1 Introduction

This language is used to write sheet music for guitar tabs. Maybe in the future it'll be able to write normal sheet music as well!
I've always found GUI music writing software to be annoying to use, and it's always difficult to find all the buttons and features you need. I've felt like it would be easier and faster to simply type out music, since typing something like 'e4' is faster than looking for the right buttons and finding the right placement. This language would also be very customizable, and the user could adjust widths, spacing, etc.

2 Design Principles

I want the language to be as simple and intuitive as possible. The syntax is very simple, and a lot of the formatting is taken care of by the evaluator, which means that there are default values for a lot of parameters, making life easier for the user. Aesthetically, I'm working to make sure the output sheet music follows music engraving standards to look professional.

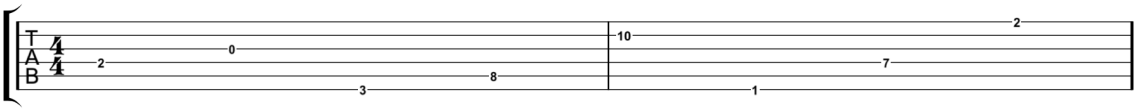
3 Example Programs

Example 1:

```
-type tab
-time 4-4
-key c

1:
   3e4
   4g
   1g
   2f
2:
   5a
   1f
   3a
   6f#
```

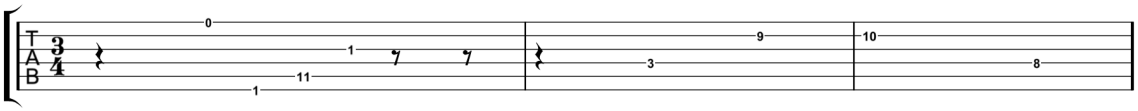
Output:



Example 2:

```
-type tab
-time 3-4
-key c

1:
   r
   6e16
   1f
   2g#
   4ab
   r8
   r
2:
   r4
   3fn
   5g#
3:
   5a2
   3bb4
```

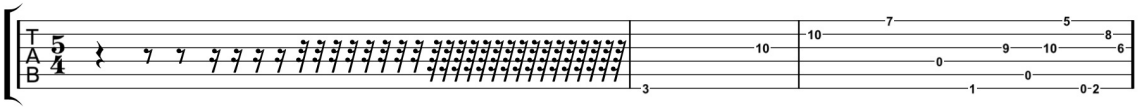


Example 3:

```
-type tab
-time 5-4
-key c

1:
   r
   r8
   r8
   r16
   r
   r
   r
   r32
   r
   r
   r
   r
   r
   r
   r
   r64
   r
   r
   r
   r
   r
   r
   r
   r
   r
   r
   r
   r
   r
   r
```

```
   r
   r
2:
   1g1
   4f4
3:
   5a2
   6b4
   3d8
   1f
   4e16
   2a
   4f32
   6a
   1e64
   1f#
   5gn
   4db
```



4 Language Concepts

Data types:
There are several data types useful to the user:

Notes - consist of a string, pitch, rhythm, and possible properties
Measure numbers
Specifiers, such as key and time signature

Grammar:

```
<expr>              ::= <option>
                      | <measure>
<option>            ::= <type>
```

```
                    | <time>
                    | <key>
<key>             ::= c | cm | c# | c#m| cb | d | dm | db | d#m | e | em | eb | ebm | f |
<time>            ::= <num>-<num>
<num>             ::= x
<type>            ::= tab
<measure>         ::= <note>+
<note>            ::= <simple>
                    | <complex>
                    | <group>
                    | <tuplet>
<simple>          ::= <singlesimple>
                    | <restsimple>
<complex>         ::= <singlecomplex>
                    | <restcomplex>
<singlesimple>    ::= <string><pitch><property>*
<restsimple>      ::= r
<singlecomplex>   ::= <string><pitch><rhythm><property>*
<restcomplex>     ::= r<rhythm>
<group>           ::= (<singlesimple>+)
                    | (<singlesimple>+)<rhythm>
<tuplet>          ::= t<num>o<num> {<simple>+}
<string>          ::= 1 | 2 | 3 | 4 | 5 | 6
<pitch>           ::= | A | ASharp | AFlat | ANat | B | BSharp | BFlat | BNat | C | CSharp
<rhythm>          ::= <rhythmnumber><dot>*
<rhythmnumber     ::= 1 | 2 | 4 | 8 | 16 | 32 | 64
<dot>             ::= .
<property>        ::= /sls | /sle | /stu | /std | /p | /plu | /pld | /gr | /har | /sl | /s
```

5 Syntax

A program begins with optional specifiers as to the type of music being written (only tab supported as of now), time signature, and key. They being with a dash, followed by the specifier, and then the actual string
e.g.
-type tab
-key f#
-time 12-8

Measures always being with an int, which is the measure number, followed by a colon
e.g.
4:

Notes start with a string number (1-6), and then a pitch
e.g. 5gb
Pitches can be: a, a#, ab, an, b, b#, bb, bn etc.

A rhythm can be specified as: 1 2 4 8 16 32 64
It can be followed by dots as well
e.g.
32..
If no rhythm is given, it defaults to 4

Properties can be specified to change or add qualities. They begin with a / and then the abbreviation
e.g.
/gr means grace note

Notes can also be rests, which are an r followed by an optional rhythm

Examples of valid notes:
5f
4g64../gr/sl
r
r4.

This language doesn't really have associativity issues

6 Semantics

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Table 1: Data and Operations

Syntax	**Abstract Syntax**	**Type**	**Meaning**
-type tab	ScoreOption of string * string	string * string	This is an option type, where it begins with a dash, followed by the specifier and the data
1:	measure number	string	A number followed by a colon is the measure number which must precede each measure
r	RestSimple	Note	An r alone is a simple rest, which uses the default rhythm
5g#	SingleSimple of int * Pitch * Property List	Note	This is a simple note, with no rhythm specified, so it uses the default rhythm, which begins as a quarter note and afterwards is whatever the last rhythm specified was.
4e32/gr	SingleComplex of int * Pitch * Rhythm * PropertyList	Note	This is a complex note, comprised of all the parts that could make up a note
r32	RestComplex of Rhythm	Note	This represents a rest, which is complex since it has a rhythm specified

7 Remaining Work

Features that I hope to implement:
Dotted rhythms
Multiple notes at once
Beaming to make rhythms easier to read
Decorations, such as slurs, staccatos, slides etc
Ability to add title, author name, other text