Project 1 Design Decisions

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Abc-tune ::= Abc-header Abc-music

Header

Abc-header ::= Field-index-number Comment* Field-title Other-fields* Field-key
Field-index-number := "X:" " "* [0-9]+ End-of-line
Field-title ::= "T:" " "* [a-zA-Z]+ End-of-line
Other-fields ::= Field-composer | Field-default-length | Field-meter | Field-tempo |
Field-voice | Comment
Field-composer ::= "C:" " "* [a-zA-Z]+ End-of-line
Field-default-length ::= "L:" " "* Note-length-strict End-of-line
Field-meter ::= "M:" " "* Meter End-of-line
Field-tempo ::= "Q:" " "* [1-9] [0-9]* End-of-line
Field-voice ::= "V:" " "* [a-zA-Z]+ End-of-line
Field-key ::= "K:" " "* Key End-of-line

Key ::= Basenote ("#" | "b")? "m"?
Meter ::= "C" | "C|" | ([1-9] [0-9]* "/" [1-9] [0-9]*)
Note-length-strict ::= [1-9] [0-9]* "/" [1-9] [0-9]*

End-of-line = Comment | linefeed
Comment ::= "%" text linefeed

Music
Abc-music ::= Abc-line+

Abc-line ::= Voice-line+ | Comment
Voice-line ::= (Change-of-voice) | (Repeat+ end-of-section linefeed)
Repeat ::= ((Measure barline)* Measure) |
(Measure barline)* Measure end-repeat linefeed*) |
(Begin-repeat (Measure barline)* Measure end-repeat linefeed*) |
(Measure* first-repeat (Measure barline)* Measure end-repeat second-repeat
(Measure barline)* Measure linefeed*) |
(Begin-repeat (Measure barline)* first-repeat (Measure barline)* Measure End-repeat
second-repeat (Measure barline)* Measure)

Measure ::= (Note | Chord | Tuplet)+
Chord ::= Begin-chord Note+ End-Chord
Begin-chord ::= "["
End-chord ::= "]"
Tuplet ::= Begin-tuplet Tuplet-set

Begin-tuplet ::= "("
Tuplet-set ::= ("2" Note Note) | ("3" Note Note Note) | ("4" Note Note Note Note)
Note ::= Rest | Played-note
Rest ::= "z" length?
Played-note ::= accidental? basenote octave? length?
accidental ::= "^" | "^^" | "_" | "__" | "="
basenote ::= "C" | "D" | "E" | "F" | "G" | "A" | "B" | "c" | "d" | "e" | "f" | "g" | "a" | "b"
octave ::= ("'"+) | (","+)
length ::= ([1-9] [0-9]*)? ("/" (([1-9] [0-9]*)?)?)?

barline ::= "|"
end-of-section ::= "||" | "|]" | "[|"
begin-repeat ::= "|:"
end-repeat ::= ":|"
first-repeat ::= "[1"
second-repeat ::= "[2"
Change-of-voice ::= Field-voice   -> (there must me no music on the same line as a Change-of-voice)
Comment ::= "% text linefeed"
linefeed ::= "\n"
space ::= "\s"

Types of Token, created by lexer (these include terminals and non-terminals from the grammar)

Token class tokens:
RestToken
PlayedNoteToken
ChangeOfVoiceToken
TupletToken
FieldToken
End

FieldToken (have .stringValue):
FieldIndexNumber
FieldTitle
FieldComposer
FieldDefaultLength
FieldMeter
FieldTempo
FieldVoice
FieldKey

StructuralToken (only have type):
EndOfSection
BeginRepeat

EndRepeat
FirstRepeat
SecondRepeat
Barline
Space
BeginChord
EndChord

Comments:
  Have now made some syntax allowed by the original EBNF grammar illegal:
1) A begin-repeat now must have an end repeat
2) Tuplets are now explicitly specified as being either 2,3,4 notes long
3) 0-length meters, note lengths and tempos are now illegal

Interfaces, Classes, and attributes of AST:
Played Interface
  PlayedNote Class

- o String Basenote
- o Integer Numerator
- o Integer Denominator
- o Integer Accidental
- o Integer Octave

  Rest Class

- o Integer Numerator
- o Integer Denominator

  Chord Class

- • ArrayList<PlayedNote>

  Tuplet Class

- • Integer TupletSize
- • ArrayList<Played>
- •

PlayedGroup Abstract Class (interface)
  MeasureElement Class

- • ArrayList<Played>

Repeat Class

- ArrayList<PlayedGroup>

Voice Class

- ArrayList<PlayedGroup>

ABCMusic Class

- HashMap<String, Voice> voiceHash

Assumptions:
1) Input measures are of the correct length, i.e. each measure has the requisite number of beats
2) Tuplets are notes of the same length
3) Chords cannot be nested
4) Tuplets cannot be nested
5) Chords do not contain rests.

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                        ┌─────────────┐
                        │   Played    │
                        └──────┬──────┘
       ┌─────────────┬─────────┼─────────┬─────────────┐
┌──────┴──────┐┌─────┴─────┐┌──┴──────────┐┌──────┴──────┐
│   Tuplet    ││   Chord   ││  PlayedNote ││    Rest     │
└──────┬──────┘└─────┬─────┘└─────────────┘└─────────────┘
       │             │
┌──────┴──────┐┌─────┴─────┐
│ Played (no  ││ Played (no│
│   nested)   ││  nested)  │
└─────────────┘└───────────┘
```