Extended Project

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1 Introduction

The purpose of this project was to put in practice de concepts seen in class, by creating a fully fledged chord calculator based on the subject of parsing primarily and the concepts of programming as a whole.

1.1 Grammar Rules

```
input:= song EOF
      song:= bar {bar} "|"
       bar:= [meter] chords "|"
     meter:= numerator "/" denominator
 numerator:= "1" | "2" | "3" | ... | "15"
denominator:= "1" | "2" | "4" | "8" | "16"
    chords:= "NC" | "%" | chord {chord}
     chord:= root [description] [bass]
      root:= note
      note:= letter [acc]
    letter:= "A" | "B" | "C" | ... | "G" |
       acc:= "#" | "b"
description:= [qual] [qnum] [add] [sus] [omit]
/* at least one, but not both qual & sus; see quiz 8 */
      qual:= "-" | "+" | "o" | "5" | "1"
             "6" | ["^"] "7" | ["^"] ext
      gnum:=
       ext:=
              "9" | "11" | "13"
       add:= alt | "(" alt ")"
       alt:= [acc] "5" | [acc] ext
       sus:= "sus2" | "sus4" | "sus24"
      omit:= "no3" | "no5" | "no35"
      bass:= "/" note
```

Figure 1: Chords grammar. The input consists of the chords in a song separated by bar lines "|" plus optional meter information for the bars. Figure 2 shows an example. (This grammar is a subset of the grammar used by Polynizer: https://www.polynizer.com.)

1.2 First And Follow Sets

Nonterminal	First set
input	$\{1, 2, 3, \dots, 15, A, B, C, D, E, F, G, NC, \%\}$
song	$\{1, 2, 3, \dots, 15, A, B, C, D, E, F, G, NC, \%\}$
bar	$\{1, 2, 3, \dots, 15, A, B, C, D, E, F, G, NC, \%\}$
meter	$\{1, 2, 3, \dots, 15\}$
numerator	$\{1, 2, 3, \dots, 15\}$
denominator	{1, 2, 4, 8, 16}
chords	$\{A, B, C, D, E, F, G, NC, \%\}$
chord	$\{A, B, C, D, E, F, G\}$
root	$\{A, B, C, D, E, F, G\}$
note	$\{A, B, C, D, E, F, G\}$
letter	$\{A, B, C, D, E, F, G\}$
acc	{#, b}
description	
qual	{-, +, o, 5, 1}
qnum	{6, 7, 9, 11, 13, ^}
ext	{9, 11, 13}
add	
alt	
sus	{sus2, sus4, sus24}
omit	{no2, no5, no35}
bass	{/}