From Graphical Scores to Sound Input and Output

Music 253/CS 275A
Stanford University
Hardware properties of MIDI

- Eight-bit architecture
- Files are binary
- Highly standardized

Street-organ controller

Harmonipan
Guido: Pitch and duration components in input

Data representation stored

- Note duration
- Note prolongation
- Octave number
- Pitch inflection

Pitch (key no.)

48 60 72

"FrereJacques"
PITCH IN RELATION TO MIDI
The MIDI pitch interface

**Keys** (MIDI C'S)
- 36
- 48
- 60
- 72
- 84

**Octaves** (Human being)
- CC #
- C
- c (Middle C)
- c'
- c''

Number line rep.

Cyclical rep./Bb
“Pitch” = key number

- Absolute (MIDI C's)
  - 36 etc.
  - 48 C 8ve below Middle C
  - 60 Middle C
  - 72 C 8ve above Middle C
  - 84 etc.
Key-number pitch is *absolute*  
Tonal music notation is *relative*

- Absolute key number
  - 36 etc.
  - 48 C 8ve below Middle C
  - 60 Middle C
  - 72 C 8ve above Middle C
  - 84 etc.

- Absolute pitch = “70”

Pitch names are contextual

**Guido:** separation of *name* and *inflection*

- CC
- C
- c (Middle C)
- c'
- c"
Pitch in MIDI transcription

Track 1

Track 2

Track 3

Composer
DURATION IN RELATION TO MIDI
Sound-related features
The MIDI duration interface

**Clock time** (absolute)
- Clock ticks/measure (120, 192, 240)
- Ticks/quarter note (30, 48, 60)

Linear rep.

**Intuitive time** (relative)
- Four-stem note
- Three-stem note
- Two-stem note

Hierarchical rep.
MIDI data organization (sound)

**Event-based system**

Part- major systems
Sequencers

- Piano roll
- Event list
- Staff notation
- Virtual keyboard
Clock-time in MIDI Event List

Absolute (machine)
- Clock ticks/measure (120, 192, 240)
- Ticks/quarter note (30, 48, 60)

Midi time stamps
Practical consequences of time precision

“Lili Marleen” via MIDI

Internet Archive:
https://archive.org/details/LiliMarleen-01-40 (55 versions; Select No. 9)