-MONKEY MARATHON-
Playtesting and Progress Report

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EXECUTIVE SUMMARY

"Monkey Marathon" is a top-down shooter with progression upgrades, where the player's objective is to travel as far as possible while killing or avoiding guards that are trying to stop the player. The map is procedurally generated with checkpoints along the way, with guards getting more difficult after every checkpoint to scale with the player's upgrades.

Regarding progress thus far, we have already implemented basic player movement and shooting mechanics, functioning guards (and basic guard AI), random level generation, a fully functioning store (with upgrades affecting the game), an economy (including sources and sinks), and the ability for players to save their progress. We have yet to implement gold coin spawning, the slingshot weapon/tool (makes a sound to distract guards), final sprites and animations, menu/settings UI, sound effects, minor store changes, and major balance changes, as well as fixing various bugs discovered in playtesting. There are also some optional features that we would like to implement if time permits, but aren't necessary for the initial release. These include more advanced map generation (ability to generate more complicated maps), more advanced guard AI (to make guards more "life-like"), ultimates, blockades, throwable explosives, lockers for the player to hide in, and laser-sights.

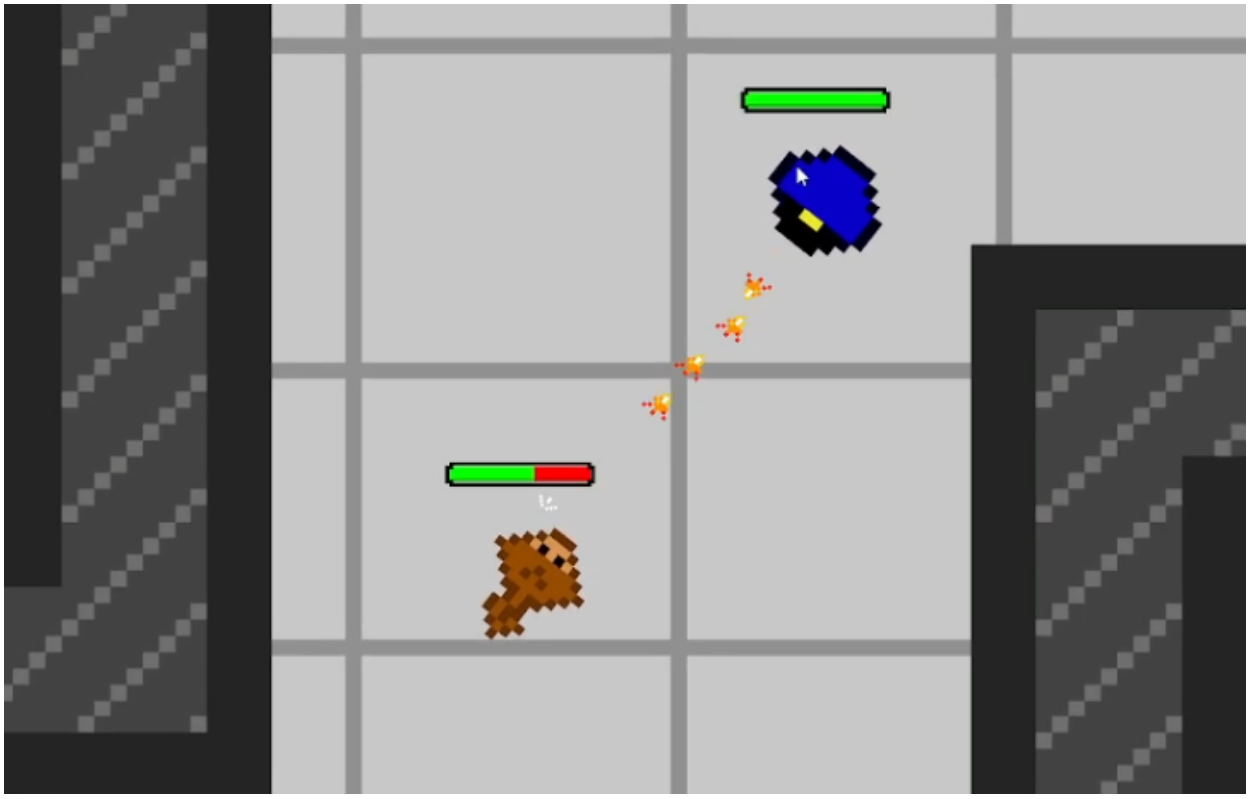
Currently, the greatest challenges in development are balancing the game, scaling the difficulty as the game progresses, as well as implementing the algorithms associated with advanced map generation and advanced guard AI.

In terms of playtesting, the developers have been constantly playtesting throughout development to make sure everything works, however the most beneficial playtesting we've done so far is 2 separate rounds of playtesting with the same non-developer playtesters. They provided crucial feedback regarding the player experience, especially in terms of what needed to be balanced. Furthermore, they noticed several bugs and exploits that need to be fixed. The most important feedback revolves around the game being too easy, including the ability to take advantage of guard AI, overpowered strategies, and the player being too economically rich. All feedback has either already been addressed/fixed, is planned to be fixed, or is still being considered.

GAME DESIGN

Gameplay Overview

"Monkey Marathon" is best described as a top-down shooter with infinite level generation and progression upgrades. Our game has no specific target audience and should be playable for everyone. In this game, you will play as a monkey who is trying to escape a laboratory where the monkey has been experimented on. Starting from the bottom floor of the laboratory, the monkey's goal is to reach the roof to escape. However, in the actual gameplay, there are infinite floors the player can traverse and never reach the roof. Regardless, the player's goal is to run as far as possible while having to fight or sneak past guards trying to stop them. Throughout their play-through, the player will earn gold from collecting it throughout the map, as well as earning it based on the distance the player has traveled in a "run". When the player dies, they will have the option of using this gold to purchase upgrades from the store to help them progress further on their next run. The stronger the player gets with upgrades purchased, the farther they will be able to run, and they will encounter stronger and greater numbers of guards. When the player reaches the staircase going up to the next floor, this will act as a checkpoint, so the player will now respawn on this new floor when they die.



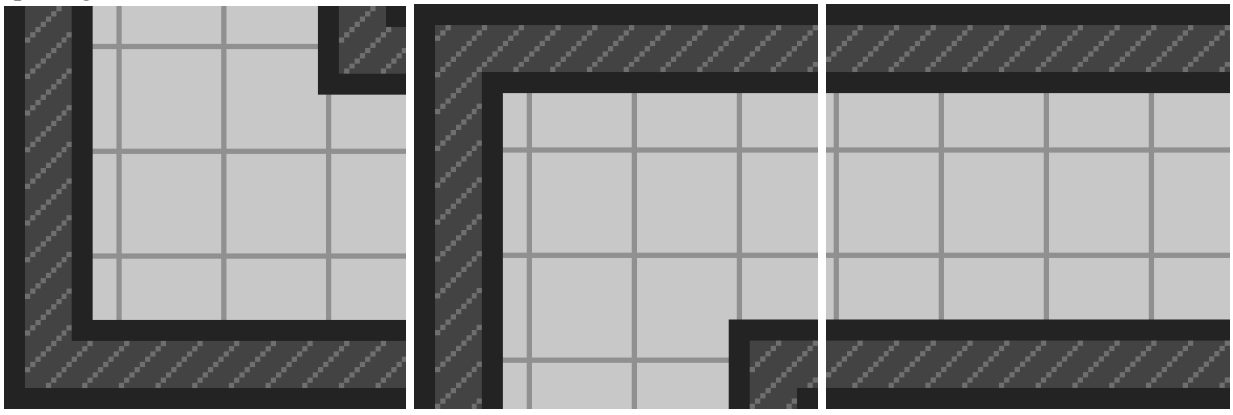
Core Design Features

Player + Controls

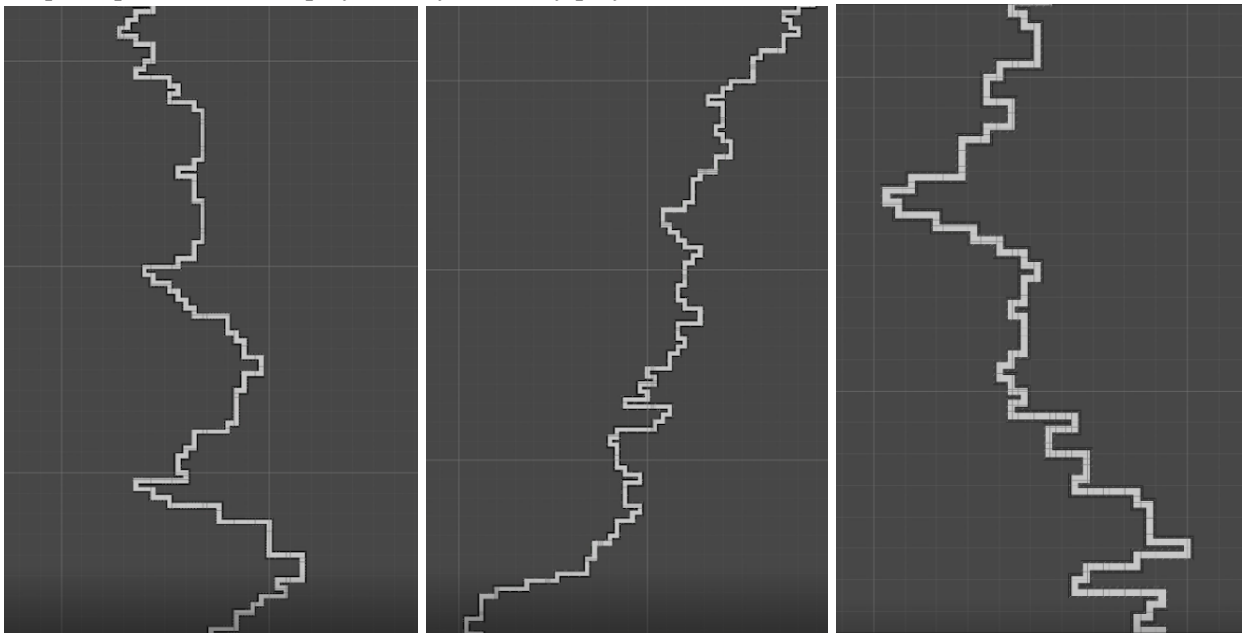
In this game, you will play as a monkey. Players will move their character using standard WASD movement controls. By default, they will be sprinting but players have the option to hold the shift key to sneak instead, which will prevent the player from making noise while moving, which the guards can hear. You can also aim and shoot by pointing and clicking the mouse. Players can toggle through their weapons by looking at the hotbar and pressing the number keys for the appropriate weapons. The monkey will have a health bar above its sprite. When a player is hit by an enemy, they will have damage inflicted on their health. If their health bar reaches zero, their run is over.

Map

Random map generation is one of our novel features. Once you begin playing our game, a map is randomly generated using a series of hallway blocks. These blocks are all of the same sizes and each has openings in two directions.

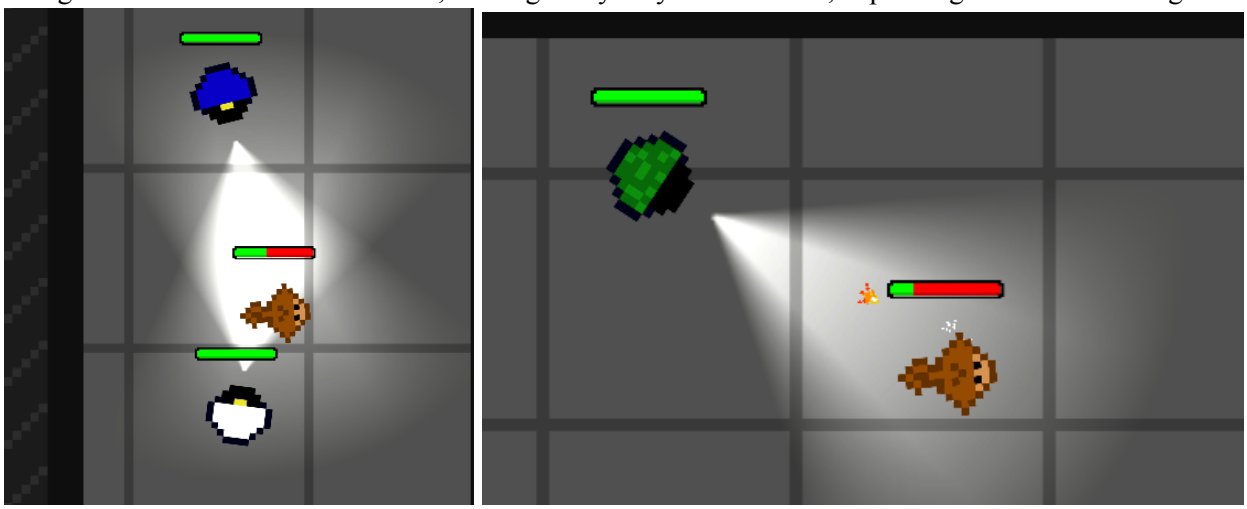


The player spawns at the entrance of the floor, at the bottom of the map to reach the exit at the top. Each tile that is placed during map generation has a chance of spawning gold and/or a guard. Every time a player reaches the end of the floor, a new map is generated with higher chances of spawning guards, and with more difficult guards. Having these infinite randomly generated maps allows for a unique experience for the player every time they play.



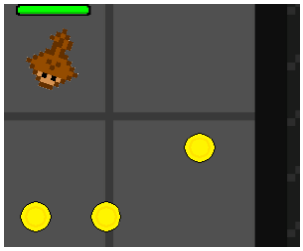
Guards

The main obstacle in your way is guards. There are three different types of guards. The first is the white guard who only has a melee attack but moves faster than the rest of the guards. Next, there is the blue guard, who has a ranged pistol attack. Finally, there is the green guard, who has more health than the blue guard and carries an assault rifle, although they may move slower, depending on balance testing.



A guard can exist on the map in three different states. Each guard has a cone of vision in front of them and a hearing radius around them that affects their states. When spawned, they are in a patrol state in which they will either move back and forth between two different tiles on the map or stay stationary at one point. If the player ever enters the guard's cone of vision, they will enter the pursuit state in which

they will either chase the monkey or stop and attack it if the player is within range. If the guard loses sight of the monkey, they will enter an investigation state. If the guard hears something (the player running, shooting, or the slingshot weapon), they will also enter an investigation state. In this investigation state, they will travel to the last point they saw the monkey, or the position they heard the sound, check the area, and if they find nothing they will go back to their patrol state.

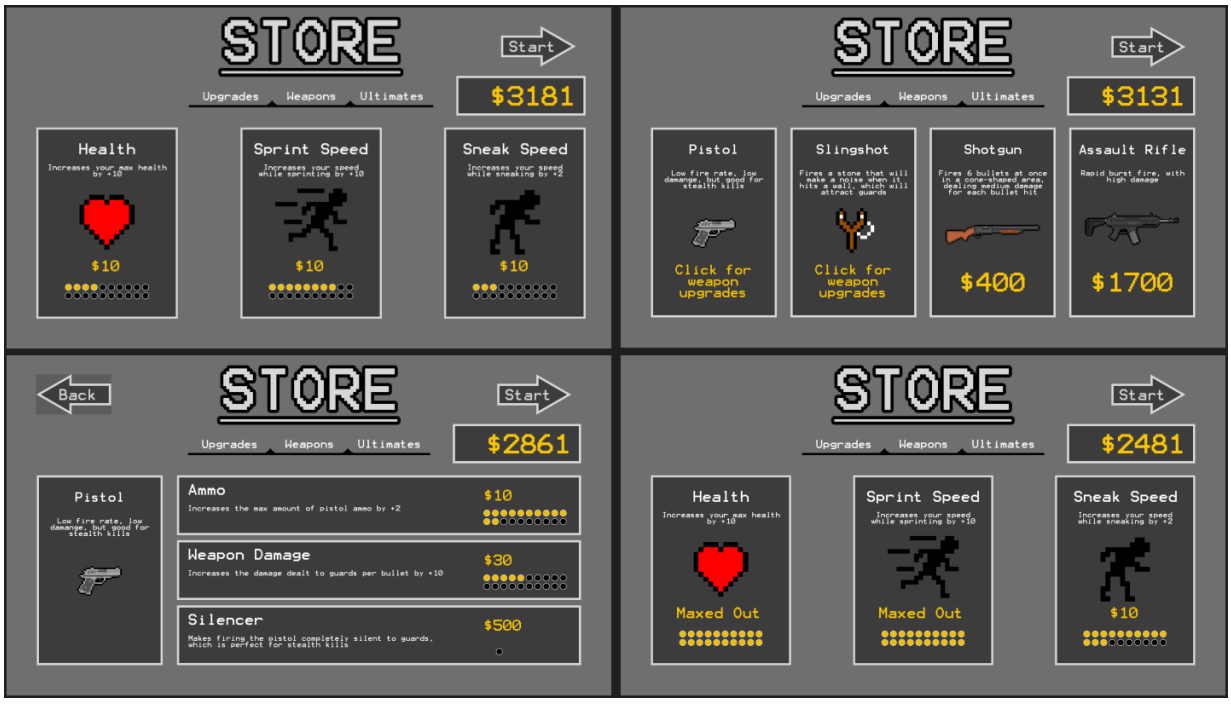


Gold

Throughout your playthrough, you will earn gold by picking it up off the ground throughout the laboratory. You will additionally earn gold every time you die based on distance traveled throughout the run. Your gold is saved after every run and can be used to purchase items from the store.

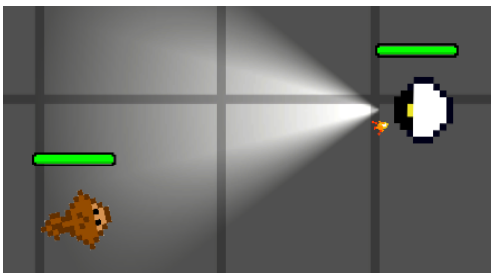
Store

Every time the player dies or launches the game, they will enter the store. Here, they can spend gold to increase their stats, unlock new weapons and upgrade their weapons. The player stats that can be upgraded are: health, sprint speed, and sneak speed. The prices will start pretty low but gradually increase as you buy upgrades. The weapons available for purchase are: a pistol, slingshot, shotgun, and assault rifle. For each weapon, the player can upgrade the ammo and weapon damage. The player can also buy a silencer exclusive to the pistol.



Weapons

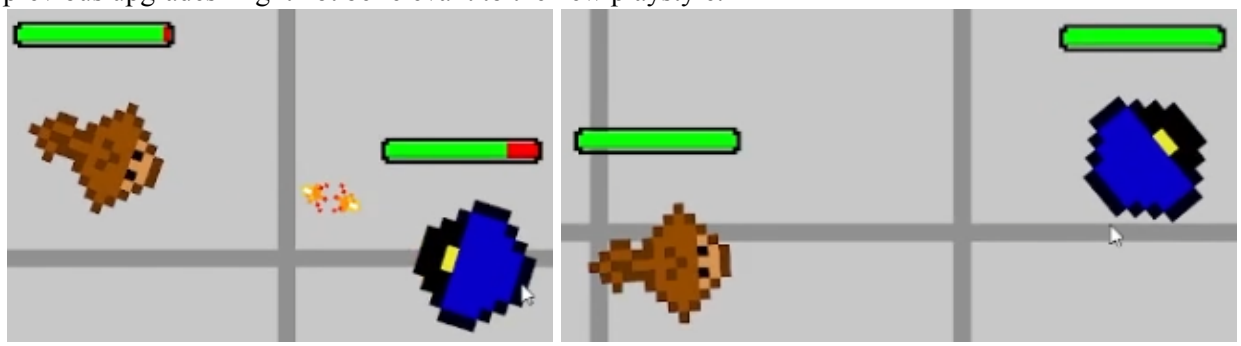
Each run, you will start with a certain amount of ammo for each gun you own. After you run out of ammo for a specific gun, you won't be able to use it anymore for the rest of the run. If you have a silencer for the pistol, gunshots cannot be heard even within a guard's hearing radius.



There are currently four weapons in the game. First, there is the pistol, the only weapon you start with, it shoots at a low rate and does minimal damage. Next, there is the slingshot, this weapon is very different from the others as instead of shooting it at guards, you shoot it at walls to create a sound which will attract guards to that location to investigate, clearing a way for the player to sneak past.. Additionally, there is the shotgun which shoots multiple bullets at once, dealing massive damage to enemies, however it is only good at short range, as bullets despawn after a fixed distance Lastly, there is an assault rifle that inflicts more damage than a pistol while shooting at a faster rate.

Playstyles

In this game, you will have the option of playing with two different play styles depending on the situation and preference: stealthy or loud and proud. For instance, if you want to play stealthy, you can focus on purchasing upgrades like the slingshot, pistol with a silencer, and sneak speed. On the other hand, if you wish to play aggressively and shoot your way out, you can invest your gold in increasing health, ammo, damage, and big guns. Players can freely switch between these playstyles, but the player's previous upgrades might not be relevant to the new playstyle.



Optional Features

Laser Sight

One optional feature that may be added, is the ability to have a laser sight for your gun rather than displaying the cursor. This would allow the player to know where they are aiming in a way that would immerse them more than using a mouse to target enemies.

Lockers

Another potential feature is having lockers spawn around the map. These lockers could be interacted with by the player to have the monkey hide in the locker while guards pass by. This addition would aim to add more features to support the stealth playstyle.

Barricades

Another possible feature would be to have barricades spawn throughout the map. These barricades will have health and will disappear when their health reaches zero. This could put players in a stressful situation in which they have to take down barricades in order to progress through the hallway, but the player will still have to deal with guards on the same side of the barrier. The monkey will be able to interact with the barricade to take it down, but this will take some time (probably about 5 seconds, depending on balance testing). However, barricades will also block guards as well, allowing the player to use them to their advantage in certain scenarios.

Explosives

Additionally, there have been thoughts about adding an explosive type of weapon/consumable to the game that can be purchased from the shop. This would be a throwable item the player can use to deal AOE damage to guards. Furthermore, they can also be used to immediately destroy a barricade.

Ultimates

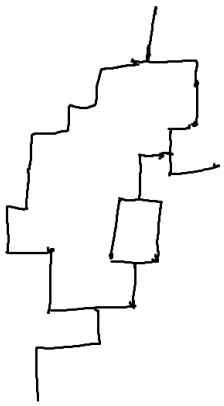
Lastly, there was an idea to add ultimate abilities that can be purchased from the shop at a high cost and make the player much stronger for a limited duration (only a few seconds). There have been two brainstormed abilities so far, one for each playstyle. The first is rage, where the monkey will embrace his inner darkness and gain a large amount of health, and gain a strong melee attack instead of using a gun. The other is an invisibility potion. When activated, the invisibility potion will make the monkey unseeable for a few seconds allowing for the player to escape a tight situation or avoid multiple enemies.

Advanced Guard AI

Currently, our guard AI works, but it is very basic and can be easily exploited if the player knows how, which is discussed in detail in the playtesting section. In general, we'd like to make the guards more "life-like." Potential changes for advanced guard AI would be creating a more nuanced investigative state in which the guard will look around their point of intrigue instead of just standing there, reacting when the guard is shot by the player, and the ability to detect when walls are blocking their line of sight to the player (currently guards will just shoot the wall thinking they are shooting the player).

Advanced Map Generation

Similar to guard AI, we currently have a working algorithm to randomly generate a map, but it has some restrictions on the complexity of the map. The main restriction is the requirement of a single continuous path, instead of the ability for a single path to branch off into multiple paths (which would allow the player the choice of which direction to go). This restriction arguably leads to our game feeling linear and less interesting. The other restriction is not allowing the path to ever go down (the player will never be traveling down on the screen), restricting the algorithm to only add map blocks in the left, right, or upward direction, but never down. The reason for this is to prevent the "head" of the path (where new blocks are being added as the map generates) from colliding into previously placed blocks. In addition to the ability to branch off into 2 paths, we'd also like to add dead ends, as well as big open rooms (square-shaped). The challenge with implementing these changes is the reason the previously discussed restrictions are necessary in the current algorithm. If the map is able to branch off into multiple paths, it would be possible for the 2 paths to collide into each other when generating, which can't happen.



Media List

- Gun pixel art is from: https://arcadeisland.itch.io/guns-asset-pack-v1
- The rest of pixel art is done by us

DEVELOPMENT STATUS

Complete

Player

Players can move around based on user input. The monkey will change the direction it's facing based on mouse position. The player can sneak and sprint as they please. The player has stats for health, sneak speed, and sprint speed. Players can take damage and will die if the health bar reaches zero. Players can shoot if they have a weapon equipped.

Map

While our current implementation of random map generation does have some restrictions limiting the complexity of the map, as discussed previously, we have completed a fully working simple implementation of random map generation. This simple implementation randomly generates a single

linear path with a random layout, as depicted in the images above. Furthermore, guards have a percent chance to spawn on each map block.

Guards

We currently have working prefabs for all three guards. Each type of guard can attack and be attacked as intended. Pathfinding has been implemented on guards so they can traverse between points when necessary. Guards have different AI for each state that allows them to behave as described in the report. Guards have a working version of a cone of vision and hearing radius. Guards have AI for transitioning between states but it is easily exploited. Guards will take damage and despawn if their health reaches zero.

Gold

We have a working gold prefab that can be picked up when the player collides with it. Gold is also earned after the player dies based on distance traveled. Gold is saved every time the shop is entered.

Store

A fully working store UI has been implemented, with purchased upgrades affecting the player ingame. Weapon purchases have been implemented. The player will enter the store after dying.

Weapons

The pistol, shotgun, and assault rifle are all fully implemented and can be shot as intended.

Save File

The player's progress will be automatically saved throughout gameplay, specifically when the player dies, and when the player enters the shop. Progress is saved using PlayerPrefs, which has been tested with a WebGL build of the game with positive results.

Incomplete

Sprites and Animations

We currently do not have any animations for the player or guards, including movement animations and death animations. Furthermore, we haven't finalized sprites, especially for the monkey. Finally, we don't have a sprite for a map block containing a staircase, which would be placed at the beginning and ending of floors.

Map

We have not decided on an algorithm that will determine the number and type of guards spawned depending on the floor level. *As discussed previously, we'd like to make a new implementation of random map generation that allows for more complex map layouts, if time allows it.

Guards

*We'd like Guard AI to be a little more life-like, especially during the investigative state.

Gold

Gold spawning on the map has not yet been implemented.

Store

Currently, store prices for a particular upgrade will not increment with the number of times said upgrade is purchased. For example, if the first time the player purchases a health upgrade the cost is $10, then we want the next health upgrade to cost $15 (values not to scale).

Weapons

The slingshot still needs to be implemented. The silencer for the pistol is not implemented yet. Ammo is not implemented yet. Finally, the hotbar UI hasn't been made yet.

Menu/Settings UI

Both the art and functionality of the main menu and settings are yet to be implemented. There is also no game over screen currently, telling the player the distance they made it, the gold they earned, and other useful information.

Sound

We haven't added sound effects yet for shooting guns, melee attacks, footsteps, the player taking damage, or clicking buttons in the store. Furthermore, no background music has been added yet.

*Laser Sight

*Lockers

*Explosives

*Barricades

*Ultimates

(denotes an optional feature)*

Barriers

Map Generation

As previously discussed in the optional features section, the current map generation algorithm has some limitations, restricting the complexity of the map generated. The challenge is implementing a new algorithm that can avoid the possibility of multiple hallways colliding, and even harder, having the 2 branched hallways merge back into one hallway again. The fallback option for this is to simply have map generation the way it is currently constructed.

Difficulty Scaling

As mentioned earlier, the levels of the game do not increase in difficulty as you play. This is mainly because we have not yet decided how this would be best implemented. (i.e. should we make guards stronger at every level or just increase their chance of spawning). Fallback would be to make the game easier than it should be so the game is not too frustrating and players can still enjoy the prospect of upgrades as their main objective.

Balancing

Due to the complicated nature of progress in our game, especially due to upgrades, the cost of those upgrades, and the amount of impact those upgrades have, balancing the game will be crucial, and not an easy task. Simply put, we need to balance our game's economy. Since balancing is an iterative process, no fallback plan is necessary.

Guard AI

As seen through our play-testing, guards are very easily exploitable which leads to the game being much easier than intended. For instance, the investigation state could be more "life-like" as they currently just stand there for a few seconds and forget about the monkey altogether too easily. Instead, we'd like the guard to search the area the monkey was last seen, trying to find him. Also, the hearing

radius needs to be fine-tuned as players can simply shoot the guard in the back from outside the guard's hearing radius and guards will not do anything in response. Additionally, there are several bugs such as the guard attempting to shoot the player from behind a wall and guards awkwardly moving backwards while shooting. The fallback option is to have guards as they are currently implemented.

PLAY-TESTING REPORT

Method

Developer Playtesting

As the main developers of Monkey Marathon, we playtest every new feature that is implemented to ensure that the feature works the way it is intended, with no obvious bugs. In general, after a "development session", the game is tested many times and tweaks are made until the game is in a playable and working state as intended. In the case where a new feature still has bugs, but the developer still wants to push it to Github, the developer would include the bug in the commit message to make the other developers aware of the bug. Depending on the bug, other developers would either work around the bug, or create a temporary branch until the bug is fixed.

Non-developer Playtesting

We went through two rounds of non-developer playtesting so far. Both rounds consisted of the same three play testers. The play testers are all young adults who are also avid gamers. Quantifiably, all have over 7000 total hours played on steam. This implies we are obtaining feedback in the eyes of experienced gamers who are educated in multiple different game genres. We recorded this feedback by sitting in a call with the play testers while they shared their screen and had them talk us through their thoughts and ideas, as well as having them try to find exploits. After receiving feedback from the playtesters, for each piece of feedback, we did one of three things: fixed it immediately, plan to fix it in the future, or debate whether or not we like the idea.

Results

First Round

- Upgrade prices should increment after each purchase of that specific upgrade
- Add toggle for sprint/sneak
- Change it so holding shift would sneak, instead of sprint (switch them around)
- Increase default sneak speed
- Add an on-screen menu button accessible in game
- The store should be accessible in game (weapon locker) where you can interact with it in the beginning of the level (increases immersion)
- Too easy to shoot guards without having guards fighting back
- Monkey moves faster moving diagonally than up/down/left/right
- Bug: when running towards a guard, the guard will move backwards in a glitchy manner
- Make all bullets despawn after a certain distance
- Make guards run faster when in pursuit state than patrol state
- Bug: reset distance after respawning or exiting the store
- Guard spawns are way too random with sometimes no guards spawning close to the start of the level, and sometimes large groups of guards spawning together

Second Round

- Guard lights go through the walls, rather than colliding
- The health bar isn't centered

- Bug: gold would occasionally rapidly increase at the start of each game
- Bug: when the player collides with the white guard, the guard will go flying and not resume pathfinding like it is intended to
- Bug: store UI sometimes doesn't save/load properly, specifically the number of upgrades already purchased
- White guards' difficulty needs to be increased (too easy with a weapon in hand)
- Bug: gold doesn't always save
- There is a broken strategy where upgrading sprint speed and you just ran past all guards without taking much damage
- Player is too rich, need to balance economy
- Some upgrades maxed out are unrealistically too powerful

PXI Questionnaires

Question	Brannon	Graham	Thomas
Playing the game was meaningful to me	-3	0	1
The game felt relevant to me	-3	0	1
Playing this game was valuable to me	-3	0	1
I wanted to explore how the game evolved	-3	2	3
I wanted to find out how the game progressed	0	3	3
I felt eager to discover how the game continued	-3	1	3
I felt I was good at playing this game	3	3	3
I felt capable while playing the game	3	3	1
I felt a sense of mastery playing this game	3	0	-1
I felt free to play the game in my own way	3	-3	3
I felt like I had choices regarding how I wanted to play this game	3	-3	1
I felt a sense of freedom about how I wanted to play this game	3	-3	2
I was no longer aware of my surroundings while I was playing	-3	0	0
I was immersed in the game	-3	3	0
I was fully focused on the game	-3	3	2
The game informed me of my progress in the game	1	-3	-1
I could easily assess how I was performing in the game	-1	3	1
The game gave clear feedback on my progress towards the goals	-3	1	-3

I enjoyed the way the game was styled	-2	1	2
I liked the look and feel of the game	-1	1	2
I appreciated the aesthetics of the game	-2	3	1
The game was not too easy and not too hard to play	-3	-3	-2
The game was challenging but not too challenging	-3	-3	-1
The challenges in the game were at the right level of difficulty for me	-3	-3	-1
It was easy to know how to perform actions in the game	-2	1	-3
The actions to control the game were clear to me	2	0	-3
I thought the game was easy to control	3	3	2
I grasped the overall goal of the game	3	3	3
The goals of the game were clear to me	-3	3	1
I understood the objectives of the game	0	3	1
I liked playing the game	-2	3	3
The game was entertaining	1	3	3
I had a good time playing this game	2	3	3

Analysis

Regarding the PXI questionnaire, while the survey does not provide quantitative results of the game, through listening to the playtesters while they completed the survey, we found that the playtester's expectations were not consistent, severely affecting the scores. For example, regarding the game's entertainment, one playtester compared the game to a professionally made game and asked himself the question, "Would I play this game every day? No." While other playtesters compared the game to other indie games. Overall, we found that due to the inconsistency of the results, and the amount some scores were penalized due to the game not being finished (known from verbal feedback while completing the survey), we valued verbal feedback much greater than the results from the PXI questionnaire.

The most obvious issue the results tell us is that there are many bugs that need addressing. Some game breaking bugs that are a high priority include the gold and distance occasionally resetting, stats are not saved and sometimes reset, and a few bugs regarding the store UI. Most of these bugs have already been fixed, as progression upgrades purchased with gold earn is our main novelty and one of the main ideas of our game. If that is not working correctly, then the majority of our game is unplayable.

In short, the game is too easy. We need to scale upgrades to properly align with the increase in guard damage/health as well as scale the amount of gold obtained as it is too easy to upgrade as of right now. All playtesters were able to get the large majority of upgrades within only a few runs, all on the first floor. In contrast, our game is meant to last a great deal long, and require the player to progress to upper floors in order to get higher tier upgrades/weapons. Economically speaking, the amount of sources of

money far exceeds the amount of sinks. To fix this, we will reduce the amount of gold earned each run and increase the upgrade prices in the store. Our goal is to create a flow in the game where the difficulty increases as the upgraded stats increase to maintain a balanced difficulty throughout the entirety of the game. We will also scale down the weapon damage as one play tester noticed that with the damage increase upgrade maxed out, the player could one-shot guards, which is not something we'd like even a maxed out player to be capable of. In general, there are some upgrades that are way too powerful that need to be properly balanced. Furthermore, in the game's current state, limited ammo has not yet been implemented, allowing playtesters to experience unlimited ammo, which after observing them, definitely affected how the game was played. Specifically, having unlimited ammo was a huge buff to the aggressive playstyle, giving no incentive to try the stealth playstyle much, if at all. Since limited ammo is such a major feature especially in terms of balancing, within the next week, after limited ammo has been implemented, we'll have playtesters test the game with this newly implemented feature.

Besides the upgrade aspect, the guard AI is not sufficient enough to provide a challenge to players, as all testers agree that the game's challenges were not at the right level. Currently, guards have one constant speed, although we've planned to implement a change one of the playtesters suggested, that is, the guards should run faster when pursuing or searching for the money, in contrast to the normal walk speed when the guard is patrolling. We will also reduce the sprint speed of the monkey, especially decreasing the effect of upgrading sprint speed through the store, as playtesters discovered an unfair strategy. The player would simply sprint past all the guards, taking minimal damage. The players would prioritize sprint speed in the store to make the strategy even stronger, flying past all enemies before they could even get a shot off. Another exploit playtesters discovered was the ability to shoot guards while standing outside the guard's hearing radius, so the guards don't detect them, and the player is able to freely damage guards without any resistance. One playtester proposed the solution of despawning bullets after a certain distance, which is good, but we're not sure this is the exact solution we want, so this idea is currently still under consideration.

Several of the playtesters also agreed that at times, there would be areas with no guards at all, making that section boring, and in other sections, having an abundance of guards. The reason for this is because currently, guards have a percent chance to spawn on every block. In extremely rare instances, it is possible for no guards to spawn in an entire map, and it is also possible that each block spawns a guard. Overall, this problem provides an inconsistent game experience for players, and we will monitor this issue, although we haven't thought of a solution yet.

Finally, to address the less significant feedback, we have increased the base sneak speed already, and plan to implement an option to toggle between sprint and shift, rather than holding shift. We also plan to increment the price of upgrades as the player purchases more and more of that upgrade. Furthermore, we also plan to implement an on-screen menu button. Regarding the idea to add a "weapon locker" into the map which the player can interact with to open the store, we are still debating this idea. The health bar not being centered and the player moving faster diagonally are issues we had not previously noticed, and we plan to fix these in the near future. Finally, a playtester noticed that guard lights currently go through walls, instead of being blocked by them.

MILESTONES TO COMPLETION

Week #1 (Mar. 13-19)

- Finish progress report
- Implement Ammo
- Spawn gold
- Implement slingshot
- Polish noise mechanic

- Implement silencer
- Make beginning and end to level

Week #2 (Mar. 20-26)
- Implement locker
- Add sound effects
- Add laser sight
- Implement advanced level generation
- Implement an object pool for bullets
- Make balance changes

Week #3 (Mar. 27-Apr. 2)
- Make balance changes
- Make final copies of sprites
- Add animations
- Add hotbar UI
- Add ray-casting to make sure the guard will only shoot if it can hit player
- Implement blockades if time permits
- Implement explosives if time permits
- Implement ultimates if time permits

Week #4 (APR. 3-9)
- Create gameplay video for final submission
- Create wrap-up report
- Make final balance changes
- Polish anything that needs polishing
- If time permits, implement anything we didn't previously have time for