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"
       qnum:=  "6" | ["^"] "7" | ["^"] ext
        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, . . . , 15, A, B, C, D, E, F, G, NC, %}
song	{1, 2, 3, . . . , 15, A, B, C, D, E, F, G, NC, %}
bar	{1, 2, 3, . . . , 15, A, B, C, D, E, F, G, NC, %}
meter	{1, 2, 3, . . . , 15}
numerator	{1, 2, 3, . . . , 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	{/}