Making Music with Numpy and Scipy

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If you want to follow along in the notebook activity

- https://github.com/maestrobrandt/Investigation

Music in Data Science

- Spotify, Pandora
- Music Information Retrieval (MIR)
- Computer Generated Music Composition

Music Notes are frequencies

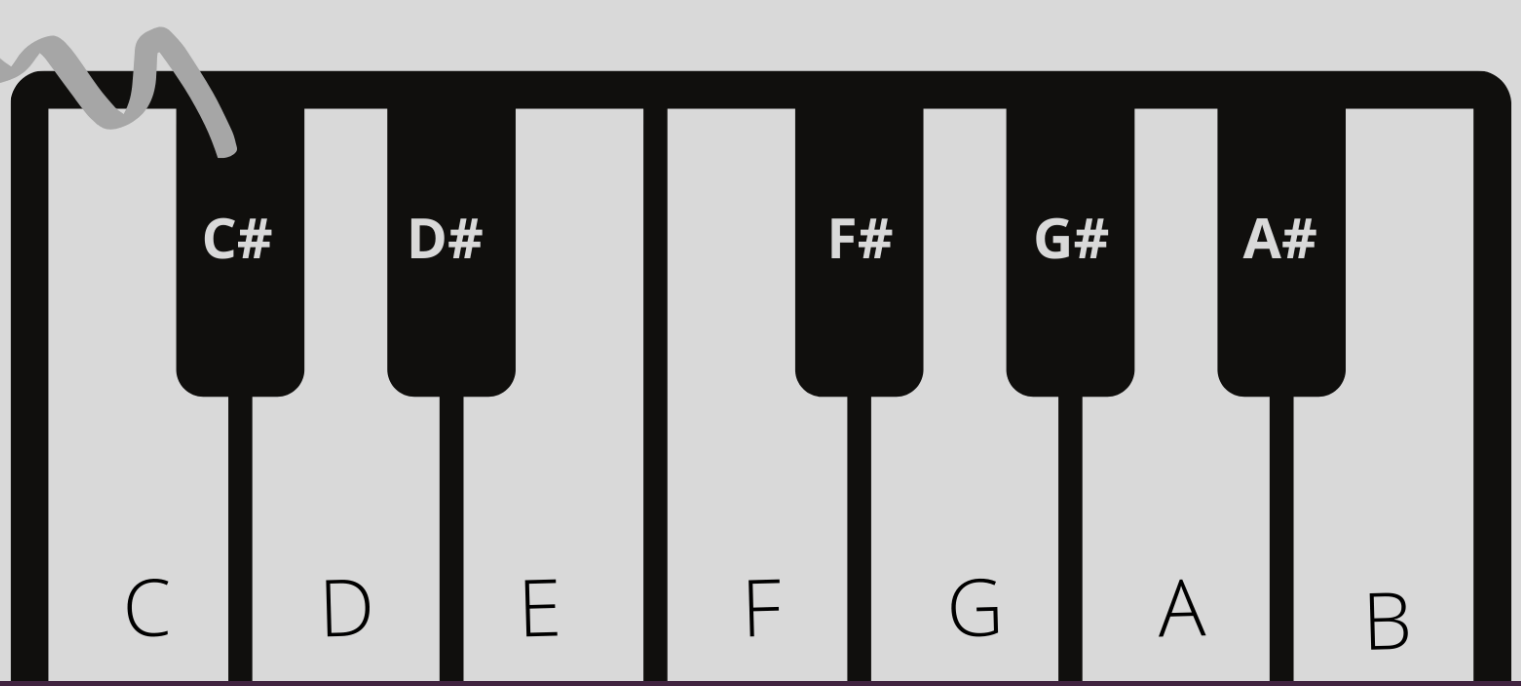
- Described by an equation like
- $g(f) = A \sin(2\pi ft)$
- ***A*** = *Amplitude or the Peak Value*
- ***f*** = *frequency*
- ***t*** = *time*

Piano consists of multiple octaves

- An *octave* is a set of ***12 keys***
  - ***7 White***
  - ***5 Black***
- Names
  - White Keys: **C, D, E, F, G, A, B**
  - Black Keys **Flat (**b**) and Sharp (#)**

ANATOMY OF KEYBOARD

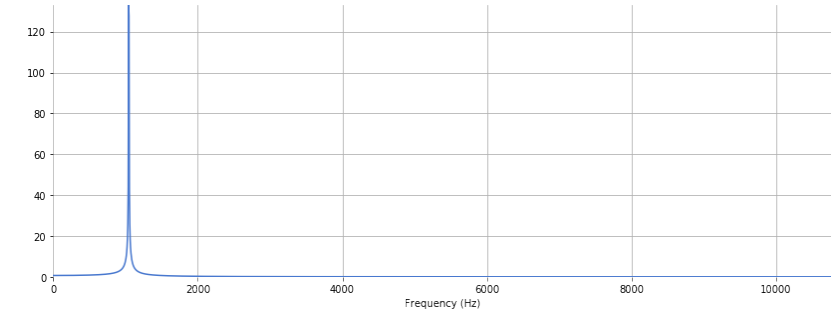
This key is also known as **D-Flat (Db)**



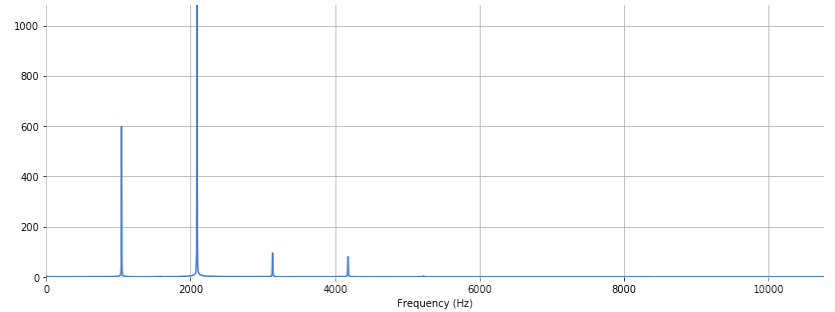
Notebook Activity

Combine Frequencies to make different timbres (instrument sounds)

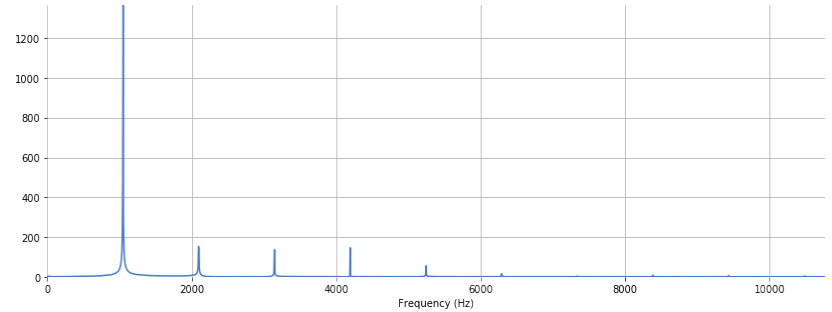
Pure Tone



Oboe



Clarinet



Music Information Retrieval (MIR)

- Can query on things like
  - instrument recognition
  - pitch tracking
  - tempo estimation
  - song structure/form
  - beat tracking
  - key detection
  - query by humming

Commercial Application

Takeaways

Musical data in psychological studies

Commercial applications

Helping musicians create their art

Questions?