Informatics for Musicology (IPM) 2024/25

Jupyter Notebooks

Teacher: JN Oliveira

Department of IT at U. Minho, in collaboration with ENSICO

Class of 29-Oct:

> 1st part - The measure as an infinite sequence and the flexibility of this approach. Introduction to musical sampling analysis. 'Sampling' and its role in 'computer-aided musicology'. The 'sample' operator from the Ipm.hs library. Illustration with several examples. Case study: analysis of the theme of the Abegg Variations (op. 1) by R. Schumann (1810-1856).
>
> 2nd part - **Presentation of the 1st practical work** : allocation of work in the collaborative edition on Wiki::score of the opera Demetrio a Rodi by Gaetano Pugnani (1731-1798).

⚠️ **Important** : run without moving the next cells.

In [ ]:
```
: opt  no - lint
: m  Data . Char
: m  Date . List
: m  Date . List . Split
: m  Data . Ratio
```

Modules developed for the discipline:

In [ ]:
```
: l  ../ src / Cp . hs
: l  ../ src / Reducer . hs
: l  ../ src / Ipm . hs
: l  ../ src / Abc . hs
```

Data ("case studies"):

In [ ]:
```
: l  ../ src / CS . hs
```

🔴Back to bars

Let's return to this topic, starting by doing the following exercise:

7.1 - Evaluate the following cells - what was the difference?

In [ ]:
```
abcPlayM  "C"  "4/4"  carnaval_serrano
```

In [ ]:
```
abcPlay  "C"  "4/4"  quatern  carnaval_serrano
```

7.2 - Anticipate the result of the next cell - what's the difference?

In [ ]:
```
abcPlay  "C"  "4/4"  ( 1 % 2 : quatern )  carnaval_serrano
```

👉About `abcplease`, `abcPlayM` and `abcPlay`:

Designation	Meaning	Detailed description
`abcplease`	show sheet music	`abcplease m` shows the score of `m` without key signature or time signature, nor barlines

Designation	Meaning	Detailed description
`abcPlayM`	show sheet music	`abcPlay K C m` - shows the score `m` with key signature `K`, `C` time signature and barlines (**regular**) deducted from `C`
`abcPlay`	show sheet music	`abcPlay K C c m` - shows the score `m` with key signature `K`, `C` time signature and barlines (**possibly irregular**) according to `c`

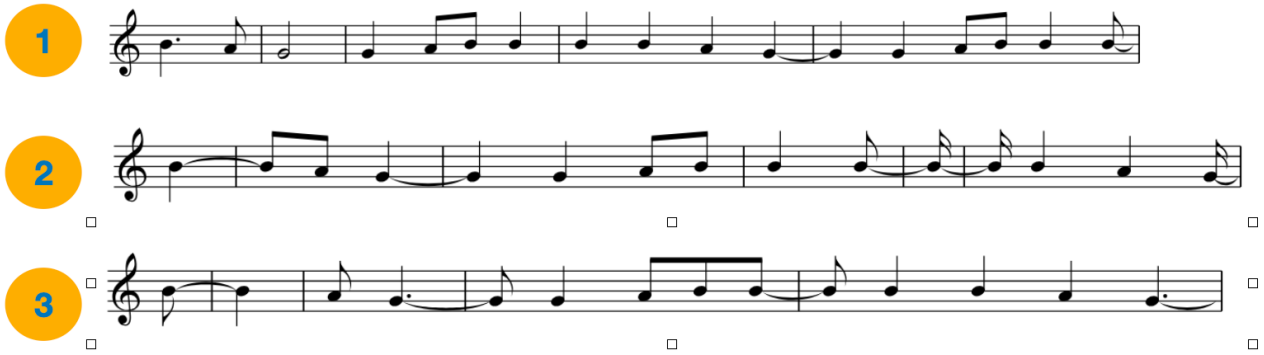
Measures - The following measures are predefined:

Designation	Meaning	Detailed description
`una`	unary	barlines every 1 quarter note ($\frac 1 4$) $\frac{1}{4}$)
`bin`	binary	barlines every 2 quarter notes ($\frac 2 4$) $\frac{2}{4}$)
`tern`	ternary	barlines every 3 quarter notes ($\frac 3 4$) $\frac{3}{4}$)
`quatern`	quaternary	barlines for each semibreve (1) 1)

7.3 - Indicate which expression of the following

> (the) `abcPlay "C" "none" [1%8,1%4,1%2,3%4,5%4] carnaval_serrano`
>
> (b) `abcPlay "C" "none" [1%4,2%4,3%4,3%8,1%16,5%8] carnaval_serrano`
>
> (w) `abcPlay "C" "none" [1%2,2%4,3%4,4%4,9%8] carnaval_serrano`

produces that pentagram of the figure:



Check your answers in the cells below.

In [ ]:

In [ ]:

In [ ]:

7.4 - The following cell records an occurrence of the recurring *Promenade theme in Pictures at an Exhibition* , by Modeste Mussorgsky (1839-1881):

In [ ]:
```
promenade  =  [( "F" , 1  %  4 ),( "E" , 1  %  4 ),( "A" , 1  %  4 ),( "B" , 1  %  8 ),( "e" , 1  %  8 ),( "
     ( "B" , 1  %  8 ),( "e" , 1  %  8 ) ,( "c" , 1  %  4 ),( "A" , 1  %  4 ),( "B" , 1  %  4 ),( "F" , 1  %
     ( "E" , 1  %  4 )]
```

Show it in sheet music knowing that the first measure is $\frac 5 4$ and the second is $\frac 6 4$:$\frac{5}{4}$and the second is$\frac{6}{4}$:

In [ ]:

7.5 - What are `bin` , , `tern` , after all `quatern` ? Evaluate the expressions in the following cells and draw conclusions:`

In [ ]:
```
get  10  bin
```

In [ ]:
```
take  10  tern
```

In [ ]:
```
get  1000  quatern
```

7.6 - Evaluate the expressions contained in the following cell:`

In [ ]:
```
tern  =  3 % 4  :  tern
---
take  20  tern
```

➡️ That is: `tern` it is the sequence that starts with `3%4` and then is equal to itself:

- `tern = 3%4 : tern`
- `tern = 3%4 : (3%4 : tern)`
- `tern = 3%4 : (3%4 : (3%4 : tern)`
- ...

It's an infinite sequence...

7.7 - Define `bin` and `quatern` in an identical way to `tern` :

In [ ]:
```
bin  =  undefined
quatern  =  undefined
---
take  20  bin
take  50  quatern
```

7.8 - What if we had mistaken ourselves and defined ourselves...

In [ ]:
```
bin  =  1 % 2  :  bin
take  20  bin
```

Interpret the result.

🔴Repetitive Patterns (Conclusion)

We already see that knowing how to generate (infinite) sequences that follow a given pattern is very useful. Let's practice a little more on how to define them.

7.9 - We want a repetitive sequence `s` that starts with `1`, then `3`, then `0` and so on. Complete your definition and observe its first 10 elements:

In [ ]:
```
s  =  undefined
take  1000  s
```

7.10 - Now more complicated: s must start with `1`, `3`, `0` and then continue as `r`; and `r` it should start with `10`, `24` and continue with `s`, etc, etc:

In [ ]:
```
s  =  undefined
r  =  undefined
--
take  1000  s
```

7.11 - Finally, anticipate the result of the next cell, before executing it: what sequence is it `s`?

In [ ]:
```
s  =  1 :  map  ( 2 + )  s
--
take  10  s
```
