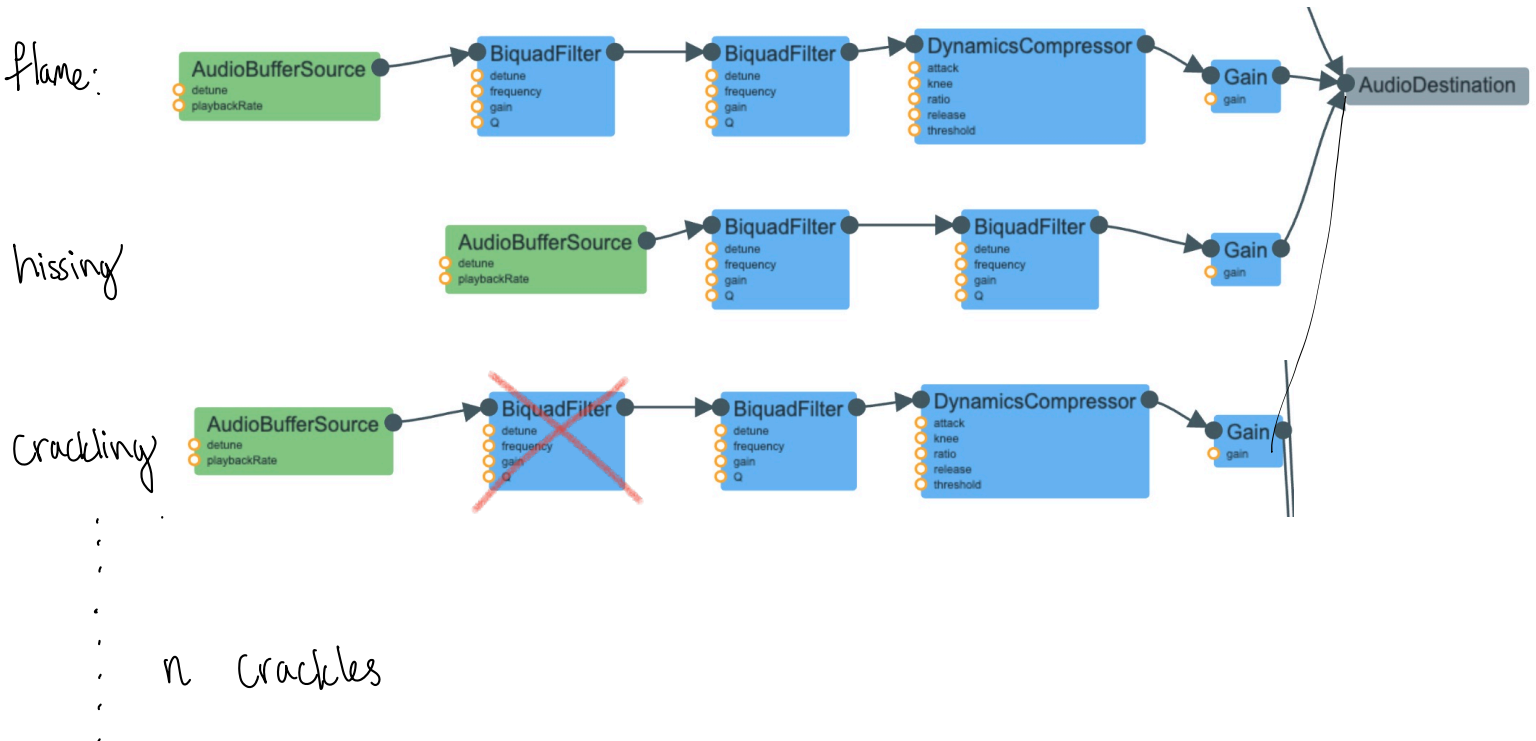


# Creating a Fire In Web Audio

Obi Okoli



As explained by Farnell, a fire consists of three main components: the flame, characterized by a low lapping sound; the hissing, which is intermittent; and the crackling, which is also intermittent. All the choices I made were, in some part, borrowed from Farnell's implementation - I'm also using some of his language to describe my solution.

## Flame

I begin by creating white noise (audio buffer source). I use a resonant bandpass filter (biquad filter) to replicate the sound of gas passing through the tube. I also use a low pass filter (biquad filter) to produce a low woofing/airy sound, and finally, a limiter (dynamics compressor) is applied to eliminate any noises that make the flame too "lively," which might drown out the hissing and crackling. This signal is then connected to a gain node, where I balance the overall volume in comparison to the hissing and crackling and connect it to my audio destination.

## Hissing

For hissing, I start with white noise (audio buffer source). I implement a lowpass filter (biquad filter) to reduce the lower values of the sound. Using a lowpass modulator, I square the modulating signal to allow values close to 1.0 to pass through while making the lower values quieter. This technique introduces random bursts of hisses, making the fire sound more volatile. I add a highpass filter (biquad filter) to further cut out lower values and emphasize the sound of gas escaping from the flames. This signal is also connected to a gain node, where I balance the overall volume in

comparison to the other two sounds.

## **Crackling**

For the crackling, I start with white noise (audio buffer source). I utilize a highpass filter (biquad filter) to introduce variations in the tone of the crackle. I use an envelope to adjust the attack to make the crackle less harsh. The decay for the envelope is set to a range of random values, creating variation in the duration of the crackle. The gain of the envelope is also set within a random range, introducing greater variation in volume. After a set time, the crackle stops, and a new crackle is generated after a random amount of time within a specified range. This signal is connected to a gain node to balance the overall volume.