Final Project Documentation

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# Introduction and Analysis

The game used for this project was pulled from free resources on the Unity asset store. In the game, you play as either a cat or a raccoon in an endless runner. The player dodges trashcans, traffic barriers and cones, rats, and sometimes dogs. There are three lanes that the player can maneuver between to dodge obstacles as well as jump and slide. The goal is to get as far as possible before losing all three lives.

This game is clearly created as a mobile game as most interfaces are click-drag enabled and the size of the game is that of a phone. There are three game states, and a few UI states inside of each of them. A shop is accessible and uses currency that has been picked up during the game to unlock different themes, character outfits, and even consumable powerups.

# Main Assets

* Dog and Rat sounds
  + These sounds are for enemies that are dependent on distance, so their roaming sounds are both 3D events. As the player gets closer to the enemies in game, the sounds they are emitting get louder. These sounds are distance indicators for the player.
* Obstacles
  + There are three obstacle sounds in the game. A traffic cone, a garbage can, and a construction fence sound. Some of the objects in game share the sounds since they are similar. They are one-shot sounds that are played whenever the player runs into one. The sounds are indicators that the player has hit an obstacle and thus losing a heart.
* Pickups
  + There are three auras for pickups in-game that give powerups. They are a magnet, invincibility, and an extra life. There is one for a multiplier too, but that one does not have an audio asset. The magnet and invincibility both have looped sounds for the duration of the powerup, while the extra life plays a one-shot clip. Both the magnet and invincibility have duration sounds to help emphasize that the powerup is active.
  + Coins have a one-shot sound that is dim since there are so many coins. There is also a premium coin that has a longer, more significant chime.
* Player
  + The player has options to play as either a cat or a raccoon, so there are specific assets for both. Both types of player types have a jump sound to help emphasize the jump, and a death sound to help indicate the run is over.
* UI
  + There are only two UI sounds in the assets. There is one for any type of button press that sounds like a pop, and another that ques the start of a run. The pop makes it easy to see when a button prompt has been launched.
* Music
  + The music has multiple pieces to it. There is the main menu music, the actual game music, and the game over music. All three of them loop until a state transition. The game music itself has stems that are added or taken away from the main music based on the speed the player is running. The faster the player runs, the more intense and in depth the music becomes to increase intensity.

# FMOD Production

To start, the music is the most in depth part of the project in terms of FMOD programming. There are a lot of logic effects and even stems triggered by parameters. Each of the three segments of the music have state transitions and loop regions to help with flow. State transitions are triggered through parameters. Each game “state” has its own parameter to help with transitions. The main menu can have a value of 0 or 1, while the two for game and game-over can have a value of 2 as well. Menu can only transition to game, while game and game-over can transition to either of the other two. 0 is the default state for all transition parameters. There is also a speed parameter that, when changed, adds or subtracts extra stems from the main game track. As the value increases, the stems included also increase. The speed variable is altered directly based on the speed at which the player is traveling. As speed increases, so does the track intensity.

As for other FMOD work, there are different types of automations thrown into a lot of different assets. Randomization of pitch is used often for many parameters that are played often such as jump, coin pickups, and the invincibility loop. This allows the sounds to sound different enough so that the game doesn’t feel static. Another form of automation is a scatterer instrument that plays a random clip for both the dog and rat roaming noises.

A big integration component of FMOD is the mixer bus control. There is a bus for music, sfx, and a master. All three have a parameter that is changed from a slider in the settings, directly editing every audio event volume in the specific bus.

# Mixing/Mastering

After setting up the FMOD Loudness meter with Live Update, there was immediately an issue with loudness. The true peak was averaged at -0.6dBTP. It was assumed however that this would be the case due to the music levels. They were very loud and only got louder with each stem that got added. As a fix to this, the music event’s volume was turned down by about 4dB. This brought the true peak down and made the sounds blend a little better together.

Now that the music issue was taken care of, it was easy to see some other outliers as well. The simple button press was way louder than a lot of the other sounds in the SFX and needed to get turned down about 4dB as well.

The standard LUFS for a game is -16LUFS. My project averages between -20LUFS and -18LUFS and with a peak of roughly -1.7dBTP, when it is recommended not to go over -1.0dBTP, it is in good standing with the standard guidelines.

# Sources and References (As Named Through Reaper)

## Enemies:

* Mouse (roaming/hit):
  + squeak 1:
    - Source Name: Mouse Squeaks.wav
    - Author: shyguy014
    - URL: <https://freesound.org/people/shyguy014/sounds/463789/>
  + squeak 2:
    - Source Name: Cat Toy
    - Author: aunrea
    - URL: <https://freesound.org/people/aunrea/sounds/495653/>
* Dog (roaming/hit):
  + bark1:
    - Source Name: Mr Dog\_01.wav
    - Author: apolloaiello
    - URL: <https://freesound.org/people/apolloaiello/sounds/276267/>
  + yelp1:
    - Source Name: Dog’s Yelping 2
    - Author: unfa
    - URL: <https://freesound.org/people/unfa/sounds/160472/>

### Player:

* Cat (dash/jump/death):
  + meow1:
    - Source Name: The cat’s meow
    - Author: Counter-gamer
    - URL: <https://freesound.org/people/Counter-gamer/sounds/213889/>
* Raccoon (dash/jump/death):
  + chipmunk1:
    - Source Name: Chipmunk Vocalization
    - Author: Mountain852
    - URL: <https://freesound.org/people/Mountain852/sounds/365819/>
* Slide:
  + road slide:
    - Source Name: Sliding on a frozen asphalt road.wav
    - Author: Magdaadga
    - URL: <https://freesound.org/people/Magdaadga/sounds/420392/>

## Obstacles:

* Garbage Can:
  + soda cans:
    - Source Name: Empty soda cans
    - Author: jmayoff
    - URL: <https://freesound.org/people/jmayoff/sounds/253339/>
  + metal thud:
    - Source Name: metal thud
    - Author: zaneclampett
    - URL: <https://freesound.org/people/zaneclampett/sounds/263620/>
* Traffic Cone:
  + Cone1:
    - Source Name: Cone Bass Clean.aif
    - Author: lovesbody
    - URL: <https://freesound.org/people/lovesbody/sounds/321825/>
* Road Sign:
  + blunt impact:
    - Source Name: Blunt Force Impact.wav
    - Author: jgriffie919
    - URL: <https://freesound.org/people/jgriffie919/sounds/400176/>
  + train:
    - Source Name: Train Track Joints Slow (Loop)
    - Author: KayleRustone
    - URL: <https://freesound.org/people/KayleRustone/sounds/474977/>

## Pickups:

* Magnet:
  + zap2:
    - Source Name: Jacobs ladder from side.wav
    - Author: parabolix
    - URL: <https://freesound.org/people/parabolix/sounds/449013/>
  + hum1:
    - Source Name: Scfi\_Electric\_Hum\_01.wav
    - Author: xixishi
    - URL: <https://freesound.org/people/xixishi/sounds/265210/>
* Invincibility:
  + sparkle1:
    - Source Name: cartoon\_wink\_magic\_sparkle.wav
    - Author: MattLeschuck
    - URL: <https://freesound.org/people/MattLeschuck/sounds/511485/>
* Currency
  + crush1:
    - Source Name: PLASTIC CUP CRUSH C617 003.wav
    - Author: sandyrb
    - URL: <https://freesound.org/people/sandyrb/sounds/93185/>

## UI:

* Buttons
  + pop1:
    - Source Name: Popping
    - Author: supersound23
    - URL: <https://freesound.org/people/supersound23/sounds/431532/>
* Countdown
  + ding1:
    - Source Name: Bell Ding
    - Author: Natty23
    - URL: <https://freesound.org/people/Natty23/sounds/411749/>
  + ding2:
    - Source Name: Slide ping
    - Author: ProjectsU012
    - URL: <https://freesound.org/people/ProjectsU012/sounds/341657/>

## Music:

* All music was taken from base game files, thrown into reaper, and then into FMOD for specialized production.