

# HarmLang Grammar

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October 29 2014

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## 1 Introduction

### 1.1 A Note on Syntax

In our grammar, we attempted to conform to the ISO 14977 standard for the Extended Backus-Naur Form syntactic metalanguage. Salient differences from the PADS grammar documentation include:

- = is used in place of ::=.
- Syntactic elements are explicitly terminated with a semicolon ;
- Rather than terminal ? and \* for option and repeat, items are enclosed in [square brackets] and {flower brackets}, respectively.
- Literal strings are "quoted".

## 2 Grammar

### 2.1 Text Primitives

$\langle whitespacechar \rangle = " " | "\texttt{t}" ;$

$\langle whitespace \rangle = \langle whitespacechar \rangle, \{ \langle whitespacechar \rangle \} ;$

$\langle digit \rangle = "0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9" ;$

### 2.2 Types

The following are types that have special syntax for literal values in HarmLang, and are thus in some sense primitives. Of the following, perhaps the most important syntactic element is the `⌈chordprogression⌋`. Most of the others build up to this element.

$\langle int \rangle = (" -"), \langle digit \rangle, \{ \langle digit \rangle \} ;$

$\langle uint \rangle = \langle digit \rangle, \{ \langle digit \rangle \} ;$

## 2.3 Musical Primitives

$\langle \text{noteletter} \rangle = \text{"A" | "B" | "C" | "D" | "E" | "F" | "G"} ;$   
 $\langle \text{modulator} \rangle = \text{"\#" | "b"} ;$   
 $\langle \text{pitchclass} \rangle = \langle \text{noteletter} \rangle, \{ \langle \text{modulator} \rangle \} ;$   
 $\langle \text{pitch} \rangle = \langle \text{pitchclass} \rangle, \langle \text{int} \rangle ;$   
 $\langle \text{timeunit} \rangle = \langle \text{int} \rangle, \text{" / "}, \langle \text{uint} \rangle | \langle \text{uint} \rangle ;$   
 $\langle \text{note} \rangle = \langle \text{pitch} \rangle \langle \text{timeunit} \rangle ;$   
 $\langle \text{numinterval} \rangle = \langle \text{int} \rangle ;$   
 $\langle \text{namedinterval} \rangle = \text{"0th" | "U" | "unison" | "m2nd" | "-2nd" | "minorsecond" | "2nd" | "second" | "m3rd" | "-3rd" | "minorthird" | "3rd" | "third" | "4th" | "fourth" | "+4th" | "\#4th" | "augmentedfourth" | "-5th" | "d5th" | "o5th" | "b5th" | "diminishedfifth" | "tritone" | "5th" | "fifth" | "+5th" | "augmentedfifth" | "m6th" | "-6th" | "minorsixth" | "6th" | "sixth" | "7th0" | "d7th" | "dom7th" | "b7th" | "seventh" | "minorseventh" | "dominantseventh" | "ma7th" | "majorseventh" | "octave"} ;$   
 $\langle \text{interval} \rangle = \langle \text{numinterval} \rangle | \langle \text{namedinterval} \rangle ;$   
 $\langle \text{rest} \rangle = \text{"_" | "REST" | "SILENCE"} ;$   
 $\langle \text{begin} \rangle = \text{"BEGIN" | "START"} ;$   
 $\langle \text{end} \rangle = \text{"END"} ;$   
 $\langle \text{specialharmony} \rangle = \langle \text{rest} \rangle | \langle \text{begin} \rangle | \langle \text{end} \rangle ;$   
 $\langle \text{namedchord} \rangle = \text{"5" | "M" | "m" | "b5" | "dim" | "o" | "7" | "Ma7" | "m7" | "mMa7" | "m7b5" | "dim7" | "o7" | "9" | "b9" | "Ma9" | "m11" | "7b6" | "13" | "Ma13"} ;$   
 $\langle \text{chord} \rangle = \langle \text{pitchclass} \rangle, \text{" : i "}, \{ \langle \text{interval} \rangle \}$   
 $\quad | \langle \text{pitchclass} \rangle, \text{" : n "}, \{ \langle \text{pitchclass} \rangle \}$   
 $\quad | \langle \text{pitchclass} \rangle, \langle \text{namedchord} \rangle$   
 $\quad | \langle \text{specialharmony} \rangle ;$   
 $\langle \text{timedchord} \rangle = \langle \text{chord} \rangle, \text{" : "}, \langle \text{timeunit} \rangle ;$   
 $\langle \text{chordprogression} \rangle = \{ \langle \text{chord} \rangle, \langle \text{whitespace} \rangle \} ;$

## 3 Notes

1. To express a pitch class, one would write something of the form “A”, “C#”, “Bbb”. Perverse forms, such as “C#####” or “Gb#” are also allowed.
2. One could write a C major chord in the following ways.
  - (a) “C:i 4,7”
  - (b) “C:i 3rd,5th”
  - (c) “C:n E,G”
  - (d) “CM”
3. One may think of pitch classes as elements of  $\mathbb{Z}_{12}$ , in which “#” and “b” act as the successor and predecessor functions, respectively. The letters “A” through “G” can be thought of literal values in the space. Not all values in  $\mathbb{Z}_{12}$  can be directly expressed as literals without the use of the successor or predecessor functions. However, any element of the set can be described by appending a successor or predecessor to a single letter.