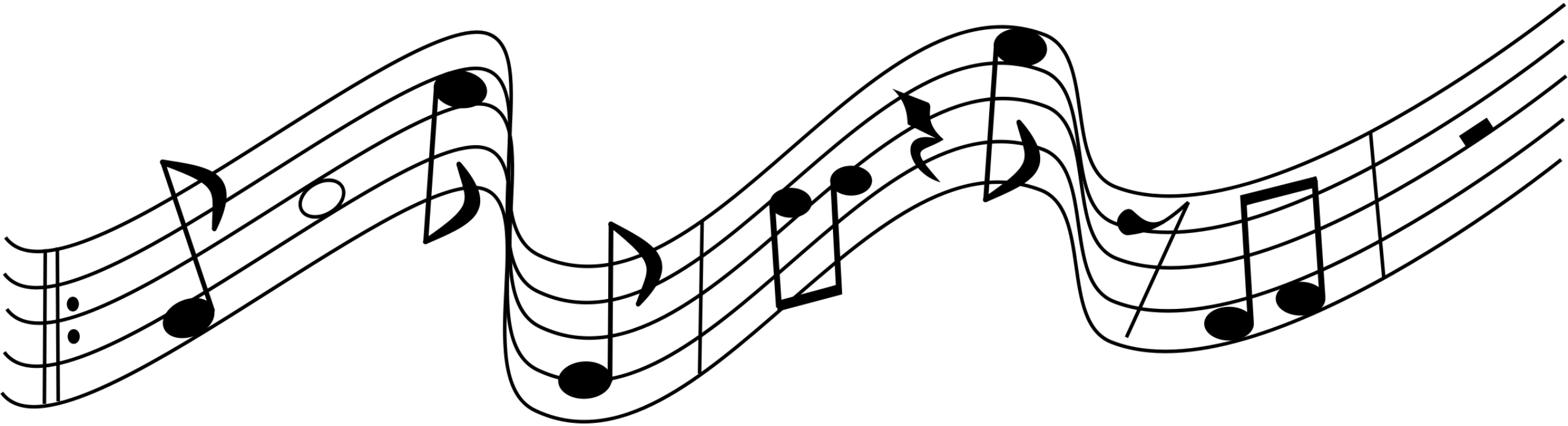
CS4347 Group Project

From Motion to Music



Your Objective

To produce a software musical instrument running on an android smartphone to perform a musical composition.

The software musical instrument **must** use the motion of the smartphone as the trigger to modulate and modify the sound it produces.

The Smartphone

Has an extremely catchy name:

Samsung Galaxy J1 Mini Prime 1/8GB J106B

According to Samsung it has:

Unique Design!!!!
Powerful Performance!!!!!!

But we are just happy that it doesn’t explode!

The Specs

- 1.2GHz Quad Core Processor, 4.0” TFT screen, HD Cameras
- Runs at least Android 5.1
- Accelerometers/Gyroscopes, Proximity Sensor
- GPS, Wifi, BLE

More here: http://www.samsung.com/sg/smartphones/galaxy-j1-mini-j105/SM-J105BZKLXSP/

Total Design Freedom (sort of)

You are free to use any libraries, algorithms, or techniques you find or dream up.

But… understanding the techniques you use is important.

In your final report you will be expected to describe how your system works. So it can not be just a black box!

With that said: we expect you to be creative and surprise us… but first:

Requirements

1. Movement Detection (gestures):

The application must detect smartphone movements, and extract some properties of the movements, such as speed, and direction (or any others you can think of). We expect a minimum of three gestures detected.

2. Sound Synthesis:

The application must be able to produce sounds so that you can play a composition. The sounds can be MIDI, pre-recorded audio, or synthesised.

3. Gesture Mapping:

The properties of the sounds should be triggered and modulated based on gestures and movement. This mapping should be intuitive and accurate. It can not be a simple mapping, i.e. playing a sequence of predefined notes one by one as a gesture is detected.

Important Dates

- 3rd of March (10%):

  Submit your design proposal and show us a very basic prototype

- 8th of April (20%):

  Submit your final report and give the final demo

You will perform a short melody of your choice

Bonus points for additional/advanced features

Some hints

1. Audio isn’t the only type of signal :O
2. Digital Signal Processing isn’t limited to audio :O :O
3. Accelerometers/Gyroscopes are sampled at a frequency :O :O :O
4. Latency is important
5. Iterative design is a good approach, get something simple going first.

Good luck

You will need to use your knowledge of signal processing, sound synthesis, software development, and music computing. But, don’t be afraid of reading outside of the module for other ideas and algorithms.

Ask your friendly neighbourhood TAs if you are having any problems, and remember google/baidu/*bing*? is your friend!