**ECS7012 Audio and Music Programming**

**Assignment 4: Original Audio Programming Demonstration**

**Instructions:**

Your task is to implement, demonstrate and evaluate an original piece of audio programming. This is typically an audio effect, a synth, procedural sound effect, or piece of sound design. Your audio programming should go beyond any of the examples in class, but the content and behaviour of what results is up to you. You could consider modifying the operation of an effect or instrument that we’ve discussed, combining elements from multiple effects, or doing something complete original. It should be developed in C++ using JUCE as a VST instrument, VST plugin or standalone plugin, unless there is a specific reason for doing it in a different programming language or development environment, for example, showing how to translate from a VST plugin to a Javascript Web Audio Worklet, or exploring how one might do computationally efficient, real-time audio programming with Python.

Once you’ve created the audio programming demonstrator, create at least two audio examples of its operation, e.g, output of a synth with different settings, output of an audio effect applied to different source material. Also include block diagrams explaining how the effect operates, and figures to demonstrate that your effect works as indicated.

The assignment will be marked in terms of originality, effort and the quality of implementation and operation.

**Turn In:**

Using the online submission system, submit a ZIP archive containing:

• **Audio files** of your effect in action. Include at least two examples, with both input and output audio files.

• **Commented** **Code** used to run the effect. Please make your code legible and easy to understand! Please also indicate how your code should be compiled, especially if you use tools other than the provided Juce library.

If created using Juce, you should only need to submit your source code and jucer file for the code.

• **PDF Report**, 4 to 6 sides of A4 total,.

Include the following information (though your report does not have to be structured in this way):

* Explain your motivation and the basic idea.
* Describe your design process. Include any sources (e.g. scientific papers, audio analysis, examples of similar implementations) that formed part of your analysis and design approach.
* Details of your implementation. Also describe any parameters used to control the system
* Include one or two plots showing the demonstrator’s operation and one or two block or signal flow diagrams illustrating how the effect works. *Y*ou can use tools like Audacity, Reaper and Sonic Visualiser to work with and analyse the output of the demonstrator.
* You are welcome to use code or designs from other sources, but you must cite your sources! Any code or designs found to come from another source without attribution will be treated as plagiarism.

The following section headings are suggested, but not required:

* Title & Abstract
* Introduction and Background (including relevant previous work)
* Design (description of what you have created, with figures)
* Evaluation (demonstrate that your project works, and evaluate its performance)
* Conclusion, including some self-critique of the work and discussion of how it could be improved.

• **Demonstration video** of your project in action. This short video should show the main features of your project, where possible with narration or text titles to explain what the video shows. Ideally, make this video of a form that you would be happy to share to publicise your project.

*If some files are too large, please provide them to me by other means (e.g. collect.qmplus.ac.uk , dropbox, youtube video, github repository …)*