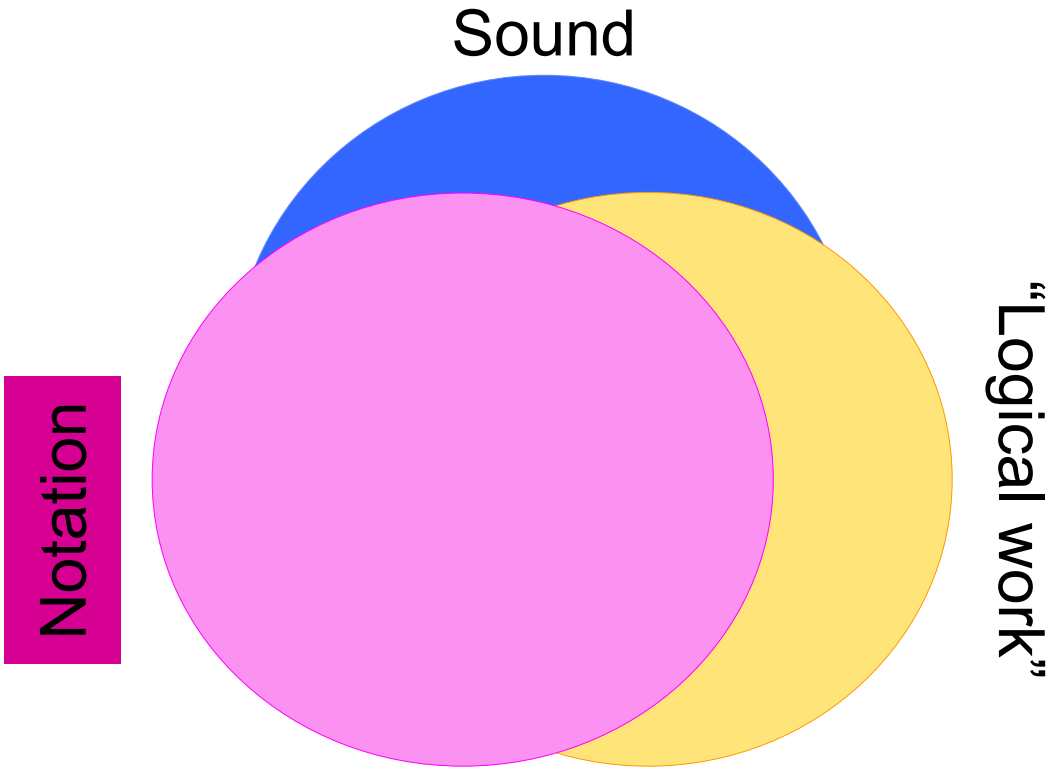
An Introduction to SCORE

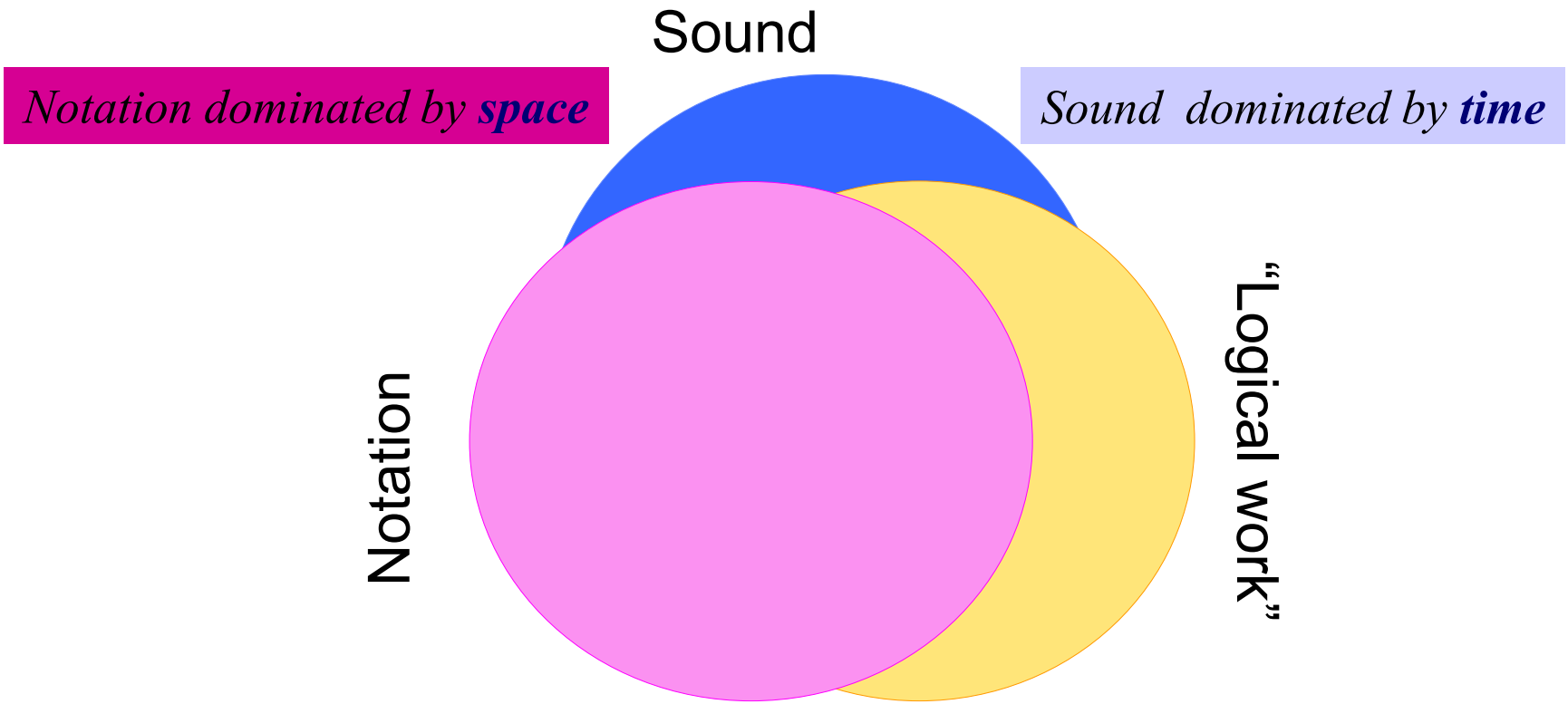
Music 253/CS 275A

Stanford University

The Graphics Domain



The Graphics Domain



The Graphics Domain: Basic Principles

Pitch

- Height on a staff

Pitch inflection

- Marks (#, B, etc)

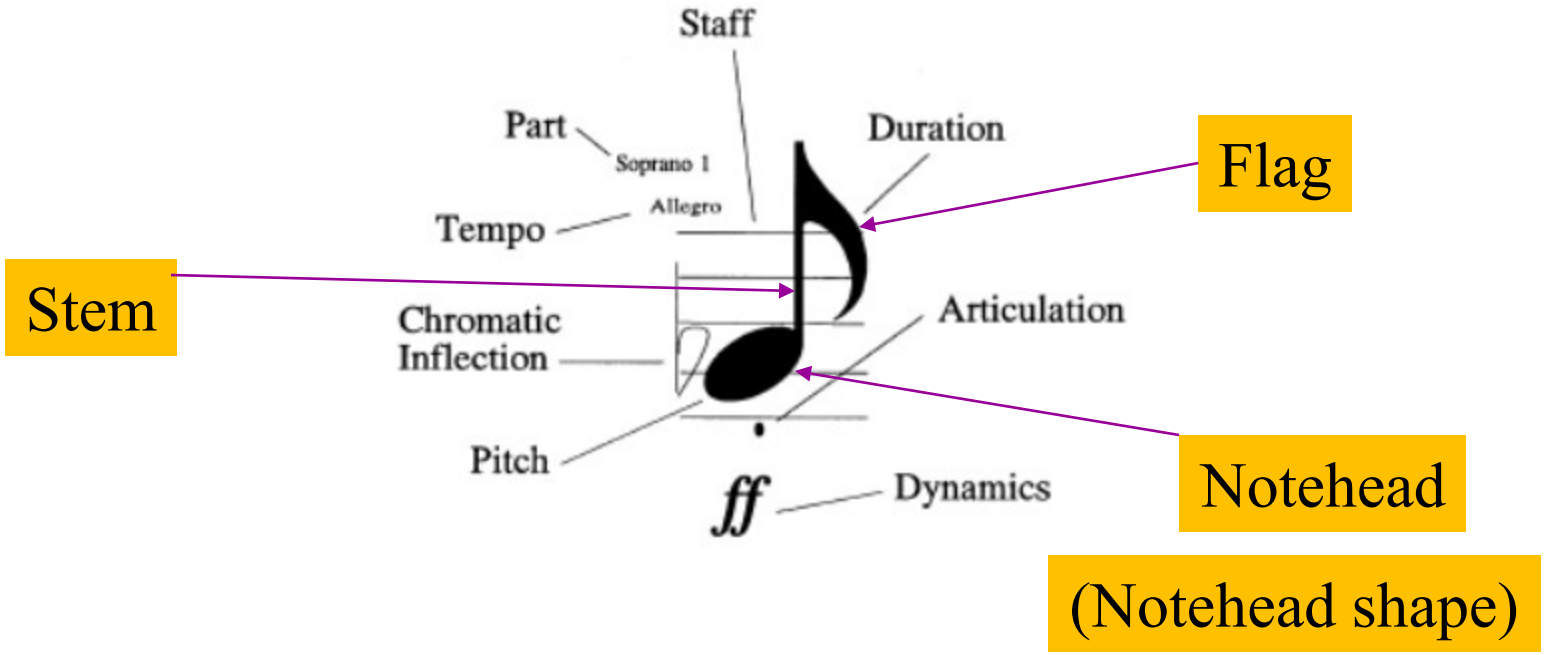
Pitch articulation

- 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



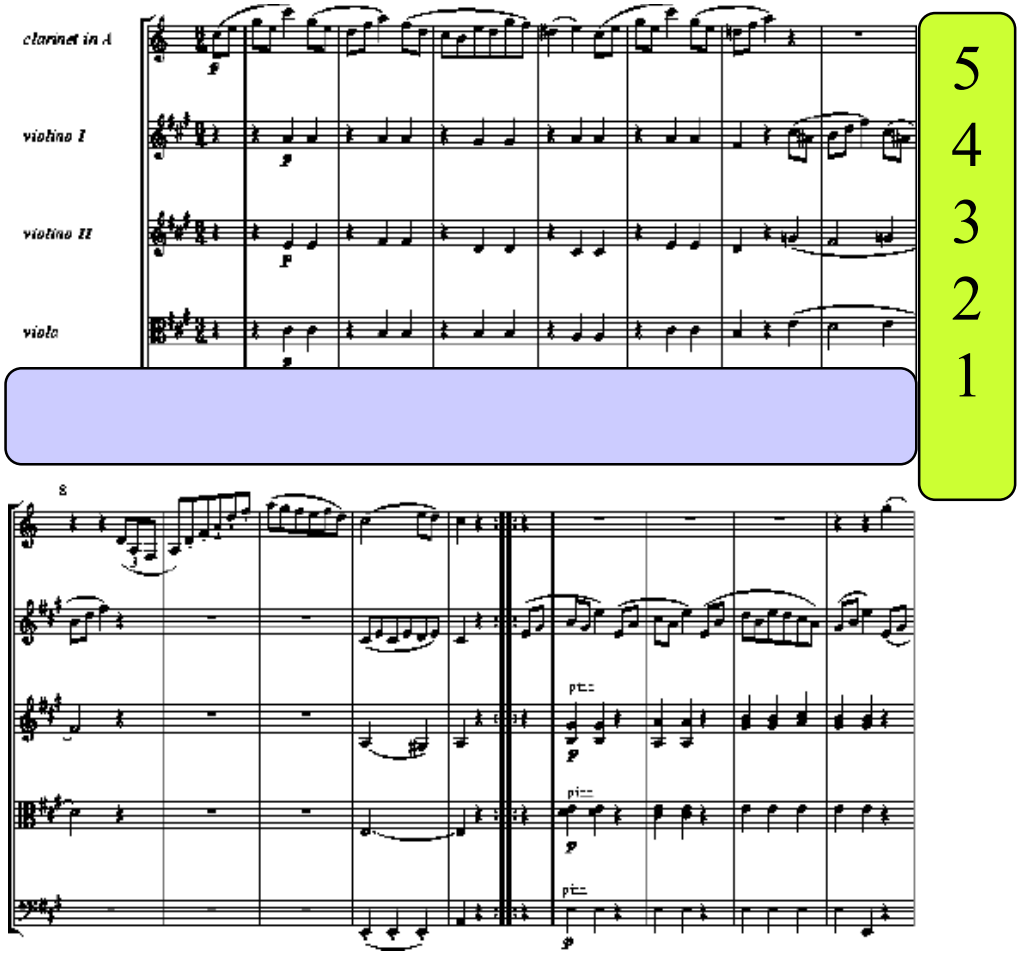
Essential Dictionary of Music Notation (1996; recommended): See
http://www.alfred.com/Products/Essential-Dictionary-of-Music-Notation--00-16638.aspx

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)

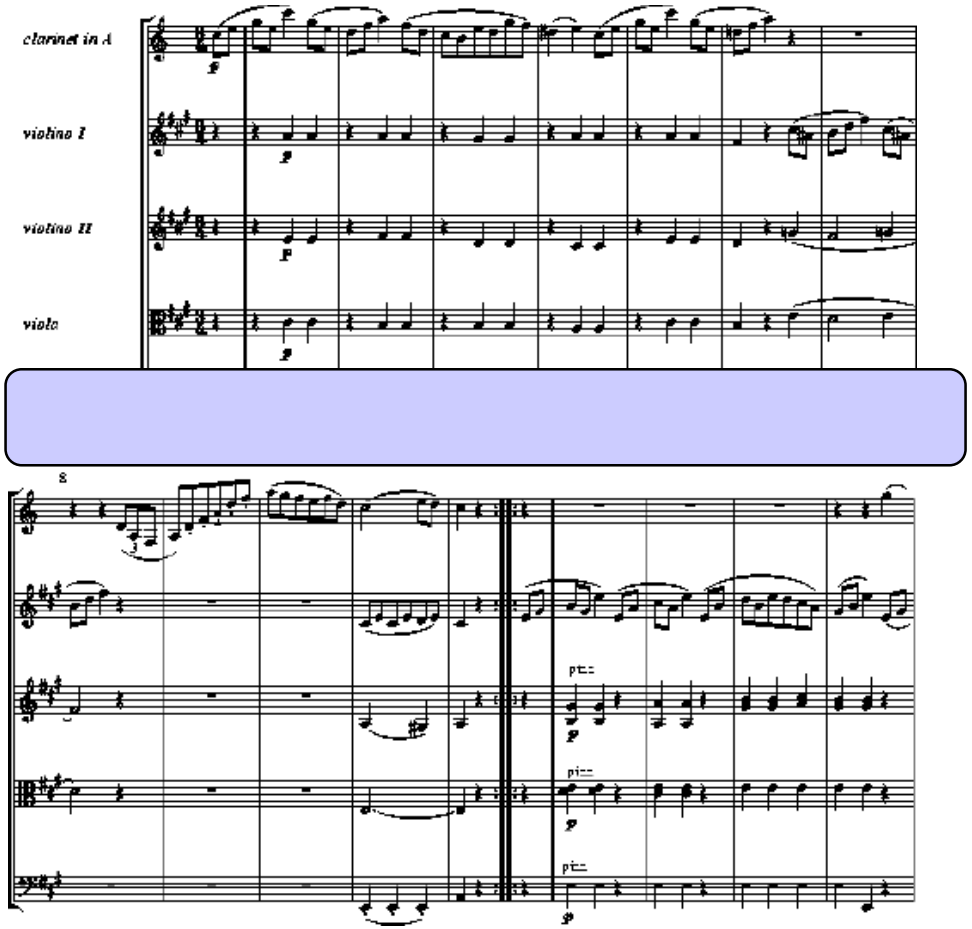
Start here



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

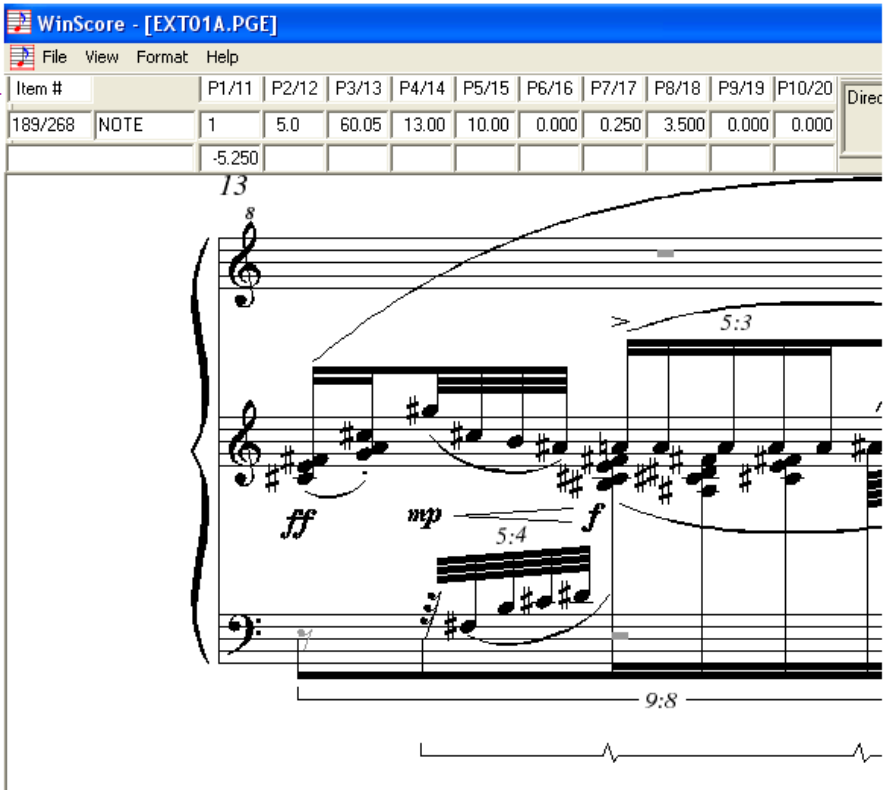


Implications:

Content must be known in advance

SCORE input/editing system

- ASCII (computer keyboard) input (next slide)
- Parametric editing



SCORE input order

Pitch

- Height on a staff

Pitch inflection

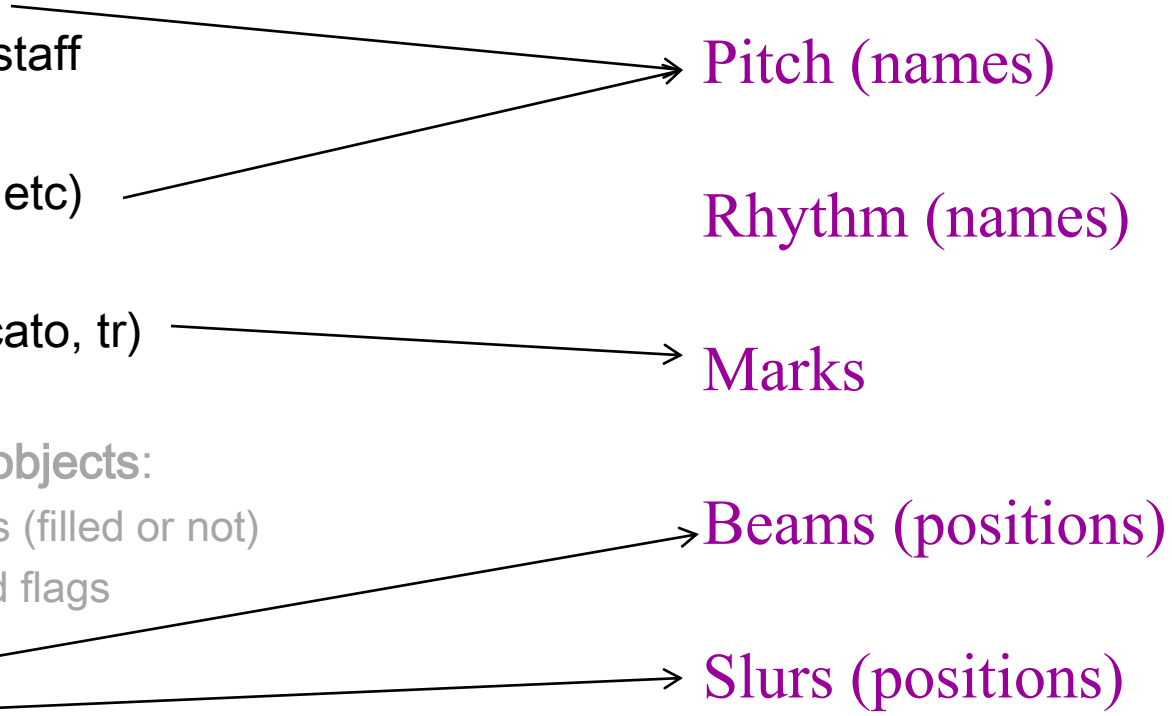
- Marks (#, B, etc)

Pitch articulation

- Marks (staccato, tr)

Duration

- **Assembly of objects**:
  - Noteheads (filled or not)
  - Stems and flags
  - Beams
  - Slurs
- **Value inferred** from combinations of objects



Musical features of one note (SCORE)

A molecule of music

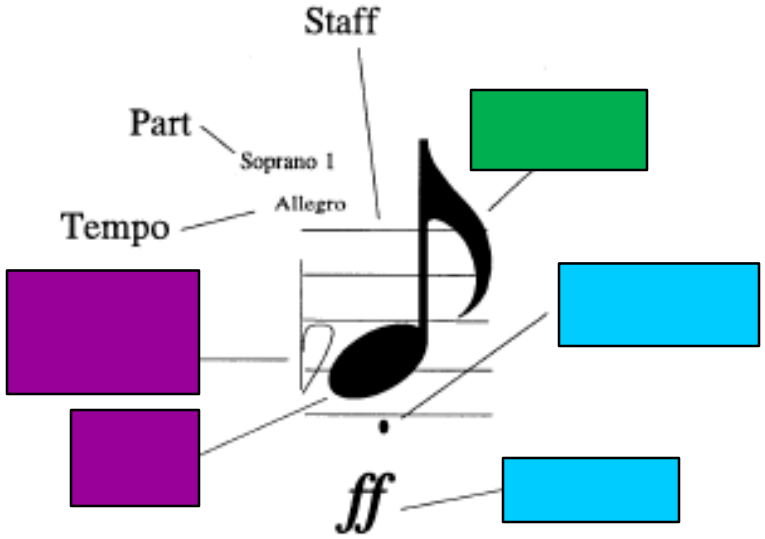


Figure 1.1 Some attributes of (or associated with) a single note

Pitch (names)

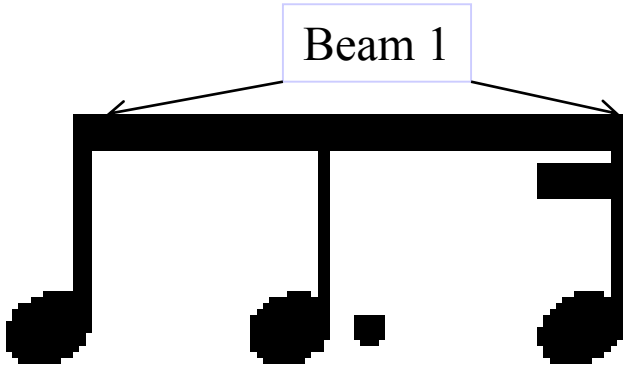
Rhythm (names)

Marks

Beams (positions)

Slurs (positions)

Object groups: (#4) beams

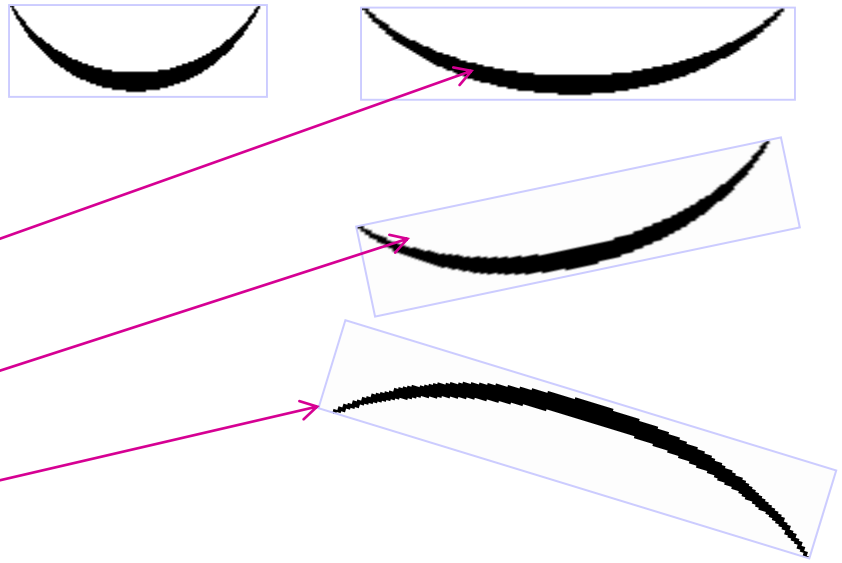


Beam 2 (flag)

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)

Object groups: slurs

Beams vary by

- Length
- Inclination

Slurs vary by

- Length
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- Inversion
- Apex (nadir) of arc

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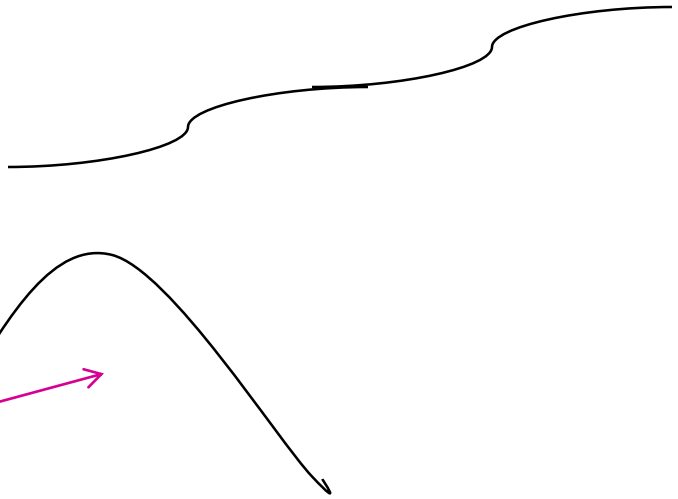
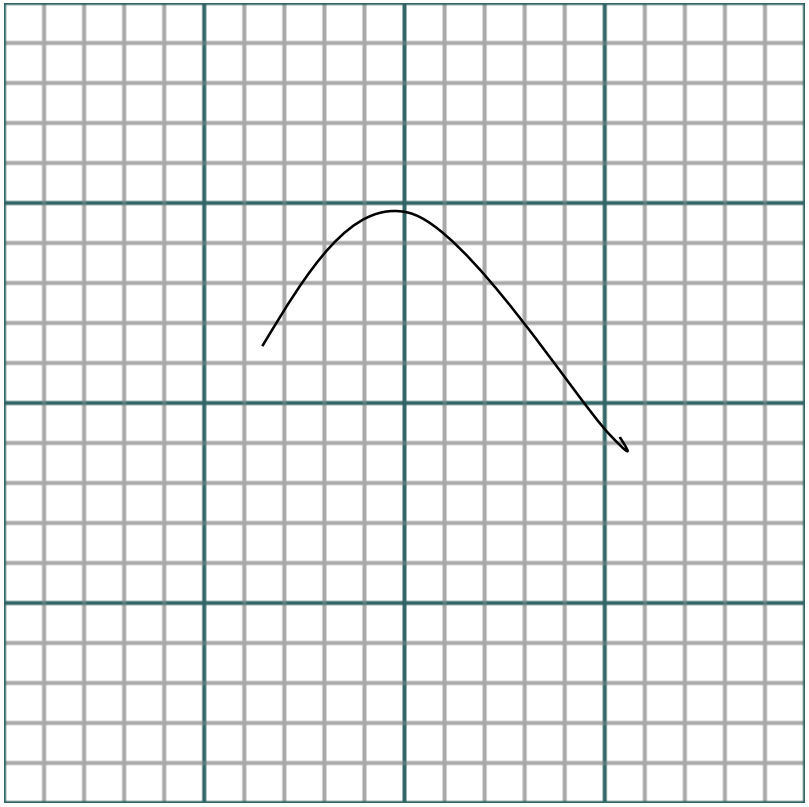


SCORE's imaginary grid

Slurs vary by

- Length
- Inclination
- Inversion
- **Apex (nadir) of arc**

(in relation to midpoint)



SCORE's imaginary grid

Slurs vary by

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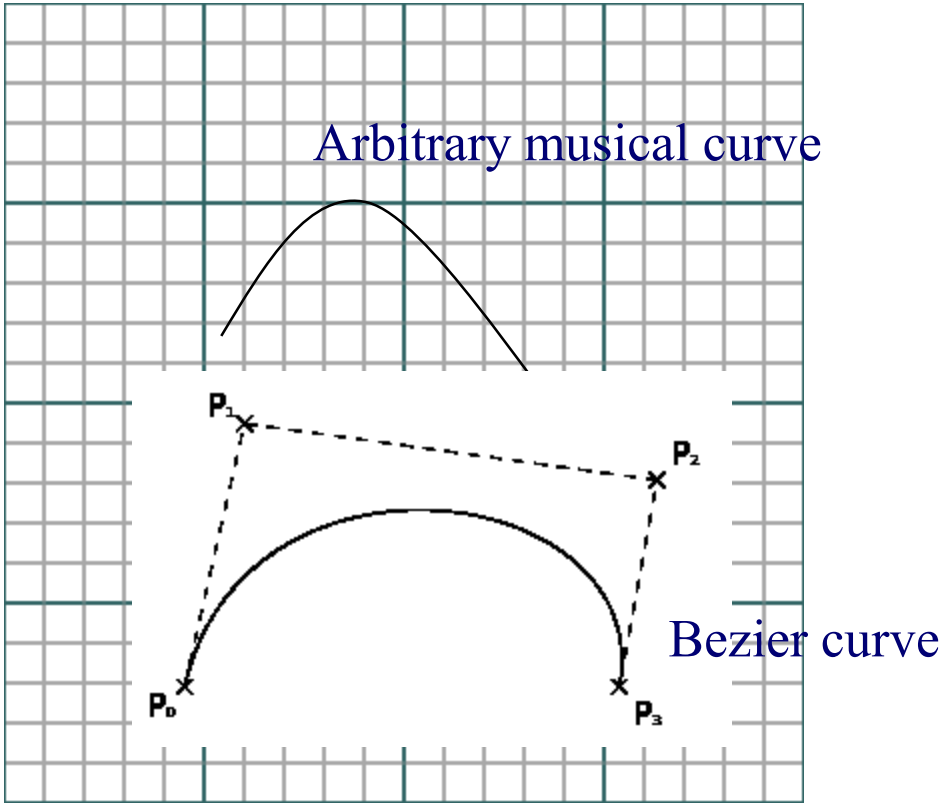
- **Apex (nadir) of arc**

(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

SCORE: A Brief History

CCRMA pre-history c. 1974

John Chowning

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

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

Users? Big music publishers—

- Schott (DE)
- Peters (DE)
- Ricordi (IT)
- Hal Leonard (US)

Photo: Patti Wood

Symbolic vs. MIDI-based notation

SCORE-type program

- **Pitch**: reliable
- **Duration**: reliable
- **MIDI playback**: [partial]
- **File import**: ?
- **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