

CENG 448/548 — Real-Time Operating Systems

South Dakota School of Mines & Technology

Laboratory Assignment Six

The objective of this assignment is to add sound effects to the nInvaders game. You will be given audio data that was digitized from the Space Invaders game, and you will play those audio sound effects using the pulse modulator device. The audio data is sampled with 8 bits of audio depth at a rate of 8000 samples per second. The audio samples are signed 8-bit integers.

Part 1:

1. Download `sound_effects.tgz` from D2L and unpack it in your main project directory. This will create a new directory containing four files. These files provide the sound effects data and the skeleton for the sound effects code.
2. Edit your `CMakeLists.txt` and get it to compile.
3. Write part of the `init` function to set up the ISR and the two queues that are used to communicate between the mixer and the ISR.
4. Temporarily program the mixer task to play one of the sound effects repeatedly, pausing for $\frac{1}{2}$ second between each repetition. Run the mixer task (and no other user task) while debugging.

Part 2:

1. Complete the mixer task, so that it reads from the effects queues, sums them, and forwards the results to the ISR.
2. Complete the sound effect task code.
3. Finish writing the `init` function so that it creates all of the queues and instantiate one task for each sound effect.
4. Write a task to test the sound effects by signalling an event for each of the sound effects at 2 second intervals.
5. Run it to debug.

Part 3:

1. Disable the sound effects test task. Enable the nInvaders task.
2. Edit the nInvaders code to signal sound effect events at the appropriate times.