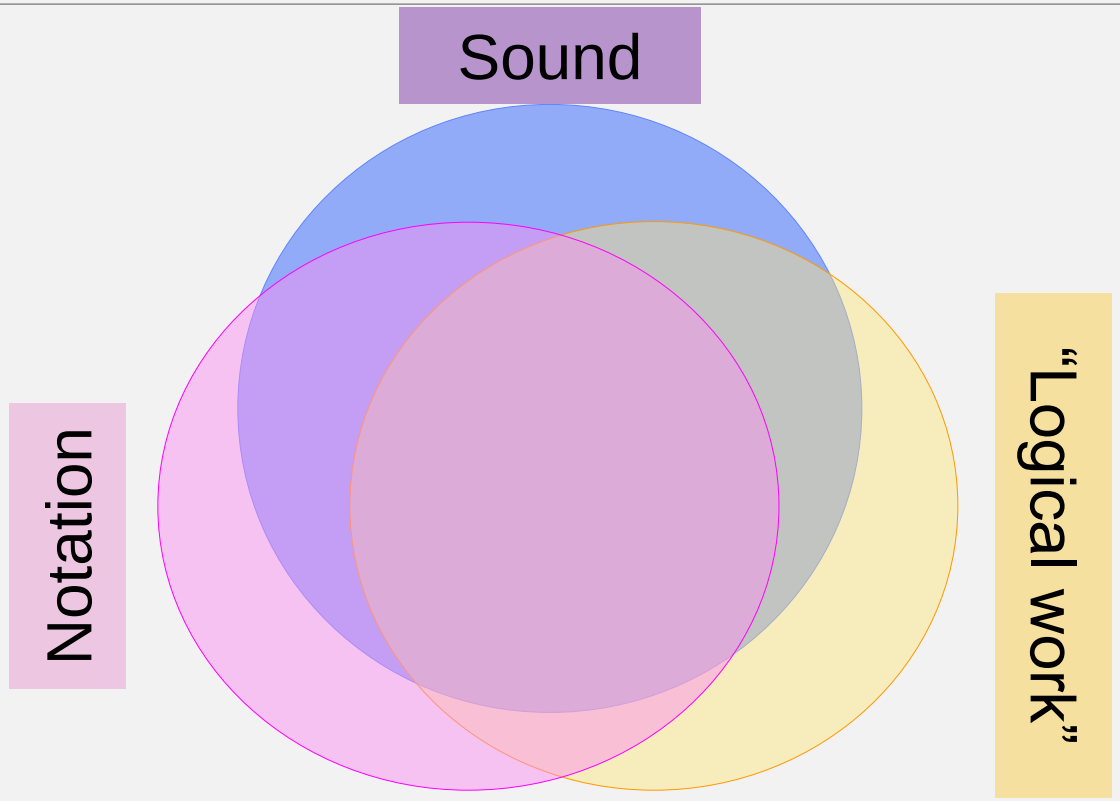
An Introduction to SCORE

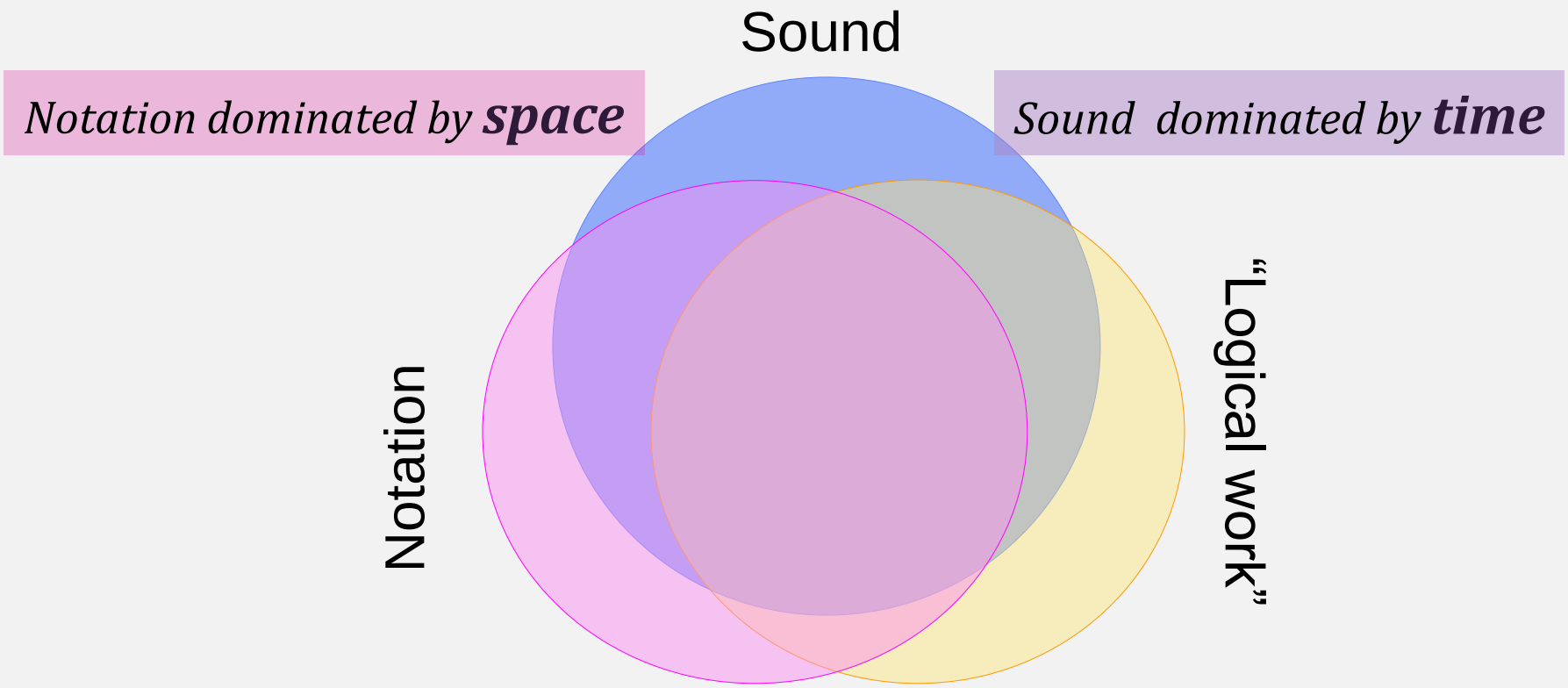
MUSIC 253/CS 275A

STANFORD UNIVERSITY

The Graphics (*Notation*) Domain



The Graphics Domain



The Graphics Domain: Basic Principles

PITCH

Height on a staff

Pitch inflection

Marks (#, B, etc)

Pitch articulation

Marks (staccato, *tr*)

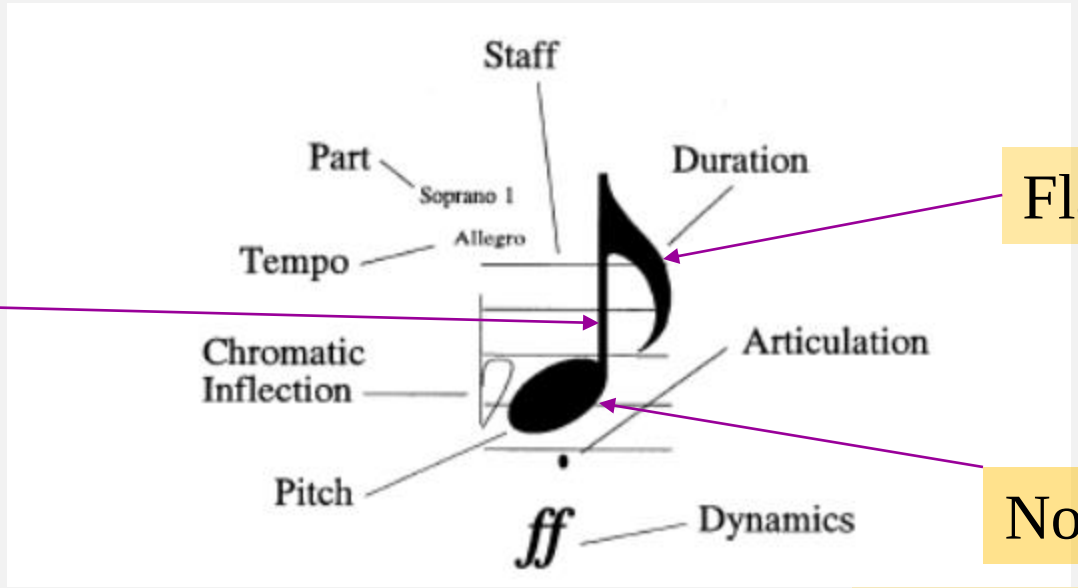
DURATION

Assembly of objects:

- Noteheads
- Stems and flags
- Beams
- Slurs

Value inferred from combinations of objects

SCORE's approach to the note



Flag

Stem

Notehead

(Notehead shape)

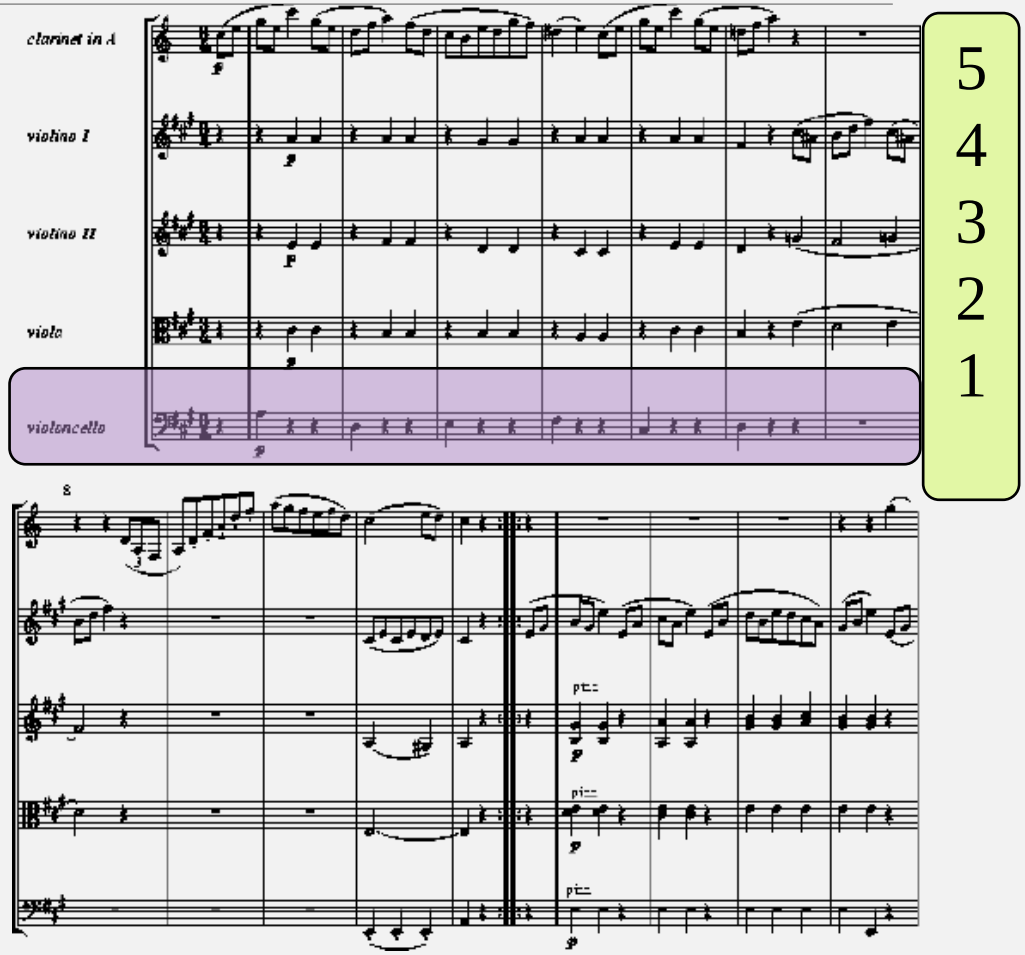
Essential Dictionary of Music Notation (1996; recommended): See http://www.alfred.com/Products/Essential-Dictionary-of-Music-Notation--00-16638.aspx

SCORE's approach to systems

Data-entry order

1. Encode lowest voice
2. Encode other voices on first system
3. Repeat until all systems are encoded
4. Assemble page(s)

Start here



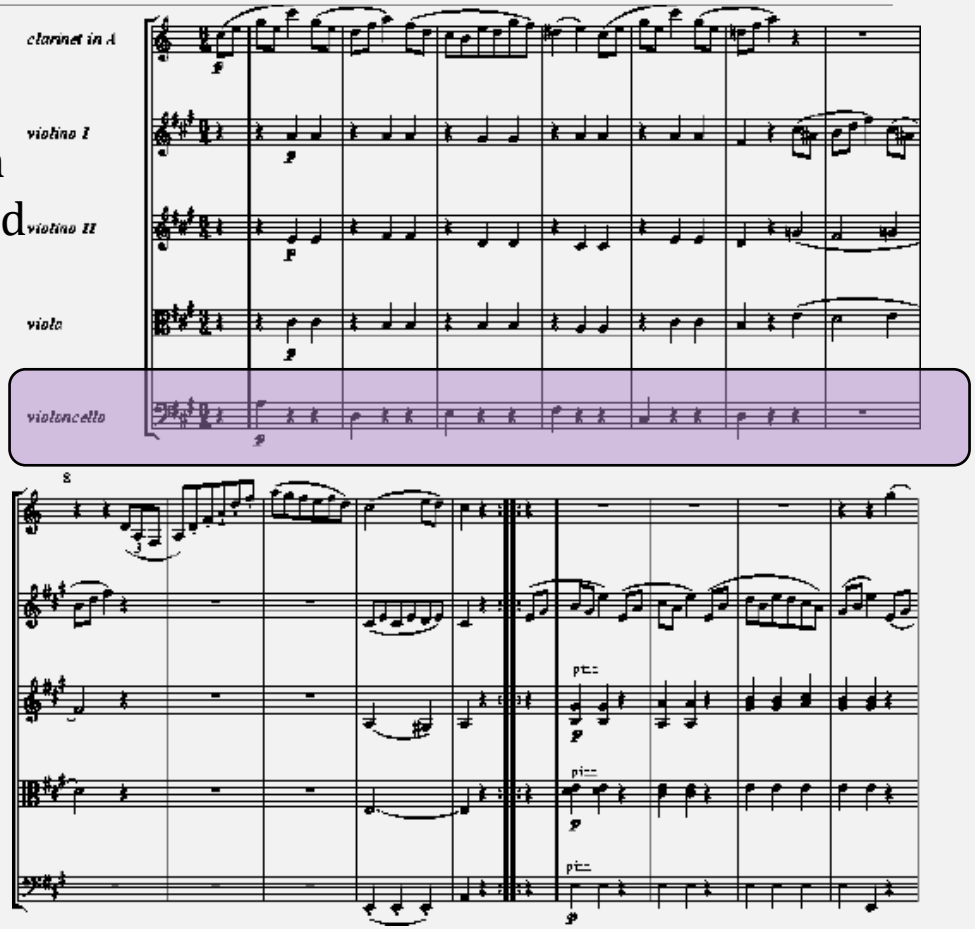
Part/score orientation in SCORE

Process

1. Encode lowest voice
2. Encode other voices on first system
3. Repeat until all systems are encoded
4. Assemble page

Implications:

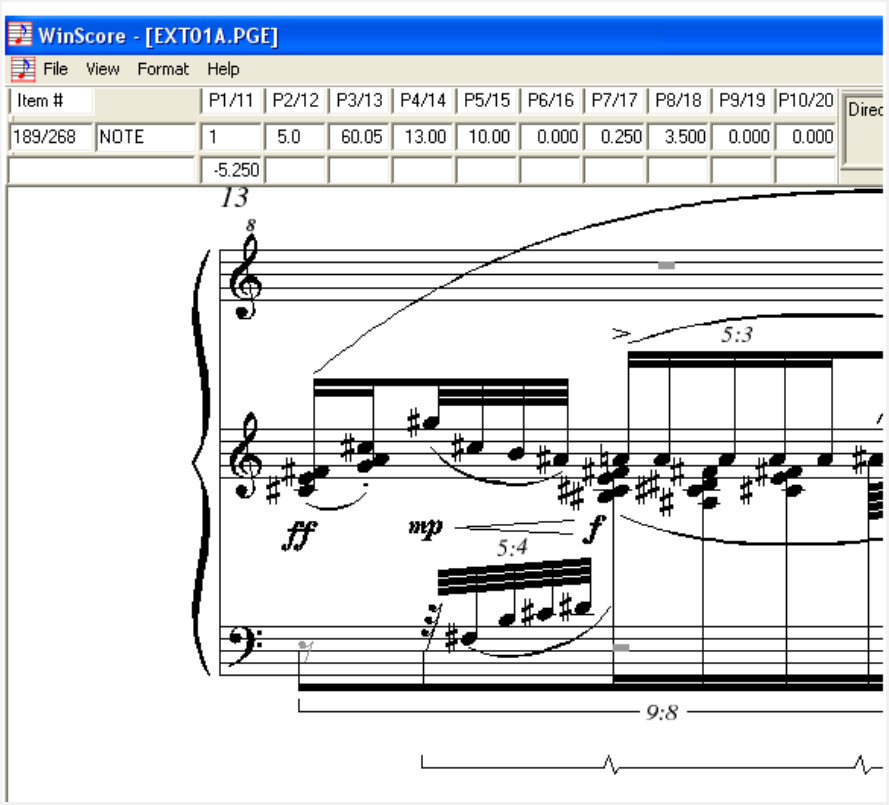
Content must be known in advance



SCORE input/editing system

ASCII (computer keyboard) input (next slide)

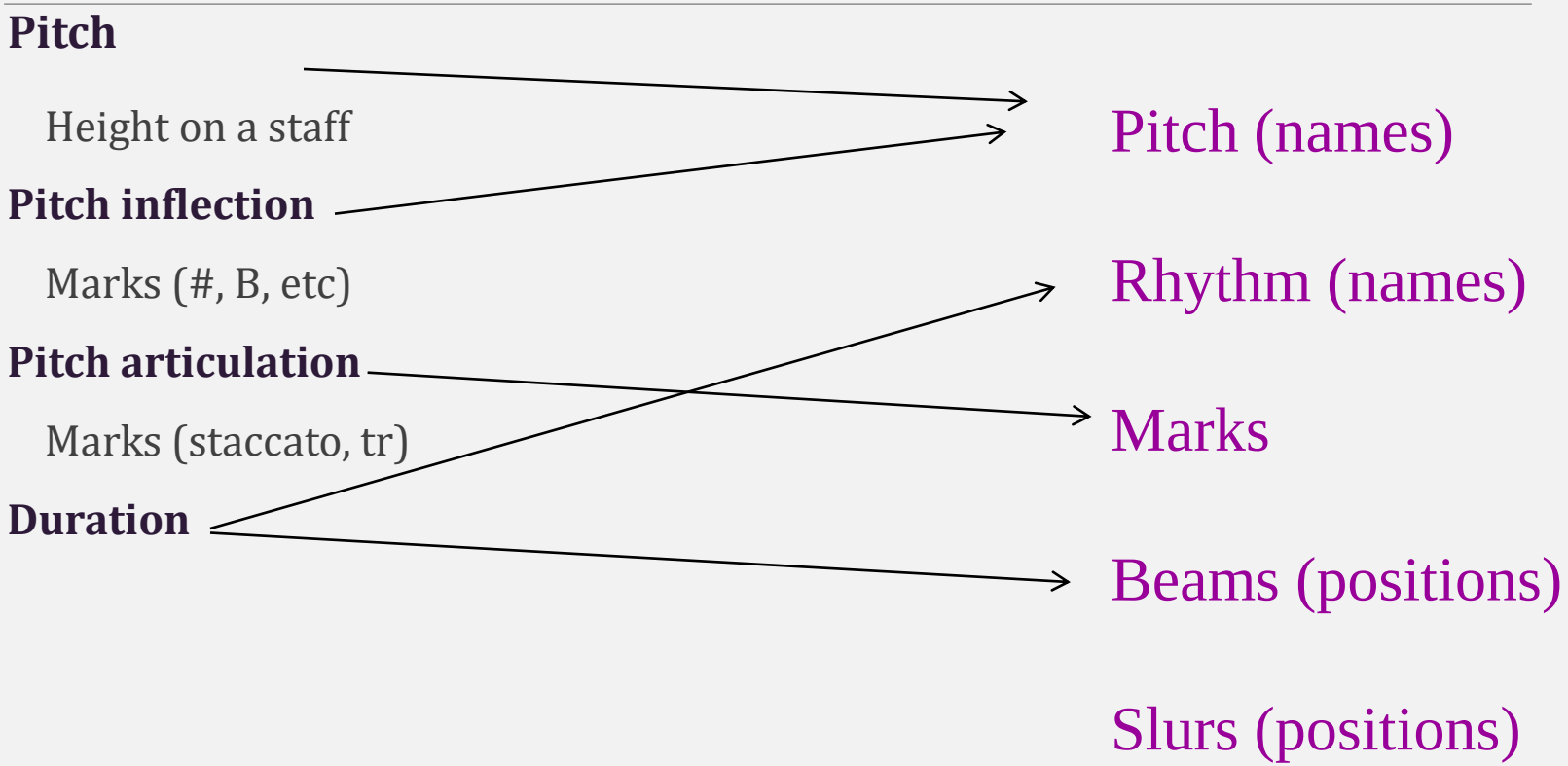
Parametric editing (2)



Two stages:

- Data entry
- Data editing

SCORE input order



Musical features of one note (SCORE)

A molecule of music

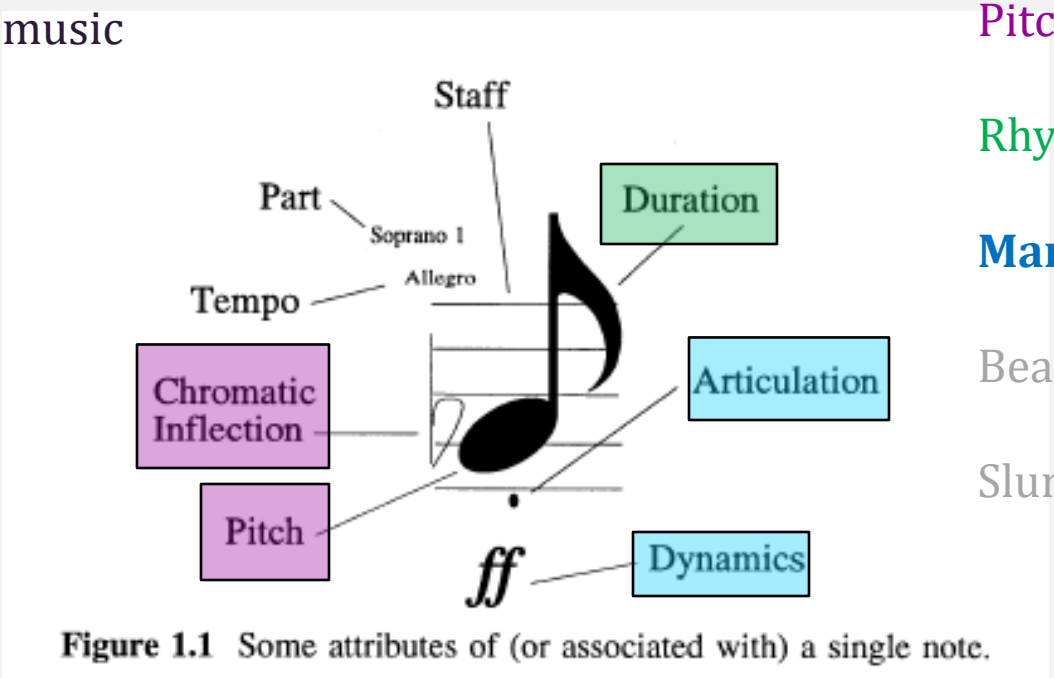


Figure 1.1 Some attributes of (or associated with) a single note.

Pitch (names)

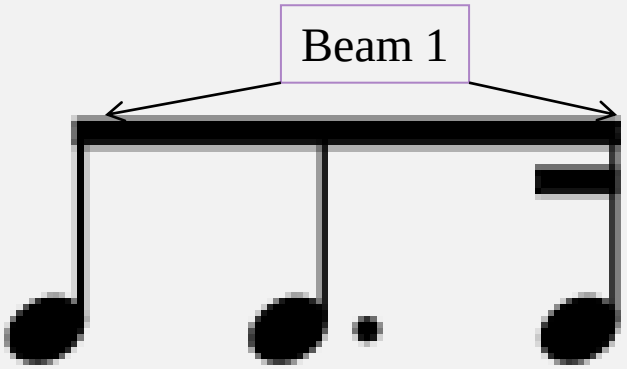
Rhythm (names)

Marks

Beams (positions)

Slurs (positions)

Object groups: (#4) beams



Beam 2 (flag)

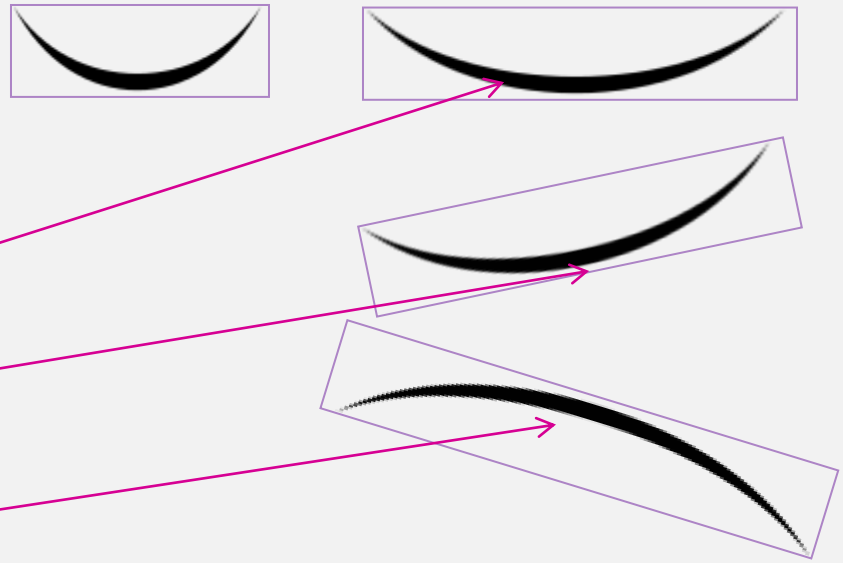
Object nos. 1 2 3

Object groups: (#4) slurs

Beams vary by
- Length
- Inclination

Slurs vary by
- Length
- Inclination
- Inversion
- Apex (nadir) of arc

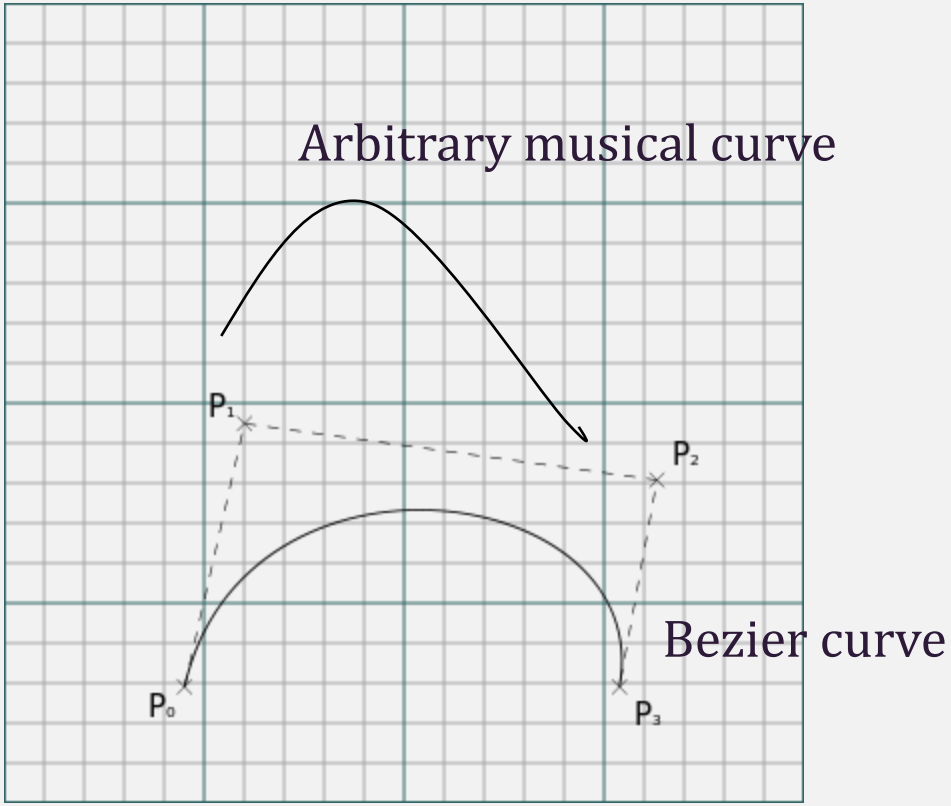
(in relation to midpoint)



SCORE's imaginary grid

Slurs vary by
- Length
- Inclination
- Inversion
- **Apex (nadir) of arc**

(in relation to midpoint)



Symbolic codes: DARMS and SCORE

- **DARMS (1965)**
  - Columbia/Princeton/Yale
  - **Theoretically** for notation
  - One-pass **input** scheme
  - Required **intermediate representation** for score assembly
  - *Note Processor* (c.1986-92): only **commercial** program to use it [on PCs]
  - **Legacy** = analysis
- ***SCORE* (1972)**
  - **Stanford/Bell Labs**
  - **Actually** for notation
  - Five-pass **input** scheme
  - Required **intermediate representation** for score assembly
  - **SCORE** (1972--): only **commercial** notation program to use it
  - **Legacy** = collected works of major composers

Music V → SCORE

MUSIC V

Max Mathews

Bell Labs

Sound-list generation

SCORE

Leland Smith

Stanford

Note-list generation

GEN2	3	0.0	2	1	1 0 .5 0 .25 0	This statement defines an instrument. Here a wave-form table for the clarinet is set up. GEN2 calls an oscillator subroutine. The parameters are (1) an operation code [3 = generate function], (2) an action time, (3) an instrument number, (4) a table number, and (5–10) the relative amplitudes of harmonics 1..6.
NOT	1	2	0.0	.5	1 440	These statements cause notes to be played. The initial parameters are (1) an operation code [1 = play note], (2) an instrument number, (3) a start-of-action time, (4) event duration, (5) an absolute amplitude for the event, and (6) event frequency (Hz). These parameters may be followed by a variable number of user-defined parameters (not shown).
NOT	1	2	0.5	.5	2 554	
NOT	1	2	1.0	.5	3 660	
NOT	1	2	1.5	.5	4 554	
NOT	1	2	2.0	1.0	5 880	
NOT	1	2	3.0	.5	3 660	
NOT	1	2	3.5	.5	2 554	
NOT	1	2	4.0	.5	2 494	
NOT	1	2	4.5	.5	4 588	
NOT	1	2	5.0	1.0	5 740	

Example G1 Music V representation of Bars 1 and 2 of the *Clarinet* part of the Mozart trio.

SCORE/CCRMA: A Brief History

DC Power Lab site

CCRMA pre-history c. 1974

John Chowning

Leland Smith

Who? **Leland Smith (1925-2013)**

- Where? Stanford/CCMRA/Palo Alto
- Goal? engraving-quality music
- Method? ASCII input, screen editing

Who uses SCORE?

- Schott (DE)
- CF Peters (DE)
- Ricordi (IT)
- Hal Leonard (US)
- Composers in Stanford sphere

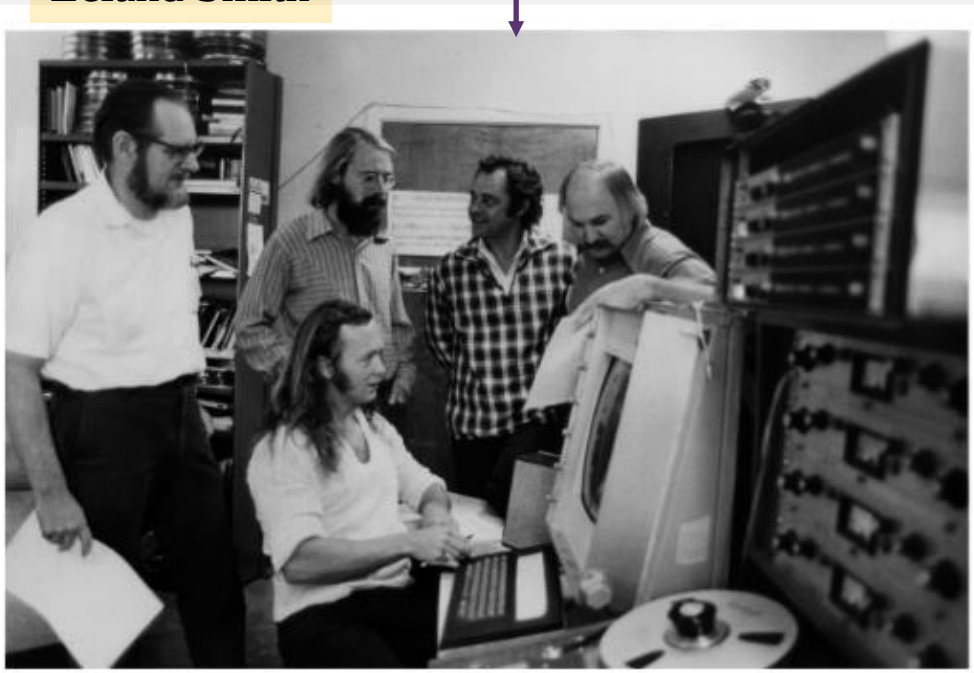


Photo: Patti Wood

Score vs MuseScore

SCORE

Pitch: reliable

Duration: reliable

MIDI playback: [pre-MIDI]

File import: little

Export: limited

System, score assembly: manual

Extensible symbol set: extensive

Fonts: beautiful; non-Roman available

MuseScore

Pitch: not always reliable

Duration: not always reliable

MIDI playback: yes

File import: MIDI, MusicXML, SCORE

Export: MusicXML

Score assembly: automatic*

Extensible symbol set: limited

Fonts: recently improved by “Leland”

Symbolic vs. MIDI-based notation

SCORE-type program

Pitch: reliable

Duration: reliable

MIDI playback: [partial]

File import: little

Export: limited

System, score assembly: manual

Extensible symbol set: yes

Finale-type program

Pitch: not always reliable

Duration: not always reliable

MIDI playback: yes

File import: MIDI, MusicXML, SCORE

Export: MusicXML

Score assembly: automatic

Extensible symbol set: partial