

# Math 321 Programming Project II - Spring 2024

## Moorer Reverb Filter - with User Interface

Please submit all project parts on the Moodle page for MAT321/598. You should include all necessary files to recompile, and a working executable, all in a zipped folder (one file for upload). Time-stamp determines the submit time, due by midnight on the due-date.

Due: Friday, March 15

This project can be done on Windows, or any other system, provided that you are prepared to demonstrate the project for the grader on that system in Teams.

The Moorer filter in Project I should be used as the engine for a project with UI which plays back an audio file as well as applies reverb to the same audio sample and plays it back through the UI. This can be done either by manipulating buffers of audio samples stored in memory, or by writing a new audio file and then playing it back.

The Moorer filter parameters should be implemented with sliders, choosing appropriate ranges for the parameter values. The calculation of reverb is not required to be dynamically updated. It is simply required to be updatable through the UI after choosing any settings on the parameters.

Required groups of parameters to be changeable:  $g_1, \dots, g_6$ ;  $R_1, \dots, R_6$ ;  $L_1, \dots, L_6$ ; (it is acceptable to have each of these groups of parameters change as a group through one single slider, or to change separately). Note: The  $R$  values should change in response to the  $g$  values, and vice versa, keeping the relationship  $R/(1 - g)$  constant. Other single parameters required to be changeable: allpass parameters  $a$  and  $m$ , constant  $R/(1 - g)$ , and the dry percentage  $K$ . Given a value of  $K$  between 0 and 1, the wet percentage is  $1 - K$ . The output signal is then assumed to be weighted accordingly.

For extra credit

- graph any of: the input or output signals, or the impulse response for the chosen reverb settings.
- make sliders to spread out the grouped parameters, or allow sliders for  $g$  and  $R$  values to have relationship  $R/(1 - g)$  different for each  $R_i$  and  $g_i$ .
- make the parameter changes real-time, so that reverb will change as you change sliders.

Any or all of these can be done for possible extra credit, for a total of up to 5 course grade percentage points. Grade for extra credit will take into account: correctness of implementation, as well as depth and detail of implementation. (For example, your final course grade is 77, you earn full points for extra credit, your course grade changes to 82.)

Other ideas for extra credit additions to the project may also be suggested. These should be discussed and cleared for extra evaluation with instructor on or before Friday, Feb 23.