



Some Lessons Learned

or Taking Karaoke Too Far?

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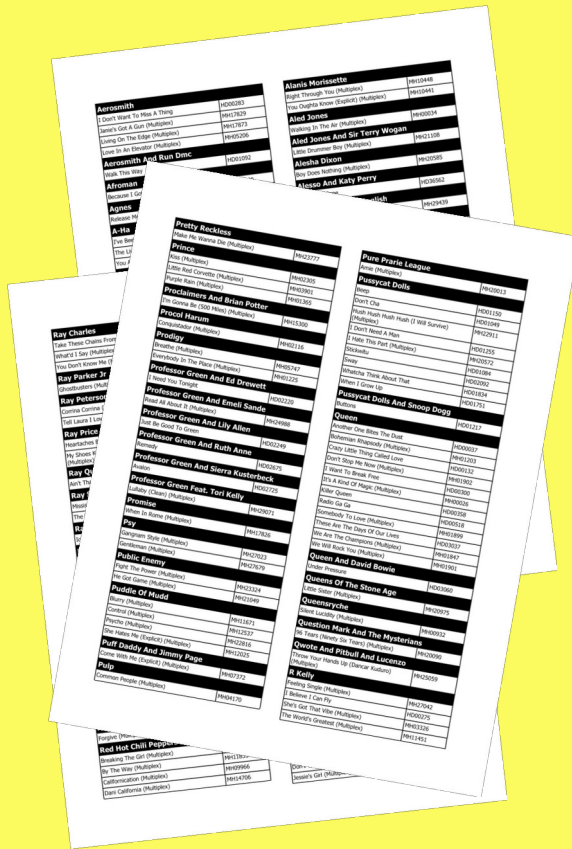


How it started...





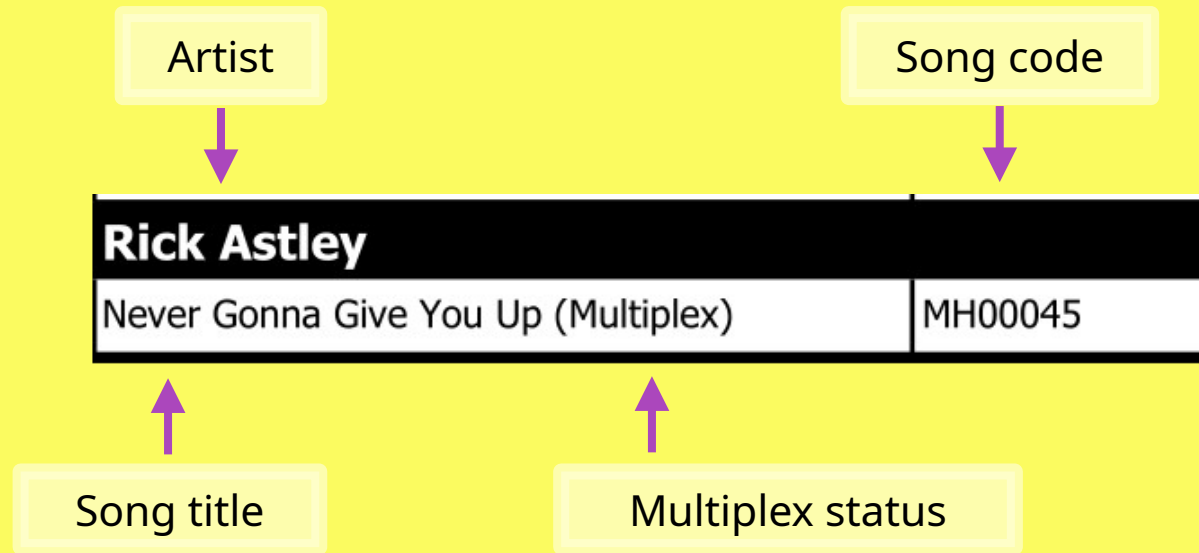
PDF to Text Conversion



10,000 Maniacs
Because The Night (Multiplex) MH02639
2 Unlimited
Tribal Dance (Multiplex) MH02516
20 Fingers
Short Dick Man (Multiplex) MH03327
21 Savage, Travis Scott, Metro Boomin
Née-Nah HD37981
24Kgoldn Feat. Iann Dior
Mood (Duet Version) (Clean) ME06600
3 Doors Down
Kryptonite (Multiplex) MH10072
30 Seconds To Mars
Closer To The Edge (Multiplex) MH23643
The Kill (Multiplex) MH20257
4 Non Blondes
What's Up (Multiplex) MH02550
5 Seconds Of Summer
Amnesia (Multiplex) MH28942
Easier ME05765
Good Girls (Multiplex) MH28834
She Looks So Perfect HD03240
Want You Back (Clean) ME05088
Youngblood ME05243
50 Cent
In Da Club (Multiplex) MH12588
6ix9ine
Gooba (Clean) ME06415
6ix9ine Feat. Nicki Minaj
Trollz (Duet Version) (Clean) ME06455
99 Souls Feat. Destiny's Child And Brandy
The Girl Is Mine HD03613
A R Rahman And Pussycat Dolls
Jai Ho (You Are My Destiny) (Multiplex) MH22134
A Taste Of Honey
Boogie Oogie Oogie (Multiplex) MH09119
Aaliyah
More Than A Woman (Multiplex) MH11128
Rock The Boat (Multiplex) MH12016
Try Again (Multiplex) MH09709
Abba
Dancing Queen (Multiplex) MH01030
Don't Shut Me Down HD36391



Anatomy of a karaoke song list



Anatomy of a karaoke song list



`-word: [L]+ .`
`-single-space: #20 .`

`artist: word**single-space .`

Artist



`@code: -" ", [Lu], [Lu], [Nd], [Nd], [Nd], [Nd], [Nd] .`

Song code



Rick Astley

Never Gonna Give You Up (Multiplex)

MH00045



Song title



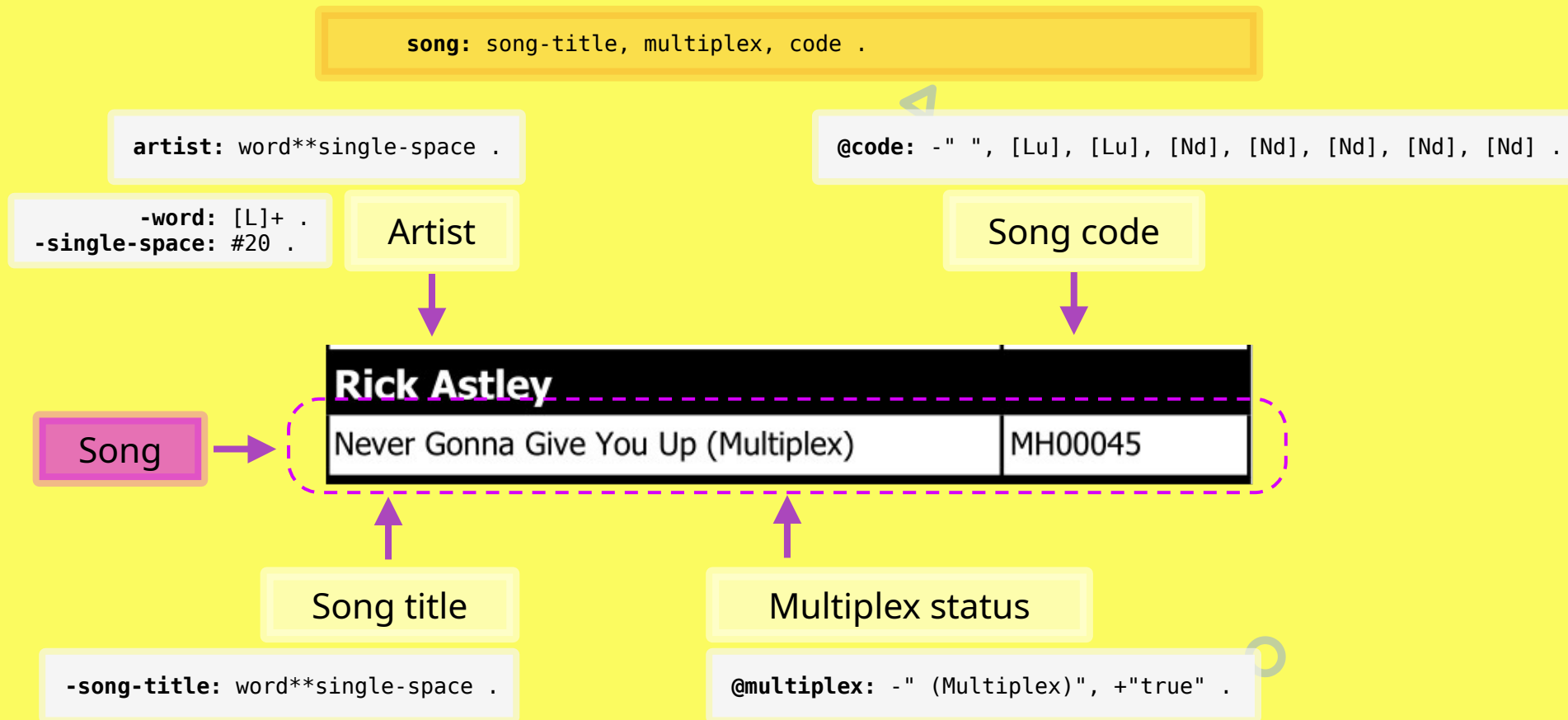
Multiplex status

`-song-title: word**single-space .`

`@multiplex: -" (Multiplex)", +"true" .`



Anatomy of a karaoke song list



Anatomy of a karaoke song list



```
song-list: artist, line-ending, song .  
          song: song-title, multiplex, code .
```

```
artist: word**single-space .
```

```
@code: -" ", [Lu], [Lu], [Nd], [Nd], [Nd], [Nd], [Nd] .
```

```
-word: [L]+ .  
-single-space: #20 .
```

Artist

Song code

Song list

Rick Astley

Never Gonna Give You Up (Multiplex)

MH00045

Song title

Multiplex status

```
-song-title: word**single-space .
```

```
@multiplex: -" (Multiplex)", +"true" .
```



The results so far

```
1 Rick Astley
2 Never Gonna Give You Up (Multiplex) MH00045
```

```
1 ▾ song-list: artist, line-ending, song .
2   artist: word**single-space .
3   song: song-title, multiplex, code .
4 ▾ -song-title: word**single-space .
5 ▾ @multiplex: -" (Multiplex)", +"true" .
6   @code: -" ", [Lu], [Lu], [Nd], [Nd], [Nd], [Nd], [Nd] .
7   -word: [L]+ .
8 -single-space: #20 .
9 -line-ending: cr?, lf .
10   -cr: -#d.
11   -lf: -#a.
```

```
1 ▾ <song-list>
2   <artist>Rick Astley</artist>
3   <song multiplex="true" code="MH00045">Never Gonna Give You Up</song>
4 </song-list>
```



A multi-song list

```
song-list: artist, song+ .  
  artist: word**single-space, line-ending .  
  song: song-title, multiplex, code, line-ending .
```

Song list

Rick Astley	
It Would Take A Strong Man (Multiplex)	MH21934
Never Gonna Give You Up (Multiplex)	MH00045
She Wants To Dance With Me (Multiplex)	MH16904
Together Forever (Multiplex)	MH01342
When I Fall In Love (Multiplex)	MH00018



Updated results

```
1 Rick Astley
2 It Would Take A Strong Man (Multiplex) MH21934
3 Never Gonna Give You Up (Multiplex) MH00045
4 She Wants To Dance With Me (Multiplex) MH16904
5 Together Forever (Multiplex) MH01342
6 When I Fall In Love (Multiplex) MH00018
7
```

```
1 song-list: artist, song+ .
2   artist: word**single-space, line-ending .
3   song: song-title, multiplex, code, line-ending .
4 -song-title: word**single-space .
5 @multiplex: -" (Multiplex)",+"true" .
6   @code: -" ",[Lu],[Lu],[Nd],[Nd],[Nd],[Nd],[Nd] .
7   -word: [L]+ .
8 -single-space: #20 .
9 -line-ending: cr?,lf .
10   -cr: -#d .
11   -lf: -#a .
```

```
1 <song-list>
2   <artist>Rick Astley</artist>
3   <song multiplex="true" code="MH21934">It Would Take A Strong Man</song>
4   <song multiplex="true" code="MH00045">Never Gonna Give You Up</song>
5   <song multiplex="true" code="MH16904">She Wants To Dance With Me</song>
6   <song multiplex="true" code="MH01342">Together Forever</song>
7   <song multiplex="true" code="MH00018">When I Fall In Love</song>
8 </song-list>
```



A multi-artist list



```
song-list: artist-song-list+ .
artist-song-list: artist, song+ .
    artist: word**single-space,
           line-ending .
    song: song-title, multiplex,
          code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd],
        [Nd], [Nd], [Nd], [Nd] .
-word: [L]+ .
-single-space: #20 .
```

Artist song list



Rick Astley

It Would Take A Strong Man (Multiplex)	MH21934
Never Gonna Give You Up (Multiplex)	MH00045
She Wants To Dance With Me (Multiplex)	MH16904
Together Forever (Multiplex)	MH01342
When I Fall In Love (Multiplex)	MH00018

Ricky Martin

(Un Dos Tres) Maria (Multiplex)	MH06739
Living La Vida Loca (Multiplex)	MH08217
She Bangs (Multiplex)	MH10154

Right Said Fred

I'm Too Sexy	HD00320
--------------	---------



Character sets



```
song-list: artist-song-list+ .
artist-song-list: artist, song+ .
    artist: word**single-space,
           line-ending .
    song: song-title, multiplex,
          code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd],
        [Nd], [Nd], [Nd], [Nd] .
-word: [L]+ .
-single-space: #20 .
```

Not letters!

Rick Astley

It Would Take A Strong Man (Multiplex)	MH21934
Never Gonna Give You Up (Multiplex)	MH00045
She Wants To Dance With Me (Multiplex)	MH16904
Together Forever (Multiplex)	MH01342
When I Fall In Love (Multiplex)	MH00018

Ricky Martin

(Un Dos Tres) Maria (Multiplex)	MH06739
Living La Vida Loca (Multiplex)	MH08217
She Bangs (Multiplex)	MH10154

Right Said Fred

I'm Too Sexy	HD00320
--------------	---------



Character sets

```
song-list: artist-song-list+ .
artist-song-list: artist, song+ .
    artist: word**single-space,
           line-ending .
    song: song-title, multiplex,
          code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd],
        [Nd], [Nd], [Nd], [Nd] .
-word: [L]+ .
-single-space: #20 .
```

Mr. Perfectly Fine (Taylor's Version) (From The Vault)	HD36151
22 (Twenty Two) (Multiplex)	MH27386
10 35	HD37440
867 - 5309 Jenny (Multiplex)	MH19299
Ur So F--King Cool (Clean)	ME06444
Bo\$\$ (Multiplex)	MH28954
Need U (100%) (Multiplex)	MH27371



Character sets



```
song-list: artist-song-list+ .
artist-song-list: artist, song+ .
    artist: word**single-space,
           line-ending .
    song: song-title, multiplex,
          code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd],
        [Nd], [Nd], [Nd], [Nd] .
-word: [L]+ .
-single-space: #20 .
```

Ke\$Ha

10,000 Maniacs

Will.I.Am

Magic!

Mr. Perfectly Fine (Taylor's Version) (From The Vault)	HD36151
22 (Twenty Two) (Multiplex)	MH27386
10 35	HD37440
867 - 5309 Jenny (Multiplex)	MH19299
Ur So F--King Cool (Clean)	ME06444
Bo\$\$ (Multiplex)	MH28954
Need U (100%) (Multiplex)	MH27371



Character sets



```
song-list: artist-song-list+ .
artist-song-list: artist, song+ .
    artist: word**single-space,
           line-ending .
    song: song-title, multiplex,
          code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd],
        [Nd], [Nd], [Nd], [Nd] .
-word: ([L]; [N]; [P]; [S])+ .
-single-space: #20 .
```

Ke\$ha

10,000 Maniacs

Will.I.Am

Magic!

Mr. Perfectly Fine (Taylor's Version) (From The Vault)	HD36151
22 (Twenty Two) (Multiplex)	MH27386
10 35	HD37440
867 - 5309 Jenny (Multiplex)	MH19299
Ur So F--King Cool (Clean)	ME06444
Bo\$\$ (Multiplex)	MH28954
Need U (100%) (Multiplex)	MH27371



Multiplex = false



```
song-list: artist-song-list+ .
artist-song-list: artist, song+ .
    artist: word**single-space,
            line-ending .
    song: song-title, multiplex,
          code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd],
        [Nd], [Nd], [Nd], [Nd] .
-word: ([L]; [N]; [P]; [S])+ .
-single-space: #20 .
```

Not multiplex

Mr. Perfectly Fine (Taylor's Version) (From The Vault)	HD36151
22 (Twenty Two) (Multiplex)	MH27386
10 35	HD37440
867 - 5309 Jenny (Multiplex)	MH19299
Ur So F--King Cool (Clean)	ME06444
Bo\$\$ (Multiplex)	MH28954
Need U (100%) (Multiplex)	MH27371



Multiplex = false

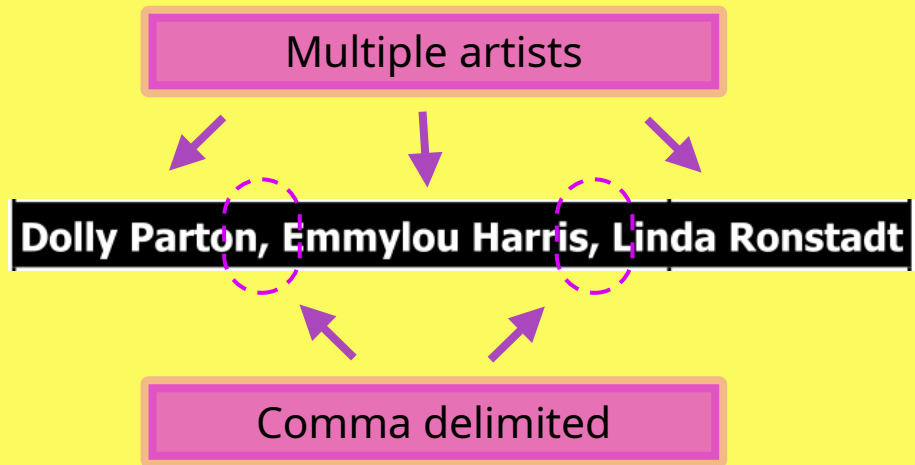


```
song-list: artist-song-list+ .
artist-song-list: artist, song+ .
    artist: word**single-space,
            line-ending .
    song: song-title, multiplex?,
          code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd],
        [Nd], [Nd], [Nd], [Nd] .
-word: ([L]; [N]; [P]; [S])+ .
-single-space: #20 .
```

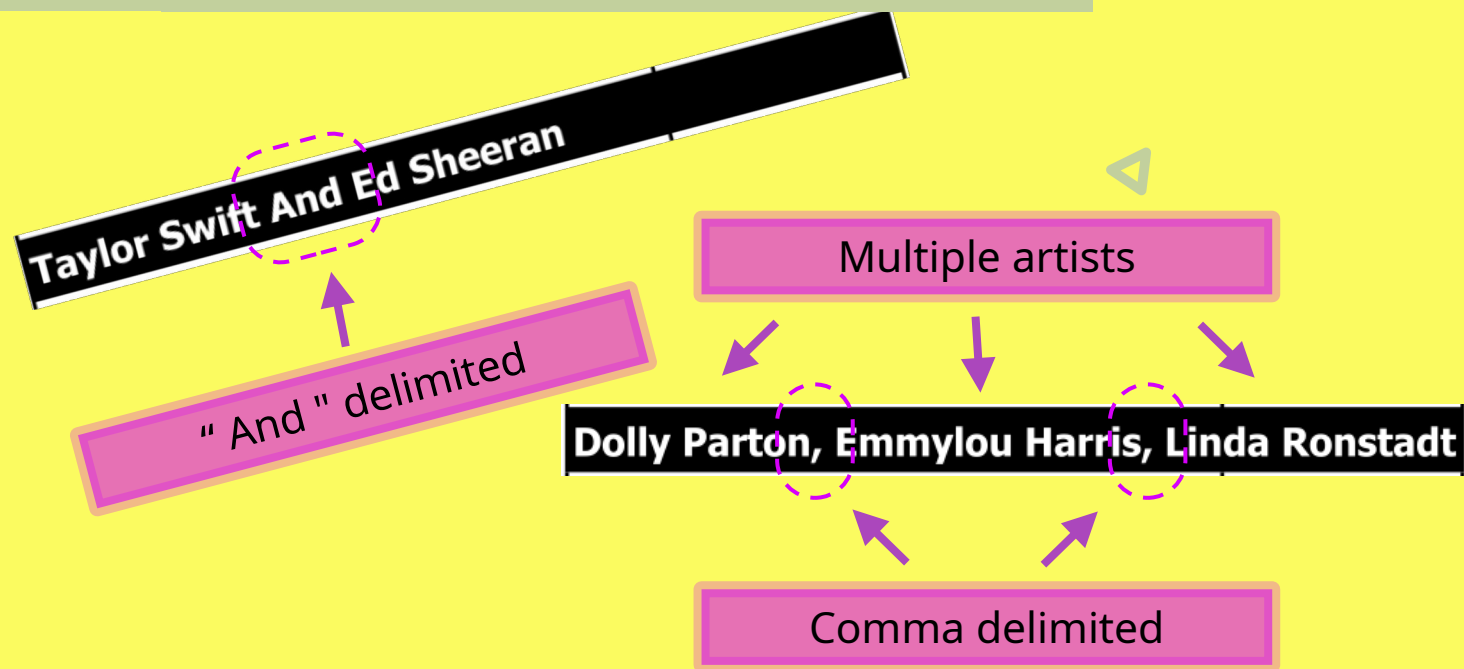
Not multiplex

Mr. Perfectly Fine (Taylor's Version) (From The Vault)	HD36151
22 (Twenty Two) (Multiplex)	MH27386
10 35	HD37440
867 - 5309 Jenny (Multiplex)	MH19299
Ur So F--King Cool (Clean)	ME06444
Bo\$\$ (Multiplex)	MH28954
Need U (100%) (Multiplex)	MH27371

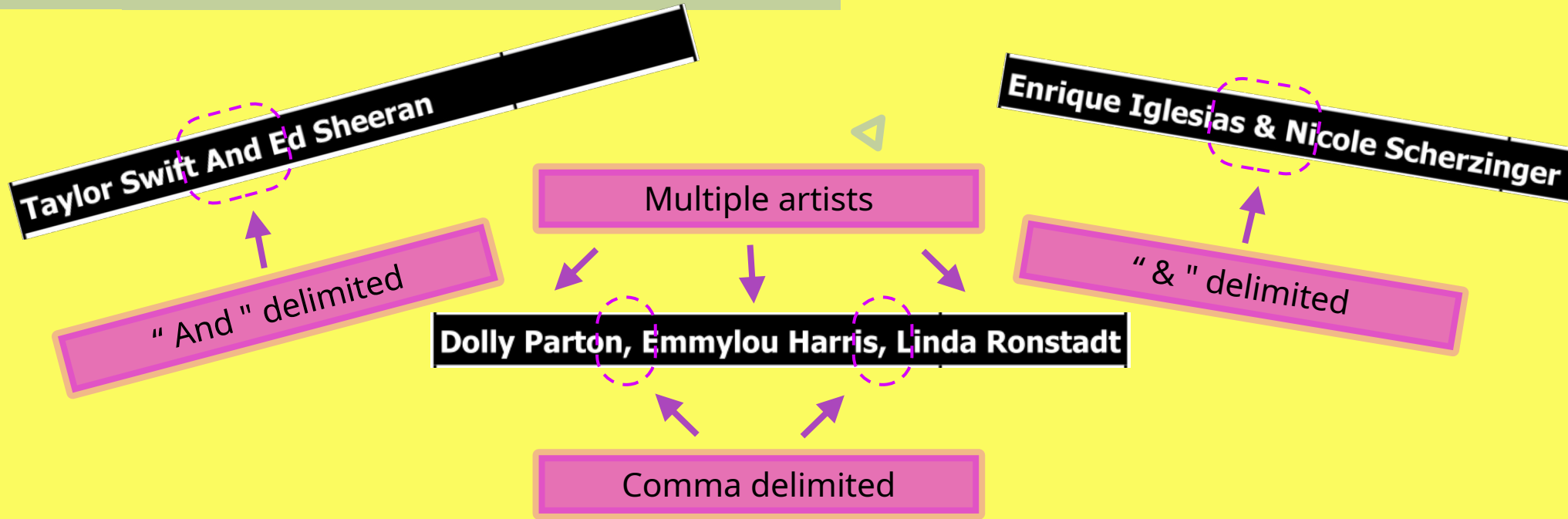




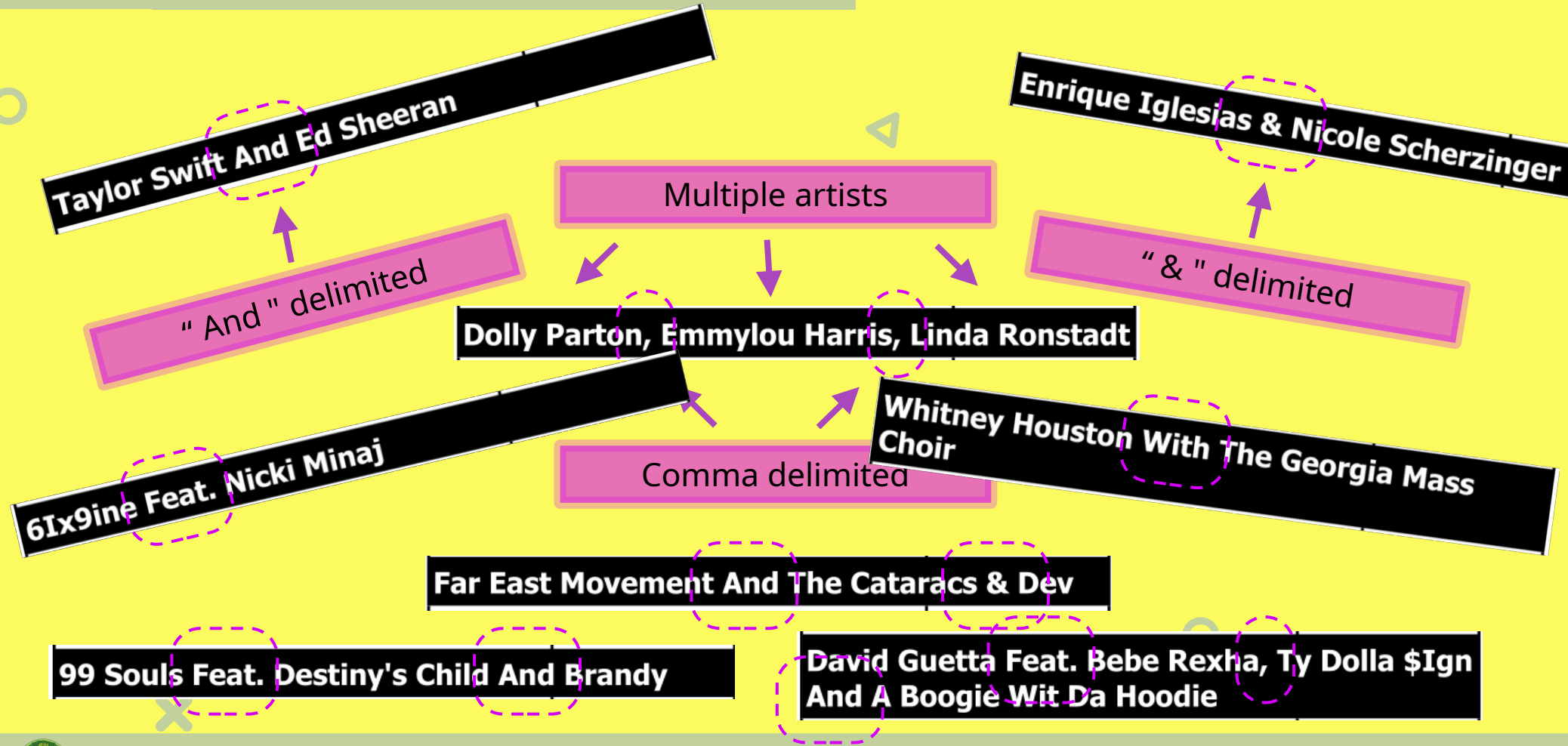
Delimiters



Delimiters



Delimiters




```
song-list: artist-song-list+ .
artist-song-list: artists, song+ .
  artists: artist**artist-delimiter, line-ending .
  artist: word**single-space .
-artist-delimiter: (" And "; " Feat. "; " & "; ", ") .
  song: song-title, multiplex?, code, line-ending .
-song-title: word**single-space .
@multiplex: -" (Multiplex)", +"true" .
@code: -" ", [Lu], [Lu], [Nd], [Nd], [Nd], [Nd], [Nd] .
-word: ([L]; [N]; [P]; [S])+ .
-single-space: #20 .
```



Expected vs. Actual



```
1 <song-list ixml:state="ambiguous" xmlns:ixml="http://invisiblexml.org/NS">
2   <artist-song-list>
3     <artists>
4       <artist>Rick Astley</artist>
5     </artists>
6     <song multiplex='true' code='MH21934'>It Would Take A Strong Man</song>
7     <song multiplex='true' code='MH00045'>Never Gonna Give You Up</song>
8     <song multiplex='true' code='MH16904'>She Wants To Dance With Me</song>
9     <song multiplex='true' code='MH01342'>Together Forever</song>
10    <song multiplex='true' code='MH00018'>When I Fall In Love</song>
11  </artist-song-list>
12  <artist-song-list>
13    <artists>
14      <artist>Ricky Martin</artist>
15    </artists>
16    <song multiplex='true' code='MH06739'>(Un Dos Tres) Maria</song>
17    <song multiplex='true' code='MH08217'>Living La Vida Loca</song>
18    <song multiplex='true' code='MH10154'>She Bangs</song>
19  </artist-song-list>
20  <artist-song-list>
21    <artists>
22      <artist>Right Said Fred</artist>
23    </artists>
24    <song code='HD00320'>I'm Too Sexy</song>
25  </artist-song-list>
26 </song-list>
```

```
1 <song-list ixml:state="ambiguous" xmlns:ixml="http://invisiblexml.org/NS">
2   <artist-song-list>
3     <artists>
4       <artist>Rick Astley</artist>
5     </artists>
6     <song multiplex='true' code='MH21934'>It Would Take A Strong Man</song>
7   </artist-song-list>
8   <artist-song-list>
9     <artists>
10      <artist>Never Gonna Give You Up (Multiplex) MH00045</artist>
11    </artists>
12    <song multiplex='true' code='MH16904'>She Wants To Dance With Me</song>
13  </artist-song-list>
14  <artist-song-list>
15    <artists>
16      <artist>Together Forever (Multiplex) MH01342</artist>
17    </artists>
18    <song multiplex='true' code='MH00018'>When I Fall In Love</song>
19  </artist-song-list>
20  <artist-song-list>
21    <artists>
22      <artist>Ricky Martin</artist>
23    </artists>
24    <song multiplex='true' code='MH06739'>(Un Dos Tres) Maria</song>
25  </artist-song-list>
26  <artist-song-list>
27    <artists>
28      <artist>Living La Vida Loca (Multiplex) MH08217</artist>
29    </artists>
30    <song multiplex='true' code='MH10154'>She Bangs</song>
31  </artist-song-list>
32  <artist-song-list>
33    <artists>
34      <artist>Right Said Fred</artist>
35    </artists>
36    <song code='HD00320'>I'm Too Sexy</song>
37  </artist-song-list>
38 </song-list>
```





"Bugs" in the input



Waterloo - Dancing Queen - Take A Chance On Me - Super Trouper (Medley)(Multiplex) (Multiplex)	MH11400
--	---------



Algo-rhythms

jwIXML

<https://johnlumley.github.io/jwiXML.xhtml>

```
1 <song-list xmlns:ixml="http://invisiblexml.org/NS" ixml:state="ambiguous">
2   <group>
3     <artists>Whitney Houston</artists>
4     <songs>
5       <song code="MH00850">Didn't We Almost Have It All (Multiplex)</song>
6     </songs>
7   </group>
8   <group>
9     <artists>Whitney Houston</artists>
10    <songs>
11      <song multiplex="true" code="MH00850">Didn't We Almost Have It All</song>
12    </songs>
13  </group>
14  <group>
15    <artists>Exhale (Shoop Shoop) (Multiplex) MH04561</artists>
16    <songs>
17      <song code="MH00297">Greatest Love Of All</song>
18      <song code="MH08228">It's Not Right But It's O K (Dance Remix) (Multiplex)</song>
19    </songs>
20  </group>
21  <group>
22    <artists>Whitney Houston And Faith Evans And Kelly Price</artists>
23    <songs>
24      <song code="MH07955">Heartbreak Hotel (Multiplex)</song>
25    </songs>
26  </group>
27  <group>
28    <artists>Whitney Houston & Q-Tip</artists>
29    <songs>
30      <song code="MH17002">Fine (Multiplex)</song>
31    </songs>
32  </group>
33  <group>
34    <artists>Taylor Swift Feat. Lana Del Rey</artists>
35    <songs>
36      <song code="HD37309">Snow On The Beach (Clean)</song>
37    </songs>
38  </group>
39  <group>
40    <artists>David Guetta Feat. Bebe Rexha, Ty Dolla $Ign And A Boogie Wit Da Hoodie </arti
41    <songs>
42      <song code="HD36521">Family (Duet Version)</song>
43    </songs>
44  </group>
45 </song-list>
```





Agence XML's Invisible XML Tester

<https://www.agencexml.com/ixml/tester.xml>

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <song-list ixml:state="ambiguous" xmlns:ixml="http://invisiblexml.org/NS">
3   <group>
4     <artists>Whitney Houston</artists>
5     <songs>
6       <song code="MH00850" multiplex="true">Didn't We Almost Have It All</song>
7     </songs>
8   </group>
9   <group>
10    <artists>Exhale (Shoop Shoop) (Multiplex) MH04561</artists>
11    <songs>
12      <song code="MH00297">Greatest Love Of All</song>
13      <song code="MH08228" multiplex="true">It's Not Right But It's O K (Dance Remix)</song>
14    </songs>
15  </group>
16  <group>
17    <artists>Whitney Houston And Faith Evans And Kelly Price</artists>
18    <songs>
19      <song code="MH07955" multiplex="true">Heartbreak Hotel</song>
20    </songs>
21  </group>
22  <group>
23    <artists>Whitney Houston & Q-Tip</artists>
24    <songs>
25      <song code="MH17002">Fine (Multiplex)</song>
26    </songs>
27  </group>
28  <group>
29    <artists>Taylor Swift Feat. Lana Del Rey</artists>
30    <songs>
31      <song code="HD37309">Snow On The Beach (Clean)</song>
32    </songs>
33  </group>
34  <group>
35    <artists>David Guetta Feat. Bebe Rexha, Ty Dolla $ign And A Boogie Wit Da Hoodie</artists>
36    <songs>
37      <song code="HD36521">Family (Duet Version)</song>
38    </songs>
39  </group>
40 </song-list>
```





ixampl

<https://www.cwi.nl/~steven/ixml/tutorial/run.html>

```
1 <fail ixml:state="failed" xmlns:ixml="http://invisiblexml.org/NS">
2   **** Parsing failed at line 1, position 17
3   Whitney Houston
4   ^
5   **** Character: "
6   " (#A).
7   **** Permitted at this position:
8   (word, " "): " "
9   [L; N; P; Sc]*: [L; N; P; Sc]
10  code: " "
11  multiplex: " (Multiplex)"
12 </fail>
```





NineML CoffeePot via XML Calabash 3.0.20

<https://codeberg.org/xmlcalabash/xmlcalabash3>

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <song-list xmlns:ixml="http://invisiblexml.org/NS" ixml:state="ambiguous">
3   <group>
4     <artists>Whitney Houston</artists>
5     <songs>
6       <song multiplex="true" code="MH00850">Didn't We Almost Have It All</song>
7     </songs>
8   </group>
9   <group>
10    <artists>Exhale (Shoop Shoop) (Multiplex) MH04561</artists>
11    <songs>
12      <song code="MH00297">Greatest Love Of All</song>
13      <song multiplex="true" code="MH08228">It's Not Right But It's O K (Dance Remix)</song>
14    </songs>
15  </group>
16  <group>
17    <artists>Whitney Houston And Faith Evans And Kelly Price</artists>
18    <songs>
19      <song multiplex="true" code="MH07955">Heartbreak Hotel</song>
20    </songs>
21  </group>
22  <group>
23    <artists>Whitney Houston & Q-Tip</artists>
24    <songs>
25      <song multiplex="true" code="MH17002">Fine</song>
26    </songs>
27  </group>
28  <group>
29    <artists>Taylor Swift Feat. Lana Del Rey</artists>
30    <songs>
31      <song code="HD37309">Snow On The Beach (Clean)</song>
32    </songs>
33  </group>
34  <group>
35    <artists>David Guetta Feat. Bebe Rexha, Ty Dolla $Ign And A Boogie Wit Da Hoodie</artists>
36    <songs>
37      <song code="HD36521">Family (Duet Version)</song>
38    </songs>
39  </group>
40 </song-list>
```





Markup Blitz 1.9

<https://github.com/GuntherRademacher/markup-blitz>

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <song-list xmlns:ixml="http://invisiblexml.org/NS" ixml:state="ambiguous">
3   <group>
4     <artists>Whitney Houston</artists>
5     <songs>
6       <song multiplex="true" code="MH00850">Didn't We Almost Have It All</song>
7       <song multiplex="true" code="MH04561">Exhale (Shoop Shoop)</song>
8       <song code="MH00297">Greatest Love Of All</song>
9       <song multiplex="true" code="MH00228">It's Not Right But It's O K (Dance Remix)</song>
10    </songs>
11  </group>
12  <group>
13    <artists>Whitney Houston And Faith Evans And Kelly Price</artists>
14    <songs>
15      <song multiplex="true" code="MH07955">Heartbreak Hotel</song>
16    </songs>
17  </group>
18  <group>
19    <artists>Whitney Houston & Q-Tip</artists>
20    <songs>
21      <song multiplex="true" code="MH17002">Fine</song>
22    </songs>
23  </group>
24  <group>
25    <artists>Taylor Swift Feat. Lana Del Rey</artists>
26    <songs>
27      <song code="HD37309">Snow On The Beach (Clean)</song>
28    </songs>
29  </group>
30  <group>
31    <artists>David Guetta Feat. Bebe Rexha, Ty Dolla $Ign And A Boogie Wit Da Hoodie</artists>
32    <songs>
33      <song code="HD36521">Family (Duet Version)</song>
34    </songs>
35  </group>
36 </song-list>
```





Not possible to set priority on rules #310

Open



martian-a opened on Oct 8, 2025 · edited by martian-a

Edits ▾ ...

The spec doesn't mention prioritisation of rules or how precedence is to be determined. This means that when I have rules that are ambiguous:

1. I can't predict or influence which rule will take precedence over another
2. Results are inconsistent across parsers





Not possible to specify an exact number of repetitions #308

Open

#326



martian-a opened on Oct 8, 2025



It's not currently possible to specify the exact number of times a pattern is expected to repeat without repeating the pattern that many times in the grammar, for example:

```
code: -" ", [Lu], [Lu], ["0"- "9"], ["0"- "9"], ["0"- "9"], ["0"- "9"], ["0"- "9"], ["0"- "9"] .
```



This issue is less about the effort it takes to write the grammar and more about how much harder it is to read.

In order to know how many repetitions are allowed, one has to count the number of times that pattern is repeated in the grammar — which takes effort and it's not difficult to lose your place when doing that. This also means it's easier to miss a mistake.

It would be much simpler, for example, to write and read:

```
code: -" ", [Lu]{2}, ["0"- "9"]{6} .
```



Considerations



- Do I need to automate this step of the process?
 - Will it need to be repeated?
 - Consistently?
 - Often?
- Are any of my rules defined elsewhere already?
 - Unicode General Category Abbreviations
 - Modular iXML...

- Is there ambiguity in my grammar?
 - ◀ • Can I remove or reduce that ambiguity?
 - With a pre- or post-processing step?
 - By applying grammars incrementally?
 - Is iXML the right tool for this job..?
- Which implementation is most appropriate for this grammar?
 - If the first one you try doesn't produce the results you were expecting, try another



Thank You



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Some Lessons Learned