**Game Description:**

Trash Dash is a unity sample project in the style of a 3-lane endless runner. The player is tasked with collecting currency while avoiding various randomly spawned obstacles as they slowly get faster and faster. The player can switch lanes, jump, and slide in order to avoid taking damage. The player can collect fishbones to spend after each game, along with the rare premium currency that can give you special boosts. The player can also collect power ups that improve their ability to succeed, like being able to grab fishbones without touching them, or become invincible for a short time. The game only ends when the player takes enough damage to die, but they can always play another round.

**Sound Requirements:**

1. Sound effects

Most sounds are one-shots that communicate in-game actions. Some, but not all use pitch and/or speed randomization. Many sound effects are repeated, and play more often as the game goes on. Sidechained compression is useful at lowering the fatigue caused by increasing sounds.

1. Interface Sounds

The menu system for the game is limited and only a few sounds are necessary. The source project relies heavily on Unity’s built-in system for button handling, making a lot of UI integration difficult.

1. Ambience

The ambience of this project is quite small. There is a lot of opportunity in it despite this. Rat enemies provide spacial ambience to go alongside some traffic sounds.

1. Music

I chose not to make any background music, but I did compose a few jingles to accompany some interface sounds and a power-up.

1. Dialogue

There is no dialogue.

**Asset Development:**

Most of the work done for asset development consisted of finding realistic and well recorded audio on freesound.org, then equalizing and normalizing the levels to fit the context of the rest of the sound. I had some difficulty finding appropriate source sounds for a couple events, so I either had to settle for noisy recordings or get creative on processing less predictable sources. The sounds for the cat all come from actual cat recordings. One of these was quite noisy and required a gate in addition to the EQ. The raccoon sounds were tough. Not many recordings of raccoon chatter, so I ended up using sounds from a chimpanzee and a magpie pitched up. The chimp sounds were old and the magpie wasn’t the only bird in the source, but I think EQ helped a lot with those issues. The rat sounds were also a challenge. I had one great recording, and another that had been heavily gated by the uploader. I fixed this by removing silent parts and adding a very slight reverb to fill in what remained. All the obstacle collision sounds consisted of one or two sources of the appropriate material being hit. I then combined the sounds where necessary and adjusted the balance between hits (second hit is usually quieter). I wasn’t quite sure how to find a sliding noise but I settled on the sound of rope sliding together. The fishbone sound is of course bones. I had to shorten it a lot and shape it so it sounded fine being repeated. All the button presses are recordings of computer mice with a lot of high pass. The magnet powerup was fun to make. I used a stylophone recording, found a smooth loop within it, then automated the gain to make it pulse. All remaining sounds are jingles I made using a very simple ReaSynth instrument. I made the instrument use a very basic, retro balance of square, saw, and pulse that fits the arcade simplicity of the game. Some jingles sound like they use delay, but I actually did those manually so I wouldn’t have to fuss with making the timing right.

**FMOD Programming:**

The bulk of events in my project are one shot, asynchronous, single instruments. Events like slide, jump, and fishbone collection that repeat a lot are given pitch randomization to alleviate this discomfort of hearing identical sounds over and over. A couple of events use multi-instruments to give some diversity to the sound of the game. Button click has three different sounds it can play. Rat growl has two sounds. Rat growl also has a distance parameter that checks the distance of a rat obstacle to the player in Unity. The closer the play is, the louder the growls. The two continuous power-ups (magnet and invincible) are loops with ADHSR. The ambient event makes use of a scatterer and three traffic tracks. I’ve set the scatterer to only ever play two at a time, and wait until one is mostly done before spawning another. This also has some ADHSR. I organized the events according to the asset sheet, barring the ambient event which I roped in with the general sounds. In the mixer, I organized the events into their effective categories: menu, character, collectable, obstacle, music, and ambience. I gave character, collectable, and obstacle a bit of reverb to match the alleyway the game takes place in.

**Mixing:**

Due to how I normalized the levels of all my assets, I was able to start mixing based on assumptions on what would need to be quieter than other assets. Generally, sounds more important to telling the player what's happening are louder. Menu sounds and music don’t really fit this hierarchy, so I just put both down a few decibels to match the general loudness of combined sounds in gameplay. I experienced issues with repeated sounds overtaking the mix, so I added sidechained compression to the character and collectable mixers, both chained to the master mix so they duck outa bit as things get louder. Many assets didn’t fit the balance and had to be softened directly instead of just through the mixers. Cat jump was the only sound that needed to be turned up. I added a snapshot mixer for when the game pauses. This snapshot lowers all the volumes, more so for menu, character, and music. The other three mixer groups receive a low pass filter, which I believe is a pretty standard practice for pause screens that don’t just mute everything.

**Mastering:**

The balance I created while mixing ended up landing me quite close to the European/US standard for game loudness. I adjusted a couple one shots to be softer and turned my ambience up a bit. A full game including some menus resulted in about -23 LUFS and a max peak of -2 dBTP. I found that many games go a good bit over in both categories, closer to standards for music. I felt that my game might become annoying to listen to if I made it any louder, so I stuck with the standards that don’t seem to be all that standard after all.

**Original Audio Used:**

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| --- | --- |
| Audio File Name | Original Uploader |
| [**cat purring and meow**](https://freesound.org/people/skymary/sounds/412016/#) | [**skymary**](https://freesound.org/people/skymary/) |
| [**Miecio the cat.wav**](https://freesound.org/people/missozzy/sounds/171220/#) | [**missozzy**](https://freesound.org/people/missozzy/) |
| [**Cat.m4a**](https://freesound.org/people/Daniela-Santos/sounds/424596/#) | [**Daniela-Santos**](https://freesound.org/people/Daniela-Santos/) |
| [**ratSqueak.wav**](https://freesound.org/people/Zabuhailo/sounds/143125/#) | [**Zabuhailo**](https://freesound.org/people/Zabuhailo/) |
| [**ratty squeaks.wav**](https://freesound.org/people/Reitanna/sounds/217767/#) | [**Reitanna**](https://freesound.org/people/Reitanna/) |
| [**Harakka räkättää / Magpie chattering, small birds in the bg**](https://freesound.org/people/YleArkisto/sounds/248336/#) | [**YleArkisto**](https://freesound.org/people/YleArkisto/) |
| [**G12-21-Monkey Chattering.wav**](https://freesound.org/people/craigsmith/sounds/437953/#) | [**craigsmith**](https://freesound.org/people/craigsmith/) |
| [**Rope Sliding.wav**](https://freesound.org/people/cmilo1269/sounds/491960/#) | [**cmilo1269**](https://freesound.org/people/cmilo1269/) |
| [**Bones 2**](https://freesound.org/people/AntumDeluge/sounds/188034/#) | [**AntumDeluge**](https://freesound.org/people/AntumDeluge/) |
| [**Hollow Impact.wav**](https://freesound.org/people/C_J/sounds/327468/#) | [**C\_J**](https://freesound.org/people/C_J/) |
| [**Plastic Trash Can**](https://freesound.org/people/zembacraftworks/sounds/427390/#) | [**zembacraftworks**](https://freesound.org/people/zembacraftworks/) |
| [**Car\_hood-Slam-hollow-metallic.aif**](https://freesound.org/people/nmscher/sounds/86236/#) | [**nmscher**](https://freesound.org/people/nmscher/) |
| [**Trash can falling over - multiple times - Mülltonne umkippen.wav**](https://freesound.org/people/usernamemoe/sounds/377888/#) | [**usernamemoe**](https://freesound.org/people/usernamemoe/) |
| [**wood board hit.wav**](https://freesound.org/people/alec_mackay/sounds/463651/#) | [**alec\_mackay**](https://freesound.org/people/alec_mackay/) |
| [**Mouse Click**](https://freesound.org/people/deleted_user_4772965/sounds/256455/#) | [**deleted\_user\_4772965**](https://freesound.org/people/deleted_user_4772965/) |
| [**Static, Stylophone, A.wav**](https://freesound.org/people/InspectorJ/sounds/415924/#) | [**InspectorJ**](https://freesound.org/people/InspectorJ/) |
| [**click1\_long.wav**](https://freesound.org/people/nirmatara/sounds/48609/#) | [**nirmatara**](https://freesound.org/people/nirmatara/) |
| [**mouse click.wav**](https://freesound.org/people/THE_bizniss/sounds/39562/#) | [**THE\_bizniss**](https://freesound.org/people/THE_bizniss/) |
| [**City Traffic (Outdoor).wav**](https://freesound.org/people/embracetheart/sounds/345313/#) | [**embracetheart**](https://freesound.org/people/embracetheart/) |
| [**traffic sounds001.WAV**](https://freesound.org/people/pesticideX/sounds/478573/#) | [**pesticideX**](https://freesound.org/people/pesticideX/) |
| [**Paris\_traffic.wav**](https://freesound.org/people/lupalenzuela/sounds/512142/#) | [**lupalenzuela**](https://freesound.org/people/lupalenzuela/) |

<https://github.com/mvh9602/EndlessRunnerSampleGame>

https://docs.google.com/spreadsheets/d/1NIaBOYe2o41eIQ8FMMB3I-FCXAQ-lM9IRLgWk8YVqDA/edit?usp=sharing