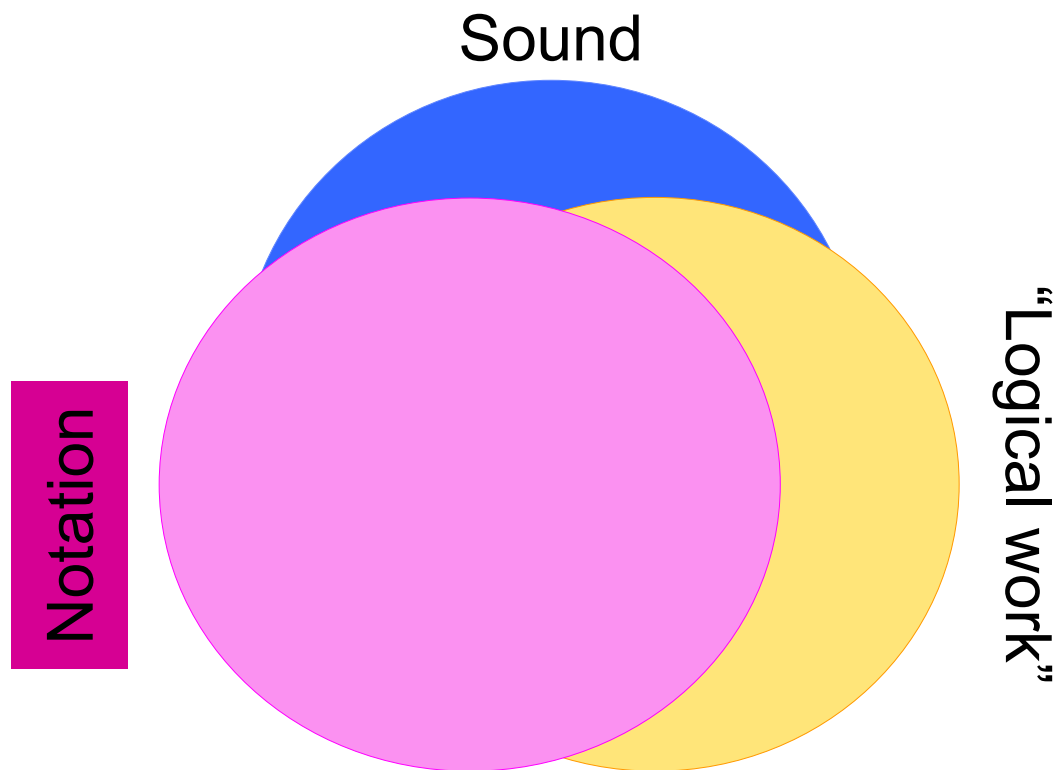


An Introduction to SCORE

Music 253/CS 275A
Stanford University

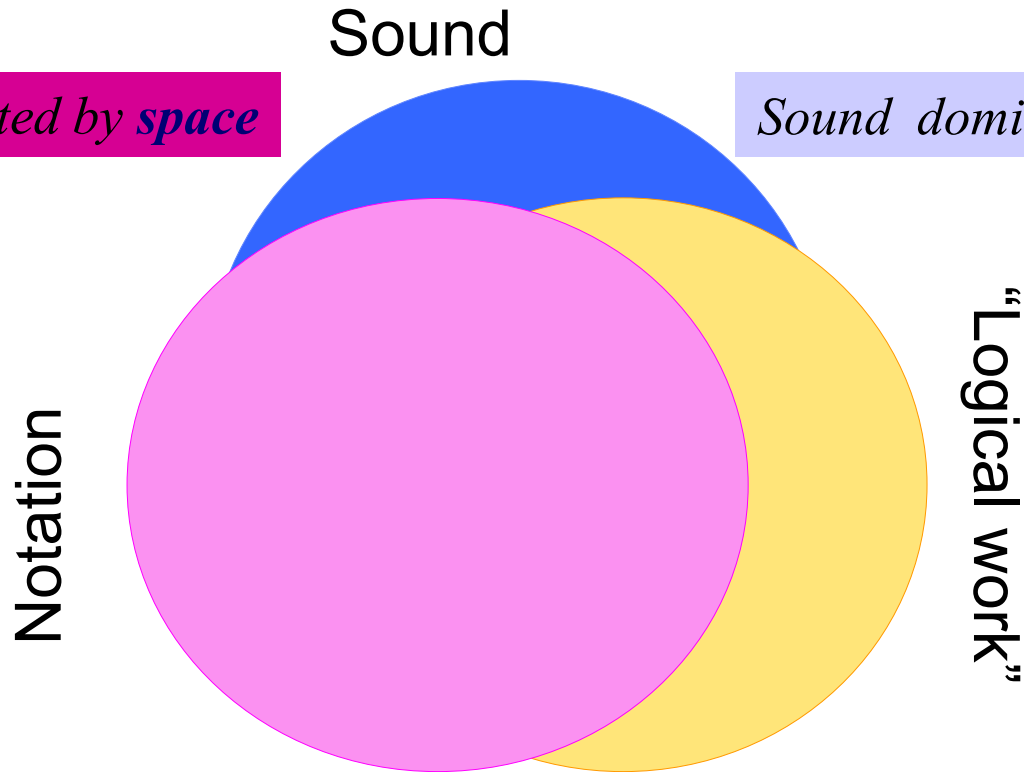
The Graphics Domain



The Graphics Domain

*Notation dominated by **space***

*Sound dominated by **time***



The Graphics Domain: Basic Principles

Pitch

- Height on a staff

Pitch inflection

- Marks (#, B, etc)

Pitch articulation

- Marks (staccato, *tr*)

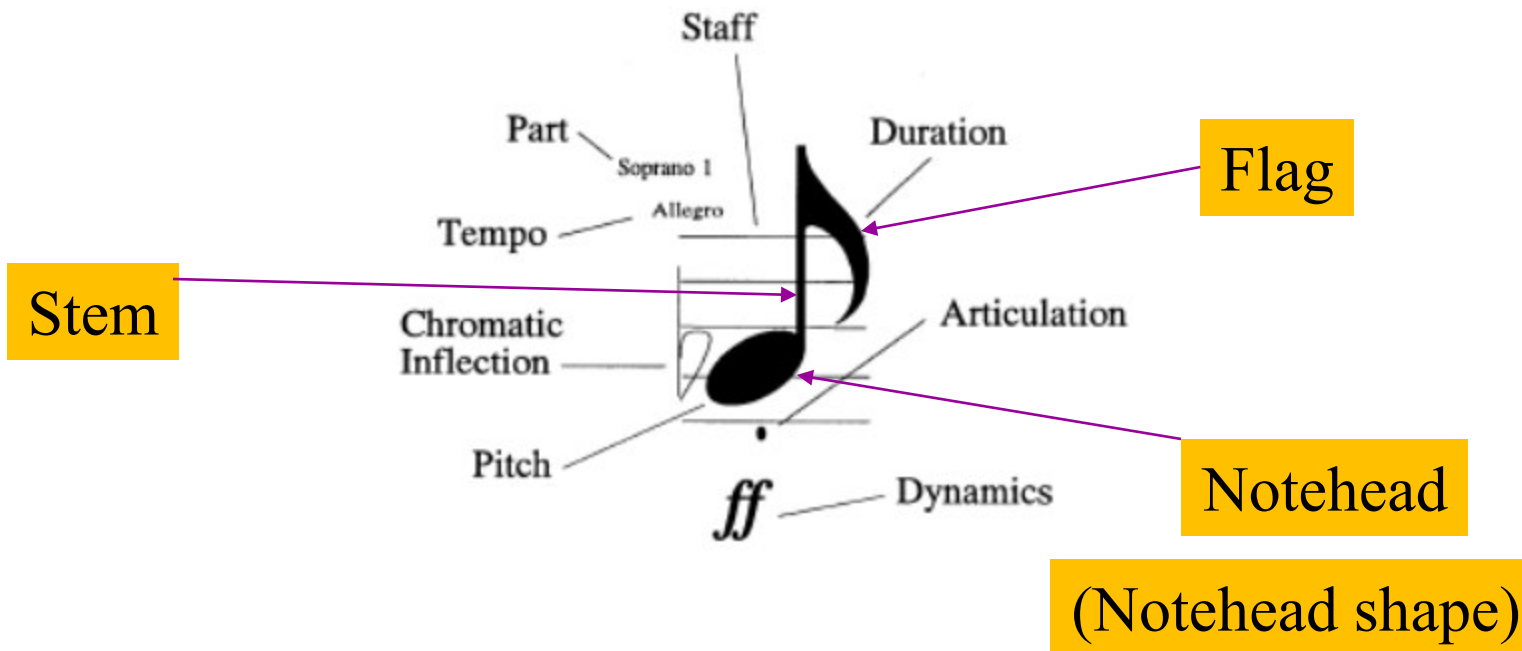
Duration

- **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

clarinet in A
violin I
violin II
viola

5
4
3
2
1

8
pt=
pi=
p=

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 from top to bottom: *clarinet in A*, *violino I*, *violino II*, and *viola*. The *clarinet in A* staff is the highest voice, and the *viola* staff is the lowest voice. The score shows several measures of music with various notes and rests.



A snippet of a musical score with five staves. The staves are labeled from top to bottom: *clarinet in A*, *violino I*, *violino II*, *viola*, and *violin*. The *clarinet in A* staff is the highest voice, and the *violin* staff is the lowest voice. The score shows several measures of music with various notes and rests. A large blue box is positioned above the *violin* staff, indicating that this part was encoded first.

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 is visible, showing musical parameters for a specific item. The table has columns for "Item #", "P1/11", "P2/12", "P3/13", "P4/14", "P5/15", "P6/16", "P7/17", "P8/18", "P9/19", and "P10/20". The first row of data shows "189/268" for Item #, "NOTE" for the description, and values "1", "5.0", "60.05", "13.00", "10.00", "0.000", "0.250", "3.500", "0.000", and "0.000" for the parameters. Below the table, a musical score is displayed, featuring a grand staff with treble and bass clefs. The score includes various musical notations such as notes, rests, and dynamic markings like *ff*, *mp*, and *f*. There are also time signature changes indicated by "5:4" and "5:3", and a measure rest of "9:8". A purple arrow points from the "Parametric editing" text in the list to the table in the software window.

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

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)

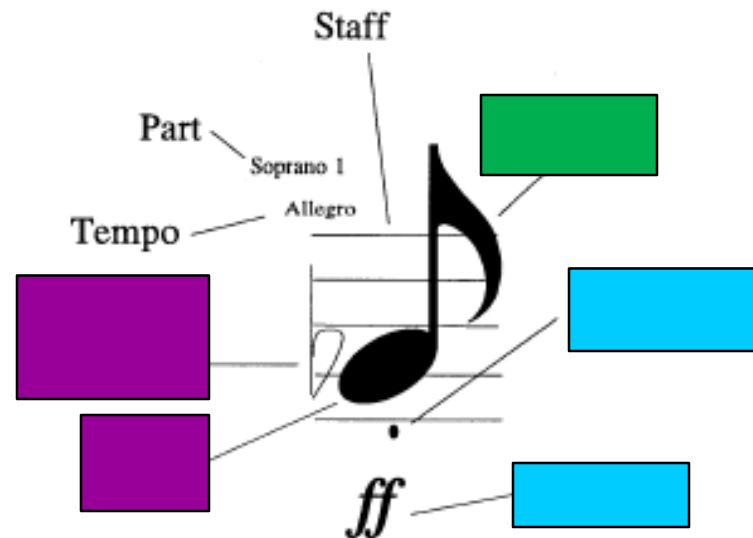
Marks

Beams (positions)

Slurs (positions)

Musical features of one note (SCORE)

A molecule of music



Pitch (names)

Rhythm (names)

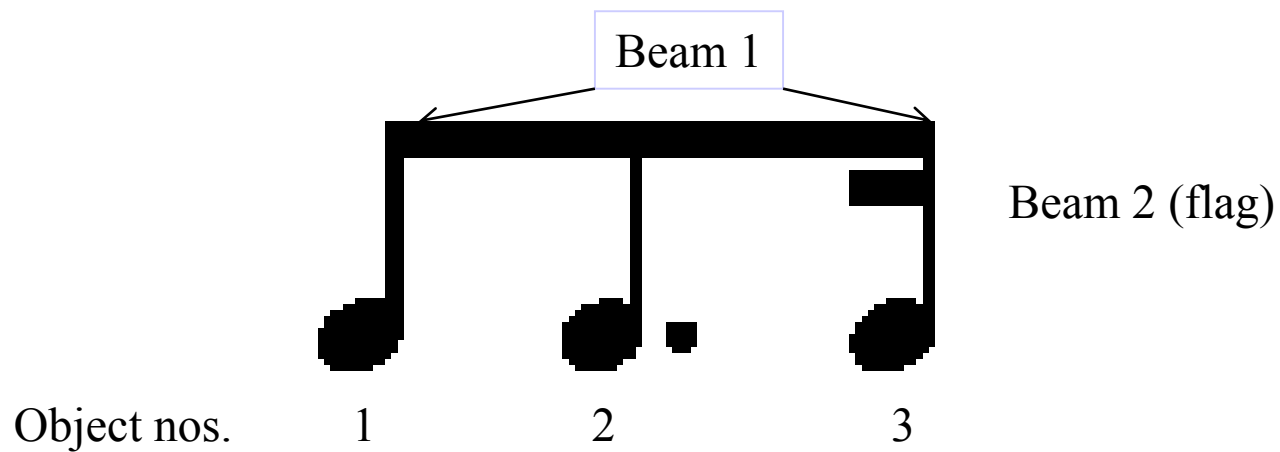
Marks

Beams (positions)

Slurs (positions)

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

Object groups: (#4) beams



Object groups: (#4) slurs

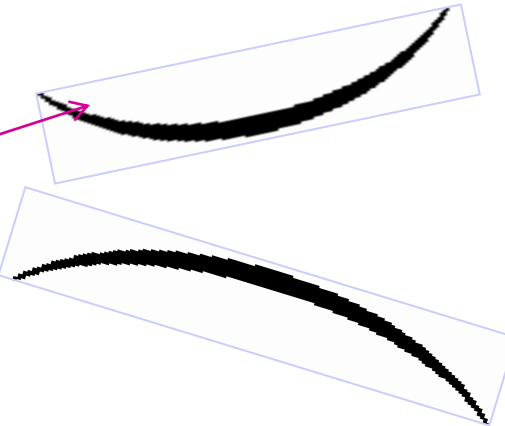
Beams vary by

- Length
- Inclination



Slurs vary by

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



Object groups: slurs

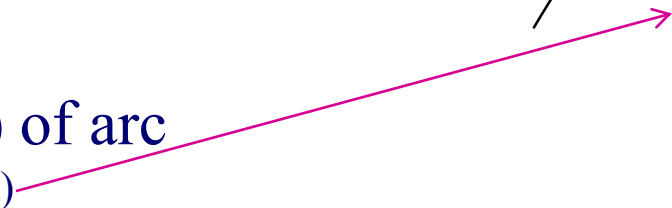
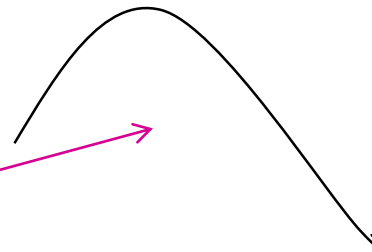
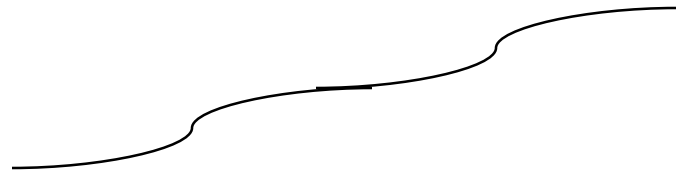
Beams vary by

- Length
- Inclination



Slurs vary by

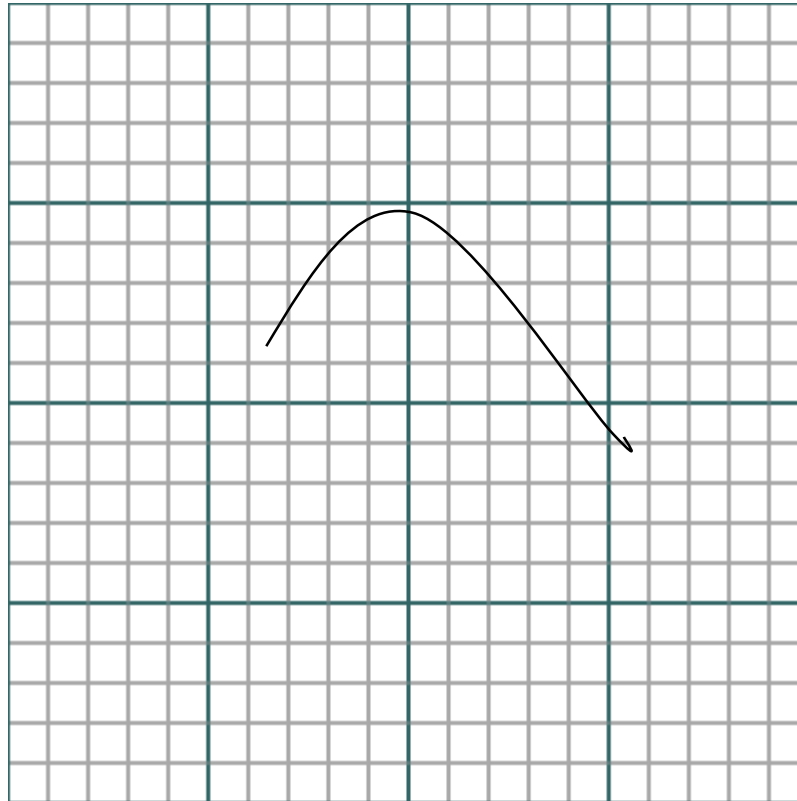
- Length
- Inclination
- Inversion
- Apex (nadir) of arc
(in relation to midpoint)



SCORE's imaginary grid

Slurs vary by

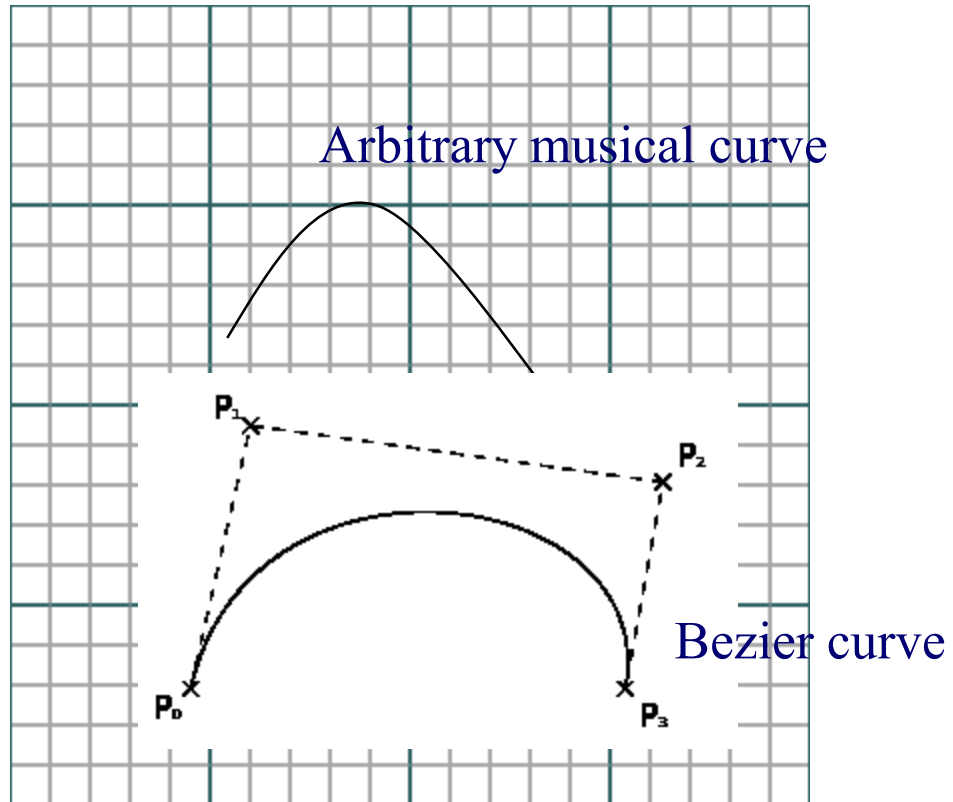
- Length
- Inclination
- Inversion
- **Apex (nadir) of arc**
(in relation to midpoint)



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