

# Math 320 Extra Credit Project - Fall 2024

## Plucked String Musical Excerpt

Due: Monday, Dec 1

Please submit all project parts on the Moodle page for MAT 320. 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. A user interface is not required, however since more students are adopting JUCE for audio projects, it is reasonable to do this sequence of projects with JUCE also. The basic requirements remain the same: text input and output.

Credit will count towards total course percentage grade, for a maximum of 2% extra credit.

1. Use the plucked string filter to generate a wave file that plays a musical excerpt of at least 8 bars in at least 2 voices. The bars should be generated by your C++ program one by one. The voices should be mixed by simple averaging of overlapping sounds. At least two different  $R$  values should be used to generate different sounding plucks.
2. Notes:
  - (a) Generate a mono wave file at sample rate 44100 Hz. The header can be borrowed from another wave file and can be modified with Hanson's struct given on the web site. The main modification to the header is to assign the correct data size before writing the output to file.
  - (b) Use appropriate constants  $R$  to generate sounds of various lengths.