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Project Rabbit Episode 0: Run Away Rabbit

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Project Rabbit Episode 0:

Run Away Rabbit

A Major Qualifying Project

submitted to the faculty of the

Worcester Polytechnic Institute

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

Submitted By: William Poirier, Xavier Mauprivez

Advised By: Britton Snyder, Joseph Beck
1 Abstract

This game tells a story of tyranny, rebellion, and the struggle for freedom that all humans desire. “Project Rabbit Episode 0: Run Away Rabbit” is a combination of a visual novel and adventure game, with a secondary focus on stealth. You play as Todd, a genetically engineered sapient rabbit created by Doctor William Jones. Todd lives in paradise, but underneath his rabbit hole exists a dark authoritarian municipality called New Arc City. Take Todd down the rabbit hole, and see how deep it goes.
2 Introduction

2a The Team

Project Rabbit was built by the two-man team of William Poirier and Xavier Mauprizez. William was responsible for the design, concept, writing, main art and animation, and some programming. Xavier was responsible for the game’s primary programming, overall sound design, the entire original soundtrack, and transitional sequences. Overlap between roles occurred often due to the small nature of the team. The MQP was supervised by Britton Snyder (IMGD) and Joseph Beck (CS).

2b Gameplay Description

Project Rabbit is a single player point and click adventure game. The player controls the main character, Todd the rabbit, by clicking on the screen, making him move towards the points where the player clicked, while staying on the path set up for him. He can click on items to pick them up or click on switches and other objects to activate them. Project Rabbit often plays out like an interactive visual novel. The game also contains some stealth elements. Project Rabbit’s gameplay is simple, but its long-term goals are far more ambitious than the game’s tiny scope.

2c An Open Project

Project Rabbit’s original assets and source code are all licensed under the WTFPL open license. The terms and conditions are incredibly liberal: “Do whatever you want.” Project Rabbit hopes to expand someday into creating its own fan base that will depend on the interactivity between fans and creators, and blur the line between them
in an age where conventional copyright protection increasingly becomes outdated. There exists a theme in our game of falling down multiple rabbit holes and encountering the awesome majesty of the infinite. Someday, players will expand upon the gameplay to new heights beyond the scope of a humble visual novel.

3 Artistic Influences

3a Inspiration from the Pullman Strike

Figure 1: George Pullman

The first inspiration for the game comes from US History. The year was 1884. The Gilded Age, as Mark Twain called the era, was at its peak. While most of the urban community was in deep economic depression, the wealthy were breaking record profits. In the summer of 1884, the infamous Pullman strike broke out in Chicago and
eventually swept the nation. The players were the non-union factory workers of the Pullman Company, George Pullman, and the National Guard.

George Pullman was the founder and original owner of the Pullman Company; a manufacturer of luxury passenger cars for trains. In 1880, Pullman had the ambitious idea of buying several acres of land outside Chicago and converting it into a commune for his factory workers. It was to be a private mini-utopia of sorts, providing easy housing and stores for his workers, and an environment free of vices such as the ever evil alcohol.

It did not take long for Pullman's Company town to deteriorate. Workers were forced to participate and live in a virtual monopoly. One anonymous worker allegedly said, "We are born in a Pullman house, fed from the Pullman shops, taught in the Pullman school, catechized in the Pullman Church, and when we die we shall go to the Pullman Hell." During the depression of 1883, Pullman cut his workers' wages without lowering rents. This eventually resulted in the infamous Pullman Strike, the first major strike in US history involving violent intervention from the United States Government, and resulted in several deaths on both sides.

This incident in US history left a huge impression on us. We envisioned how such events might play in modern times, springing not just from a small town, but a large city. From this story, we envisioned a city on a private island, owned by a private corporation, but sanctioned by a government, and with all the traits of a mega-state Orwellian dystopia.

3b Political Inspiration and the Stealth Concept
We live today in tumultuous times that recall much of the angst of the Gilded Age, amplified into extreme magnitudes. Industrialization, mechanization, an emphasis on efficiency over human psychological needs has grown. In the 19th century at least, people were capable of living independent and self-sustained life styles. Today, there are almost no places left in America that are not completely dependent on the industrial corporate system. In the midst of this, we live in a century where for the first time, essential resources like oil might be peaking. On top of this, the rise of domestic surveillance and militarized police across the country has us deeply troubled. We wanted to make a game that wove these fears together.

At the time, we had also been playing many stealth related games such as the *Metal Gear Solid* games released at the time. *Metal Gear Solid*, between its stealth-reliant gameplay, heavy focus on story, and social commentary provided a gateway to building a stealth game. At this point, there were two ideas for two separate games we had: a stealth game involving sneaking through a dystopian city, and the following idea.

### 3c The Rabbit Prank Concept

The themes of dystopia might be heavy for a small adventure game. But the final game’s origins also come from a more light hearted and mischievous side of the creative process. In addition to the dystopian stealth setting, we wanted to make another game with the sole purpose to prank the players. It would star a cute fluffy bunny, and begin in an idyllic forest. Suddenly though, mysterious men would appear, burn the down forest, kidnap your fluffy friends, and send you on a journey to hell and back. Although this version of the story was not used, the essence of the prank survives
in the game’s opening sequence. Someday, a sequel may be developed using this story.

Figure 2: Original Concept Art 1

Figure 3: Original Concept Art 2

3d The Dream
Simultaneously, we were grappling with how to build upon the dystopian city game. We had thought of stealth related gameplay, but had massive writer's block on story and characters. Then one night, in the most helpful of dreams, the two concepts merged. Will dreamt of a rabbit (whose design eventually became the final one) trapped on a burning mono-rail, and being stalked by a robot hunter. The rabbit snuck under the train car's chairs, jumped out into the water, and swam to shore. What he saw in the dream next was a dystopian city deeply in poverty, and trapped inside a police state cruel enough to incinerate a homeless family. The idea of a tiny helpless rabbit navigating through a surveillance state worked incredibly well with our stealth concept.

Figure 4: Burning Mono-Rail Concept Art

4 The Design Process
4a Initial Outline and Prototype

What followed was the first design of the game. Will outlined several game screens where Todd slowly transitioned from a forest and rural town to the monstrous metropolis of New Arc City. Although these game screens and story were not used in the final game, they provided the main inspiration for the design process. The final story used in Project Rabbit Episode 0 was envisioned as a prequel to this.

Two prototypes were created before production of the game officially began in 2013. Both were written in GameMaker HTML5. In the first prototype from 2011, Todd was not controlled by a pointer, but arrow keys. The idea was to have multiple layers of depth the player could switch between to allow hiding. We were dissatisfied with this version of the prototype, and the game was shelved temporarily. A little less than a year later, Will opened the game's project file and modified the game into a point-and-click interface. This version of the game was much more fun to control, and we realized would allow for greater portability to mobile systems that only allow touch screen input. This prototype became the basis for the final game.
4b Desired Gameplay Goals

Project Rabbit’s initial design goal was to combine several game-play genres into one. Its primary mechanics derived from point and click “guidance” games where the player guides an avatar with a mouse cursor or other pointing input. The rabbit would be programmed to be extremely adept at adjusting to its situation. The player would also instruct the rabbit to manipulate objects in various contexts. In the original vision of the game, the scientist who created the rabbit was controlling an insect sized drone that guides the rabbit along the path and instructs.

Stealth was, and still is a significant element of the gameplay. The game’s premise revolves around the rabbit trying to sneak out of a laboratory, and then later a city in chaos. Several game objects were conceived to be “hidable.” Clicking on these
objects would cause the rabbit to move to them and hide himself under, inside, or behind the hide-able objects. Some objects may provide better cover than others. Shadows may also factor in. If the rabbit's cover is blown, enemies will try to flank him and kill him. Not all hope is lost though if the rabbit is caught. If you run away fast enough, you might just get away far enough to be able to hide and “disappear” in the minds of your enemies.

Although not an exact match, the game contains several elements of traditional adventure games. Story elements are critical to this game’s experience. In many ways it resembles an interactive movie. Puzzle solving is also crucial. Figuring out the best path for the rabbit to sneak away and how to manipulate objects in a given game area will in conjunction were to consist of the game’s puzzle elements.

Sometimes the rabbit will be spotted and have no choice but to run instead of hide. Although not an action game in the traditional “violent” sense, this aspect of the gameplay did suggest action segments of a different kind. Also, some puzzle elements suggest pieces of an action game. One example consisted of picking up an object, say a rock, and throwing it at an enemy to knock him out.

4c Backstory Concepts

In 1985, a visionary scientist named William Henry Jones conceptualized a utopian anarcho-socialist city. He had a vision where the common person was actively involved in educating themselves and others; a vision of people using their own talents and creativity to engineer and innovate; a society of free and open ideas, where communication and information were free as in freedom, and free beer. And perhaps
most ambitious of all, it would be a socialist society with a free market. People would organize themselves into worker owned and operated cooperatives and non-profits. And there would be no central banks, only a decentralized currency. People would work together for the good of all mankind, and eventually take humanity to the stars. It would literally be a new arc; a boat to the stars to save mankind and their fellow earth organisms from the destruction of the sun. Hence he titled his vision “New Arc.”

Shortly after, Doctor Jones formed the New Arc Corporation with funding from an influential banker named Han Emulion, also an old acquaintance and former CEO of a company Bill Jones once worked for. In the beginning it was primarily focused on mechanical engineering. In the late 1990s New Arc expanded into telecommunications. And in the mid-2000s, they opened a biotechnology and genetic engineering firm. This whole time Doctor Jones never forgot his vision. After 2009, Jones vision caught on and spread like a meme. Donations to fund to the New Arc City project poured in from people of all social classes. The investments of large financial firms sealed the deal, and construction for New Arc City began.

In 2014, the vision became alive. New Arc City went live in early February on an island off the coast of the Northeastern United States. The city was granted temporary immunity and independence for the ambitious scope of the project. In the beginning prospects exceeded expectation. People were motivated to come and work together for something great. Creative talent in engineering and art accelerated. There was nowhere else in the world with a great DIY scene. Independent Media of all kinds flourished. 3D printing and home CNC technologies together fostered innovation unlike any other seen. People were self-organized, knew their neighbors, trusted one another, and
helped each other from nothing but self-motivation. Doctor Jones ecstatically thought his dream was coming true.

But his dreams became increasingly hard to live up to as time passed. The lack of central control in the city seemed to create many problems for its citizens. Neighborhoods were forming private police forces and militias for protection against hooligans. Gangs sprang up and terrorized the city. Scam artists made New Arc City a personal haven. And bad investments poisoned the local stock exchange. All signs pointed to New Arc going horribly wrong. Jones was continuously pressured by all of New Arc's major parties involved to change course of the experiment to a more traditional and orderly system and abandon the laissez-faire policy of the parent corporation. Parties including concerned citizens, colleagues who insisted the experiment was a failure, and New Arc's investors. But Jones refused. He stubbornly insisted that this was part of the natural cycle and would work itself out.

Then four years into the experiment, New Arc City's economy mysteriously crashed, and nearly brought the world economy down with it due to the city's high risk investors at the biggest global financial firms. Jones finally caved into all the pressures and began to abandon New Arc's libertarian founding. This caused a chain reaction that turned New Arc City from an anarchist paradise to a totalitarian police state. First he approved at Han Emulion's suggestion the construction of the highest caliber security and surveillance technologies. A massive police force was organized, and various countries even lent soldiers, human and robotic, to New Arc to help straighten the place out. Then Jones formed various departments designed to control the public in order to restore order. The chairman and overseer of all departments was Han Emulion. It was
the first choice of New Arc's shareholders. Jones wanted his personal best friend and
colleague Alex J. Hicks to lead the new city council, but investors threatened to pull
funds at this choice.

Worst of all to Bill Jones, New Arc's decentralized currency had to be shut down
and replaced with a central bank and currency under the supervision of the largest
world financial firms.

New Arc went from being in total chaos to the utmost order and control in a two
year span. But the shift to such an opposite philosophy nearly broke Bill Jones. The city
turned into the pinnacle example of a police state practically overnight. People were
being imprisoned left and right, regardless of political affiliation or opinion. The city was
free of crime, but people now lived in far greater fear and misery than they ever did
when the city's policies were at most minarchist. There were no more citizens out in the
street trading art and filming movies, only televisions with microphones and cameras,
feeding generic information about peace and obedience, that served dual functionality
as spying devices with microphones and cameras built in.

To add insult to injury, Dr. Jones's wife and child were struck down by a car near
Christmas of 2020. Jones became reclusive, and could do nothing but focus on bringing
them back to life. He created a sapient rabbit named after his son Todd. It was no true
replacement for his son, but the Todd rabbit was built to emulate the original Todd's
personality and characteristics. Instead of focusing on the decay and misery outside of
the New Arc HQ's laboratory, Jones focused inward on creating an artificial meadow for
Todd that he called Eden. While the seeds of mass revolution were being sown, Jones
ignored them to focus on his Garden of Eden and left New Arc to crumble by the hands of incompetent bureaucrats.

4d Initial Level Design

Project Rabbit’s initial scope was considerably larger compared to the final version. Initially, it was thought New Arc City would be almost ten times larger and have far more interior locations to explore. These designs were sketched out in thumbnails; of which only a tiny few made it into the final game.
Elaborate Puzzles were conceived for these screens. In one of the areas displayed above, players would have to escape a building by swinging across a chasm on a broken power line. But before this would be possible, the player would need to explore the building to shut off the circuit breaker. In another screen above, players
would be required to reach the bottom floor of a building by first pulling down crawl-space ladder, entering the attic, and then jump down a laundry chute.

Several of these screens were conceived with the idea of having voice-overs, or at least text-boxes, appear without interrupting the game. Non-playable characters would be able to move around and talk, but Todd would continue to be controllable without the game being paused. These areas would have factored into the stealth focus, forcing the player to watch and study character’s movements in order to hide more effectively from non-playable characters. A mix of technical and time constraints prevented these rooms from coming to fruition.

5 The Development Process

5a Art Design

5a i. First Art Style

The initial art style harkens back to the original prank idea. It is designed to trick the players into believing this is a happy environment out of a children's story. Inspirations ranged from Peter Rabbit, to 19th century impressionism works such as George Seurat and Vincent Van Gogh. All of the art was digitally created in Adobe Photoshop. To create the Impressionist look, we first created the painting in a flat look, and then dotted them with a Bristle Brush in Photoshop.

Animations were also created in Photoshop using the Timeline editor. Within Photoshop, animations were created at a high resolution, and then scaled down
afterwards to more conventional game sprite sizes. Most of the animation references in the game came from Preston Blair and Eadweard Muybridge. Todd’s walk cycle in particular is heavily based on one of Blair’s walk cycles. Some animations, such as a throwing animation, were not used in the final game due to cut functionality.

![Figure 7: Preston Blair Walk Cycle](image)

5a ii. Transition Style

After the first three screens of the game, Todd transitions in a new world deeper down his rabbit hole. Given this city possessed a more sinister tone, it was necessary to change the art style enough to reflect the dystopian theme, but not so much that they didn’t match the art style of the first few screens. Also, our artistic abilities might have been enough to create the first batch of screens, but they were too slow to produce detailed screens in a timely manner without slowing development of the gameplay and story.

Our advisor, Britt Snyder, suggested looking into a paper cutout style for the city. After searching the internet, we discovered an artist named Gail Bartel who created city landscapes very similar to what we had in mind.
Coincidently, one of the first concept art pieces we had created for New Arc city back in 2011 was incredibly similar in style. The art style clicked immediately, and we began to create our own city drawings.
Gail created her painting with traditional art. She would first make cardboard cutouts of building outlines, trace over them, and then paint them with watercolor. Our workflow, however, was entirely digital. First we would build the city buildings using vectors in Adobe Illustrator, then export them as rasterized images. We would then open them in Photoshop, select individually colored pieces with the magic wand tool, and apply shading.

Figure 10: Unshaded vs. Shaded City Image

5a iii. Character Designs

Todd

"Follow the White Rabbit, Neo." Todd's design as a bipedal white rabbit might seem inherent to the final game, but Todd actually went through several iterations.
Todd’s initial design was a gray, quadruped rabbit. This design would have limited Todd's range of possible actions, and he was changed to a more anthropomorphic design. He was also re-colored white in reference to Alice in Wonderland.

![Figure 12: Todd’s Initial Design](image)

Todd's giant empty eyes were a trait practically from the beginning. Their main inspiration came from Jhonen Vasquez's character design for Invader Zim.
The fox was a rather late addition relative to the game’s development and planning. Much like his role in the game’s narrative, Subject PT appeared spontaneously late in development and completely changed the flow of the game’s planned story. His character essentially replaced Professor Alex Hick’s role in assisting Todd. The Fox’s design and personality was somewhat modeled after William Poirier,
the game's creator. Subject PT has many traits of trickster Archetypes such as Renard the Fox from French folklore and Coyote from Native American mythology. Is he there to help the player? Or is he up to something far more sinister and mischievous?

**Doctor William Henry Jones**

Doctor Jones is a humble man despite his status as co-founder of the New Arc Corporation. He lost his wife and child to a mysterious car crash, causing him to become reclusive and ignore the problems occurring in New Arc City. He created Todd the Rabbit as a replacement for his son, but his attempts to bring back his wife have consistently failed. Jones was designed to look like a 1970s Silicon Valley computer engineer. His pink coat, sunglasses, and long hair give him a hippy-ish look, contrasting him with the evil robots and executives controlling New Arc.

**Han Emulion**
He is Han Emulion, menace to society; and the enemy of the Fox. Emulion's face is never seen, similar to villains such as Doctor Claw from Inspector Gadget. He is the faceless evil executive; the man pulling the strings behind the curtain. Early on, we thought of making Emulion only second-in-command of New Arc Corporation. All the important decisions would be made by Doctor Jones, but this seemed less effective from a narrative standpoint. One unused story concept involved an angry mob angrily tearing Emulion apart while walking out of New Arc Headquarters. By the way, his name is actually an encoded message. See if you can figure it out!

Protestors
The game contains a cutscene where a crowd of protesters gathers outside of New Arc Headquarters, and is subsequently transformed into cattle by drones. The idea of a protest cutscene was present from nearly the beginning, but these character designs were amongst the last to be designed. Their designs are reminiscent of the main characters and were made to match their style. This in-game drawing may appear to be drawn on notebook paper, but is actually digital. The notebook paper effect was created by scanning a crumpled piece of paper, and then overlaying the drawing.

Monsters
These monsters are mysterious entities perhaps from a dimension not of our world. What are they? What do they represent? The truth is we have no idea ourselves. These monsters were originally doodled by Will as temporary art really quickly, but we liked the designs so much we decided to keep them as is. They are whatever the viewer wishes them to represent. Weather you see them as nightmares incarnate, subconscious manifestations of the artist, or whatever else, any interpretation is valid.

5a iv. Psychedelic Graphics

There are some scenes in the game where Todd is thrown into a new area. These scenes are where “twists” in the story occur. They are very reminiscent of the Disney movie *Alice in Wonderland*, where the main character, Alice, tumbles down a rabbit hole and falls down a long passage while common objects strangely float around
the sides as she passes them. In our game, Todd experiences a feeling of dread as he falls down the hole. Not understanding what is happening, his stomach churns, resulting in his image being stretched out and squeezed back in and turning, over and over again, as strange, abstract shapes fly past him in all sorts of directions.

These shapes were drawn using GameMaker’s sprite editing window, with the polygon drawing tool. For the first scene, smaller shapes were drawn, and then sized up, giving them a very retro, pixelated look. In the second one, the objects used were drawn at the size that they appear in the game, just to have some variety in the game. The shapes were strange looking because of the way the tool works. Drawing edges for the shape that crossed over each other would result in what would appear to be multiple connected shapes.
5b Programming

5b i. Unity Failures

We started out this project in the Unity game engine. Unity is designed for use with 3D games, but we found a 2D framework, Orthello, to help us build a 2D environment in the 3D engine by using an orthographic camera. We found that while we were making progress, it was coming along very slowly. Having little experience with both Unity and Orthello, we had trouble getting our code to work. In addition, the documentation for Orthello was unorganized and not very useful. Halfway into C-term, we realized the project would not be finished on time if we stuck to Unity, and made the difficult decision to switch to GameMaker.

Figure 20: Scrapped Unity Version of the Game
5b ii. Switching to GameMaker

We decided that since we were not making progress with Unity and Orthello, we should switch game engines. It was a very drastic change but we believed that ultimately we would make much more progress with a game engine that we both had a lot more experience with, so we agreed to switch over. It didn’t take long for us to recreate most of the functionality that was implemented in the Unity version.

One section of code that was tricky to implement was the node system that would eventually be Todd’s “rail” for him to move back and forth on. At first, we had barriers that we set up on top of the backgrounds, around the “walkable” areas, so that Todd could walk around on the ground and up ladders but not on the sky, for example. Programming barriers proved difficult within Gamemaker’s collision system. Initial attempts at programming barriers was incredibly buggy. It also meant writing a sophisticated pathfinding algorithm. We came up with two possible solutions: one would be a system where Todd was forced onto a path full of nodes. Only being able to stop at a node would mean we could remove the barriers and we would have more control over where he could go. The second solution that we ended up trying first was a fix that had Todd bounce off of barriers when he hit them and continue to move as close to the target location as possible while remaining within the barriers. The problem with this was that it looked very unnatural as Todd zig-zagged as fast as he could while inching ever so slowly towards his destination.

So we decided to go with the other option at this point: we removed all the barriers and created node objects and placed them strategically where we wanted them: only along the paths, and not on the buildings or in the sky or on trees. Our code forces
Todd to move towards the node closest to wherever the mouse is clicked on the screen. This was a good start, but this would have Todd walking right over tree trunks and walls, which looked very unnatural. We then came up with a method of keeping Todd on the path that worked a little bit better. We had to do some math that had Todd stop at several nodes along the way. He would stop at the node closest to the halfway point between him and his destination, and also at the two nodes closest to the halfway points between those three aforementioned nodes.

```
//when reached halfX and halfY, keep moving to final destination
if(floor(todd.x) > q1X - 10 && floor(todd.x) < q1X + 10
    && floor(todd.y) > q1Y - 10 && floor(todd.y) < q1Y + 10 && !throwMode){
    move_towards_point(halfX, halfY, toddWalkSpeed);
}

//when reached halfX and halfY, keep moving to final destination
if(floor(todd.x) > halfX - 10 && floor(todd.x) < halfX + 10
    && floor(todd.y) > halfY - 10 && floor(todd.y) < halfY + 10 && !throwMode){
    move_towards_point(q3X, q3Y, toddWalkSpeed);
}

//when reached halfX and halfY, keep moving to final destination
if(floor(todd.x) > q3X - 10 && floor(todd.x) < q3X + 10
    && floor(todd.y) > q3Y - 10 && floor(todd.y) < q3Y + 10 && !throwMode){
    move_towards_point(destX, destY, toddWalkSpeed);
}

//stop moving when reached destX and destY
if(floor(todd.x) > destX - 10 && floor(todd.x) < destX + 10
    && floor(todd.y) > destY - 10 && floor(todd.y) < destY + 10 && !throwMode){
    audio_stop_sound(sfx_footsteps);
    move_towards_point(destX, destY, 0);
    sprite_index = spr_todd_idle;
    moving = false;
}
```

Figure 21: Small Portion of the Movement Code
Most of the game involves Todd exploring the areas and moving between areas. We have set a bunch of triggers for all the individual events that occur. We have objects that Todd can collide with that will bring him to the next area, and some that bring him back to previous areas and some that bring him to new areas although they appear the same (i.e., have the same background). We do this to move the story forward while giving the player the illusion that they are revisiting previous areas. We simply made duplicate rooms but changed the triggers in them.

As for the enemies, we have only a few types. We have the hawk who moves back and forth. The code for the hawk just involved it turning around when it hit a certain point, and then again at another point, having it go back and forth endlessly. The security cameras, drones, and helicopters are all stationary. As for the search lights, or, “fields of vision”, the enemies have different types. The hawk’s field of vision moves along the ground just a little bit ahead of it. It moves at the same speed as the hawk, and then when the hawk turns around, its field of vision moves quickly back towards the same spot on the other side, as to remain in front of the hawk in the same position. The vision circles of all the other enemies ran on looping paths that we formed by tracing lines on a grid in GameMaker.
Since this is a stealth based game, we needed to have hiding spots for Todd to hole up in while enemies hunted for him. We only ended up with one hiding spot being used in the final game, but we had a few more areas designed with hidable objects in mind. We would trace a part of the background using Photoshop, and create an extra layer with only the object that was meant to camouflage Todd. In the final game, it was only the bush in the hawk area that acted as a hiding spot. If the player clicked on it, Todd would move towards the node hidden behind it, then go through the hiding animation. The bush became translucent so Todd could still be seen, but the hawk would pass right over him without noticing him or capturing him. Then as Todd walked out from behind the bush, it would return to an opaque state.
There was a little bit of math involved in the part of the game where Todd falls down the rabbit hole. As the psychedelic shapes float across the screen and the mechanical sounds go back and forth between the two speakers, Todd is stuck in the center of the screen, and his body is being contorted. This was just a bit of code set on a timer so that every few milliseconds Todd’s height and width would randomly start increasing or decreasing, even becoming negative, making his image reverse itself.

In addition, Todd appears smaller when walking around in the city because the angle of view is from far away, up in the sky, to allow the player to see the entire buildings. We had intended to mess with Todd’s height and width a little bit more with the addition of magic potions that made him smaller or larger, just like in *Alice in Wonderland*, but we did not end up using these in the final version.
On the screen right before Todd enters the train at the end of the game, Todd starts out small in the opening of the doorway, then gets larger as he walks over to the train station entrance. This was done by having Todd’s height and width change dynamically based on his current position on the screen, meaning he would get smaller again if he walked back to the door on the upper left portion of the room.

The second area of the game (the area with the hawk) was intended to be part of a larger tutorial level. We had had code in the game that allowed Todd to walk over to an apple, pick it up, and throw it at the hawk. The hawk would then fall out of the sky and the player would be allowed to move on to the next area. The problem with this was that we couldn’t get it to work smoothly every time. Sometimes, Todd would play the “pick up” animation as he threw the apple, and sometimes the apple would go in the complete opposite direction of the intended target. We worked on this problem for a
while before eventually deciding to remove the apple from the game entirely. The area then acted as a way of showing the player how to hide behind objects, as the only way to make it through to the next area was to hide behind the bush to avoid being spotted by the hawk.

A few areas of the game have the screen fade out. In the short scene where Dr. Jones confronts the fox, the screen fades, and when it returns, Jones is unconscious, lying on the floor. In addition, the screen fades to white during the protest cutscene when all the protesters are turned into cows. Lastly, screen fades are used whenever Todd is caught by an enemy. He is then sent back to the start of the room. These were done on timers that simply had a black rectangle drawn on the screen so that it covered it up completely. The opacity of the rectangle would start at 0 then increase every few milliseconds until it was completely opaque.

The rest of the game was mostly just triggers such as the elevator button that opens the elevator door, the button that lets Todd get out of the lab and the key that opens the box with the fox in it. The key was hidden behind a bush that was covered by an invisible trigger that would reveal the key once it was clicked.

5c Sound and Music

5c i. Sound Effects

Some of the sound effects were created digitally with the Ableton Live software. We would find an instrument from Ableton’s built-in instrument packs, one that seemed like a good basis for the current sound we were trying to mimic, then we would record a
single note and adjust a number of variables such as the length of the note, volume, pitch, velocity and equalization (frequencies). Next, we would add effects to the note: delay, distortion, reverb, and chorus are some of the effects we used.

The sound that is played during the “rabbit hole” transition sequence is one such sound that was created in Ableton by altering an instrument’s parameters, and playing multiple repeated notes. That sound is also panned back and forth between the two speakers for an added “trippy” effect.

Then there were some sound effects that we created using analog sound. We used a Moog synthesizer to change up the waveforms of the notes and experimented mixing up different oscillators and adding noise into the mix. Once we had these sounds, we recorded them using a Zoom condenser microphone that we plugged in to the synth. From there we ran the output into our laptop computer and recorded the sounds with Audacity, in real-time, as we played the notes physically on the synth.

5c ii. Music

A few of the songs in the game were taken from the internet. In three particular instances, creative commons recordings of classical music found on archive.org and the wikimedia commons were used. Segments from Beethoven’s Symphony 9 were used as a theme of sorts for whenever the fox appears. During the protest cutscene, the beginning of Bach’s Toccata and Fugue played.
The original music, however, was created by us, entirely in Ableton Live. The instruments that were used for the music all came packaged with Ableton Live. We composed the songs with slow tempos and long notes in minor keys to fit the style of the game and the game environment. We felt that the game needed mostly dark and gloomy music to better represent the feelings of isolation and confusion and even wonder that Todd felt as he discovered that his world was a lie and as he explored the dark dystopia of New Arc City that seemed very unreal.

The melodies were simple, the drum beats were slow, and the music was overall a little repetitive, but with new instruments being added in every couple of measures, the sounds worked well at giving the game some atmosphere and immersing the player into the game world.
Ableton Live was a great program to use because of its instrument packages and because it was easy for us to stop the sound at the exact point where looping the sound would be appropriate. There were no blips where the sound stopped in between loops. The music all sounded continuous to the point where people could not tell where the loop started.

Figure 26: A Song with Multiple Tracks Showing in Ableton Live

6 Conclusion

Project Rabbit in many respects met, and even exceeded its design goals. It tells the story of Todd and New Arc City without resorting to endless exposition on either backstory. The stealth concepts work well with the adventure game and visual novel
aspects. And the art style transition between paradise and dystopia works well. Animations and character designs also are effective, and the story moves at brisk pace overall.

That being said, there is still much work to be done. The only complete animations include Todd and the Fox. It would be nice if other characters were eventually fully animated. Some artwork such as the protest cutscene could be improved. We did not have time to include nearly as many hidable areas as we wanted, limiting an important design concept to only the first screen. Some cut functionality such as Todd being able to pick up and throw objects would be nice to include in later iterations.

The ways the story was handled could be improved further. Some scenes such as when Han Emulion is introduced might have worked better if the player was not forced to sit through the text. In the future, the concept of having scenes of NPCs wandering around interacting each other while Todd sneaks around them is essential to producing a more immersive experience.

There also exists no viable way for people to submit and share their derivative creations based on the game. If Project Rabbit hopes to build a dedicated fanbase, this must change soon. Currently, projectrabbit.org is being developed as a way for people to submit their derivative works. Project Rabbit has miles to go in order to achieve its goal of creating a dedicated fanbase full of creative content, but is well on its way to move forward and take Todd farther down the rabbit hole.