. Once the player gets through all the levels in a life stage, even if some levels were skipped, the entire level is made accessible because the barriers have been overcome. Additionally, depending on how many times a certain barrier occurred in that level, a [puzzle type](#) will match that barrier.

Game Length

The game will consist of multiple life stages

- Stage 1 is elementary school grades 1 - 8
- Stage 2 consists of high school grades 9 to 12 + Gap Year
- Stage 3 is post-secondary, college then university
- Stage 4 is adult life / Intimate life / Job (Age 30+)
- Stage 5 is adult life/family life / Job (Age 40+)
- Stage 6 is retirement (Age 65+)

Each life stage consists of 10 levels except the last stage since it will consist of only one level.

Points Depending on Challenges:

Barrier	Amount of Points
Communication (Puzzle 1)	5
Cultural (Puzzle 2)	10
Policy / Systemic (Puzzle 3)	15

Physical / Environmental (Puzzle 4)	20
Social (Puzzle 5)	25

Table 1.1: challenge point table

Difficulty Levels:

Difficulty Level	Points required to get
1	100
2	200
3	300
4	400
5	500

Table 1.2: difficulty level table

Section 2 - Gameplay and Mechanics

Gameplay

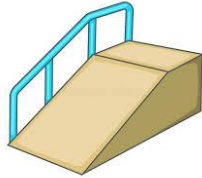
The gameplay in *Tenacious* is based around finding inaccessible locations in a 2.5D environment and then solving various different puzzles at the end of the level and making the environment more accessible. The specific gameplay objects are:

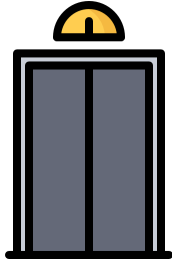
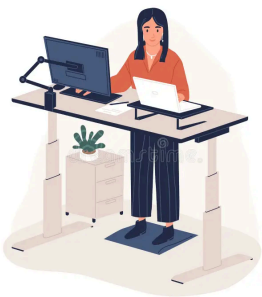
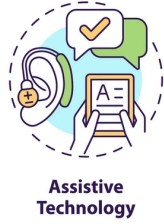
Identifying Locations That Are Inaccessible

The main gameplay will be a point-and-click mechanic where the player has to spot inaccessible locations in a 2.5D environment, a box in the top corner will tell the player how many locations are needed to be found.

Once the character has progressed through the narrative and found all the inaccessible locations, the player has to solve a puzzle at the end of the game. Depending on the amount of barriers the player has gone through, and which barriers occurred the most often, one type of puzzle appears with a certain difficulty. That depends on the challenge points a player has received. Once the puzzle is solved an accessible item makes the inaccessible location accessible.

Here are some of the accessible items:

Name of Item	Description	Image
Ramp	This item is used for putting on a step so that a wheelchair user can wheel into the building.	

Elevators	This item is used for getting into higher floors of a building that would be impossible for a ramp	
Accessible Washrooms	This item is used for helping wheelchair users and people with lower mobility to be able to use a washroom	
Accessible Doors (Hand-Wave Buttons)	This item is used for opening a door without needing to use the handle or getting someone to help	
Adjustable Tables / Desks	This item is used for desks to be adjustable for any height	
Assistive Education Tech (Smart Tablets)	This item is used for assisting students with education more effectively	

Accessible Ceiling Lift	This item is used for assisting in lifting and transferring a wheelchair user	
Accessible Pool	This item is used for allows wheelchair users and people with lower mobility to use the pool	
Wheelchair	This item is used for allowing transport by a person who is unable to walk	
Accessible Computer Areas	This item is used for assisting in the use of computers	
Stair Climbing Wheelchair	This item is used for allowing wheelchair users to be able to use stairs	

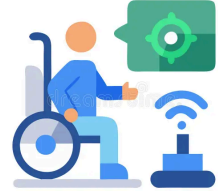
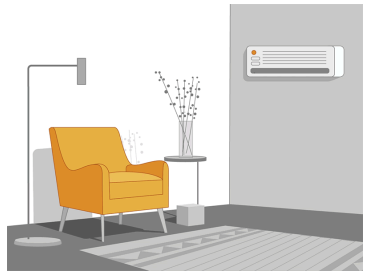
Assistive AI	This item is used for helping people with all sorts of things	
Area with Air Conditioning	This item is used for keeping people cool	

Table 2.1: Accessible items table

Navigating the City Map

Once a level is completed the player is taken to a city map which shows the progress of how accessible the city is becoming. The map will be divided using multiple colours just so it is easier for the player to distinguish the life stages the player has gone through.

Tutorials

Shows up in the first level, and can be accessed from the options menu

Stage 1: Will tell you how to move in 2.5D environment and find your first inaccessible location, using text boxes and/or narration.

Stage 2: Once the player has completed the first level, a tutorial will also tell you how to solve the puzzles. Additionally, a tutorial shows up whenever the player gets a puzzle they haven't seen before, and it will go over the puzzle-solving sections.

Stage 3: A tutorial will pop-up explaining how to navigate the city map and how to unlock levels that are locked.

Game Mechanics

Puzzle-Solving

The point of the puzzles is that the environments will have certain difficulty levels set depending on how many barriers the player has gone through. Each puzzle will have a difficulty level (up to level 5). If the puzzle is way too difficult the player can also skip the puzzle. The puzzle is difficult on purpose so it shows the player that some things are impossible to complete as it is in life since they can't have a social life with the barriers. Depending on how often the player went through a certain barrier that type of puzzle will be displayed.

All the puzzles will be logic puzzles:

3x3 Slide Puzzle

The player will have to rearrange a 3x3 grid of a scrambled picture, only having 8 squares to move as one spot needs to be empty to move the other squares around. The player will see the completed picture before it scrambles and can see the completed picture anytime they want.

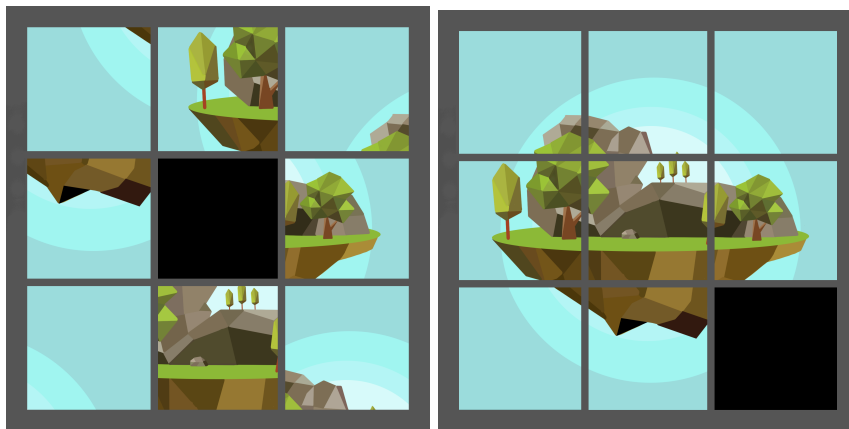


Image 2.1: Unsolved and solved 3x3 slide puzzle

Slide and Escape Puzzle

The player will have to guide a red brick out of an area, by sliding other bricks around so that the red one has a clear path to the exit.

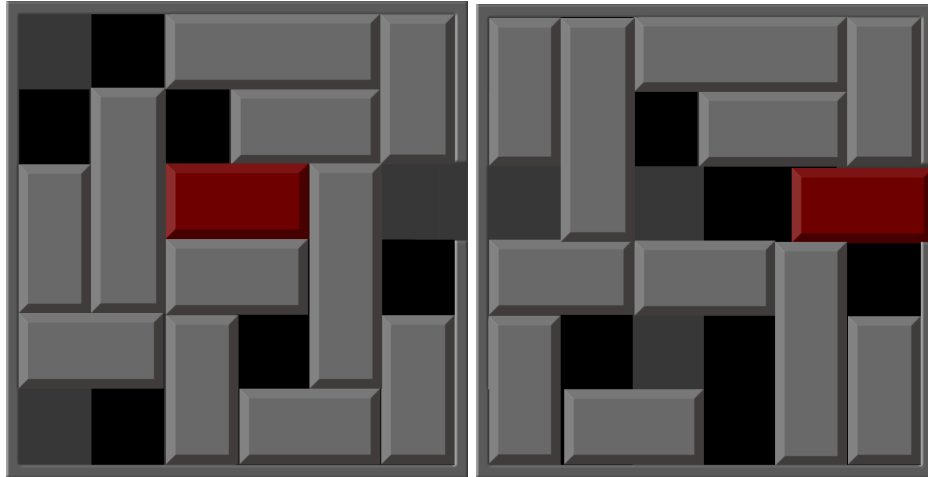


Image 2.2: Unsolved and solved slide and escape puzzle

Gear Puzzle

The player will have to use gears to make a gear at the end rotate. One gear at the start will be rotating. There will be three sizes: small, medium, and large. Some gears will be locked in place and not be able to be moved by the player.

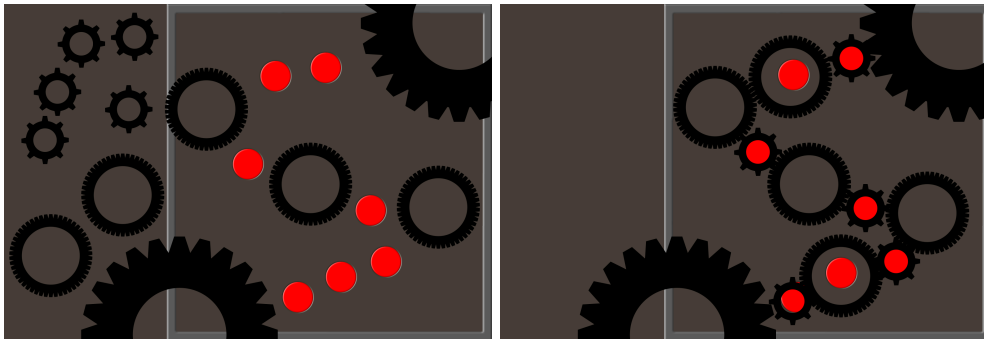


Image 2.3: Unsolved and solved gear puzzle

Water Flow Puzzle

Using different shapes of pipes the player will have to direct the water to an exit. The player can also rotate these pieces.

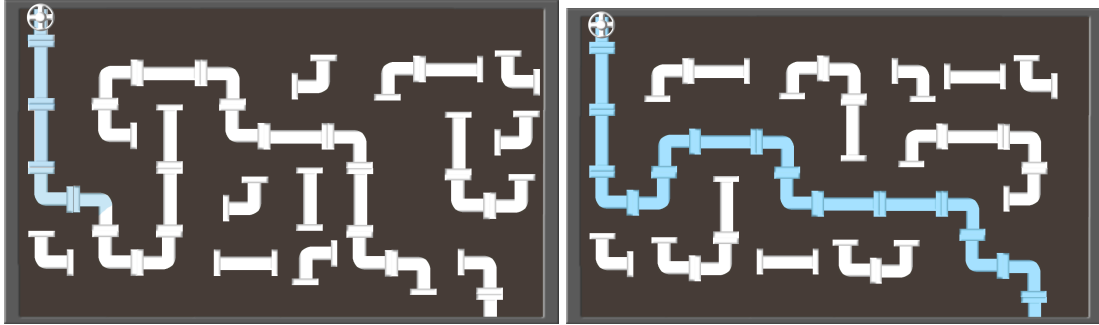


Image 2.4: Unsolved and solved water flow puzzle

Laser Bounce Puzzle

The player will have to guide a laser from its start point to the endpoint or endpoints by using a variety of mirrors.

Players will start with a partially completed board.

The top will tell the player how many targets there are, and what the player can place (can be placed in a free square), if it has a question mark with arrows it can be placed in any rotation

What can be placed:

- Red square is the beam emitter
- Blue mirrors reflect the beam
- Green mirrors split the beam
- Yellow mirrors require the beam to go through it
- Purple mirrors can reflect the beam or act as targets (the dark triangle)
- Black squares can't have anything placed on them

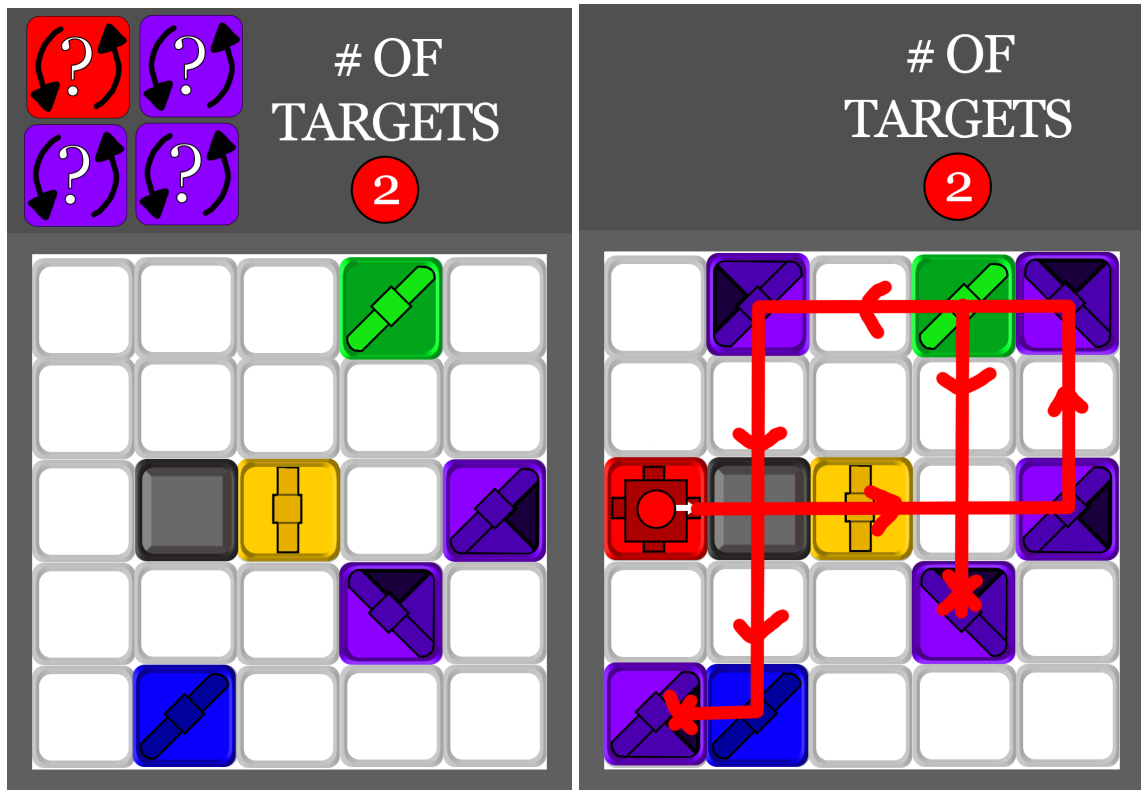


Image 2.5: Unsolved and solved laser bounce puzzle

Point-and-Click

This mechanic is used for clicking where to navigate for the player as well as select what's inaccessible in the levels.

Section 3 – Art

Colour Palette

Colours will be bright but not too bright so that it's more accessible to people with vision disabilities

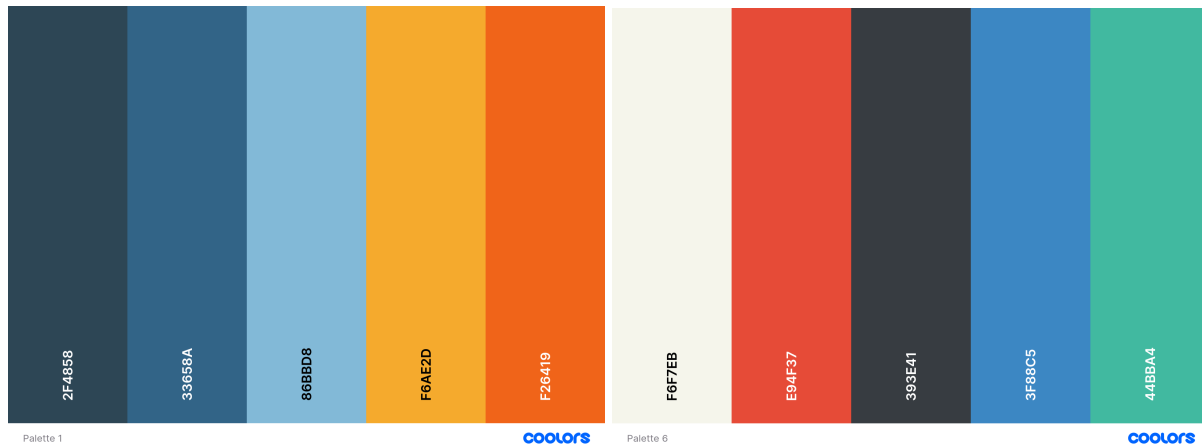


Image 3.1: Colour palette

Art Style

The art style for the 3D is a cartoony environment similar to *Homescapes*. However, since it's architectural which means everything has to be proportional and follow architectural guidelines such as proper door size, etc...

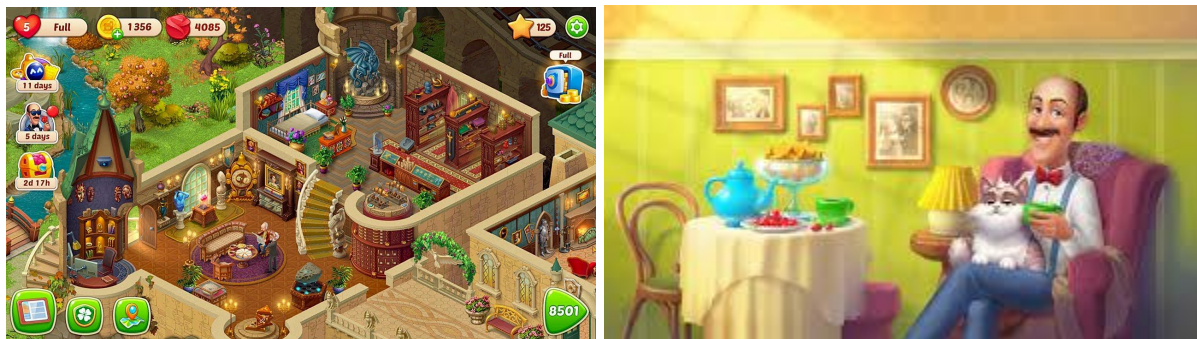


Image 3.2: Art style for *Homescapes*

Section 4 – Story, Narrative and Settings

The Story

A person who is wheelchair-bound is working to make the world more inclusive and accessible to people with disabilities. His name is Tyler. Tyler was always an isolated person and not accepted by society because of stereotypes invoked on him by many factors such as; the media. The game goes over his entire life from when he was a child up to his adult life where he starts a family life. This game promotes inclusivity for people who are isolated due to societal, economic, political, and accessibility barriers.

Game World

Life Stages and Levels

Life Stage	Level	Description
1 - Walks	1-1	Started grade 1 at the age of 7. Is diagnosed with Muscular Dystrophy. He attends a regular school that is not accessible and has no elevators. Is constantly bullied because he is different from the rest and has a disability.
	1-2	After a year, Tyler is transferred to a different school that is more accessible and has an elevator, however, there are still accessibility issues in the playground.
	1-3	In Grade 3, Tyler is invited to a birthday party by his friend, however the house is inaccessible. The kids' parents are so nice and they carry Tyler inside. They have dinner and then they go sledding in the snow.
	1-4	Tyler usually does not get invited to birthdays however In Grade 4, he is invited by yet another friend, and also gets carried in by the friend's parents but they play cards and have dinner. The friends' family become friends with Tyler's family.
	1-5	In Grade 5, Tyler has graduation because the school is only up to grade 5. The professors organize an accessible graduation where Tyler is able to participate.

	1-6	In Grade 6, Tyler goes to a new school and there is a special education program for people with disabilities. They go to school with able-bodied kids.
	1-7	Tyler meets a music teacher who introduces him to the trumpet. Tyler becomes better and starts playing in the jazz ensemble and concert band.
	1-8	Tyler is bullied by a couple of people in grade 7 and a girl helps him stand up to them because they laughed that he can't walk (ableist behaviour).
	1-9	In grade 8, Tyler drastically becomes one of the most popular kids. He plays Trumpet in the jazz ensemble and concert band, but he also sings in a Glee club and acts in a drama club. He performs even though it's not accessible because the pros and students help him on stage.
	1-10	Tyler likes a girl in class. Her name is Elyssa, so he starts chatting with her using a chat app. He eventually starts dating her and starts his first relationship. She respects his character as a person, regardless of the fact that he uses a wheelchair. In this scene, they take a stroll in the park.
2 - Walks a bit and uses a manual chair. Moves to an electric chair after grade 12	2-1	Tyler graduates and has to go to a different school then his girlfriend breaks up with him because he has no time to hang out or travel because the bus rides take 1.5 hours daily and there is lots of homework in grade 9. When he starts he knows no one except for the assistants that work in the Special Ed Classroom, which is a special area where people with disabilities can go.
	2-2	After the first week, no one talks to Tyler because of stereotypes that a disabled person has to be pitied. He however manages to meet a friend that he always talks to from music class because they both listen to Jazz. This section is just another day at school.
	2-3	Tyler has gym class which he has to do in grade 9. They have a track and Tyler wheels himself 50 laps. A girl decided to talk to him because she was shocked that he did 50 laps even though he was tired. In this section, Tyler has a regular day at school.
	2-4	Tyler comes home exhausted from school after having to get home from a snowstorm. He still has to do

		chores, do some exercise, and play his trumpet. He has no time for socialization and is focused on music. The level takes place in Tyler's home.
	2-5	Tyler goes swimming with the help of the education assistant who helps him get into the water. The lift isn't open so he has to carry him and hurts his back while lifting. The story takes place in the changing room and then in the pool.
	2-6	The class goes skating and Tyler just stays in the Special Classroom doing his work because he can't go. Everyone is socializing and he is working on homework. Takes place in school, and Tyler daydreams of himself socializing with friends. This takes place in the special ed classroom.
	2-7	Tyler is in grade 11, and there has not been a single class about people with disabilities and ableism continues. People in Tyler's class assume he is dumb because he is in a wheelchair when he was offered to be in a gifted program before because he has a photographic memory. He goes to the library to sign out a book and read it. This takes place in the social sciences classroom and then the library.
	2-8	It is the end of the school year, and Tyler is playing a concert for the end of the school year with the concert band, the ramp breaks, and students have to lift him up the stairs with the wheelchair. Additionally, there is no air conditioning which makes it way harder for Tyler to play. This takes place at the gym in the school.
	2-9	Grade 12 graduation goes well but again there are tons of stairs and he has to get carried in with his wheelchair. Was quite boring because he honestly had no one to dance with and just sat at the table for most of the night. Everyone pretty much had couples and he was the only one that did not. His educational assistant however kept him occupied and they had a good conversation. Tyler started to mature way more quickly against the stereotype that the disabled are less mature. Tyler remembers how he would always sit at a table with adults and learn proper table behaviour. He would also learn how to make toasts with juice in his glass, while the adults drank alcohol. His intellect continued growing.

	2-10	In this period, Tyler took a gap year and decided to go to a mall. When he was at the mall parents would take their kids and move them away from Tyler, they did not even let them talk to Tyler. However, he did not care because he had seen that many times before. Some stores were inaccessible so he could not even enter it. His mom would have to bring out some clothes outside. Luckily she had very good taste. Then he goes to video games and buys some racing games. This takes place at the mall.
3 - Walks with help, then later in the story has to fully rely on a power wheelchair because cannot walk.	3-1	Tyler decided to do computer programming in college since he wanted to learn web development. It is a three-year program and he is the only person with a wheelchair in the class. But what sucks is that there was not a single girl in the class, and all that's left to do is just attend classes and do work. No parties even. There was only one elevator for the school and the campus was slow. People that did not need it constantly took the elevator and Tyler had to wait a long time. The accessible washroom was also constantly occupied as usual. There is only one accessible washroom in the whole school. This stage takes place over 3 years because every day is quite the usual. All of these stages take place in college.
	3-2	Tyler graduates and is looking for jobs but it is hard to find any. He attends a couple of interviews and does not get the job. He starts working as a freelance web developer from home where again he is constantly alone doing stuff on his computer. His family also moved to a different house, which is bigger but it's away from the city and he barely has any friends. Most of his friends are adults. Tyler also gets a drum kit however it's downstairs so his dad has to constantly carry him downstairs. This takes place at an interview and then in Tyler's new house.
	3-3	Covid hits and Tyler takes a couple of years from work to just practice music for hours and improve his trumpet skills. His dad convinces him to take him for a walk outside the pond. The bridge is not very accessible however it is manageable to maneuver. People around are ignorant as always and are more scared because of the covid and think that disabled people are under more risk. That would depend if you have an autoimmune disease but Tyler did not and he wore a mask like everyone else even though it was hard

		to breathe. This takes place in the pond not too far from the house.
	3-4	Tyler decides to switch careers and attends university for game design. He likes the program, it's fun and interesting. However, he does not talk to many people because he sits at home most of the time during covid and most people are even scared to talk to him. He gets offered to play at a Jazz Ensemble in the trumpet section that he really enjoys being part of. This takes place at the university and rehearsal area.
	3-5	Tyler has a class all the way in another block but all the doors to get there have no accessibility buttons whatsoever. He constantly needs to get help opening doors and he does not like to ask people for help. He does get to his classrooms however. This takes place at the university.
	3-6	Tyler gets a job in the university library where he does a good job assisting students with finding certain books and signing them out. It is not that accessible but the librarians find a solution to ease the process. In this stage Tyler is navigating the library.
	3-7	Tyler is put on a team to make a game that has to go to a competition and is kicked from the production roles in the team because they assume that he will not be able to handle his responsibilities, when he is already helping produce a film with a team size of 20 people. Tyler is ambitious because he wants to get known but yet in life, he is not given much positive stimulation. So he wants to prove that he is able to do it in a competition. This takes place in the class and then in the competition. Instead, he starts the process of writing a GDD for his own game and opens an accessibility association at school.
	3-8	This time his work gets recognized and he gets a team of people that want to actually work with him. They built a working game that wins an award. Also the accessibility association starts to gain popularity and becomes known. The school starts the process of making the doors accessible in the school. This takes place at a competition and then university.
	3-9	He tries to find a girlfriend however with no success because he either gets rejected or none of them want

		to talk to him. Since there is a stereotype that males have to take care of themselves, no one wants to date him. Anyway he moves on and decides to do a masters degree in accessibility and spread word that people with disabilities are foremost people. He continues his solo game project. He is in the game classroom as well as different places in the university.
	3-10	Tyler takes his game to a competition that is not as accessible and many people help him in. He becomes so much more social and starts talking to many people. He eventually wins an award as a solo indie developer and finally gets the attention he wanted. He finally finds a girl that is interested in him and she is apparently attending the same school where he is planning to get his Ph.D. He takes her out on a date which goes well and they decide to become a couple. This takes place at a competition and then in a restaurant.
4 - Uses only a power wheelchair	4-1	Tyler continues his journey in a different university pursuing a Ph-D. He moves out to live with his girlfriend who learns how to use all the lifts and he also gets a nurse that helps him out. His girlfriend is a very talented artist and is a big lover of Jazz. This takes place at a university and in the condo he lives in.
	4-2	In the university, Tyler is recognized at the institution for his work on the accessibility association in his previous institution. The university already has better accessibility services and there are no problems with it. He adapts easily to the new environment and makes many new friends who are also studying accessibility. However, on his way home the bus driver does not let him in. The driver lets the other people in. Tyler has to wait another half an hour for another bus. It is -10 degrees outside. He does make it home. The story takes place at the university and the bus stop.
	4-3	Tyler continues doing his research and finds a way to make VR accessible for disabilities. He shares his research in the United States where he is able to collaborate with MIT, to create this new technology. His girlfriend comes over to his lab and they eat dinner there. It is a pretty easy day for Tyler with no issues. This story takes place in the university lab that Tyler does not leave for the entire day.
	4-4	Tyler takes a week off and he goes to the cottage with

		his girlfriend in order to spend some time. The cottage is accessible and specialized, however it costs so much that I have to borrow money for a loan. It's good that both he and his girlfriend work. He goes to the forest but it is not really accessible. His girlfriend finds that an off-road wheelchair can be rented. He takes his girlfriend for a ride on the off-road chair and they have a blast. This takes place at the cottage and forest.
	4-5	Tyler has been in a relationship and doing his ph.d for three years. He is invited to a very big gala event and he takes his girlfriend with him. The stage is made fully accessible. Tyler finds out apparently that he is nominated to win an award for his research. Once he gets his reward he proposes to his girlfriend, which he was preparing for a couple of months. She accepts. This takes place at the gala.
	4-6	A year after the event Tyler finds out his girlfriend is pregnant in the second month of her pregnancy. Tyler is excited because he gets to become a dad for the newborn soon. They go to the hospital to do some tests to find out if the baby is a girl or boy and if it's healthy. Everything is good, however he sees that a more healthy patient is given medication instead of the one that needs it more. He tells the other doctors to give that other man medicine. This takes place at the hospital.
	4-7	9 months pass and he finally becomes a dad. Tyler gets his good friend he met in university to drive him and his wife home. Thankfully they make it safely. Tyler got his other friends to renovate the room a month in advance. This takes place in the hospital, then at home.
	4-8	A year and a half later he completed his ph.d and now he has to continue working at the institution to get his tenure status. While he does that he opens his own business that specializes in accessibility consultation. He also sees how the baby girl finally starts to take her first steps. This takes place at his new business office and then at home.
	4-9	A year later he gets his tenure status and has started a new accessibility faculty. He also got a partner to run the business up because it's hard to manage alone. They start making profits. He decides to leave work early so that he can spend time with his two-year-old.

		The bus he takes is not running and he has to take more buses to get home. His trip unfortunately takes a very long trip. He gets home when the baby is sleeping, but at least he got home safely. This takes place in the university, bus stop, and home.
	4-10	After 6 years, he has to go to a hospital because he has to get a pace-maker in order to help him live longer. It is part of the condition of progress. After he gets it he comes home and takes a week to rest. He spends time with his daughter who is now in grade 1. He decides to get his dad to teach his daughter to play piano. He spends time in the hospital and then at home.
5 - Uses power wheelchair and condition remains unchanged.	5-1	Tyler takes a sabbatical for a year and goes to the Caribbean with his now wife for a couple of weeks. The child stays with grandpa who takes care of her. There are many accessibility issues however the good people there and the medical staff are very well trained. They help carry Tyler because the government does not give a lot for accessibility. They do however have beach wheelchairs that help get into the water. This takes place in the resort.
	5-2	After the sabbatical he got promoted and now gets \$300,000 per year as a professor. Tyler decides to move with his wife into a bigger house, however lots of lifts and elevators need to be installed. They go for a house viewing. This takes place in the new house.
	5-3	The house has been renovated and now his 10-year-old daughter has a bigger room where she can bring her friends. The kids at the daughter's school make fun of her because her dad is in a wheelchair but she told them that she does not care because he is a good dad. They leave her alone because they know they can't get anything out of her. Tyler tells her good job for that. This takes place at the daughters' school this time.
	5-4	When his daughter turned 14 she started grade 9 and lots of guys did not want to date her because of her father. However, she met a boy who's interested in pursuing game design and wants to hang out with her. She brings him to her house to meet Tyler. They have a good time together and he lets him date his daughter because he is well mannered and respected. This takes place in school then in the house.

	5-5	Tyler gets called to do a presentation at his daughters school when she is in grade 11. He talks about video games however the school is not really accessible and they had to make his presentation in the gym. Many kids were impressed with solutions he was talking about to make games more accessible. The whole day takes place only at the school.
	5-6	His daughter is thinking of a university to go to. She goes for engineering because she wants to create accessible technology for people with disabilities. She has no time to socialize and go to parties because to get into an engineering university she wants she needs a 90% average. Her mom is proud of her since she is trying to change the stereotypes. This takes place at home.
	5-7	Tyler's kid gets accepted into the university and she starts learning there, however she has to live at a campus in a different province. Tyler and his wife take their daughter to the airport. At the airport some people recognized Tyler for his research in accessibility. They talked to him in a coffee shop at the airport. This takes place at the airport.
	5-8	A year later, his daughter gets another boyfriend who is also interested in jazz like Tyler and he is also a talented engineer. They are working on a wheelchair that climbs chairs so that it will be easy to go to any location. They get a good grant to complete the chair. It takes place at the daughter's university.
	5-9	In the next two years, the stair climbing wheelchair is complete and works. Tyler tests it and is very excited that he can now easily go up stairs. This takes place at the daughter's university because Tyler came to visit.
	5-10	His daughter graduates and Tyler gives his business to her because he is already too old to handle it, and she opens a new business area for wheelchair manufacturing, Tyler is very happy for her and that the world will be more accessible.
6 - Becomes much more paralyzed.	6-1	His daughter gets married, has a baby and Tyler can finally retire and spend his last years with his family and wife. In the end, he achieves everything he ever wanted and lives happily.

Table 4.1: Life Stages and Levels

Setting

The game world will be set in the 21st century. In the beginning the world is not as accessible, however over time the world becomes more accessible. That will depend on how far the player has progressed through the story.

Environment

City Level Map



Image 4.1: city level map

Characters (Characters are made using: <https://www.cartoonize.net/avatar-maker/>)

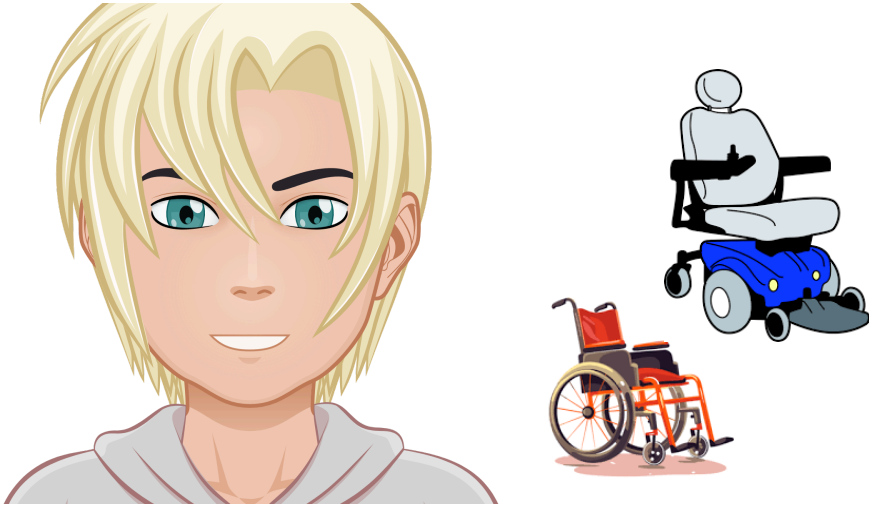
Name:	Tyler (Protagonist)	Age:	28	Encountered In:
				Every single level since he was diagnosed with his condition at 7. He walks in some levels then uses a manual chair, and then he uses a powerchair.
Characteristics:	Biography:		Purpose:	
The image shows how he looks currently. Depending on the age there will be variations to how the character looks. The character uses a powerchair to get to places.	Tyler is the protagonist of the game, who is disabled with Muscular Dystrophy, a muscle wasting disease. He is a very resilient person since he has gone through many hardships in life. He is hardworking, musical and an optimistic person.		To show players the stages Tyler goes through in his life, so that they learn to empathize with the character. In the game the character will be sitting on a wheelchair. So there will be art of the character and the wheelchair.	

Table 4.2: Tyler

Supporting Characters

Family

Mother

Name:	Samantha	Age:	34	Encountered In:
				She is mostly encountered in the early stages especially when Tyler gets diagnosed with his condition, as well as in the stages where Tyler gets married and has a baby.
Characteristics:	Biography:			Purpose:
Has big eyes, takes care of herself because she has to look good for any performances. She is strict but friendly and believes in Tyler every step of the way.	Born in Europe, Tyler's mom speaks multiple languages and is actually a musician, a violin player. She graduated from Finland and got a bachelors in classical violin. She is the one that keeps the family well structured.			Her purpose is to show other parents the hardships they face, but they accept Tyler the way he is and not try to cure him.

Table 4.3: Samatha

Father

Name:	Paul	Age:	35	Encountered In:
				She is mostly encountered in the early stages especially when Tyler gets diagnosed with his condition, as well as in the stages where Tyler gets married and has a baby.
Characteristics:	Biography:			Purpose:
Is funny, caring and has helped Tyler so much in his life.	Born in Canada, Tyler's dad speaks multiple languages and is a musician, a talented jazz piano player. He graduated from Canada and got a bachelors in jazz piano. He is a really fun dad.			Her purpose is to show other parents the hardships they face, but they accept Tyler the way he is and not try to cure him.

Table 4.4: Paul

Significant Others

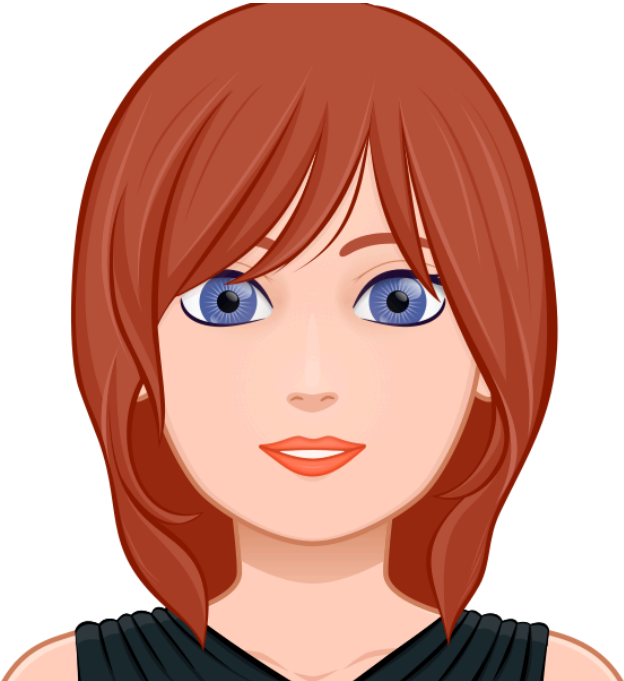
Name:	Crystal	Age:	26	Encountered In:
				Encounter in the later stages when she starts dating Tyler up to the part where they get married, have grandkids and retire. Will look older when close to retirement.
Characteristics:	Biography:			Purpose:
Is caring, is passionate about the stuff Tyler works. She is a very strong and passionate person.	Born in Canada, Crystal speaks English and French. She is a nurse at a hospital. She really likes to listen to Jazz and supports all Tyler's studies.			Her purpose is to show the hardships couples face but they accept each other regardless of disability.

Table 4.5: Crystal

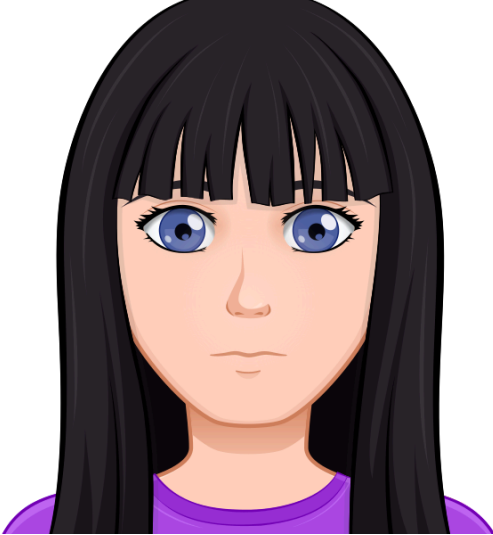
Name:	Elyssa	Age:	13	Encountered In:
				She is encountered in the middle school and high school stages for a very short period of time.
Characteristics:	Biography:			Purpose:
Elyssa is a very caring and affectionate person. Every girl was telling her Tyler is not cool but she still decided to date him because of his music choices and personality.	Elyssa is from Canada. She cheerleads at school. Her parents are doctors and she really wants to become a doctor just like them. Tyler was her first boyfriend.			Her purpose is to show that a person who is disabled can have feelings and romantic ones as well. It shows that Tyler can also have a social life.

Table 4.6: Elyssa

Friends

There will be a lot of friend encounters, so it does not make sense to include 50 of them in this document.

Bullies

There will be bullying to show examples of ableism and how it looks from a different angle.

Encounters

There will be more people encountered, they are more like people in the background who talk in the back somewhere.

Section 5 – User Interface

Screen Flow

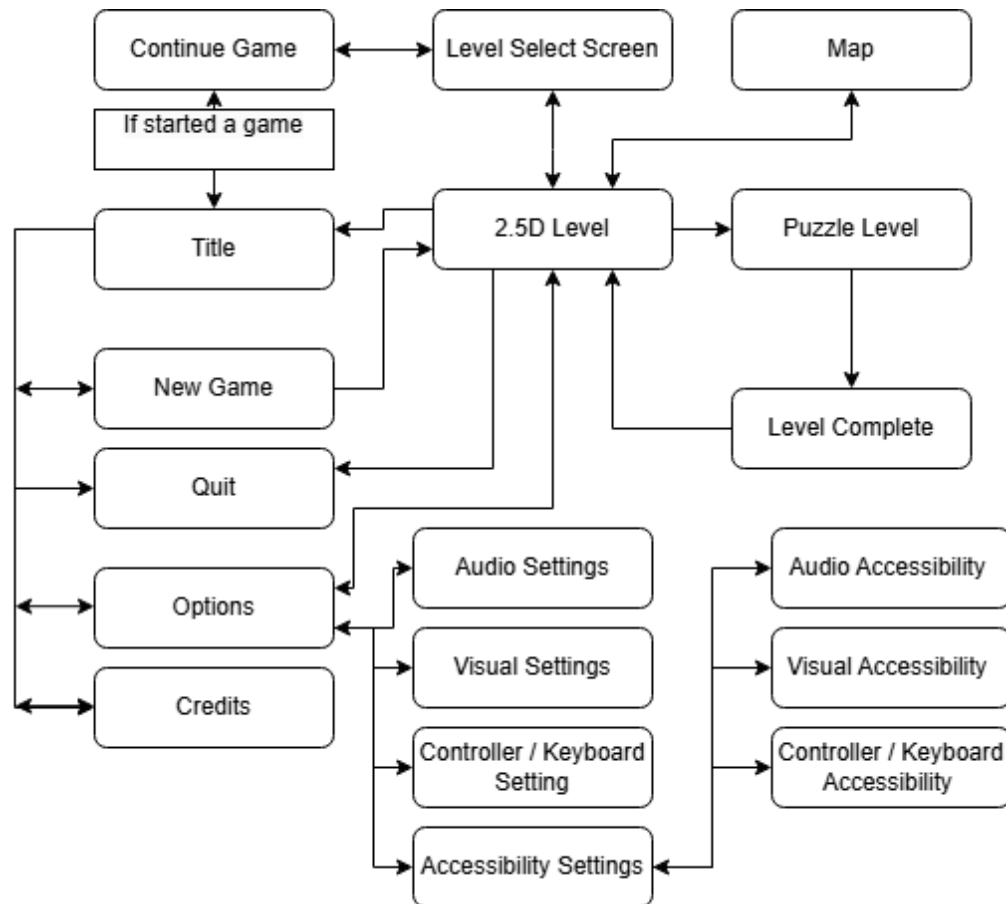


Image 5.1: Screen flow

Menus

Title Screen



Image 5.2: Title screen

- Here the player can start a new game or continue any old one
- The player can also access the options and credits screen
- The player can also quit from the menu

Level Completed Screen



Image 5.3: Level completed screen

- The player will see this each time they finish a level
- The player can go to the next level or return to the title

Level Map

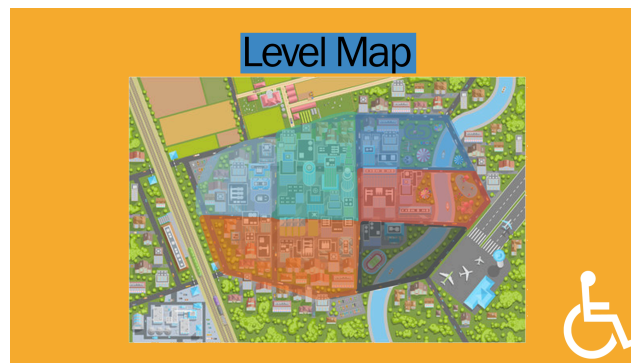


Image 5.4: Level map

- This is the level map the player sees this when they press next from the above menu
- It shows what is next and how accessible the city is becoming
- Each colour represents a different life stage

Credits Screen

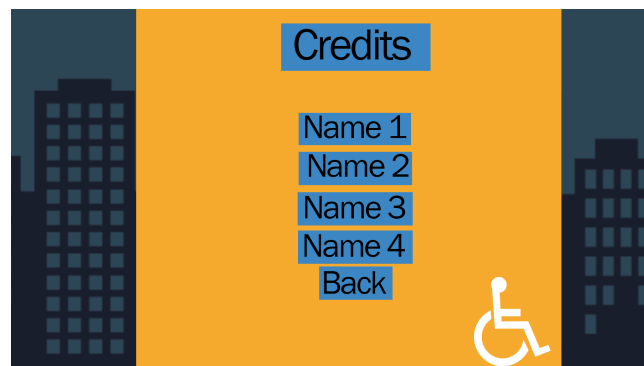


Image 5.5: Credits screen

- It shows the names of the people who worked on the game

Options Menu

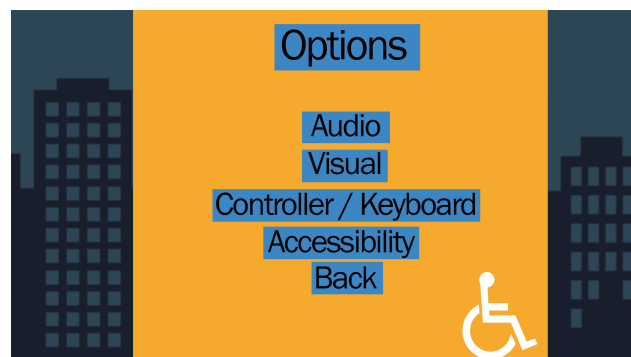


Image 5.6: Options menu

- Shows the player the options

Audio Settings

- Settings that involve audio components

Visual Settings

- Settings that involve visual components

Controller / Keyboard Settings

- Settings that involve Controller / Keyboard components

Accessibility Settings

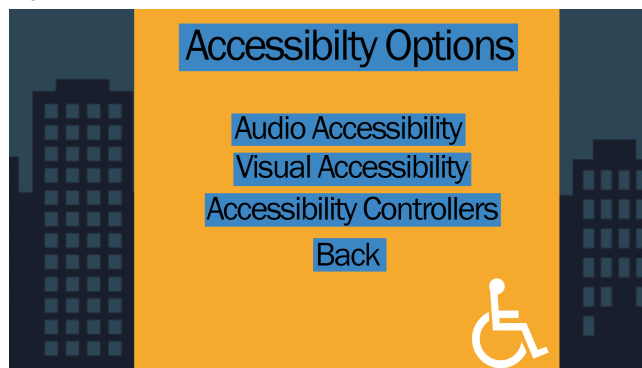


Image 5.7: Accessibility settings

- A menu dedicated for accessibility, accessed from the above menu

Audio Accessibility

- Settings that involve accessible audio components

Visual Accessibility

- Setting that involve accessible visual components

Accessibility Controllers

- Setting that involve accessible visual controllers

HUD



Image 5.8: UI

- Top left, button to the pause menu
- Top right, an indicator of how many inaccessible locations the player needs to find
- Bottom middle, Character dialogue box with the location of the character drawing

Section 6 – Animations

There will be character, UI and environment animations.

For the character we will need idle, and walk animations of all supporting and background characters, it makes sense to do mocap and reuse the rig for ease of time. Tyler will need idle and walk/move animations for when he walks, uses manual chair and power chair. For UI animating the screens will be important so mostly the Title Screen, City Map Screen and Game Screen depending on the player interactions like pressing a button. The environment animations will mostly be transportation vehicles, trees, pools of water, rain and clouds moving.

Section 7 – Music and Sounds

The music is dynamic meaning it changes depending on the player interaction. So in the game every life stage will have its own music. In total it will contain 6 music tracks. There will also be music tracks for each puzzle, totalling to 5 tracks. In addition, depending on the puzzle difficulty a vertical layering approach will be used which means the melody sounds the same but more instruments are overlaid on top of that melody.

Music Track	Description
Life Stage Track 1	Music Theme for Life Stage 1
Life Stage Track 2	Music Theme for Life Stage 2
Life Stage Track 3	Music Theme for Life Stage 3
Life Stage Track 4	Music Theme for Life Stage 4
Life Stage Track 5	Music Theme for Life Stage 5
Life Stage Track 6	Music Theme for Life Stage 6
Puzzle Track 1	Music Theme for Puzzle 1 + 5 Additional Loops for every difficulty variation.
Puzzle Track 2	Music Theme for Puzzle 2 + 5 Additional Loops for every difficulty variation.
Puzzle Track 3	Music Theme for Puzzle 3 + 5 Additional Loops for every difficulty variation.
Puzzle Track 4	Music Theme for Puzzle 4 + 5 Additional Loops for every difficulty variation.
Puzzle Track 5	Music Theme for Puzzle 5 + 5 Additional Loops for every difficulty variation.

Table 7.1: Music table

Sounds

SFX

The sound effects will include multiple in-game sounds so that the player can differentiate what interactions happen in the game, such as the environmental sounds, the sounds characters produce like footsteps, the UI sounds which tell a player if certain options were selected from the menu bar and the ambience which are continuous sounds in an environment like cars driving in a megapolis.

Character

This will feature all the character SFX

Sound Effect	Description
Player Walking on Wood Floor, Carpet, Tiled Floor, Outdoor Tiles, Concrete Sidewalk and Road	Sounds of player walking on different surfaces. (x6 Sounds)
Player Using Manual Chair to Push	Sounds of manual wheelchair moving on different surfaces. (x6 Sound for every floor variation as above)
Player Using Powerchair	Sounds of wheelchair moving on different surfaces. (x6 Sound for every floor variation as above).
Powerchair clicking sound when stopping / going.	Clicking sound of the motor on the chair when it stops moving or starts moving.
Wheelchair Joystick Controller Sound	The rubbery sound of moving a joystick in a wheelchair
Player breathing out deeply due to stress / anger / sadness	Players starts to breath out deeply depending if the player is stressed, angered or sad. Will need a random variety of sounds.
Character making uh sound	Character making an uh sound when thinking

Table 7.2: Character SFX

Environment

This table will feature all the Environment SFX

Sound Effect	Description
Keyboard Clicking	Keyboard clicking sounds
Student Desks being moved	Student desks are being moved in a classroom
Tables being moved	Tables are being moved in a classroom.
Chairs being moved / picked-up	Chairs are being moved and picked up (x2 sounds)
Writing on whiteboard	Sound of writing on whiteboard with marker
Turning TV ON/OFF	Sound of the TV turning OFF and ON
Piano keys being pressed	Sound coming from piano keys when pressed.
Trumpet being played	Trumpet notes sounding when being played on.
Writing Sounds	Sounds of people writing using different utensils. Will need random sounds for variety.
Drawing Sounds	Sounds of people drawing
Sitting Down • Chair • Couch • Floor	People sitting down on different surfaces. Will need 3 variations of sound.
Giving toasts with Glass Cups	People giving toasts with glass cups of liquid.
Snacks Being Opened	Snacks being opened. Variations of sounds depending on items such as wrapping or cardboard boxes.

Table 7.3: Environment SFX

UI

This table will feature all the UI SFX

Sound Effect	Description
Button Selection	Sound when button is clicked
Pause Sound	Sound when game is paused
Level Completion	Sound when the level has been completed.
Level Section from Map	Sound of the level selected
Options Menu Selection	Sound of opening the options menu

Table 7.4: UI SFX

Ambience

This table will feature all the Ambient Sounds

Sound Effect	Description
Sound of Chatter in School	Sounds of chatter in elementary school, middle school and high school. Sounds will be randomized for variety.
Sound of City Traffic	Sound of Traffic in the city
Chatter in College / University	Sounds of chatter in different institutions. Sounds will be randomized for variety.
Sound of Nature in the Outdoors	Sounds in the school fields. Birds chirping and cicadas can be heard. Sounds will also be randomized for variety.
Sound of Students working in classroom	Students doing work in the class using staplers, hole punchers and doing the work in their notebooks. Sounds will be

	randomized for variety.
Sound coming from the computers in the computer lab	Sound of computer labs. Depending on the lab the computers might sound different, therefore sound is also randomized for variety.

Table 7.5: Ambience SFX

Dialogue

The game will feature a lot of dialogue and it will be recorded by live voice actors, not AI because it won't capture the intended feel.

Section 8 – Settings

Audio

Master Volume

- Master volume slider that increases / decreases the volume of all the sounds. Ranges from 0-100, and you can type out the number.

SFX

- SFX volume slider that increases / decreases the volume of the sound effects in the game. Ranges from 0-100, and you can type out the number.

Ambience

- Ambience volume slider that increases / decreases the volume of the ambience sounds in the game. Ranges from 0-100, and you can type out the number.

Music

- Music volume slider that increases / decreases the volume of the music in the game. Ranges from 0-100, and you can type out the number.

Dialogue

- Dialogue volume slider that increases / decreases the volume of the menu dialogue and narrative in the game. Ranges from 0-100, and you can type out the number.

Visual

Resolution

- Refers to the number of pixels displayed on the screen

- Options for: 1280 x 720, 1920 x 1080, 2560 x 1440, 3840 x 2160, as well as a way for the user to enter their own

Refresh Rate

- The frequency with which the image on the screen is refreshed
- Options for: 60Hz, 74Hz, 50Hz, 59Hz

Vertical Sync

- Synchronize the frame rate with the refresh rate to prevent screen tearing
- Will be On or Off

Aspect Ratio

- The ratio of the width to the height of the screen.
- Options for: 4:5, 16:9, 16:10

Brightness

- How bright the game will be
- Will be a slider from 0-100

Contrast

- The difference in brightness between light and dark areas of the game
- Will be a slider from 0-100

Gamma

- How smoothly black transitions to white
- Will be a slider from 0-100

Texture Quality

- How much quality the textures in the game have
- Options for: low, medium, high

Shadow Quality

- How much quality the shadows in the game have
- Options for: low, medium, high

Bloom

- Simulates the appearance of light bleeding or glowing
- Will be On or Off

Depth of Field

- Objects close appear sharp, and object far appear burred
- Will be On or Off

Anti-Aliasing

- Used to reduce the jagged edges
- Will be On or Off

Safe Zone Settings

- Lets you adjust the safe zone
- UI elements only appear in the safe zone

Controller / Keyboard

Button Remapping

- Allows the player to remap all the buttons on the keyboard or controller

Mouse or Controller sensitivity (depending on which the player is using)

- How sensitive moving the mouse or joysticks are
- Will be a slider from 0-100

Dead zone (For controller)

- Region of a controller's joystick where no movement or input is detected
- Able to increase or decrease the dead zone, Will be a slider from -100 - 100

Vibration

- If vibration from the controller happens
- Will be On or Off

Saving Options

- Both Manual and Autosave Options Available

Section 9 – Accessibility Options

Accessibility (Software)

Audio

Audio Cues

- Will be On or Off, Will give the player audio cues when important stuff happens, ex, when they hover over an interactable object, or a puzzle component.

Visual

Text Size

- Will allow the player to choose their text size from a drop-down, with the option to put a custom size

Text Speed

- How fast the text shows up
- Will be a slider from 0-100, with 100 being instant

Font

- Will allow the player to choose their font from a drop-down

Visual Cues

- Will be On or Off, Will give the player visual cues, like change to a different colour, when important stuff happens, ex, when they hover over an interactable object, or a puzzle component.

Colourblind mode(s)

- Will be able to choose different modes depending on which colorblindness the player has

Changeable interfaces

- Allows for the game interfaces to be resized and rearranged

Cephable

- Allowing for easy implementation of Cephable, letting players add their own voice, head, face controls, and virtual buttons/switches

Accessibility (Hardware)

Xbox Adaptive Controller

- Allowing for easy implementation of the XAC, along with the various switches and attachments that can be added

Quadstick

- This is a controller solely operated by using the mouth so players with motor control issues, and allowing easy implementation would allow more players to play

While these two hardwares will be the focus, we also plan to make even more inputs highly customizable, so that no matter what type of controller a player has they will be able to change the controls into a way that fits them.

References from other games



Image 9.1: High contrast mode - The Last of Us Part II

Adding a high contrast mode will help players who have a vision impairment, making interactables stand out

Section 10 – Technical Specifications

Middleware

FMOD

This software will be used to implement dynamic sound. Dynamic sound just means that sound that interacts with the player as well as the surrounding environment. For example, if the player has moved to a different life stage a certain melody plays. The FMOD middleware makes implementing that much easier and does not require coding an entire system.

Unreal Engine Version Control

Unreal Engine Version 5.5.4

The game will be built using Unreal Engine Version 5.5.3, all the models, art and code will be assembled via the engine.

Unreal Engine Blueprint

Unreal Engine Blueprint Version 5.5.4

The game will use Blueprint version 5.5.4 for all the programming needs. Since we are not as advanced in programming this tool is a visual representation of code via code blocks that simplify the work of coding.

Houdini

Since Houdini is a procedural generated software it will ease the job of modelling an entire city. All city maps we have in the game will be procedurally modelled.

3DS Max

3DS Max will be used for modelling the main environmental scenes as well as all the assets that will be implemented.

Adobe Substance Painter & Designer

Substance will be used to texture all the models and procedurally generated buildings.

Adobe Creative Suite

Photoshop

Will be used for creating all the characters in the game, as well as any textures that might need to have custom textures.

Illustrator

Used for all the UI elements since its vector-based and allows for higher quality images which works best for UI.

Premiere Pro

Will be used for putting together the cinematics, in an mp4 file which will feature the cutscenes.

After Effects

Will be used for making the cinematics more visually appealing as well as any additional VFX that the game might need.

Section 11 – References

<https://gameaccessibilityguidelines.com>
<https://www.cartoonize.net/avatar-maker/>
<https://ablegamers.org/>

For Images

<https://www.vexels.com/>
<https://www.svgheart.com/>
<https://stock.adobe.com/>

Accessible item list:

https://www.flaticon.com/free-icon/elevator_948696
<https://www.istockphoto.com/illustrations/accessible-shower>
<https://www.istockphoto.com/photos/handicap-door-button>
<https://www.dreamstime.com/illustration/standing-desk.html>
https://www.shutterstock.com/search/assistive-technology-disability?image_type=vector
<https://www.istockphoto.com/illustrations/patient-lift-icon>
<https://anthonysylvan.com/pool-features/accessibility/>
<https://creazilla.com/search/clipart/wheelchair>
<https://in.pinterest.com/pin/159807486765664851/>
<https://caterwil.com/2019/10/22/how-to-choose-a-power-wheelchair-that-is-perfect-for-you/>
<https://www.dreamstime.com/illustration/assistive-technology.html>
<https://www.sajmep.com/blog/media-centre-1/mastering-indoor-comfort-the-art-of-air-conditioning-26#gsc.tab=0>