

# Using Musical Information

---

MUSIC 253/CS 275A 1B

STANFORD UNIVERSITY



# 1. Classifying Data Domains

---

**Visual** domain

- scores, parts

**Aural** domain

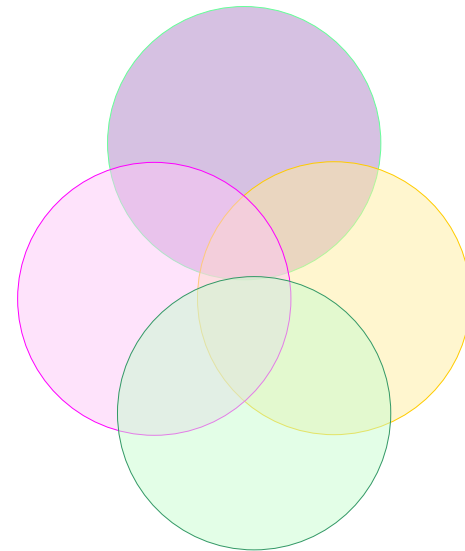
- performances, recordings

**Logical** domain

- analytical data sets

**Cognitive/perceptual** domain

- how we hear/understand music



## 2. Granularity of information

Data for **interchange**

Data for **classification**

A comparison of three view modes:



Satellite View



Blend View



DEM View

Data for **form** analysis

[Click image for a larger view](#)

Data for **feature** analysis

A comparison of different resolution:



20km resolution



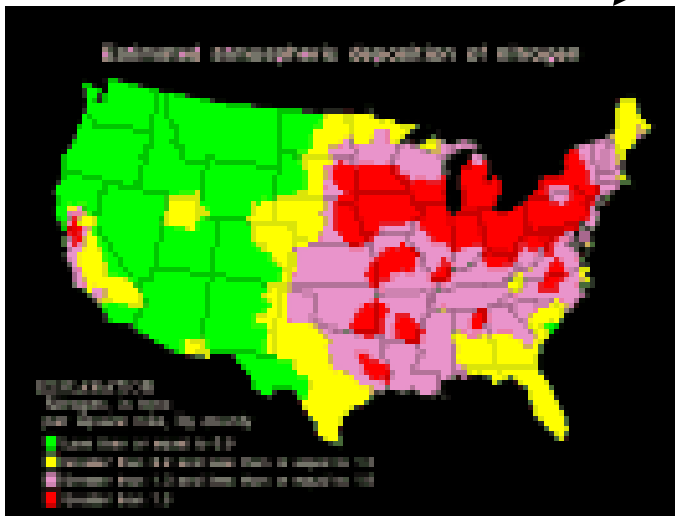
1km resolution



50m resolution

# 3. Information for comparison

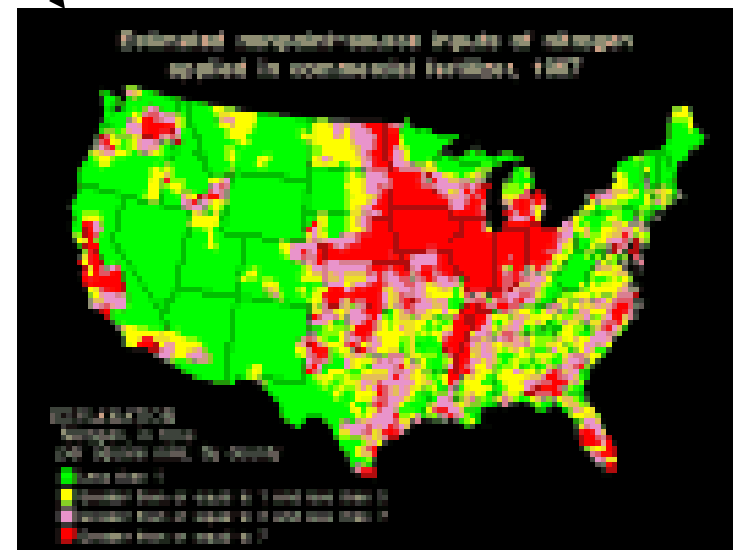
Entity: the US



Identity #1:

The **atmospheric** nitrogen map of the US

Background=US



Identity #2:

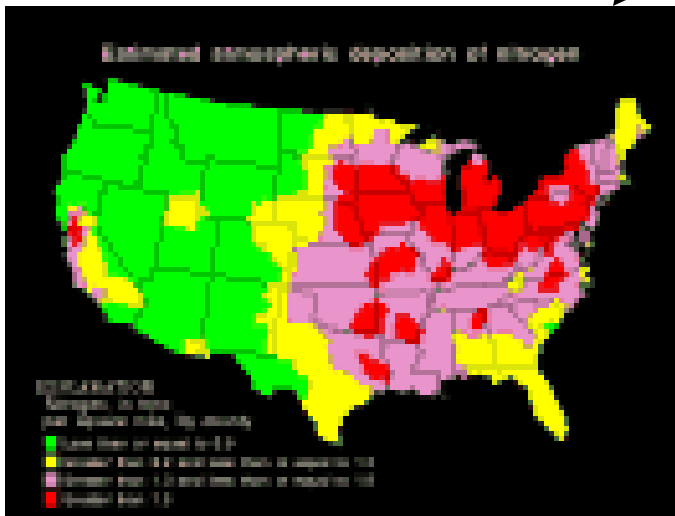
The **ground** nitrogen map of the US

Background=US

### 3. Information for comparison:

## What is in the foreground?

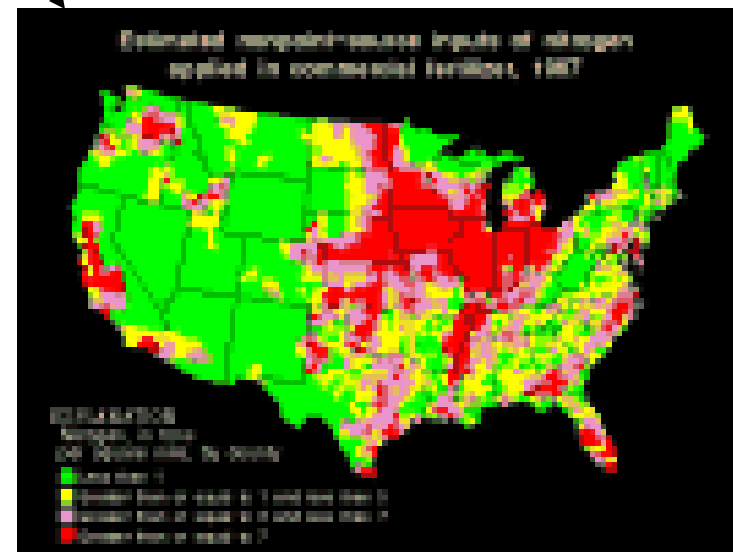
Entity: the US



Identity #1:

The **atmospheric** nitrogen map of the US

Background=US



Identity #2:

The **ground** nitrogen map of the US

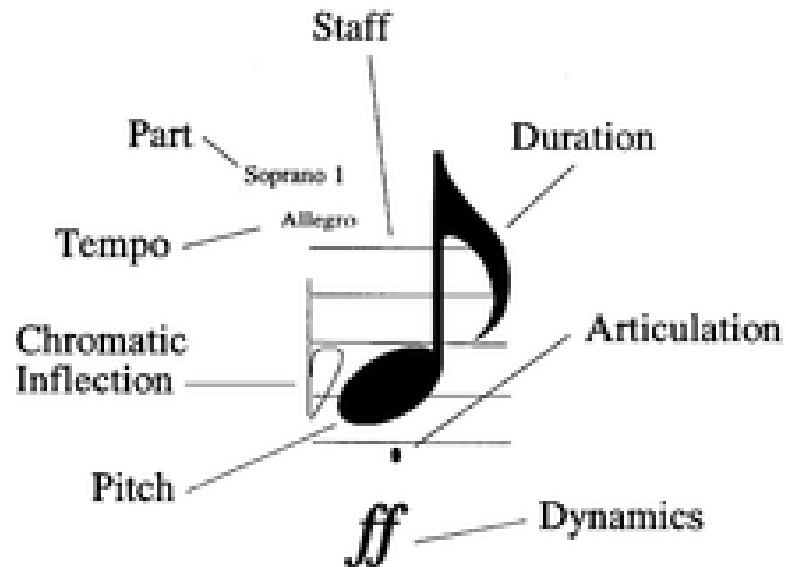
Background=US

# 4. Musical features of one note

---

**Many features used  
only selectively**

*Violin*



# 4. Musical features of one note

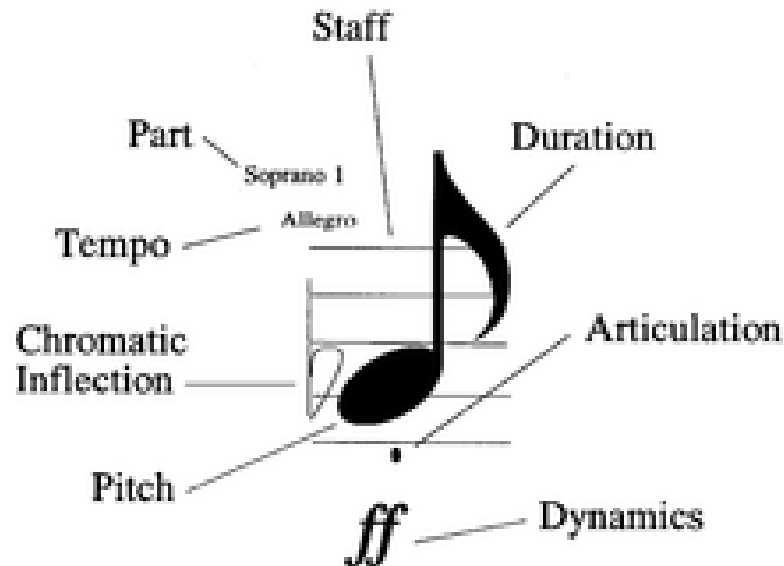
---

Many features used only selectively

Two features are **fundamental**:

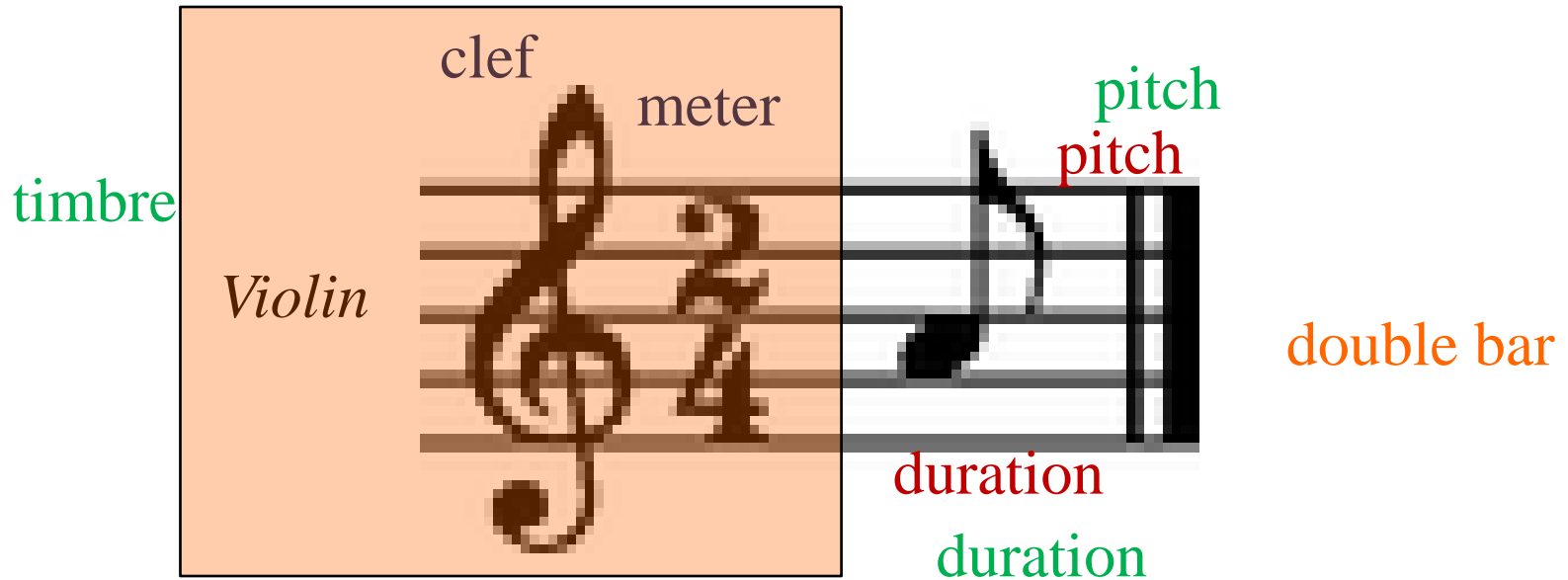
**Pitch**  
**Duration**

*Violin*



# 4. Musical features of one note

## Contextual information (**notation**)



## Contextual information (**metadata, aural ambience**)



# 5. Musical features by domain

---

## Articulation

Example 1

Sopran

The musical score is written on a single staff in 4/4 time. It begins with a treble clef and a key signature of one sharp (F#). The first measure contains a quarter rest. The second measure starts with a sforzando (sf) symbol, followed by a quarter note on G4 with an accent (>) and a crescendo (cresc.) marking below it. The third measure features a half note on G4 with a fermata above it and a fortissimo (fff) dynamic marking below it. The fourth measure contains a quarter note on A4 with a fermata above it. The fifth measure has a quarter note on B4 with a fermata above it. The sixth measure contains a quarter note on C5 with a fermata above it. The seventh measure has a quarter note on B4 with a fermata above it. The eighth measure contains a quarter note on A4 with a fermata above it. The score ends with a double bar line. There are some faint markings below the staff, including a 'p' and a star symbol.

## Dynamics, Gesture

# 5. Domain conflicts (symbols vs sound)

## Continuous vs static features

**Articulation:** many sound events prescribed in one symbolic figure

Example 1

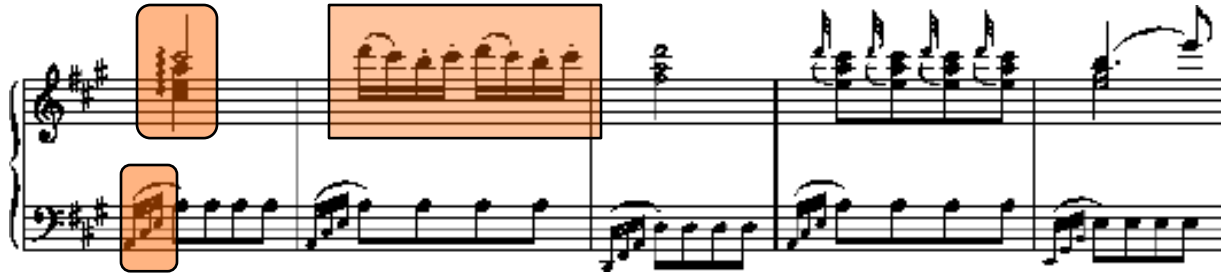
The image shows a musical staff for Soprano in 4/4 time. The notation includes a quarter note, a half note, a quarter note, a quarter note, a quarter note, a half note, and a quarter note. Above the staff, there are annotations: a symbol resembling a section sign (§) above the first note, an accent (>) above the first note, a fermata over the second note, a fermata over the third note, a fermata over the sixth note, and a fermata over the seventh note. Below the staff, there are dynamic markings: 'cresc.' under the first note, 'fff' under the second note, 'Ped.' under the sixth note, and a star symbol under the seventh note. The entire staff and annotations are enclosed in a light orange rectangular box.

**Dynamics, Gesture:** reduced to symbols in writing but may operate on continuum

# 6. Data beyond time (*Beyond MIDI #2*)

---

## Time-stealing “durations”



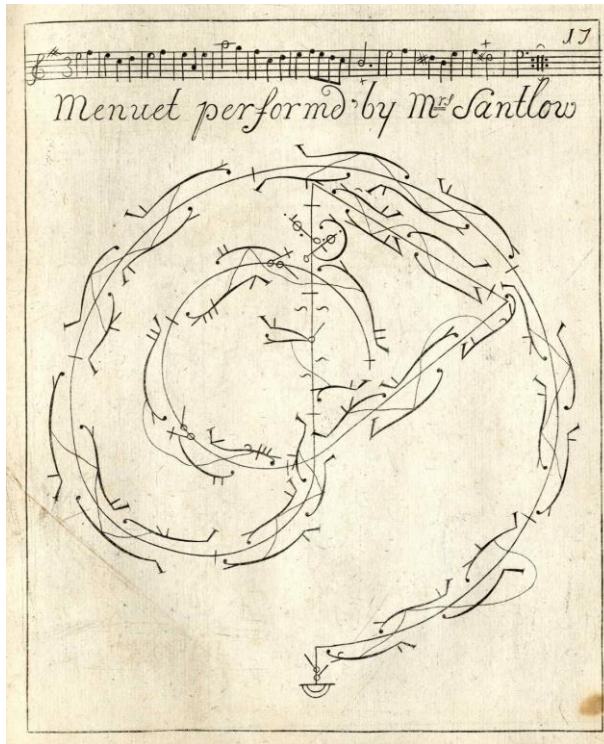
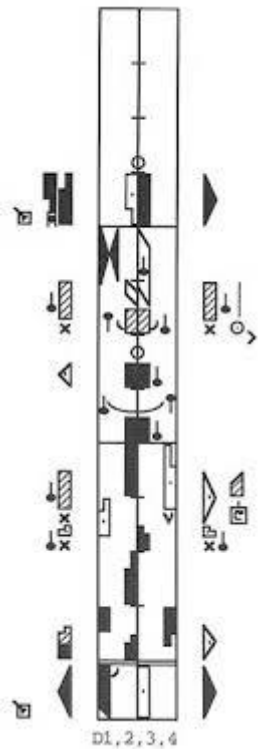
**Arpeggios**

**Grace notes (single, multiple)**

**Staccatos**

# 7. Gestural data (examples)

Choreography: (L) Labanotation, (M) French dance c1700, (R) Ballet



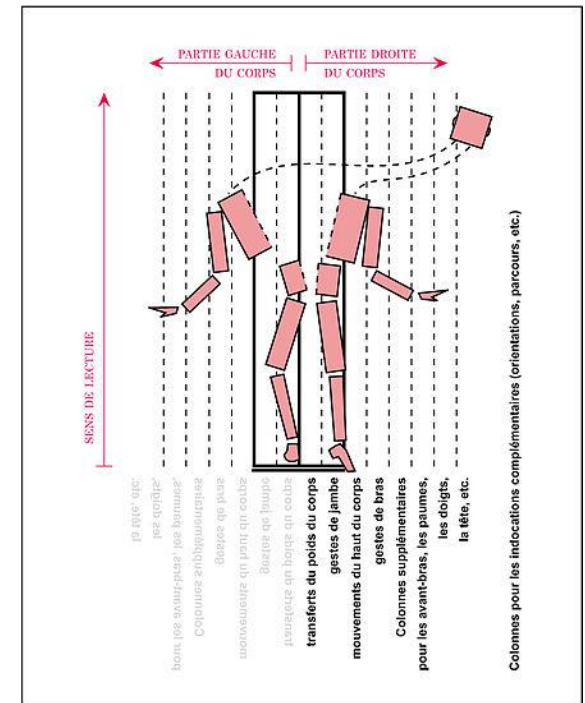
*Blue Bird, Male Solo*  
*"Sleeping Beauty," Act III*  
Choreography: after Petipa Music: Tchaikovsky  
Cut bars 47 to 54

Allegro (Tempo di valse)

A musical score for a male solo, featuring five staves of music. The score is written on a single staff in 3/4 time, with a key signature of one flat. The tempo is marked "Allegro (Tempo di valse)". The score includes various musical notations such as notes, rests, and dynamics. There are also choreographic markings, including arrows and symbols, indicating the movement directions for the dancer. The score is cut from bars 47 to 54.

# Labanotation

- Rudolf Laban (1879-1958), Hungarian
- Aimed to study dance in a “scientific” way through Laban movement analysis
  - Labeling parts of the body

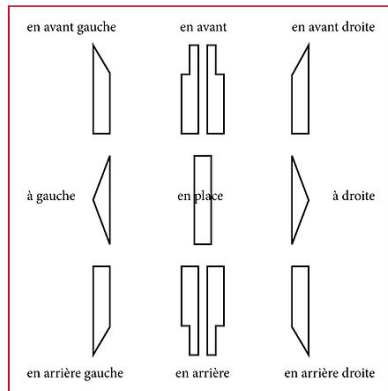
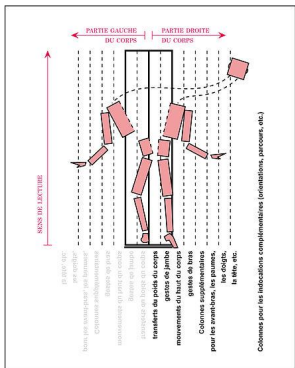


# Labanotation

- Rudolf Laban (1879-1958), Hungarian
- Aimed to study dance in a “scientific” way through

## Laban movement analysis

- Labeling parts of the body
- Basic directional signs
- 27 directional signs (3D)



**Direction Signs**  
**Die Richtungszeichen**  
**Les signes de directions**

Level Ebene Niveau	F = forward B = backward L = to the left H = right D = deep P = in place	V = vor Z = zurück R = rechts L = links H = hoch T = tief P = am Platz	Av = en avant Ar = en arrière Dl = à droite G = à gauche H = en haut B = en bas P = en place
high hoch haut	LH LH GH	LH LH GH	FH FH RH RH DH
medium level mittelhoch niveau moyen	LH LH GH	LH LH GH	FH FH RH RH DH
low tief bas	LH LH GH	LH LH GH	FH FH RH RH DH

# 8. Score organization

Types 1a, 1b (*Beyond MIDI* #1)

Score-major systems

Part-major systems

Page-traversal dilemmas

The image displays a musical score snippet illustrating score organization. The top system is a score-major system, where the staves are grouped by instrument: clarinet in A, violino I, violino II, viola, and violoncello. A vertical yellow bar highlights a specific measure across all staves, demonstrating how a single measure is spread across multiple systems. The bottom system is a part-major system, where the staves are grouped by part: strings (violin I, violin II, viola, cello) and piano. A vertical black bar highlights a specific measure across all parts, demonstrating how a single measure is spread across multiple systems. The page-traversal dilemma is highlighted by the fact that the highlighted measure in the part-major system spans across two systems, while the highlighted measure in the score-major system spans across five systems.

# 9. Score organization

Type 2 (*Beyond MIDI #2*)

---

## The “grand staff”



## The grand staff as a **single instrument**



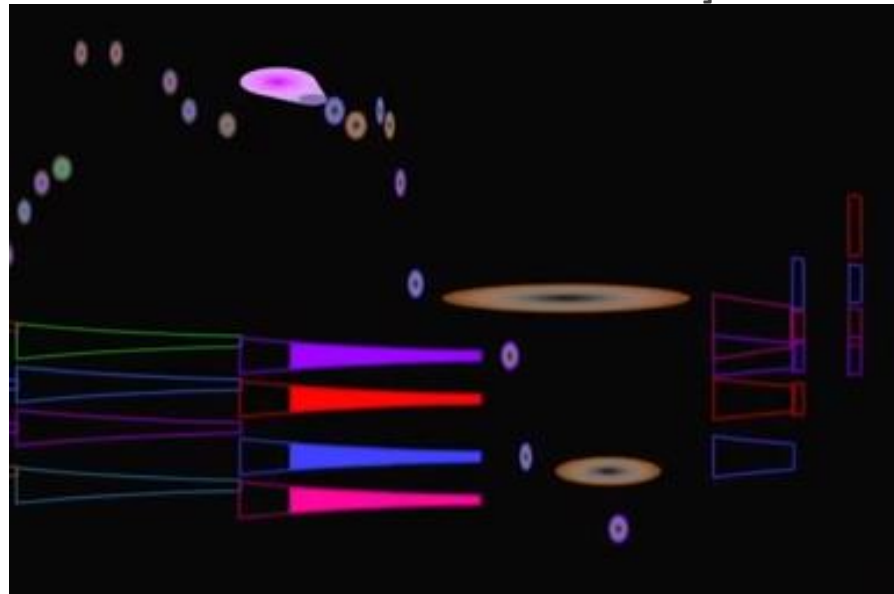
# 10. Sound features **not** in notation

---

## *Sound decay*

<http://www.youtube.com/watch?v=WdGQuITuwiQ>

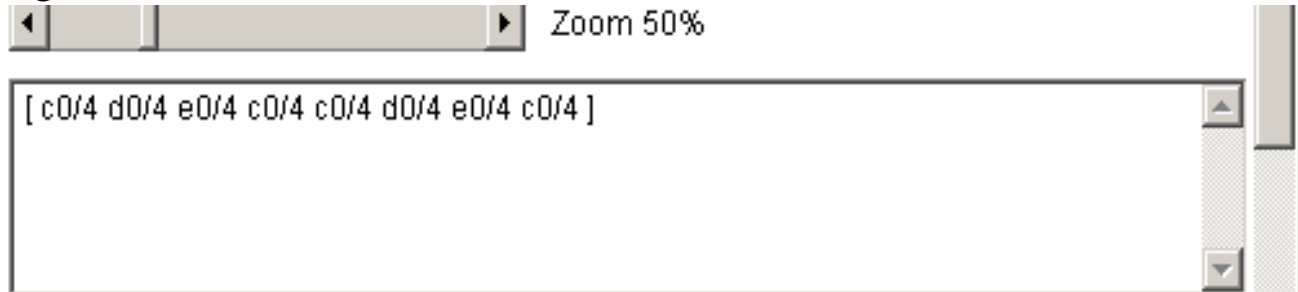
[from Stephen Malinowski's Music Animation Machine]



# 11. The GUIDO *NoteServer* (ASCII input)

Developed by Holger Hoos et al at the Fraunhofer Institut, Darmstadt, 2000-04]

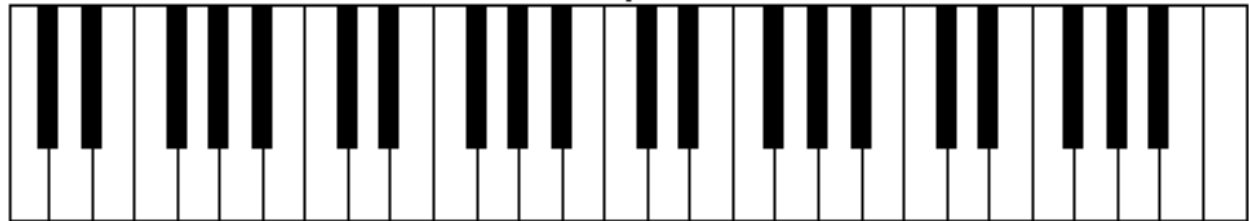
3. Stored data



2. Symbol



1. Sound



Find method for entering: pitch, inflection, octave

<http://www.noteserver.org/>

# Guido input: Pitch and Duration

## Feature definition and grouping

### Data

representation  
stored

### Note duration

Note prolongation

Octave number

Pitch inflection

### Pitch (key no.)

The screenshot shows a software interface for entering musical notation. At the top, a zoom level of 50% is indicated. Below that, a text input field contains the Guido notation: `[ c0/4 d0/4 e0/4 c0/4 c0/4 d0/4 e0/4 c0/4 ]`. The title "FrereJacques" is centered below the notation. The main area features a piano keyboard with a red box highlighting the first five notes (C, D, E, C, D) and a blue box highlighting the next two notes (E, C). A red box highlights the first note of the second measure (C). Below the keyboard, a control panel includes a "rest" button, a "send" button, a checked "auto load" checkbox, and a "page settings" button. The time signature 4/4 is indicated by a "4" above the first measure. The measure numbers 48, 60, and 72 are marked at the bottom.