

1 What is musical information?

MUSIC 253/CS 275A

STANFORD UNIVERSITY



What is the basic **essence** of music?

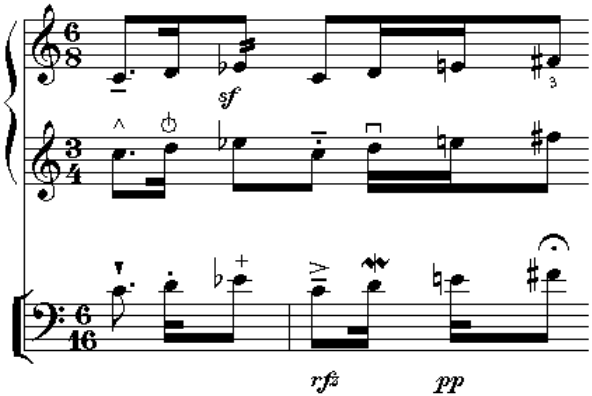


Sound

Text

Act

Mental image



What is music **representation**?

Sound: parameterization of sound qualities

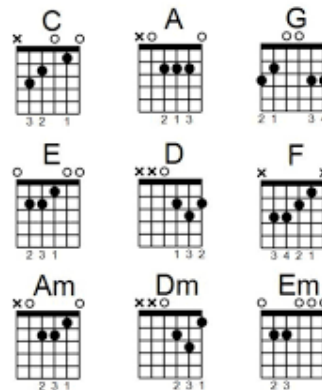
Text: symbolic representation of **scores**

Act: symbolic representation of **gestures**

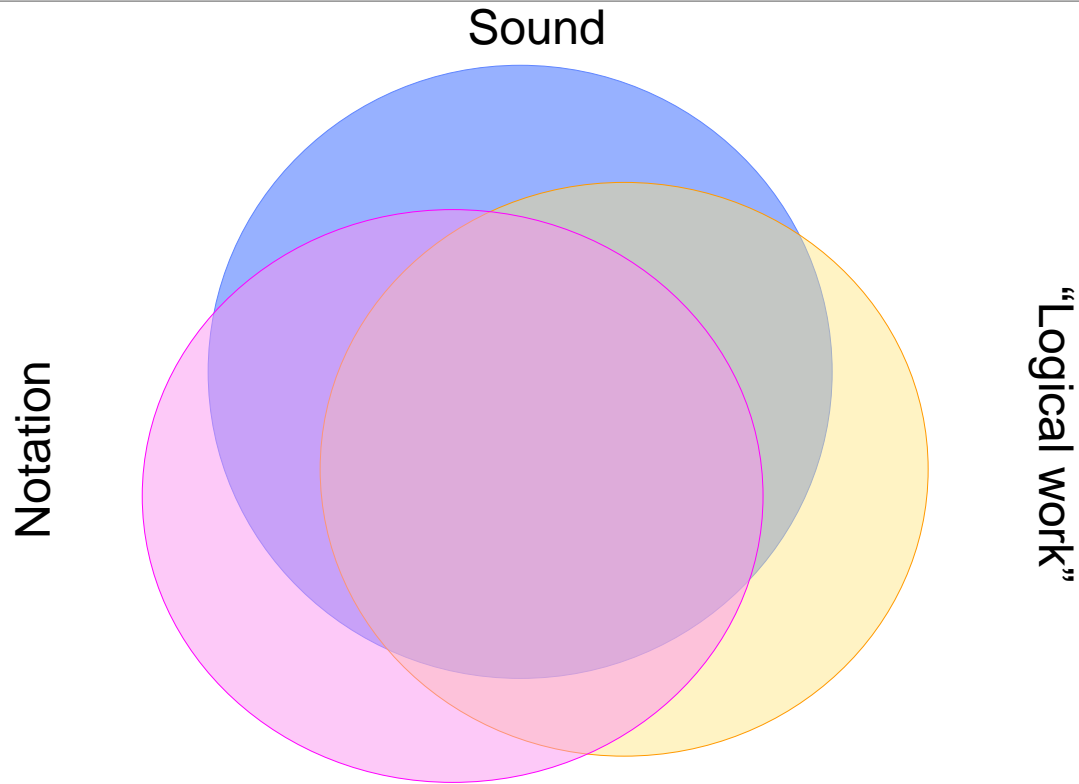
Mental image: rules, principles, perceptions



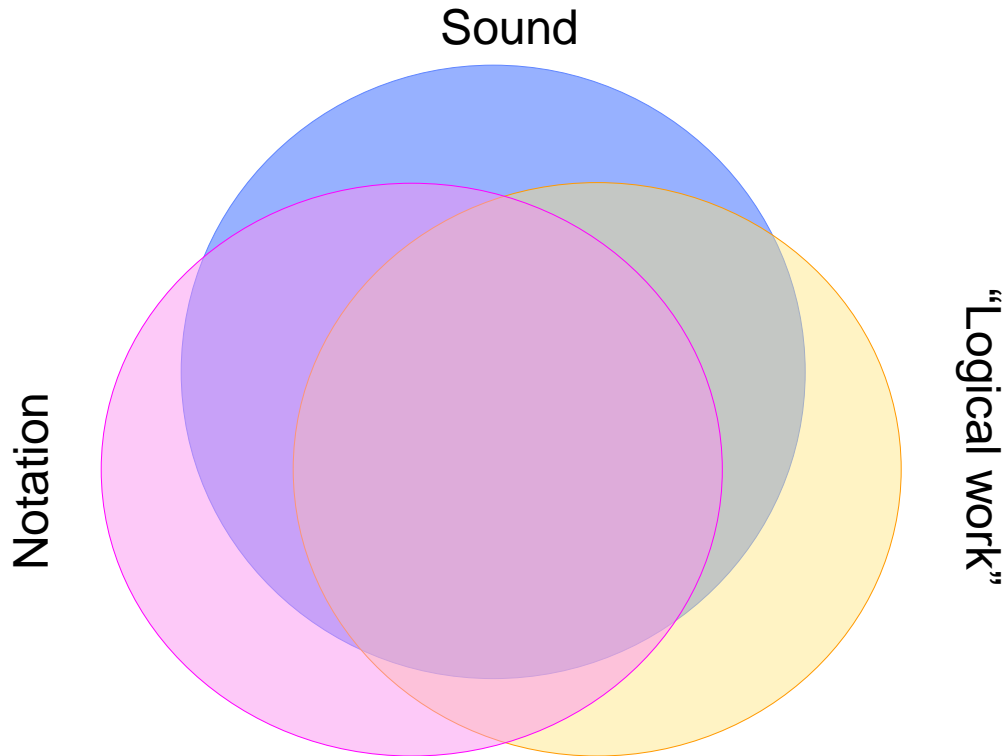
Basic Guitar Chords Chart



Domains of information



Domains of musical information

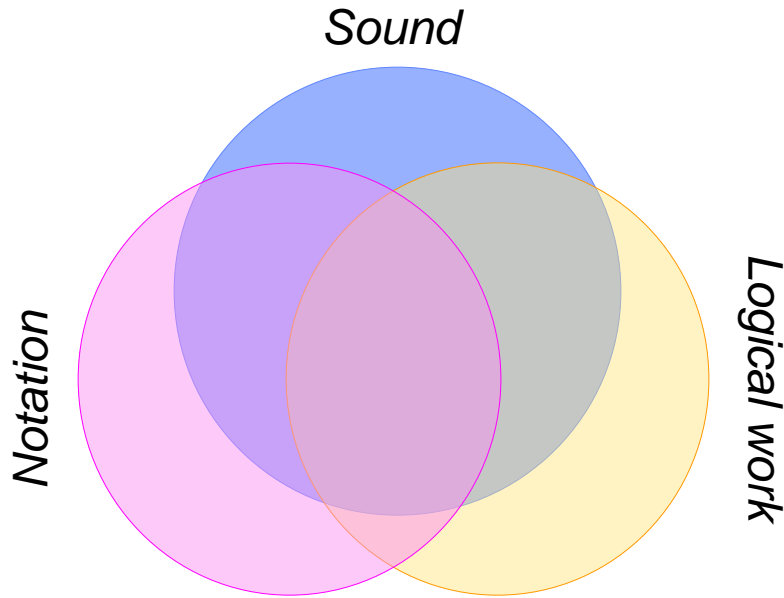


- No ASCII code for music
- Some parametric ideas common to all domains
- “Logical” = perceptual??

Musical information confounds

Virtual symbolic content:

- Pure graphics
- Pure sound



Sign vs. sound (semiotics)

rsp **domain-specific features**

A musical score for piano, showing two systems of staves. The tempo is marked as ♩ = 120. The score includes various musical notations such as notes, rests, and dynamic markings (p, mp, mf, f). Several specific features are highlighted with purple boxes: a melodic phrase in the right hand of the first system, a dynamic change in the left hand of the first system, a complex rhythmic pattern in the right hand of the second system, and a dynamic change in the left hand of the second system.

Software used in the course

Sound-based: MIDI*

Text-based: *Guido**, *Finale*, *SCORE*, *Sibelius*, *abcplus*

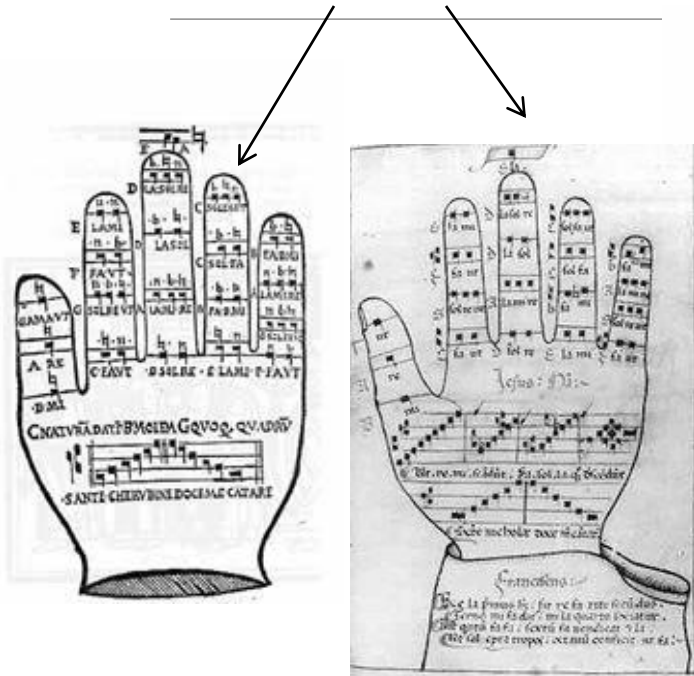
Logical/analysis-friendly: *Humdrum** [spring quarter]

Data and data interchange: *MuseData*, *MusicXML**, *MEI**, *Verovio Humdrum Viewer*

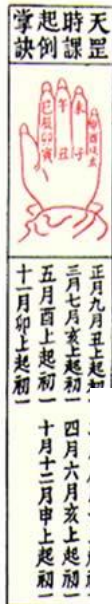


The image shows a screenshot of a music notation software interface. On the left side, there is a complex, multi-column interface with various icons and text labels, likely representing a software menu or tool palette. On the right side, there is a musical score for a piano piece. The score is written in three staves: two for the right hand (treble clef) and one for the left hand (bass clef). The time signature is 6/8. The music features various notes, rests, and dynamic markings such as *mf* and *pp*. The interface on the left includes a list of instruments and a set of controls for each, including volume, pan, and other parameters. The overall appearance is that of a professional music notation software like Sibelius or Finale.

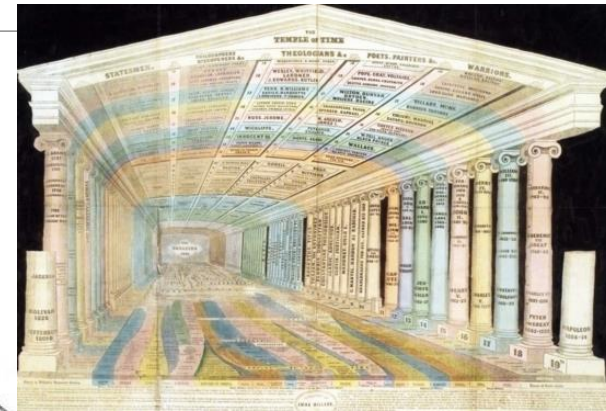
Music codes before machine computation: The Guidonian hand (mnemonics)



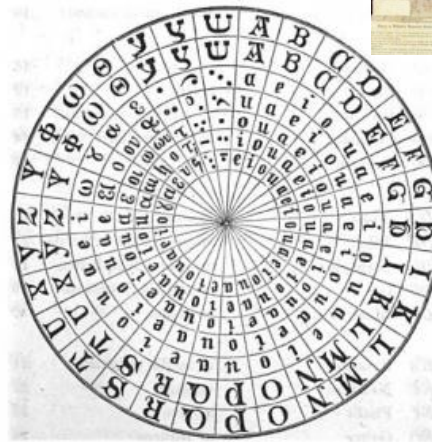
Mnemonic devices (c. 1000 AD)



Identified by
Shi Yi Liang, 2022



Memory Palace



Giordano Bruno's **memory wheel** (1582)

Confusing terminology

Absolute vs. relative

- machine-oriented
- MIDI key nos.
- **user**-oriented
- Intervallic information



Tangible vs. cognitive (selective)

- Selection by **domain**
- Selection by **reduction**



Selective understandings

Raw vs. interpreted data

- **When** interpreted?
 - On input
 - In processing



Common vs. application-specific data

- **Data** attributes
- **Application** attributes



Frontiers of musical information

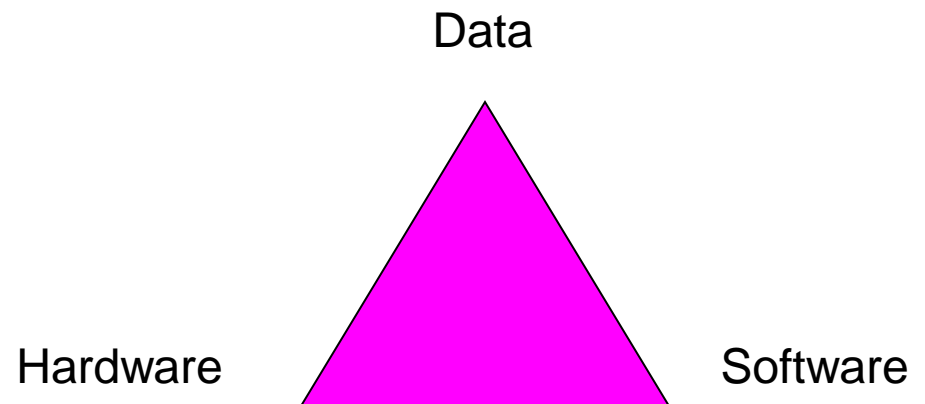
Data resource development

Data management and identification

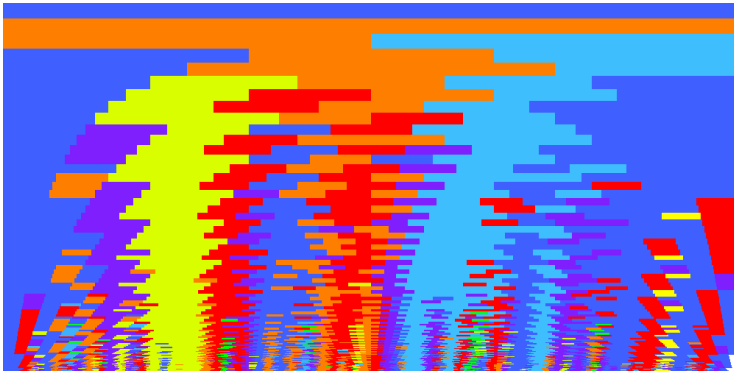
Data interchange

Data query/search and analysis

Data visualization*

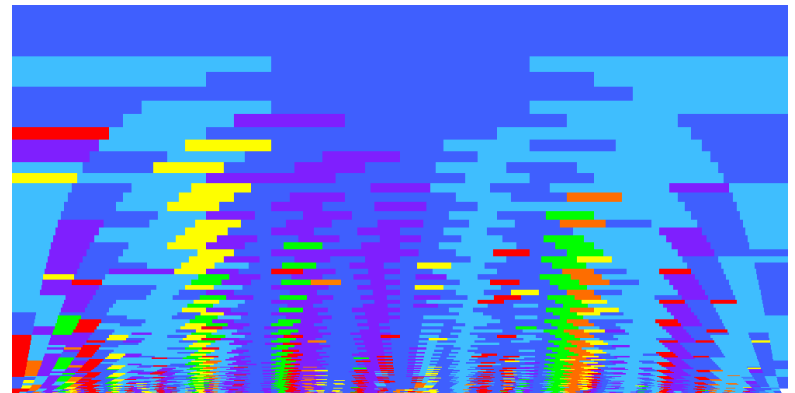


Harmonic representation schemes (Craig Sapp)



J. S. Bach: **Prelude** in D Major

J. S. Bach: **Fugue** in D Minor



Keyscapes (old-style) by Craig Sapp

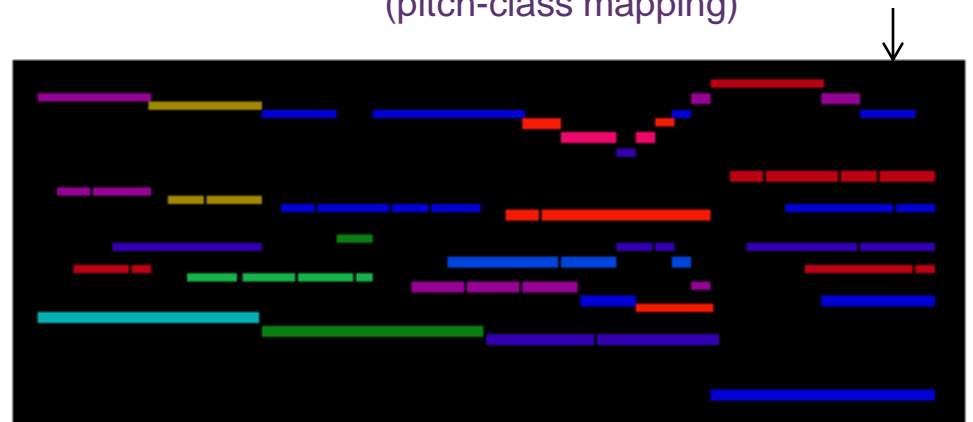
Piano rolls as music representations

(Stephen Malinowski)



↑ Chopin: Prelude
(voice-part mapping)

J. S. Bach: Chorale No. 1
(pitch-class mapping)



The *Music Animation Machine* (Stephen Malinowski)

2006: Bach Prelude and Fugue in D Minor

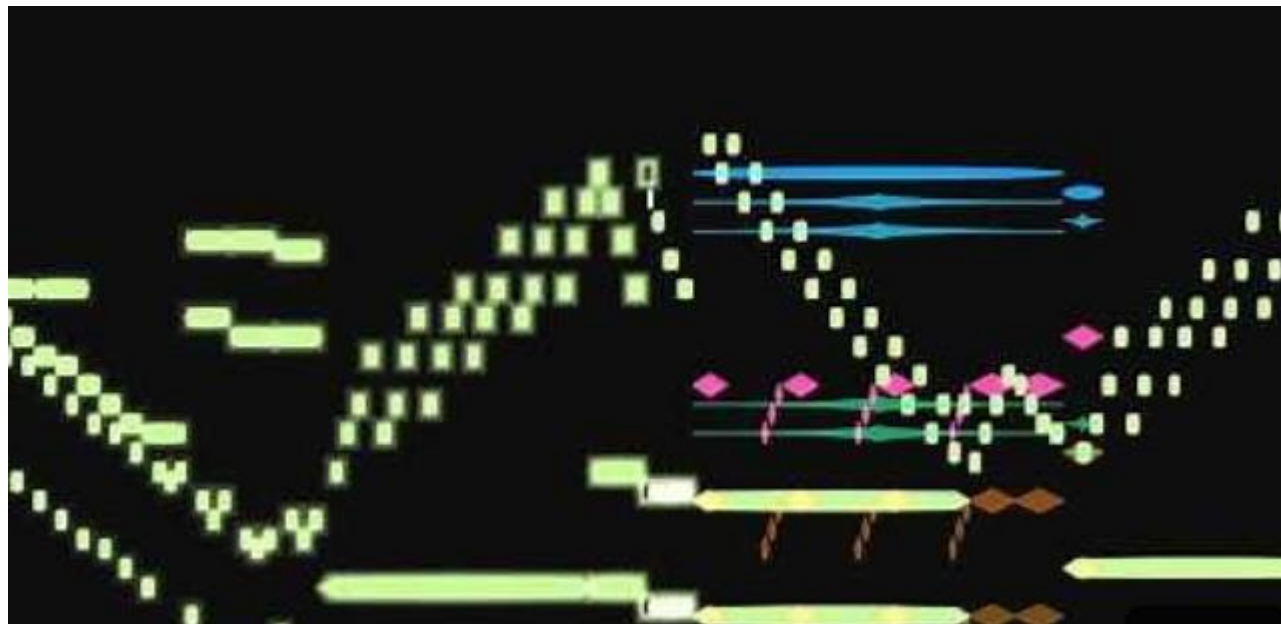


https://www.youtube.com/watch?v=ipzR9bhei_o

BWV 565

The *Music Animation Machine* (Stephen Malinowski)

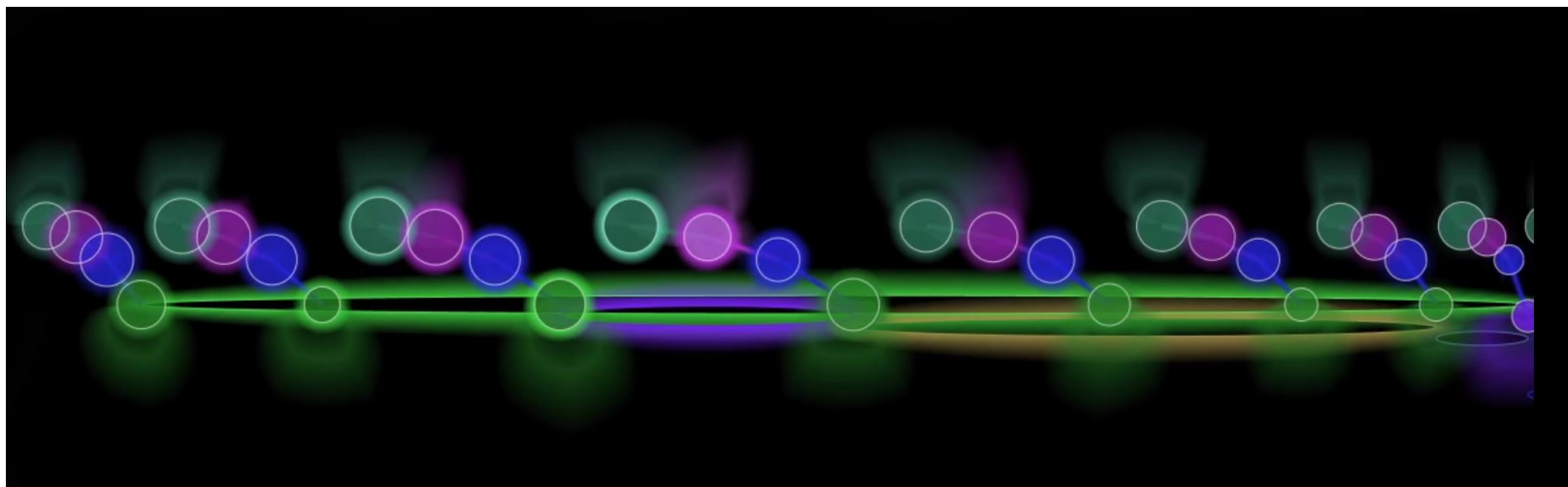
Mozart Piano Concerto No. 20 (K. 466), I:
<https://youtu.be/7QgOBbKl0eY>



The *Music Animation Machine* (Stephen Malinowski)

Rachmaninoff: Les Larmes (Tears). Op 5, No. 1

<https://www.youtube.com/watch?v=aHEbmYVCcKE>



Malinoski: Resources for the Music Animation Machine (musanim)

Highlights year by year:

<http://musanim.com/YouTubeHighlights/>

Techniques used (with examples):

<https://www.musanim.com/YouTube/>