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# GRACEFUL MUSIC DOCS (CHEAT SHEET)

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## Overview

Everything in Graceful Music happens in the context of a Performance. A Performance is an environment made up of two parts, an instrument that is for live playing and the sequencer which is like a backing band!

When you give a Performance a Synth as its instrument that Synth then shows up on your MIDI keyboard as shown below. If we don't want to set a chord for a Synth or a Sequencer for a performance, we can just put an empty string eg. ("" ) and they will be ignored.

## Performance with only a playable synthesiser

---

```
def s = Synth.name("Howard") wave("sine") chord("")
def p = Performance.instrument(s) sequencer("")
```

---

You can now play the Synth we have defined as 's' on your keyboard like a normal synthesiser. In order to get a backing band we need to create some Parts.

A Part is a combination of an instrument and a rhythm. We give parts to a Sequencer which takes care of playing the Parts for us, then we give the Sequencer to the Performance so our live instruments and our band are in the same place.

As shown below, we create two Synths, one we give a chord we want it to play. We give that Synth to a Part along with a rhythm, then that Part we give to the Sequencer. Most rhythms can be played by any instrument but there are a couple that are only for the DrumMachine, you can find those further on in these docs. All of that goes into the Performance and we're off!

## Performance with a playable synthesiser and sequencer

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```
def seqSynth = Synth.name("s") wave("triangle") chord("C-MAJ7")

def seqSynthPart = Part.instrument(seqSynth) rhythm("CR")
def seq = Sequencer.parts(list.with(seqSynthPart))

def p = Performance.instrument(seqSynth) sequencer(seq)
```

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Notice when we give Parts to the Sequencer we surround them with the *list.with(x, y, z)* syntax. This allows us to send as many Parts to the Sequencer as we want.

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## Modifying the Envelope

We can change the shape of the tone on a Synth

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```
def liveSynth = Synth.name("live") wave("square") chord("")
liveSynth.setEnvelopeAttack(1.5)

def p = Performance.instrument(liveSynth) sequencer("")
```

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## Adding effects

We can add effects to the signal chain of a Synth.

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```
def liveSynth = Synth.name("live") wave("square") chord("")
liveSynth.insert("reverb")

def p = Performance.instrument(liveSynth) sequencer("")
```

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## class Synth :: Instrument

Polyphonic Synthesiser, when passed as the instrument argument to a Performance object can be played via a MIDI interface. When passed a chord and passed to a sequencer it can be sequenced using a RhythmUtil constant.

### Constructor

---

```
def s = Synth.name("") wave(wave') chord(chord')
```

---

### Constructor Arguments

| Name  | Argument Type | Required | Options                     |
|-------|---------------|----------|-----------------------------|
| name  | string        | yes      |                             |
| wave  | string        | yes      | sine, square, triangle, saw |
| chord | string        | yes      | HarmonyUtil.CONSTANT        |

### Methods

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| Name                      | Argument Type | Required | Return | Constraints / Options    |
|---------------------------|---------------|----------|--------|--------------------------|
| <b>setEnvelopeAttack</b>  | float         | yes      | void   | +ve                      |
| <b>setEnvelopeSustain</b> | float         | yes      | void   | +ve                      |
| <b>setEnvelopeRelease</b> | float         | yes      | void   | +ve                      |
| <b>insert</b>             | string        | yes      | void   | "reverb"<br>"distortion" |
| <b>invertChord</b>        | none          | n/a      | void   | chord not null           |
| <b>pan</b>                | float         | yes      | void   | -1.0..1.0                |

## class DrumMachine :: Instrument

A three part Drum Machine, hihat, snare and kick are loaded on instantiation. Can currently only be passed with a Part to a Sequencer to be sequenced.

### Example: DrumMachine sequenced

---

```
def d = DrumMachine.name("rockbeat")
def dp = Part.instrument(d) rhythm("ROCK_BEAT_ONE")

def seq = Sequencer.parts(list.with(dp))
def p = Performance.instrument("") sequencer(seq)
```

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### Example: DrumMachine sequenced with playable Synth

---

```
def s = Synth.name("s") wave("triangle") chord("C-MAJ7")
s.setEnvelopeRelease(2.0)
s.insert("reverb")
s.insert("distortion")

def d = DrumMachine.name("rockbeat")
def dp = Part.instrument(d) rhythm("ROCK_BEAT_ONE")

def seq = Sequencer.parts(list.with(dp))
def p = Performance.instrument(s) sequencer(seq)
```

---

## class LoopPlayer :: Instrument

### Example: LoopPlayer with first sample

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```

def s = Synth.name("s") wave("triangle") chord("C-MAJ7")
def lp = LoopPlayer.name("lp" ) sample("sample_2")

def lpprt = Part.instrument(lp) rhythm("ONE_BAR_LOOP")

def seq = Sequencer.parts(list.with(lpprt))
def p = Performance.instrument(s) sequencer(seq)

```

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## Constructor Arguments

| Name            | Argument Type | Required | Options  |
|-----------------|---------------|----------|--|
| <b>name</b>     | string        | yes      |  |
| <b>filename</b> | string        | yes      | sample_1<br>sample_2<br>sample_3<br>sample_4<br>sample_5<br>sample_6<br>sample_7<br>sample_8<br>kick<br>snare<br>hihat |

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## class Part

Wraps any subclass of Instrument and any RhythmUtil constant referenced as a string.

### constructor

---

```
def lp = Part.instrument(instrument) rhythm("rhythm")
```

---

### Constructor Arguments

| Name       | Argument Type | Required | Options             |
|------------|---------------|----------|---------------------|
| instrument | Instrument    | yes      |                     |
| rhythm     | string        | yes      | RhythmUtil.CONSTANT |

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## class RhythmUtil

Exposes simple rhythmic patterns that may be paired with Instruments to be sequenced.

### Class Constants

| Name                 | Desc.  |                  |
|----------------------|--|------------------|
| <b>CR</b>            | One note per beat for one bar. (crotchet)              |                  |
| <b>CR_OFF</b>        | One note per off beat for one bar. (crotchet)          |                  |
| <b>QU</b>            | Two notes per beat for one bar. (quaver)               |                  |
| <b>SQ</b>            | Four notes per beat for one bar. (semiquaver)          |                  |
| <b>ONE_THREE</b>     | Notes on the first and third beats for one bar.        |                  |
| <b>TWO_FOUR</b>      | Notes on the second and fourth beats for one bar.      |                  |
| <b>FOUR_FOUR</b>     | Notes on every beat for one bar.                       |                  |
| <b>CLAVE</b>         | 2/3 Clave Rhythm                                       |                  |
| <b>ONE_BAR_LOOP</b>  | Note on beat one for one bar                           |                  |
| <b>TWO_BAR_LOOP</b>  | Note on beat one for two bars                          |                  |
| <b>FOUR_BAR_LOOP</b> | Note on beat one for four bars                         |                  |
| <b>ROCK_BEAT_ONE</b> | Hihat > QU<br>Snare > TWO_FOUR<br>KICK > ONE_THREE     | DrumMachine only |
| <b>HOUSE_BEAT</b>    | Hihat > CR_OFF<br>Snare > TWO_FOUR<br>Kick > FOUR_FOUR | DrumMachine only |

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## class HarmonyUtil

Exposes simple harmonies for use with a sequenced Synth object, passed as a string to the Synth constructor. Must be prefixed with a note name from A-G.

### Example:

---

```
def s = Synth.name("Harold") wave("sine") chord("C-MAJ7")
```

---

### Class Constants

| Name   | Desc.  |
|--------|--|
| -MAJ   | Major triad<br>1 - 3 - 5                       |
| -MAJ7  | Major seven<br>1 - 3 - 5 - 7                   |
| -MAJ9  | Major ninth<br>1 - 3 - 5 - 7 - 9               |
| -DOM   | Dominant seventh<br>1 - 3 - 5 - b7             |
| -MIN   | Minor<br>1 - b3 - 5                            |
| -MIN7  | Minor seventh<br>1 - b3 - 5 - b7               |
| -MIN9  | Minor ninth<br>1 - b3 - 5 - b7 - 9             |
| -MIN11 | Minor eleventh<br>1 - b3 - 5 - b7 - 9 - 13 (4) |
| -DIM   | Diminished<br>1 - b3 - b5                      |
| -AUG   | Augmented<br>1 - 3 - #5                        |

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## class Sequencer

Sequences multiple instruments according to the RhythmUtil constant passed in the Part object.

### Example with multiple sequenced parts and a playable Synth

---

```
def s = Synth.name("s") wave("triangle") chord("")

def lp = LoopPlayer.name("lp" ) sample("sample_1")
def lpprt = Part.instrument(lp) rhythm("ONE_BAR_LOOP")

def d = DrumMachine.name("rockbeat")
def dp = Part.instrument(d) rhythm("ROCK_BEAT_ONE")

def seq = Sequencer.parts( list.with(lpprt, dp) )
def p = Performance.instrument(s) sequencer(seq)
```

---

### constructor

---

```
def seq = Sequencer.parts( list.with(parts))
```

---

### Constructor Arguments

| Name                               | Argument Type | Required | Options |
|------------------------------------|---------------|----------|---------|
| <b>list.with(partOne, partTwo)</b> | List -> Part  | yes      |         |



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## class Performance

A live performance environment that supports live MIDI playback of a single Synth and sequencing of arbitrarily many Parts.

### constructor

---

```
def perf = Performance.instrument(instrument') sequencer(sequencer↔')
```

---

### Constructor Arguments

| Name              | Argument Type | Required |
|-------------------|---------------|----------|
| <b>instrument</b> | Instrument    | no       |
| <b>sequencer</b>  | Sequencer     | no       |