

TOPIC

INTRO TO DSP WITH PYTHON

AN INTERACTIVE TUTORIAL

DATE

JULY 11, 2013

PRESENTER

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Intro

Based on a 3 hour PyCon
tutorial



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Based on a 3 hour PyCon
tutorial

... Itself a summary of a
144-hour 4th-year course



No Problem

We'll just cover it in 1/288th
the time



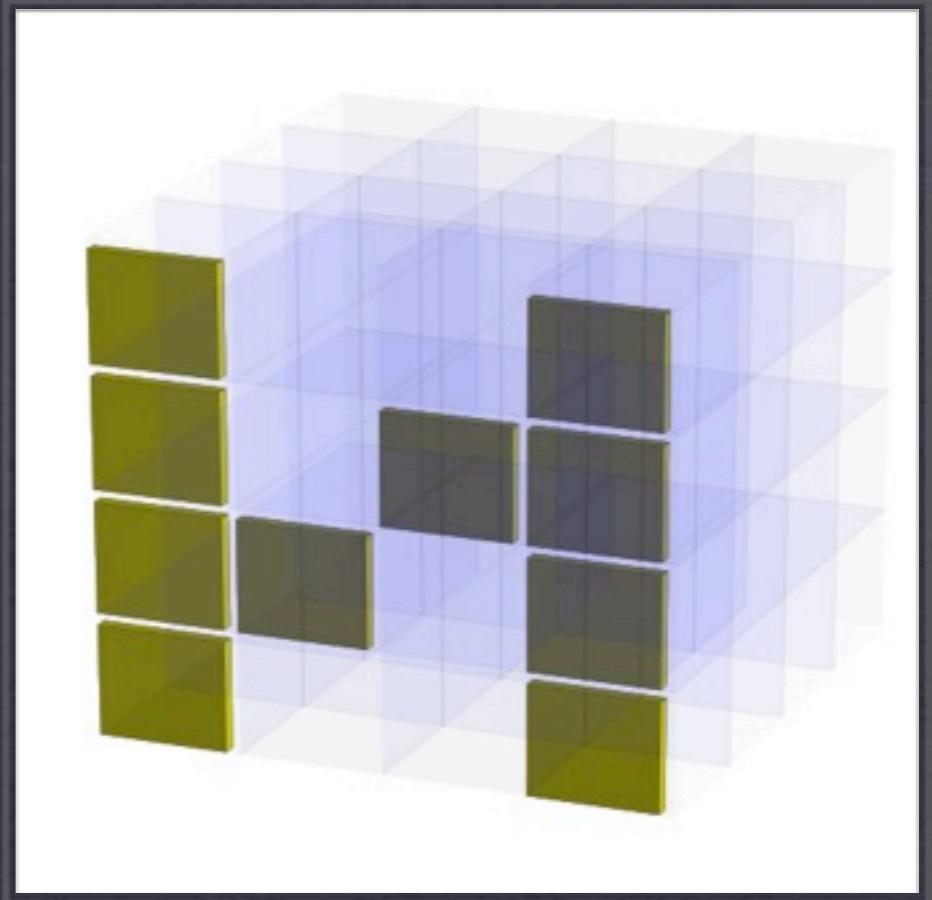
What to Expect...

1. To be able to begin playing with and visualizing audio in Python

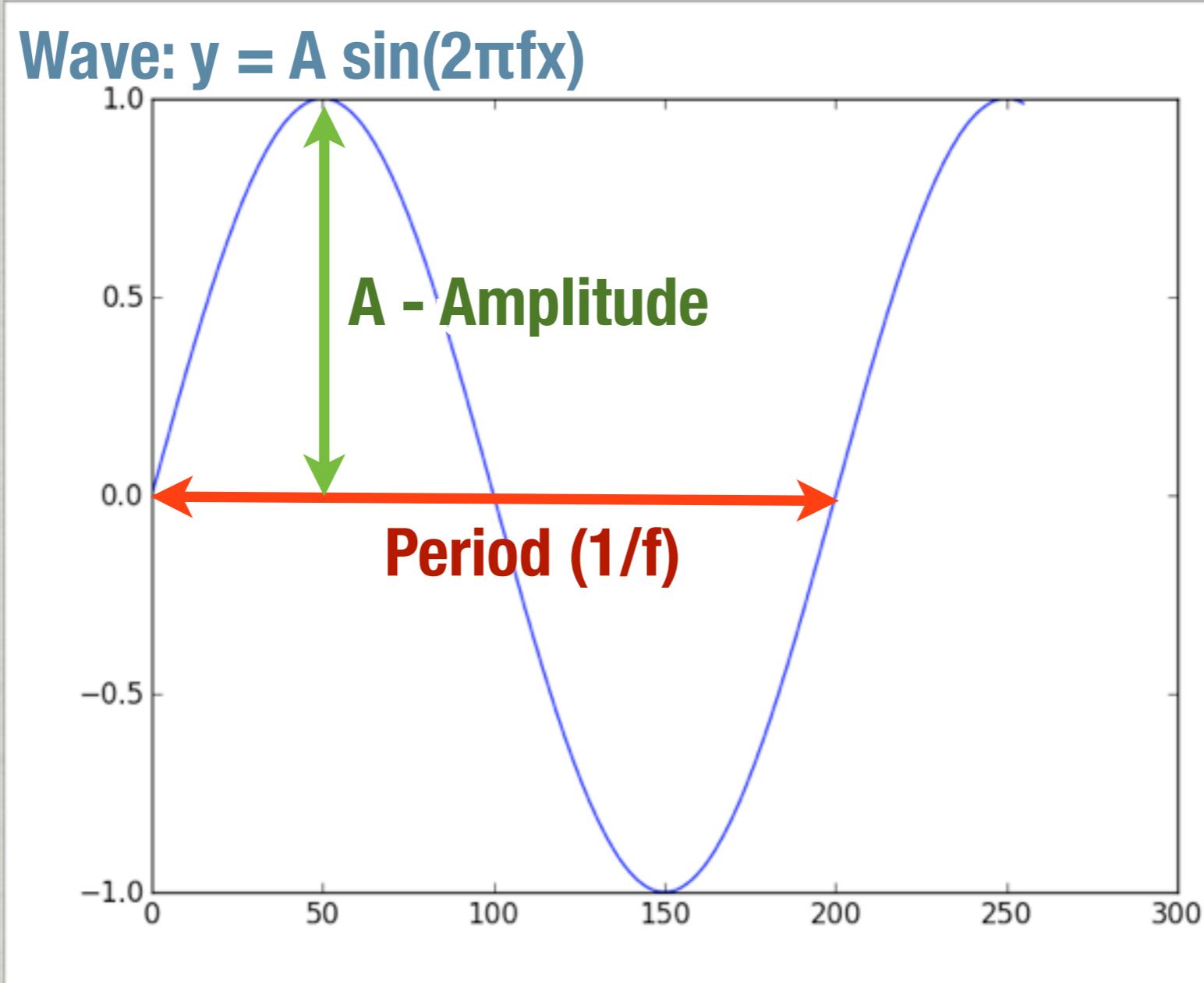


What to Expect...

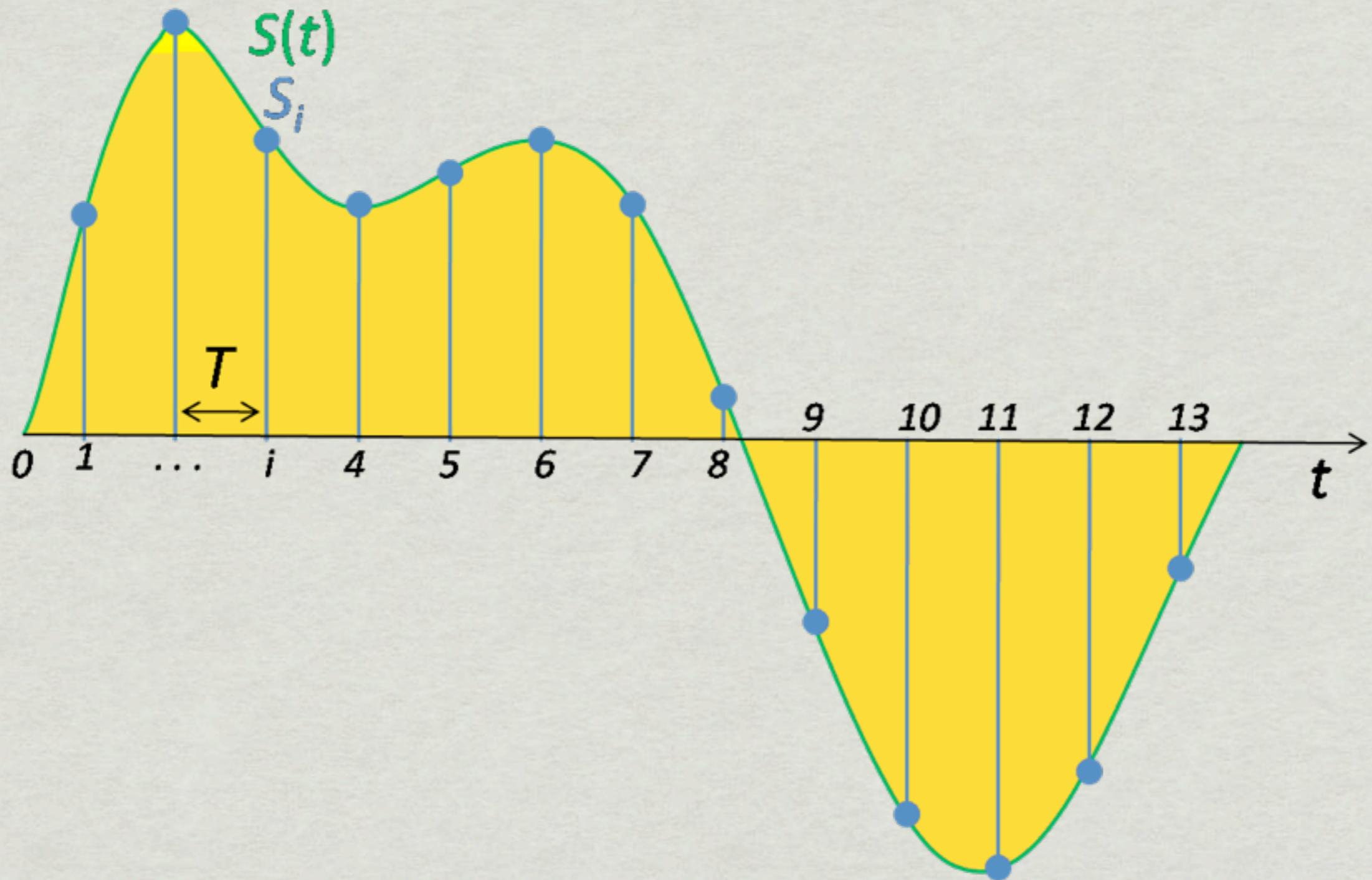
2. A starting point with key related NumPy and SciPy libraries



A Sinusoidal Signal

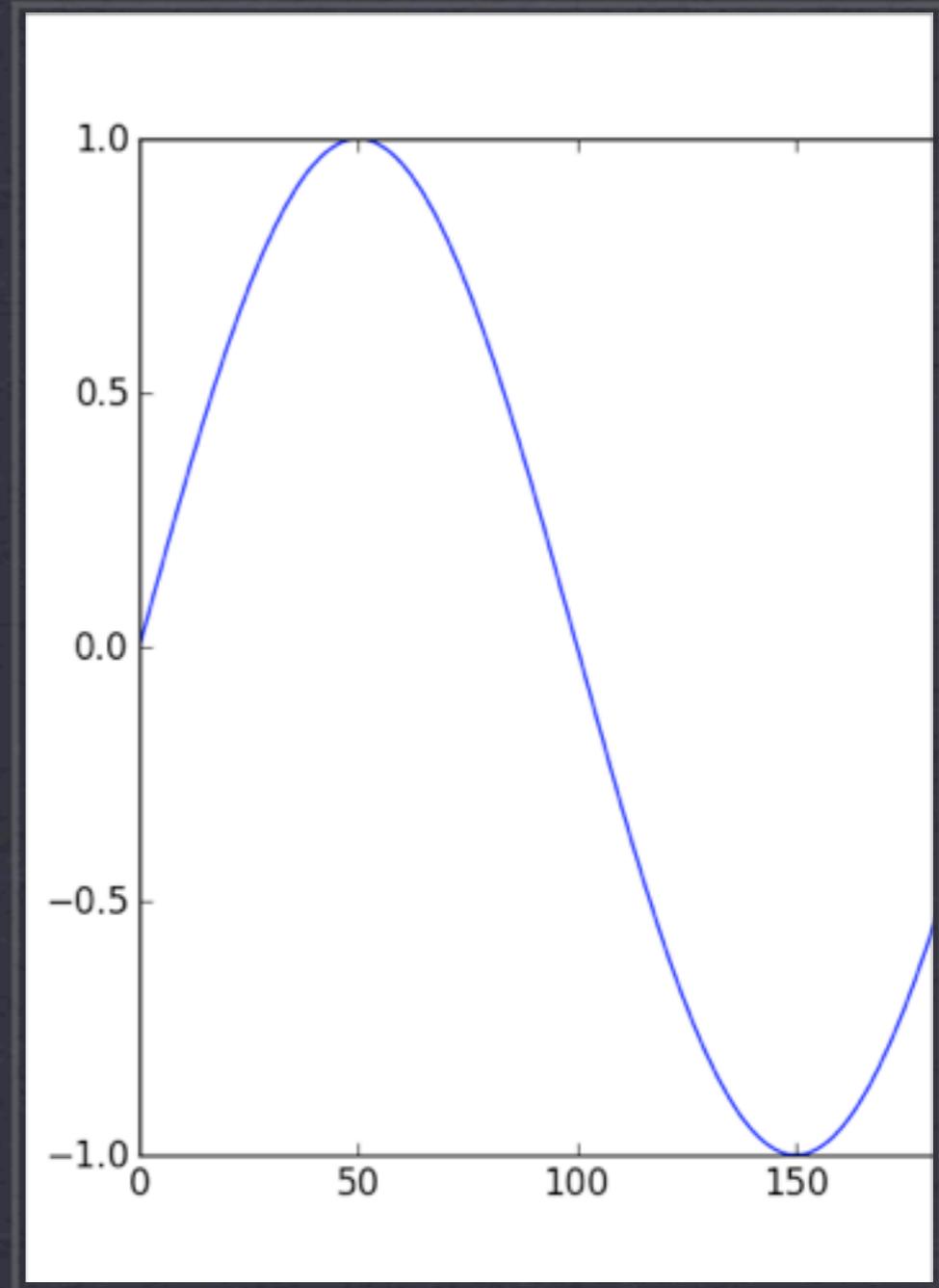


Sampling



Working with Sine Waves

Let's generate and plot
some sine waves...



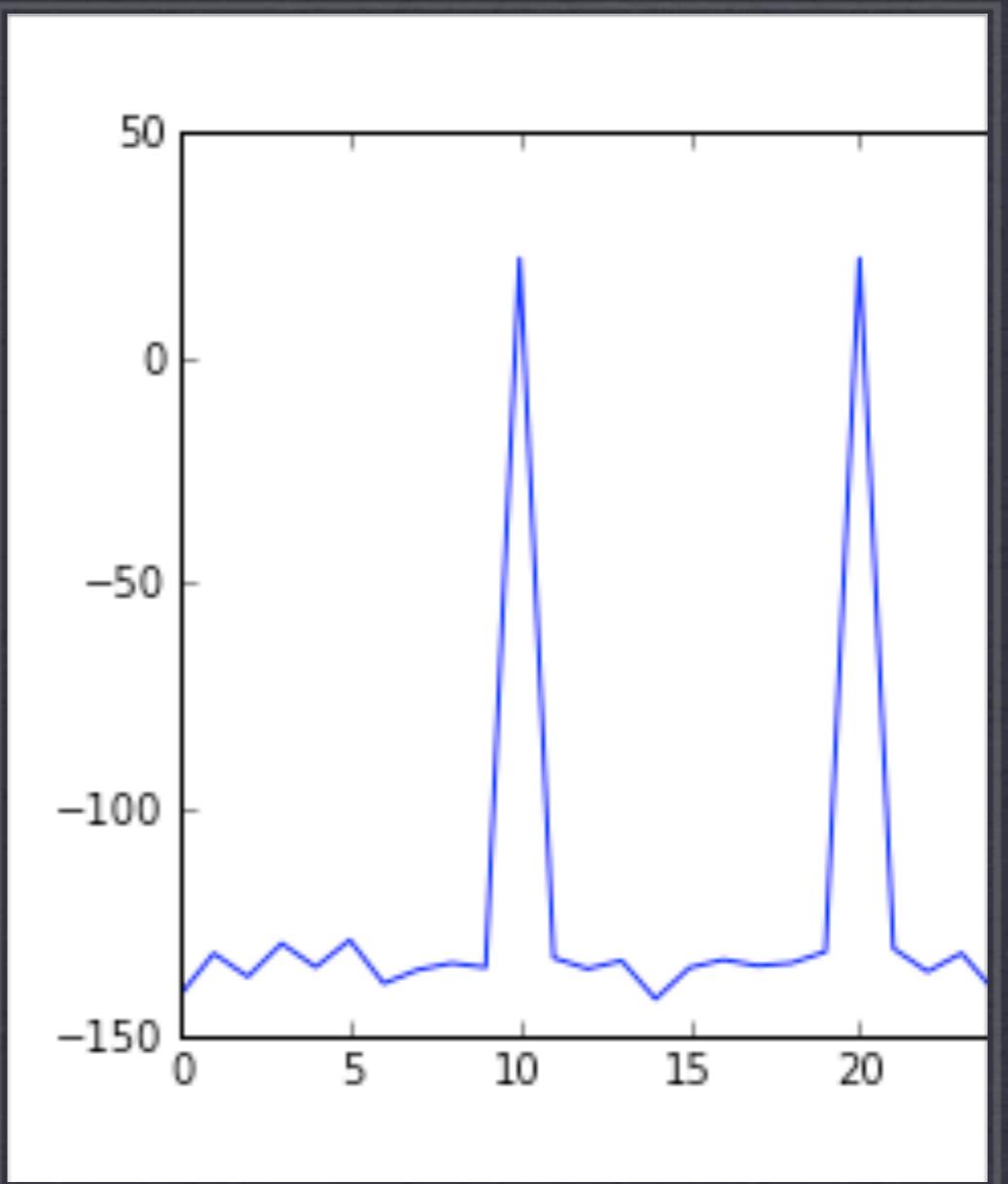
The Fourier Transform

- * Any signal can be represented as a sum of sinusoidal waves
- * The Fourier transform gives you information about the component waves that make up your signal



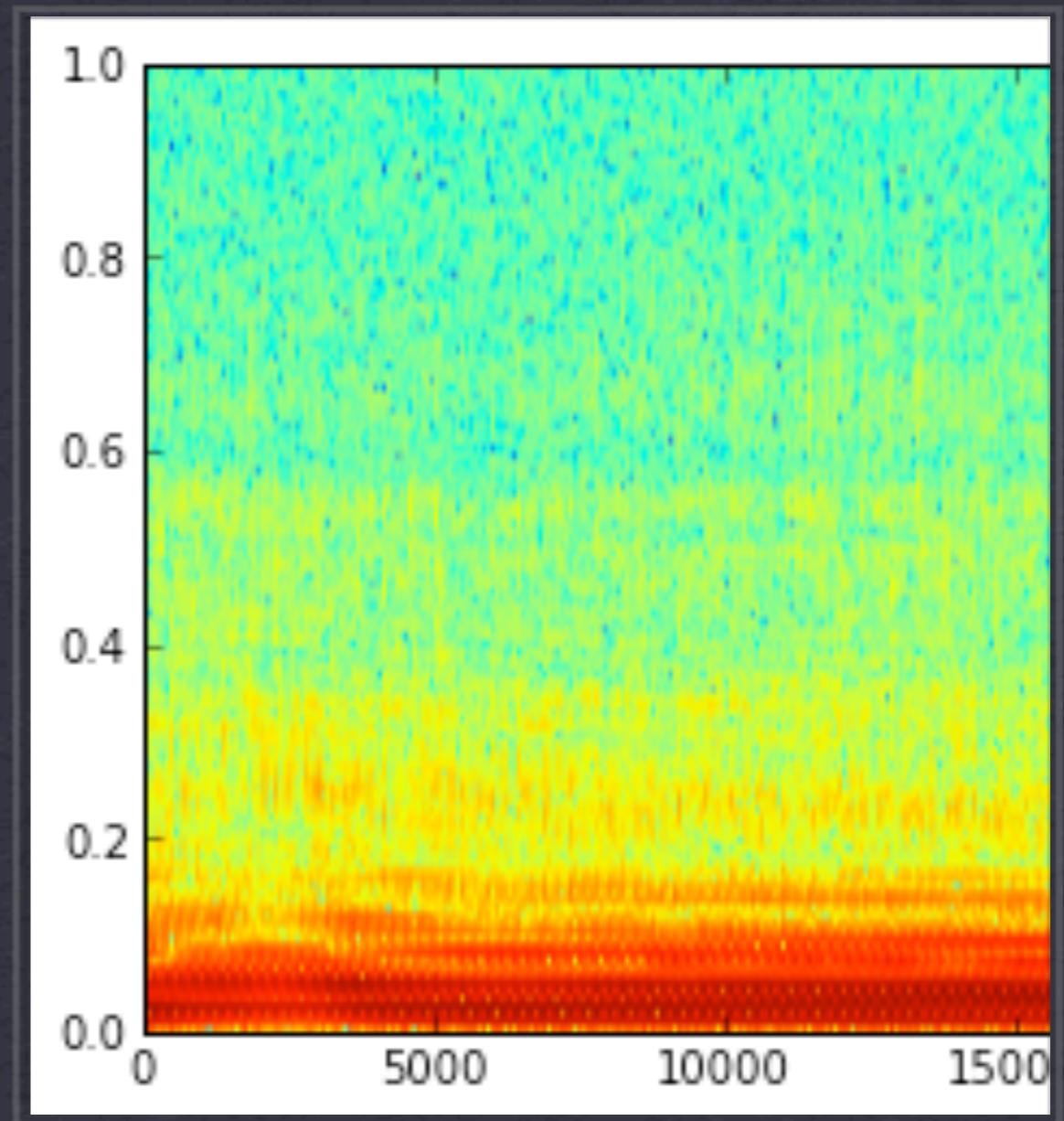
Frequency Analysis

Visualizing the frequency domain



Audio Processing

A first step



Take it with You

NumPy, SciPy and matplotlib
are available by default on
PythonAnywhere



Some Ideas for Exploration

- * See if you can create an audible beat frequency by combining a pure B3 tone (246.94Hz) with the flute.wav file's data
- * How could you create high and low-pass filters?
- * What about frequency shifting (hint: Python's slicing operators also support a step argument)

The End
Thanks for Attending