

## COSC 4P98 Computer Media and Digital Audio: Project

**Due:** End of term (April). Exact day and time will be announced later.

### Hand in

- Hard-copy listings of source code and data (or excerpt of data).
- Electronic copy of compiled application, data. It can be on a DVD or handed in via course hand-in script on sandcastle.
- Written report: see description below. Approximately 8 pages. It may be a print-out of a web site, or a PDF file. Include electronic **and** hard-copy.
- Signed department cover page.
- For group projects (maximum 2 per group): Group cover page, and a listing that indicates the project tasks completed by each group member. It is expected that group projects should be sufficiently complex enough to require two people's participation.
- Please contact me to schedule a demonstration of your project (required for marking).

### Description

- The course project involves a topic from computer media and digital audio.
- Audio and music is an intrinsic and central focus of the project. Graphics-themed projects are not permitted (see below).
- It can be done by yourself or in a group of two (depending on project topic).
- Projects require some sort of programmed implementation, as well as a written report.
- You should pass your project idea by me beforehand.
- Do not leave it too late!

### Possible ideas

There is a huge range of different projects that can be done for this course. Computer media and digital audio are enormously active areas these days. It is a Golden Age for making highly innovative and creative applications on a variety of cutting-edge hardware and software platforms. In past years, students have done many different innovative and interesting projects, and a selection of them can be viewed on the 4p98 web site.

The main goal of the project is that audio or music should be a primary focus of the project. A project may take ideas given during the lectures, and pursue them further. Here are some examples of potential projects. Please talk to me if you need more information, or have your own ideas that you'd like to run by me.

1. **VST plug-in:** This would be more complex than that done in the assignment. It might be a MIDI-enabled instrument or audio effect. It should include its own GUI skin. It should be programmed, and not done with Synthmaker or some other high-level VST editor.
2. **Music player visualization:** Some music applications (Winamp, Windows Media Player, and others) permit visualization plug-ins. These produce animated renderings that react in real-time to the music. You can implement a visualization plug-in for such an application. However, please do not use any high-level scripting language (eg. the AVS system in Winamp). Please talk to me to confirm that your plug-in idea will be suitable.

3. **Processing application:** Write a computer media application in Processing and Beads. This may be a visualization app, a composition tool, or an audio processing app.
4. **Arduino application:** Make a stand-alone application on the Arduino platform. This could be a computer media installation, that may involve audio, graphics, and interaction with the outside world (physical sensors, camera, video, internet, Wii controllers, Kinect, robotics...). If you choose this kind of application, you will need to purchase your own hardware. Arduino boards are cheap!
5. **AI Application:** Derive an AI-based application, using a GA, PSO, ANN, or others. You might analyze audio, compose music, or generate sound.
6. **Hardware:** Create a hardware controller for music and audio. This should interface with a host computer/application. This could be similar to the Arduino topic above, but involve a standard PC system.
7. **Misc app:** Some other application in music or audio written in C, C++, Java, etc.. It could be for Windows, OS X, Linux, iPad, Android, etc.

**Topic selection:** Although graphics may also be involved in your project, it should not be a “graphics project” (ie. computer game engine, rendering algorithm, image processing, computer animation, etc.). Be aware that ray tracing and computer graphics are no longer 4P98 topics, as in past years. Also, music compositions (Csound or other system) are not considered appropriate project topics, unless they involve some fundamental technology that you have created (synthesis algorithm, audio processing tool, ...). Feel free to talk to me if you have any questions about your ideas for a project.

## Report

A portion of your grade will be based on your project report. It is important that you document the sources of all your ideas! This includes: algorithms, formulas, techniques, inspiration for your own ideas, borrowed libraries, etc. All these documented ideas should include a citation to the source (journal, conference, book, web site, ...).

The report will describe all the technical aspects of your project, including the following:

- Description of the application.
- Background information of the technical foundations for the application, for example, mathematical and theoretical basis, algorithm details, efficiency, etc.
- Implementation details: architecture, design decisions, etc.
- User manual: how to get use your application.
- Bibliography: You should include a **complete** list of references to all the resources used during the course of your project. This may include web sites, journals, books, SDK tutorials, and other systems.