

CS427 Assignment 3: Synthesizer

Winter 2020

By doing this assignment, you will learn how to build a synthesizer with Web Audio API.

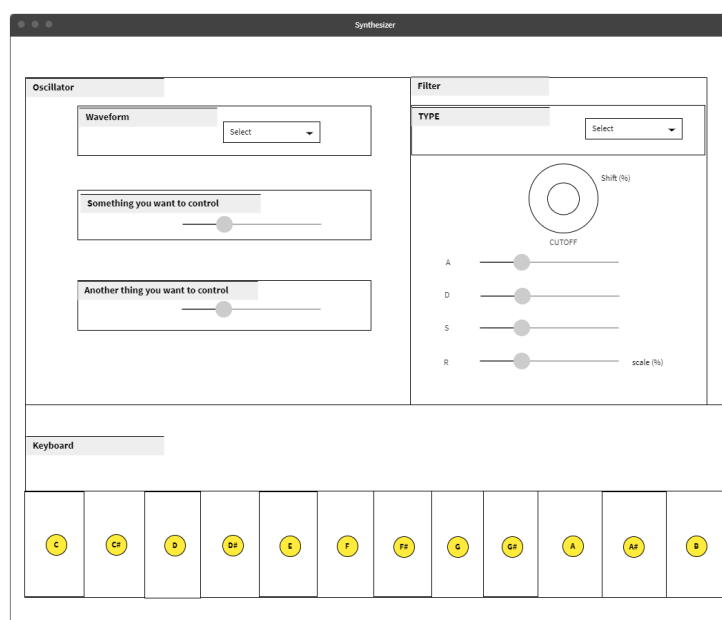


Figure 1: A synthesizer interface

1. **A mock-up of synthesizer front-end interface as shown in Fig. 1. Please write a short review (in PDF or Microsoft Word format) about this interface, which summarizes pros and cons from all aspects.**

There are three parts in this interface:

1. An oscillator that allows you to choose a fundamental waveform, e.g. square, triangle, etc.; Moreover, there are a few sliders allow user to change some variables of the sound wave.
2. A filter that allows you to select a certain type of filters such as low-pass filter (LPF) and high-pass filter (HPF); Furthermore, a knob in the middle

allows setting the cutoff frequency of either LPF or HPF. Beneath the knob, you can adjust the volume envelopes of “attack”, “decay”, “sustain”, and “release” individually by using sliders.

3. A musical keyboard that allows you to play musical notes (to set the pitch of the sound wave). You can see a musical note displayed on each key throughout the entire keyboard, which indicates the corresponding pitch (a frequency value) will be played when clicking.

2. Build a web-based synthesizer by using Web Audio APIs and other third party JavaScript libraries

Requirement #1: The front-end should include three parts shown in Fig. 1.

Requirement #2: The basic functions you need to implement:

1. Waveform selection (including 4 different fundamental waveforms).
2. Filter selection (including LPF and HPF)
3. Controlling widgets of the CUTOFF frequency
4. Musical Keyboard to play chromatic scale musical keys.

Requirement #3: You should cite any 3rd party packages or libraries in the code comments.

Requirement #4: Test your application in a browser to make sure it is a bug-free application.

Requirement #5: Write as much comments as you can to explain each important line of your code to readers. And keep the same programming style throughout the project, such as indentation, etc.

Requirement #6: In each HTML and JavaScript file, you should add a comment block on the top of the file, which is above the real code. It includes file name, project name, copyright (licence) declaration, author name, date of the last modification, and description of the project. See example below.

```
1  /* File:      Hello.js
2     * Project:   Hello_World
3     * Licence:   BSD
4     * Author:    Ada Lovelace
5     * Date:      Jan-29-2020
6     * Description: A method to print "Hello World!"
7     */
8
9     function hello() {
10         YOUR CODE // Bla Bla Bla
11     }
```