**Desktop app – Random polyphonic oscillator**

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This is a program that is created mostly with pure C++ coding and a few libraries, this is with the objective of exercising sound synthesis and processing through the specific programming language C++.

This program uses libsndfile ([*http://www.mega-nerd.com/libsndfile/*](http://www.mega-nerd.com/libsndfile/) *)* library to output an audio file with random frequencies processed with a digitally programmed oscillator.

.Net libraries and Visual C++ are used as well to create the desktop GUI, the program can be exported with Microsoft Visual Studio as a .exe that can be used in any Windows OS machine.

Victor Lazzarini's “*AuLib*” library ([*https://github.com/aulib/aulib*](https://github.com/aulib/aulib)*)* and the techniques seen in “Music signal processing” have been used as a reference to build this program.

The code consists in four oscillators that are chosen depending on the availability, whether they are playing a note at the moment or not, if all of the oscillators are playing a note the older one is chosen, this emulates the functionality of an analogic classic synthesizer capable to reproduce four voices. The oscillators process a function table that is passed as an argument. There is code in the program capable of simulating digitally the basic wave shapes such as: sine, triangle, square, and sawtooth waves. The code has a basic envelope that processes the four oscillators, the values of the ADSR envelope can be changed easily in the code. All this code is adapted to work with the WinForms libraries to make it easier for a Windows user to experience the program.

*References:*

[*http://www.mega-nerd.com/libsndfile/*](http://www.mega-nerd.com/libsndfile/) *- Eric de Castro Lopo*

[*https://github.com/aulib/aulib*](https://github.com/aulib/aulib) *- Victor Lazzarini*

[*https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170*](https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170) *- Microsoft*

[*https://www.advancedinstaller.com/*](https://www.advancedinstaller.com/) *- Caphyon*