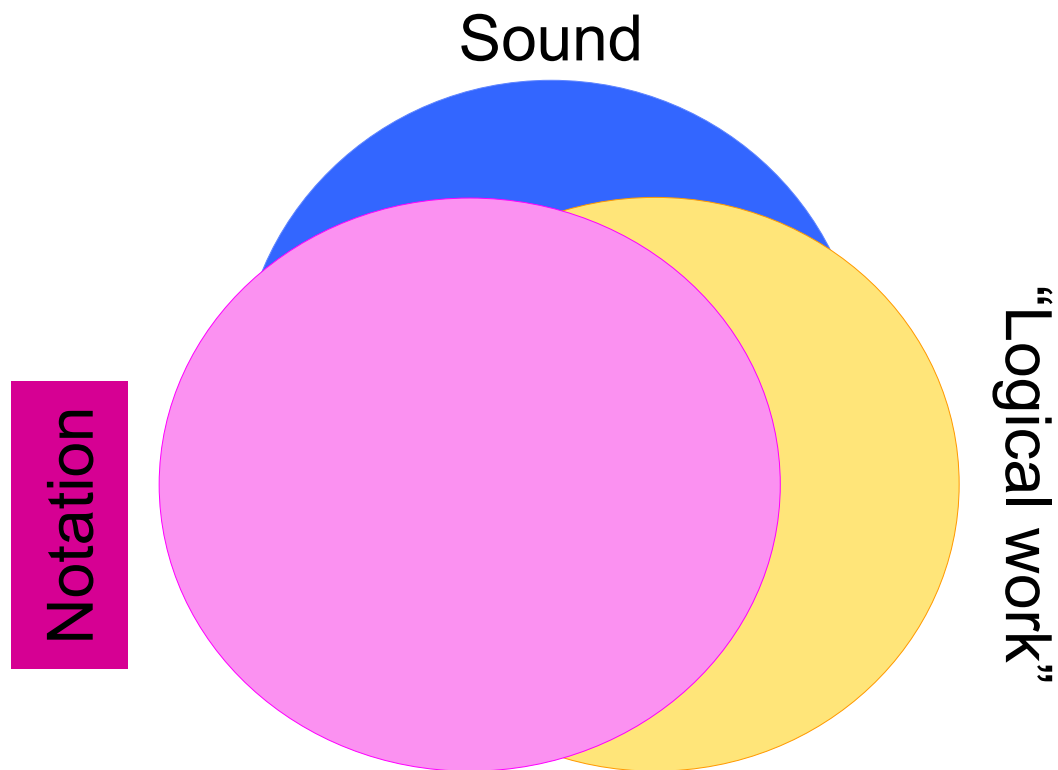


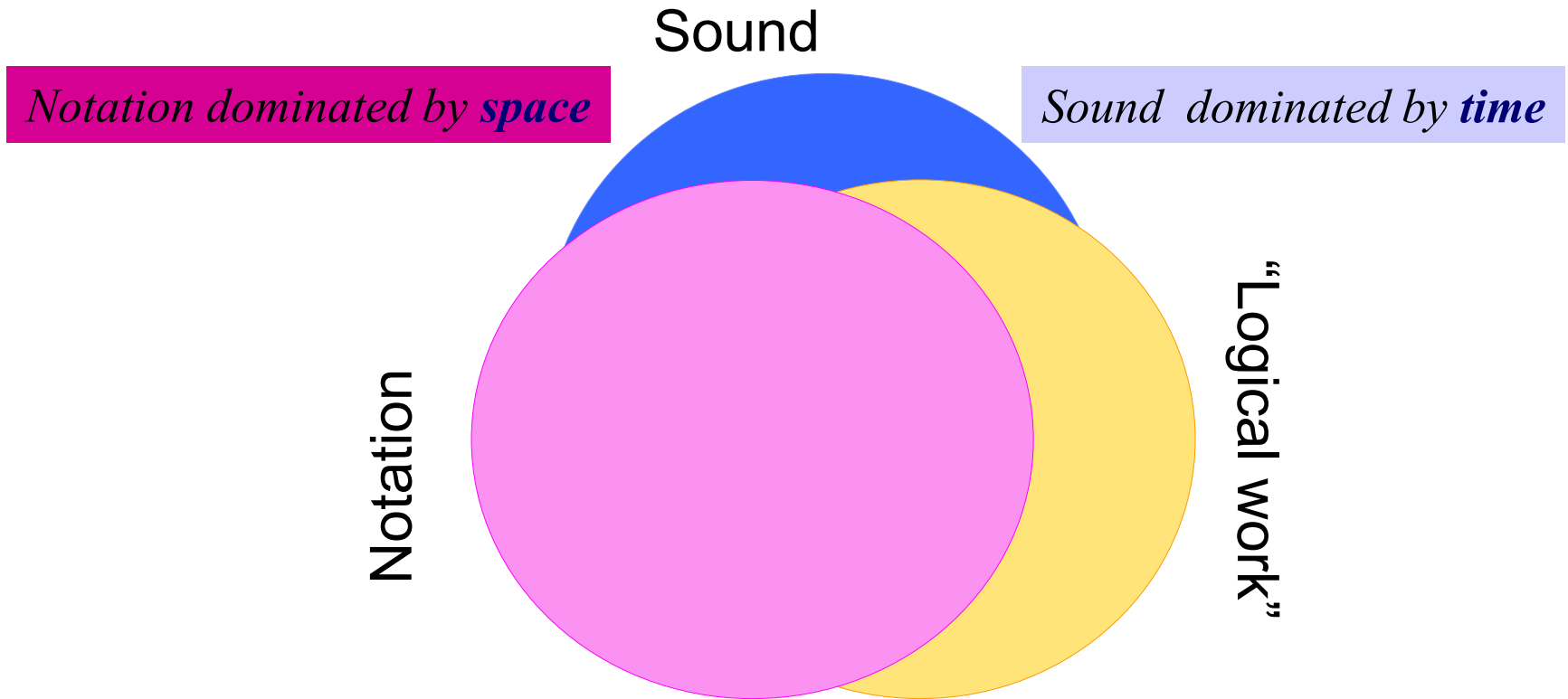
An Introduction to SCORE

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*)

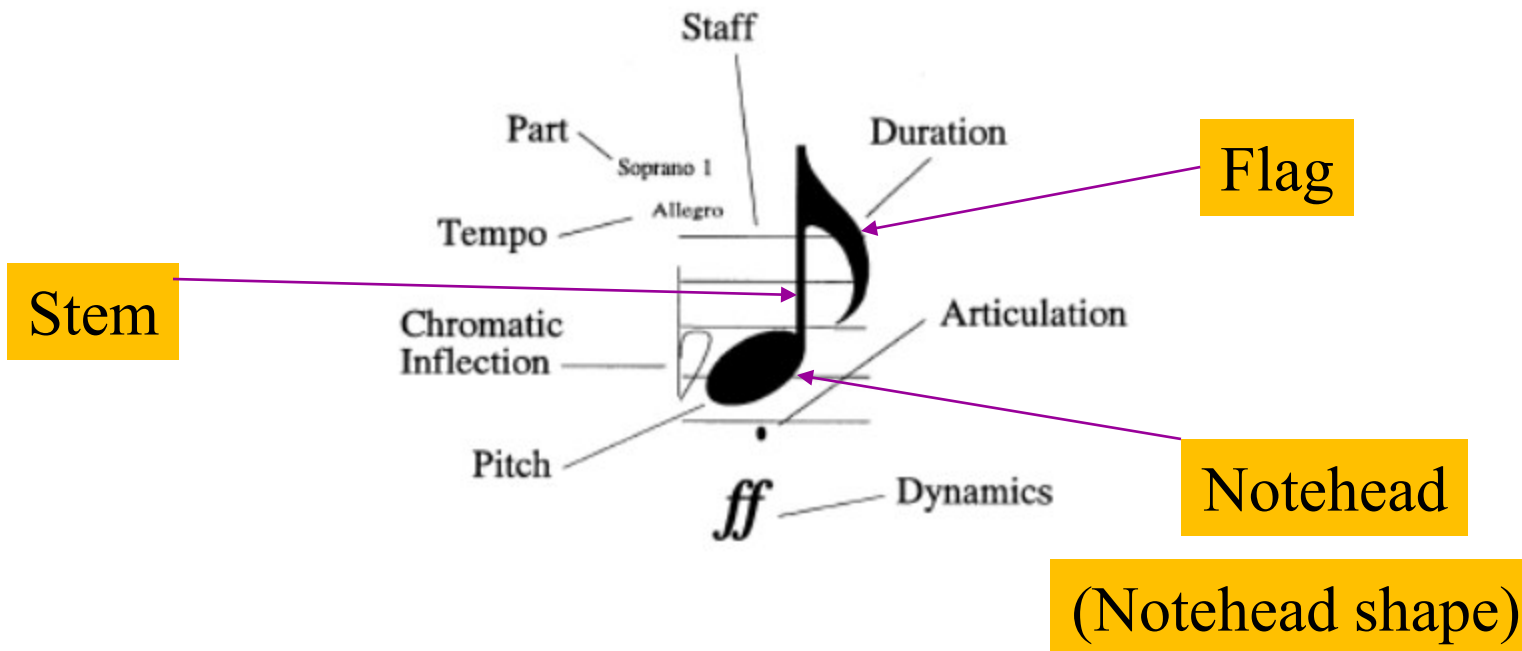
Duration

- **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)



clarinet in A
violino I
violino II
viola

5
4
3
2
1

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:

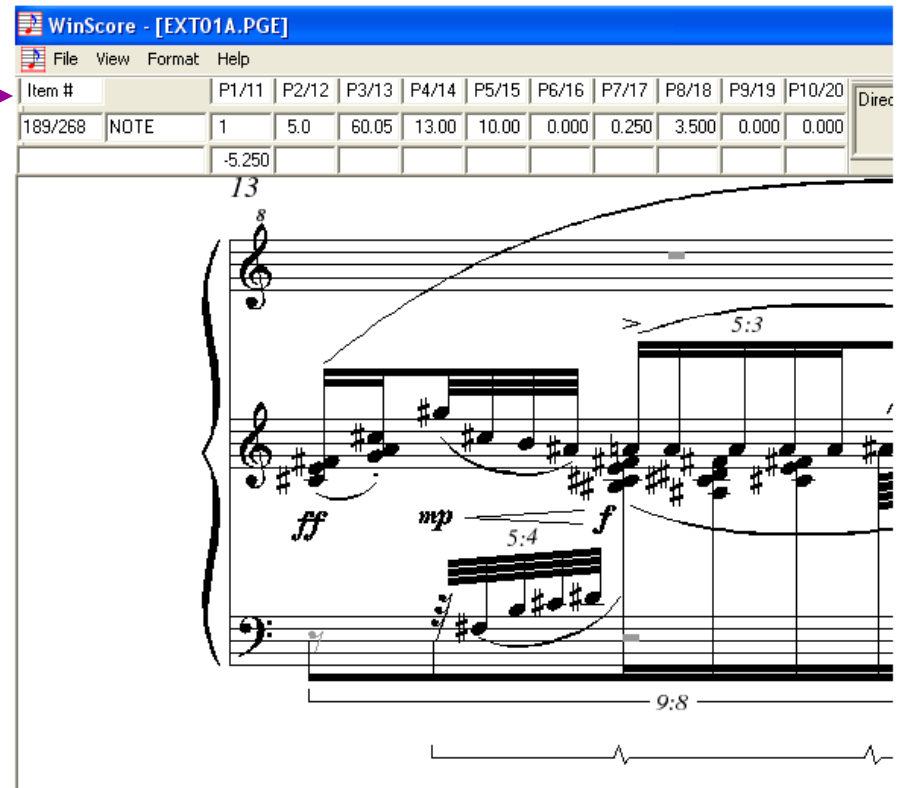
Content must be known in advance

A snippet of a musical score with four staves. The staves are labeled: *clarinet in A*, *violino I*, *violino II*, and *viola*. The first system of music is highlighted with a light blue background. The music is in 2/4 time and features various notes and rests.

A snippet of a musical score with five staves. The first system of music is highlighted with a light blue background. The music is in 2/4 time and features various notes and rests. The staves are labeled with instrument abbreviations: *s*, *pt=*, *pi=*, and *pi=*.

SCORE input/editing system

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



The screenshot shows the WinScore software interface. At the top, the title bar reads "WinScore - [EXT01A.PGE]". Below it is a menu bar with "File", "View", "Format", and "Help". A table of parametric data is visible, with a purple arrow pointing from the "Parametric editing" bullet point to the "Item # 189/268" row.

Item #	P1/11	P2/12	P3/13	P4/14	P5/15	P6/16	P7/17	P8/18	P9/19	P10/20	Dir
189/268	NOTE	1	5.0	60.05	13.00	10.00	0.000	0.250	3.500	0.000	0.000

Below the table is a musical score for piano. The score is in G major and 4/4 time. It features a treble and bass clef. The music includes dynamic markings (*ff*, *mp*, *f*), articulation marks (accents), and phrasing slurs. A large slur covers the first two measures, and another slur covers the last two measures. A 5:3 ratio is indicated above the second measure, and a 5:4 ratio is indicated above the third measure. A 9:8 ratio is indicated below the first two measures. The score is numbered 13 at the beginning.

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

Pitch (names)

Rhythm (names)

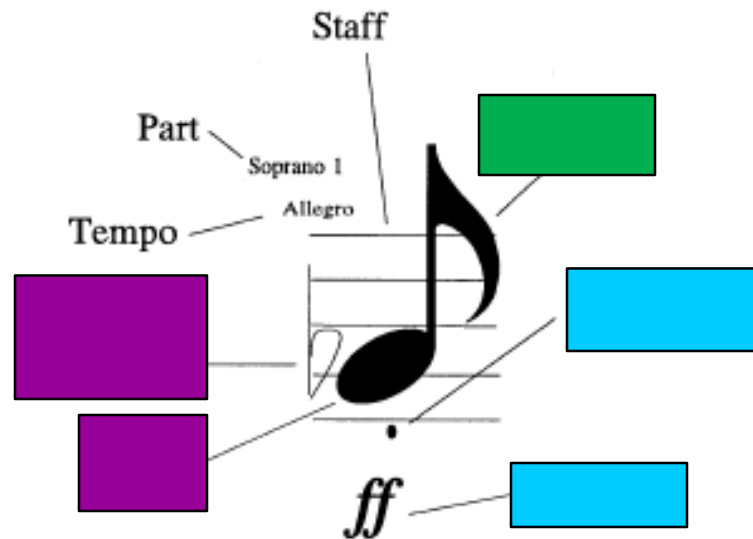
Marks

Beams (positions)

Slurs (positions)

Musical features of one note (SCORE)

A molecule of music



Pitch (names)

Rhythm (names)

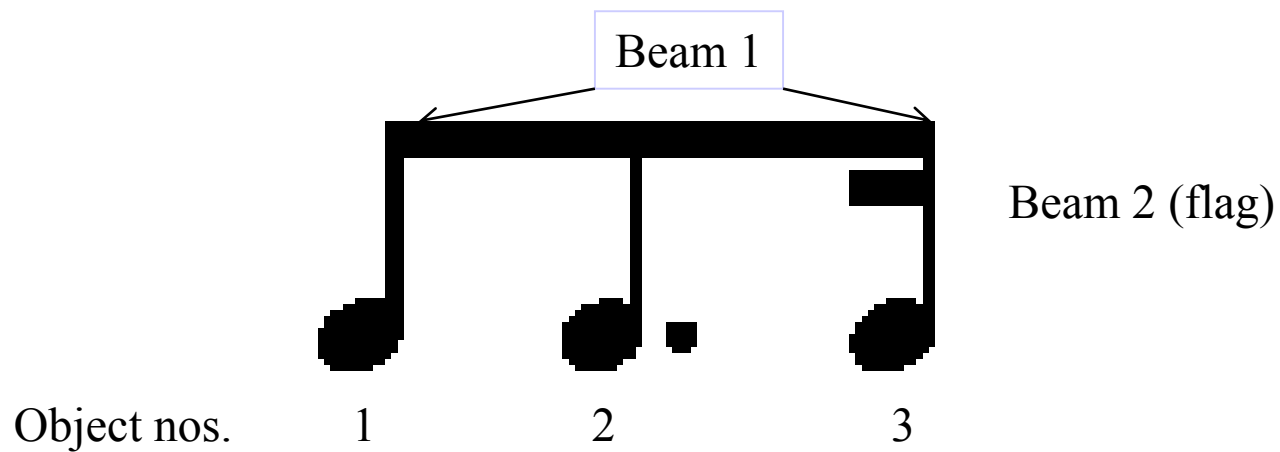
Marks

Beams (positions)

Slurs (positions)

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

Object groups: (#4) beams



Object groups: (#4) slurs

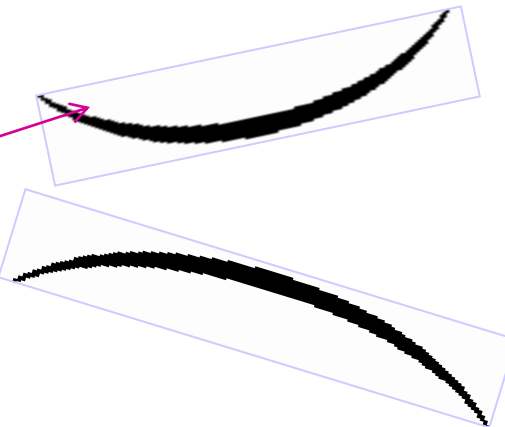
Beams vary by

- Length
- Inclination



Slurs vary by

- Length
- Inclination
- Inversion
- Apex (nadir) of arc
(in relation to midpoint)



Object groups: slurs

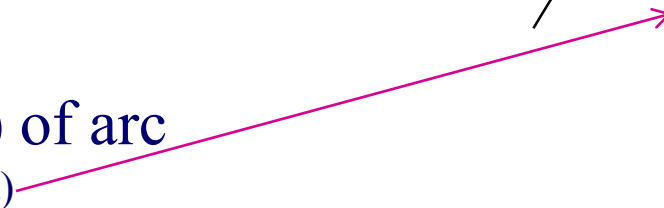
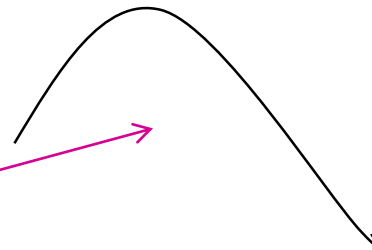
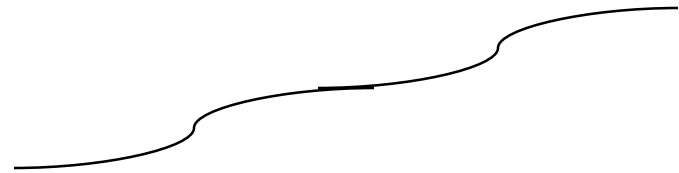
Beams vary by

- Length
- Inclination



Slurs vary by

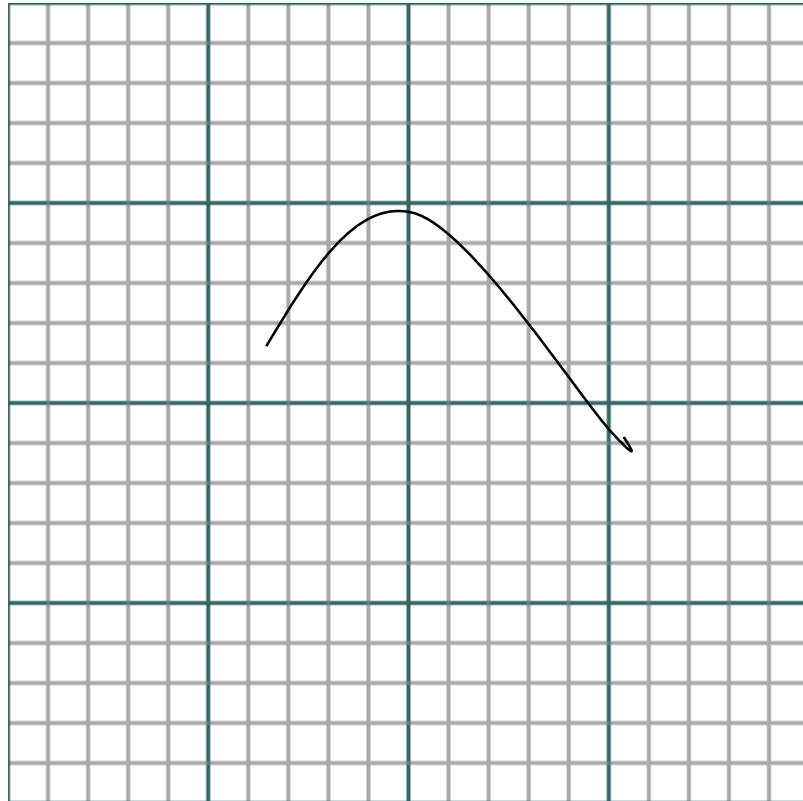
- Length
- Inclination
- Inversion
- Apex (nadir) of arc
(in relation to midpoint)



SCORE's imaginary grid

Slurs vary by

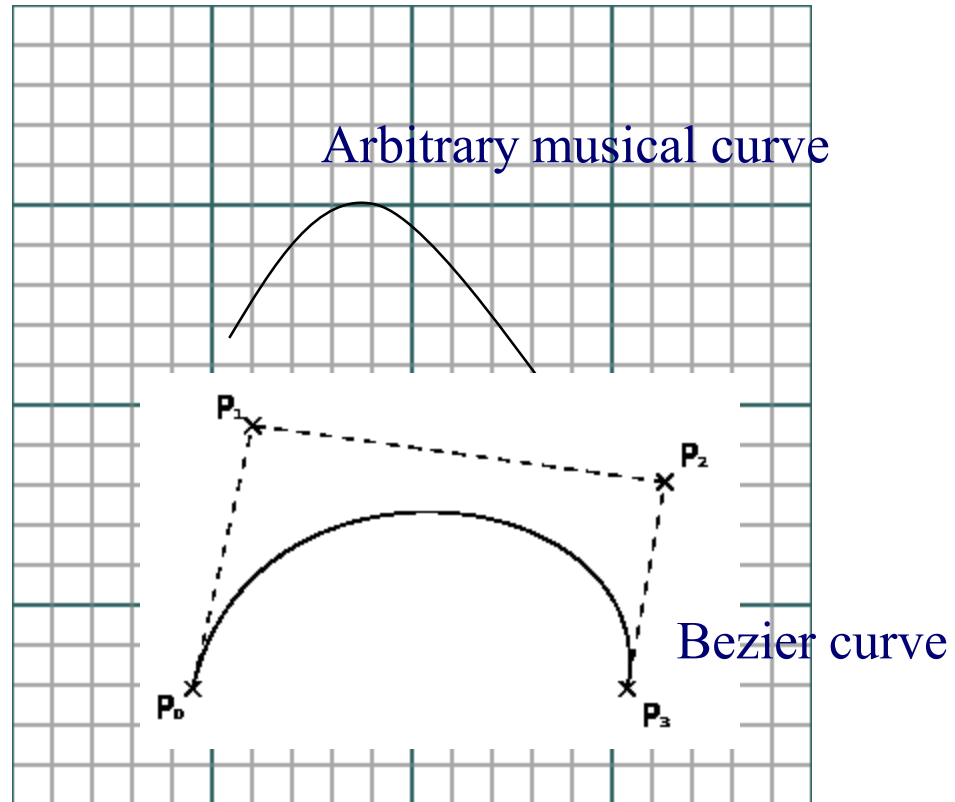
- Length
- Inclination
- Inversion
- **Apex (nadir) of arc**
(in relation to midpoint)



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



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