

Examples of Humdrum ****kern** Encoding

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Johann Joseph Fux. Example from "Gradus ad Parnassum" Vienna, 1725.



```
!! Johann Joseph Fux,
!! Example from "Gradus ad Parnassum"
**kern
*M4/4
*k[]
=1-
2d/
4f/
4a/
=2
2b-/
2a/
==|!
*_
```

Notice that ****kern** does not distinguish "common time" from 4/4 meter. The ****kern** representation represents the syntactic rather than orthographic (visual) information in a score.

The absence of a key signature is explicitly encoded (***k[]**).

Barlines are normally labelled with the explicit measure number, even if these numbers do not appear in the original notation.

In ****kern**, barlines are used to indicate logical divisions. Since the first measure is complete, a barline is encoded -- even though no barline is notated. The minus sign at the end of the barline token (=1-) means that the barline is "invisible". (In other words, ****kern** barlines do encode some orthographic information.)

Durations are represented by the reciprocal of the American duration names (2 for half-note, 4 for

quarter-note, etc.)

Flats are represented by the minus sign. Sharps are represented by the octothorpe (#).

All of the stems in this example are up-stems and so are represented by slashes (/). Down-stems are represented by backslashes (\).

The double barline is represented by both syntactic and orthographic information. The two equals signs (==) identify the logical end of the work (or movement). The subsequent vertical bar and exclamation mark (!) indicate that the barline is composed of first a line of normal width (|), followed by a heavy line (!).

If a double barline were to occur in the middle of a work or movement it is encoded with a single equals sign (=). However, the orthographic rendering of the double barline can be indicated. For example: =||

Johann Sebastian Bach. Praeambulum, BWV 930 from Klavierbuechlein fuer Wilhelm Friedemann Bach. Neue Ausgabe Saemtlicher Werke, Serie V, Band 5, p. 12. Basel: Baerenreiter, 1962.



```
!! J.S. Bach, Praeambulum BWV 930
**kern **kern
*staff2 *staff1
*k[b-] *k[b-]
*M3/4 *M3/4
=1- =1-
2.r 8r
. 8d/L
. 8g/
. 8b-/
. 8g/
. 8d/J
=2 =2
8r 4dd\
8GG/L .
8BB-/ 4r
8D/ .
8BB-/ 4r
8GG/J .
=3 =3
4Gw?\ 8r
! Perhaps a whole-tone mordent (W). !
. 8dd\L
8GG/L 8b-\
```

```

8BB- / 8g\
8D/ 8gg\
8G/J 8b-\J
=4 =4
4D\ 8a\L
. 8gg\
4d\ 8ff\
. 8ee\
4D\ 8ff\
. 8a-\J
=5 =5
*_ *_

```

Two separate staves are defined. Staves are numbered beginning at the top of the system. Note that this means that any number of parts may be notated as sharing the same staff. Also this permits a part to switch staves.

In ****kern** encodings, the structure of the file is analogous to the score turned sideways (rotated 90 degrees to the right). Hence, the lower parts or staves of the system are encoded to the right with the higher parts on the left.

The difference between an orthographic (visual) and syntactic representation is highlighted by the rest in the bass part in measure 1. The visual appearance of the rest is as a whole-rest. However, in the context of 3/4 meter, this rest has a duration equivalent to three quarter-notes. In ****kern**, the rest is represented syntactically as 2.r.

Beaming information has been encoded as well as stem direction. The beginning of each beam is signified by the upper-case letter L, whereas the end of each beam is signified by the upper-case J.

Notice that all pitches are encoded at absolute pitch height. Although B-flat is encoded in the key signature, each flatted note must continue to be explicitly encoded as having a flat.

Whole-tone mordents are represented by "M". Half-step mordents are represented by "m". Inverted mordents are represented by "W" (whole-step) and "w" (half-step). The inverted mordent in the third measure has been explicitly interpreted as a half-step mordent (w). Since it is possible that this mordent might be interpreted as a whole-tone mordent, an official "editorial footnote" has been added and signified by the single question-mark (?). The comment follows immediately. Notice that this comment is a "local comment" that refers only to the bass voice.

Wolfgang Amadeus Mozart. From Sieben Menuette, Koechel 65a (string trio). Kassel: Baerenreiter-Verlag.

Violino I

Violino II

Violoncello

!! W.A. Mozart, Sieben Menuette, K.65a

**kern **kern **kern

*Icello *Ivioln *Ivioln

! ! II ! I

*staff3 *staff2 *staff1

*clefF4 *clefG2 *clefG2

*k[f#] *k[f#] *k[f#]

*M3/4 *M3/4 *M3/4

*r[A,A] *r[A,A] *r[A,A]

*nr[A] *nr[A] *nr[A]

*>A *>A *>A

=1- =1- =1-

2.G 8g 4gg

. 8b .

. 8a 4ff#

. 8cc .

. 8a 4ee

. 8cc .

=2 =2 =2

2G 4b 4dd

. (12gg (12bb

. 12ff# 12aa

. 12ee) 12gg)

4r (12dd (12ff#

. 12cc 12ee

. 12b) 12dd)

=3 =3 =3

4D 4a 4cc

4E 4a 4cc

4F# 4a 4cc

=4 =4 =4

4G (4a (4cc

4GG 4g) 4b)

4r 4r 4bb`

=5 =5 =5

2.G 4r (4dd

. 16e 4cc#)

. 16d .

. 16c# .

. 16B .

. 4A 4aa`

=6 =6 =6

2.F# 4r (4ee

. 4a 4dd)

. [4dd 4aa`

=7 =7 =7

4G 8dd] (12bb

```

.          .          12aa
.          8ee        .
.          .          12gg)
4A         4dd        4ff#
4AA        4cc#       4ee
=8         =8         =8
2D         2dd        2dd
4r         4r         4r
=: | !    =: | !    =: | !
*_        *_        *_

```

In order to highlight other aspects of the ****kern** representation, stem-directions and beamings are omitted from this (and all subsequent) examples. Note that there is no *requirement* in ****kern** that such information be encoded. Indeed, not even pitch or duration need be encoded -- if this suits the user's application.

Note the triplets in the second measure.

Slurs, ties, and phrase markings are logically distinguished from each other in ****kern**. Slurs are encoded using open and closed parentheses: () Phrases are encoded using open and closed curly braces: { } Ties are encoded using open and closed square brackets: [] If a tie consists of three or more notes, the middle notes of the tie are designated by the underscore character.

The "attacka" marks in measures 4-6 in the first violin are signified by the greve (˘).

Since the final measure in this example does not end the piece, the final barline is represented as a syntactic single-bar (=), but orthographically it is represented with a repeat sign (:) followed by a normal barline (|), followed by a heavy barline (!) -- hence the data token: =:|!

In Humdrum, repeats, Da Capos, etc. are represented entirely independently of the representations for barlines. A section label (***>A**) at the beginning of the work assigns the arbitrary section name "A". Sections end either when a new section is defined, or when all spines terminate.

Two different expansion-lists have been defined -- one labelled "r" and one labelled "nr". The label names are arbitrary ways of distinguishing "repeated" (r) and "non-repeated" (nr) renditions. The expansion list labelled "nr" (***nr>[A,A]**) signifies that a "through-composed" version of this passage would repeat section "A".

The second expansion-list (***>nr[A]**) shows that it is possible to represent the explicit presence of a repeat that is ignored.

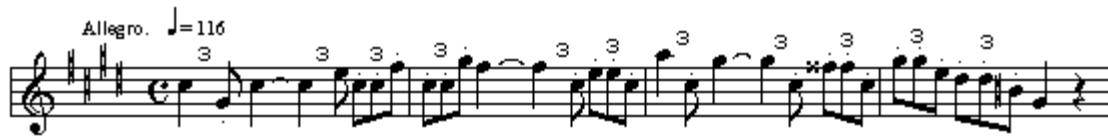
The appropriate through-composed version can be generated by using the Humdrum "thru" command, with the appropriate version label, e.g.:

```

    thru -v nr inputfile
or   thru -v n  inputfile

```

Joachim Andersen. First two measures from "Study for Flute," Opus 33, No. 10. Copyright Carl Fischer, Inc., 1941.



```

!! Joachim Andersen
!! Study for Flute, Opus 33, No. 10.
!! Measures 1-2.
**kern
*ClefG2
*M4/4
*k[f#c#g#d#]
*c#:
*MM116
!! Allegro.
=1-
6cc#
12g#'
[4cc#
6cc#]
12ee
12cc#'
12cc#'
12ff#'
=2
12cc#'
12cc#'
12gg#'
[4ff#
6ff#]
12cc#'
12ee'
12ee'
12cc#'
=3
*_

```

This excerpt again highlights the difference between printed icons (orthographic information) and logical data (syntactic information). The third and fourth notes (two C-sharps tied together) are both visually rendered as quarter notes -- however, their durations differ. The first note of the tie is a quarter-note, whereas the second note of the tie is a quarter-note triplet.

See section 3.2.8 in the file "kern_hlp.txt" for further information regarding the encoding of triplets and other "N-tuplets".

Notice the double-sharp in measure 3 is simply represented by two sharp signifiers (##).

The overlay text in this example includes an explicit indication of the key: C-sharp minor. A tandem interpretation has been added to the encoding in order to make the key explicit (*c#:).

Also, the metronome marking has been encoded. The *MM tandem interpretation always encodes the tempo in QUARTER-DURATIONS per minute.

Franz Schubert. String Quartet Opus 161, 2nd movement; measures 1-5. Breitkopf & Haertel, 1884-1897.

Andante un poco moto.

!! Franz Schubert, String Quartet Opus 161

!! 2nd movement, mm.1-5

!! Andante un poco moto.

```

**kern **kern **kern **kern
*Icello *Iviola *Ivioln *Ivioln
*ICstr *ICstr *ICstr *ICstr
*staff4 *staff3 *staff2 *staff1
*clefF4 *clefC3 *clefG2 *clefG2
*M4/4 *M4/4 *M4/4 *M4/4
=1- =1- =1- =1-
2.BB [1B 2.b 2.bb 2.b 2.bb
*clefC4 * * *
. . . 16bQ
. . . 16ccQ
(4e . (4g (8.b
. . . 16a#
=2 =2 =2 =2
8d#) 1B] 8f#) 8b)
8r . 8r 8r
4r . 4r 4r
4r . 2r 2r
(4B . .
=3 =3 =3 =3
2.a 4B' 4r 4r
. 2b^ (4b (4b
. . 4f#^ 4dd#^
4g) (4B' 8g) 8ee)
. . 8r 8r
=4 =4 =4 =4
(2.f# 4B') 4r 4r
. 2b^ (4b (4b
. . 4dd#^ 4aa^
4e) (4B' 8ee) 8gg)
. . 8r 8r
=5 =5 =5 =5
(4d#' 4B') 4r 4r
4d#') 2b^ (4ff# (2bb

```

```

(8f#      .      [4gg      .
8e        .      .      .
8d#      (4B'    8gg])  8eee)
8e)      .      8r      8r
=6       =6     =6     =6
*_      *_     *_     *_

```

Note that, in addition to encoding the different instruments, instrument CLASS interpretations have been added (*ICstr). These indicate that the instruments are string instruments.

Notice the appropriate encoding of the clefs. In particular, note the change of clef for the 'cello in measure 1 -- from bass clef to tenor clef.

The first measure contains a ****kern** "groupetto" in the first violin. Although these notes are notated (and encoded) as "sixteenth" notes, they do not "belong" to the total measure duration. Groupettos are explicitly identified by the presence of the signifier "Q". Note that in the ****kern** representation it is forbidden to encode non-groupetto notes on the same record as groupetto notes.

Accents in measures 3-5 are encoded using the caret (^).

In the final measure of the second violin an important difference between the syntactic and orthographic representations arises. The F-sharp is notated as slurred to the next G; and that G is notated as tied to the subsequent G. Since the tied G's act as a single note, the logical end of the slur corresponds to the second G rather than the first. In the ****kern** data this syntactic interpretation is made explicit.

Note that in ****kern**, it is generally unusual to have a phrase or a slur end part-way through a tied note. However, in most notated scores, it is uncommon to continue the phrase or slur marking to the end of the last tied note.

Dmitri Kabalevsky. Measures 62 to 67 from "Variations," Opus 40, No. 2 in A minor. Copyright MCA Music, 1947.

Variation 3
Meno mosso (Tempo I)

```

!! Dmitri Kabalevsky
!! Variations, Opus 40, No. 2 in A minor
!! Measures 62-67
**kern **kern
*ClefF4 *ClefG2
=62     =62
4AAA'   (1G# 1d- 1fn
4EE'    .
4AA'    .

```



```

4EE'      .
=63      =63
4AAA'    1A 1c 1e)
4EE'      .
4AA'      .
4E'       .
=64      =64
4A'       4r
*x        *x
4r        4e'
2r        4a'
.         4b- '
=65      =65
1r        4bn'
.         4cc'
.         4cc#'
.         4dd'
=66      =66
1r        4dd#'
.         4r
.         4ee'
.         4r
=67      =67
!! Variation 3
!! Meno mosso (Tempo I)
4r        {2.ff
(4BBB-    .
4F 4B- 4d)      .
4r         8ee
.          8ff
=68      =68
*_       *_

```

In measure 64 of this excerpt, the bass line crosses into the treble staff and continues as the melody line in Variation 3. A literal encoding of the printed score might leave the impression that the bass line ended at A3 and treble line resumed with E4 after a quarter note rest. One solution to this might be to encode the entire passage in the "bass" voice, leaving rests in the treble staff for until measure 67. This encoding would cause a discontinuity between the pitch E5 at the end of Variation 2, and the F5 at the beginning of Variation 3. For example, the minor second interval between E5 and F5 would not be derivable if the pitches were assigned to different spines.

Humdrum provides a simple solution to this problem via the spine-path exchange. The position of two spines may be exchanged by encoding two ***x** spine-paths on a single record. Humdrum analytic tools, such as those that identify melodic intervals, understand and adapt to spine-path changes.

**Claude Debussy. Measures 61 and 62 from "Jardins sous la pluie" for piano.
Copyright Broekmans & Van Poppel, 1969.**



!! Claude Debussy
 !! "Jardins sous la pluie" for piano.
 !! Measures 61-62
 !! Copyright Broekmans & Van Poppel, 1969.

```

**kern **kern **kern
=61      =61      =61
(2GG 2G 4rxx 16G
.        .        16cc# 16ffn
.        .        16an
.        .        16f
.        8c#'     16c#
.        .        16cc# 16ff
.        8rxx    16a
.        .        16f
2AA 2A) 4rxx    16A
.        .        16bn 16ee-
.        .        16g
.        .        16e-
.        8Bn'    16Bn
.        .        16ee- 16gg
.        8rxx    16b
.        .        16g
=62      =62      =62
(2GG 2G 4rxx 16G
.        .        16cc# 16ff
.        .        16a
.        .        16f
.        8c#'     16c#
.        .        16cc# 16ff
.        8rxx    16a
.        .        16f
2AA 2A) 4rxx    16A
.        .        16b 16ee-
.        .        16g
.        .        16e-
.        4a~     16a
.        .        16gg 16bb
.        .        16ee-
.        .        16b
=63      =63      =63
*_       *_       *_

```

Most music-analysis tasks require that information in a score be interpreted in some way. For example, not all successive pitches imply intervening intervals. Usually, theorists restrict their notion of pitch interval to successive pitches within a single voice or part. Melodic intervals may also be deemed to occur between pitches spanning longer time spans, but again, this is usually dependent upon whether the pitches are deemed to be in the same voice.

The importance of voicing interpretation is highlighted in this piano excerpt from Debussy's "Jardins sous la pluie."

Three voices would seem to be implied from this notation. One line consists of the half notes octaves in the bass. These can be encoded as double-stops in a single **kern spine. A less plausible case might be made that the octaves should be split apart and placed in separate spines.

Another line implied by the notation is the succession of sixteenth notes. The beams indicate that certain notes in the bass clef should be included in this line. The first question is whether both notes in the notated octaves should be included with the sixteenths. The down-stem on the lower pitch of each octave would seem to give credence to the view that only the upper pitch of each octave participates in the sixteenths. This is the way we have encoded this passage.

In summary, the first G3 at the beginning of the excerpt is interpreted to be two pitches: a half-note G3 linked to the G2 an octave lower, and a sixteenth-note G3 linked to the sixteenths in the upper voice.

The most thorny problem in this excerpt is the eighth-notes C#4, B3, and the quarter-note A4 in the last beat of the second measure. The notation for these notes implies that they belong to an independent voice. However, are there any other pitches that belong to this inner voice? For example, is the G3 in the first beat linked to the C#4 in the second beat? That is, ought we to interpret the initial G3 as actually implying "three" notes -- one attached to each of the three voices? We might think not, and so we would encode the middle voice as a quarter-rest, followed by an eighth-note C#, followed by a dotted-quarter-equivalent rest, followed by an eighth-note B4, etc.

Another way of highlighting the voicing problem is by asking the following question: Is there a tritone melodic interval in the measure 61 of Debussy's "Jardins sous la pluie?" That is, does the G3 in the first beat in some way connect to the C#4 in the second beat?

The point of this excerpt is to highlight the fact that, if users wish to pursue analytic questions on the basis of notated information, then they MUST interpret the score in some way. In the accompanying encoding, a particular editorial decision has been taken, but other editorial interpretations are possible.

Note that **kern provides several signifiers to identify various levels or types of editorial intervention or interpretation. In this example, all notes/rests that are editorial interpolations are explicitly identified using the "xx" signifiers.

Aram Khachaturian. Measures 94-95 from third movement of "Sonatina (1959)."
Copyright MCA Music, 1964.

```

!! Aram Khachaturian
!! Sonatina (1959)
!! Copyright MCA Music, 1964.
!! Third movement, measures 94-95.
**kern
=94
*staff2
(16B-
16d-
*staff1
16g-
16b-)
*staff2
(16d-
16g-
*staff1
16an
16b-)
*staff2
(16d-
16g-
*staff1
16a
16b-)
*staff2
(16g-
16an
*staff1
16b-
16dd-)
=95
*staff2
(16g-
16an
*staff1
16b-
16dd-)
*staff2
(16a
16b-
*staff1
16dd-
16gg-)
*staff2
(16a
16b-
*staff1
16dd-
16gg-)
*staff2
(16b-
16dd-
*staff1
16gg-
16aan)
=96
*_

```

The arrangement of staves in this example is important primarily in indicating which hand plays which

note. The staffing has little analytic importance. The excerpt shows a single musical line (notwithstanding its compound melodic properties). Although the line is notated across the treble and bass staves, probably the most appropriate way to represent this in **kern is by using a single spine. Tandem interpretations have been added to indicate the staffing.

Bela Bartok. Measures 151 to 153 from Two Romanian Dances, Dance No. 2, Opus 8a, No. 2. Copyright Editio Musica Budapest, 1971.



```
!! Bartok, Bela
!! Ket Roman Tanc
!! Opus 8a, No. 2
!! Editio Musica Budapest
!! page 20, mm.151-153
**kern **kern
*ClefF4 *ClefG2
*staff2 *staff1
=151      =151
8GGGL      8GGL 8GL
8AAA      8AA 8A
8BBBJ      8BBJ 8BJ
8GGG^L     8GG^L 8G^L
8BBB      8BB 8B
8CC#       8C# 8c#
8EEJ       8EJ 8e
8CC#^L     8C#^L 8c#^L
=152      =152
8DD#       8D# 8d#
8GG#       8G# 8g#
8AA#J      8A#J 8a#J
8EE^L      8E^L 8e^L
8AA#n      8A#n 8a#n
8BB        8B 8b
8EJ        8eJ 8eeJ
8DDn^      8D^ 8d^
=153      =153
8GGGL 8GGL 8GL 8gL
8AAA 8AA 8A 8a
8BBBJ 8BBJ 8BJ 8bJ
8GGG^L 8GG^L 8G^L 8g^L
8BBB 8BB 8B 8b
8CC# 8C# 8c# 8cc#
8EEJ 8EJ 8eJ 8eeJ
8CC#^ 8C#^ 8c#^ 8cc#^
=154      =154
*_        *_
```

This excerpt illustrates how composers occasionally use beams to stress non-metric grouping. In this case, the beams have analytic significance, and so may be important in non-printing applications. The capital letters `L' and `J' are used to signify the beginning and end of beams, respectively. If necessary, the letters may be repeated to indicate double (LL - JJ) and triple (LLL - JJJ) beams, etc.

Notice that beaming information is specified for each note in a multiple-stop -- even though notes in multiple-stops are always assumed to share the same beams.

Franz Liszt. Measures 256 and 257 from "Reminiscences of Don Juan [Don Giovanni]" (Mozart). Edited by V.S. Belov and K.S. Sorokin. Copyright Gosudarstvennoe Musykal'noe Izdatel'stvo, 1958.

```
!! Franz Liszt
!! Reminiscences of "Don Juan [Don Giovanni] (Mozart)"
!! Measures 256 to 257
!! page 41
!! Edited by V.S. Belov and K.S. Sorokin.
!! Copyright Gosudarstvennoe Musykal'noe Izdatel'stvo, 1958.
**kern **kern **kern
=256      =256      =256
34.BB-   16B-     8e
34.AA    .        .
.        16A     .
34.AA-   .        .
.        16B-    8e
34.GG    .        .
34.GG-   .        .
.        16A     .
34.FF    .        .
.        16B-    8e
34.EE    .        .
34.EE-   16A     .
34.DD    .        .
.        16B-    8e
34.DD-   .        .
.        16A     .
34.CC    .        .
34.BBB   .        .
.        16B-    8e
34.BBB-  .        .
```

```

.          16A      .
34.AAAAn .      .
34.AAA- .      .
.          16B-    8e
34.GGGn .      .
.          16c      .
34.GGG- .      .
=||257 =||257 =||257
*M2/4 *M2/4 *M2/4
*k[b-e-] *k[b-e-] *k[b-e-]
!! Presto spiritoso
4FFF 8A` 4f^
.      8c` .
4r 8A` 4r
.      8c` .
=258 =258 =258
*_ *_ *_

```

This excerpt highlights **kern duration representation abilities.

In measure 256, Liszt writes a polyrhythm of 17 against 12. The 12 eighth-notes are normal in a measure of 3/4 meter, so are encoded normally as eighths (8). The left-hand part contains 17 notes in the time of a dotted half note. The appropriate duration encoding is simply 17 x 2 (dotted) or a dotted 34th note.

Incidentally, a common multiple of 17 and 12 is 214 (17 x 12). Using the Humdrum "timebase -t 214" command will permit the user to prepare individual encodings of the parts so they can be assembled automatically using the "assemble" command. In this way, the user need not calculate by hand the order of the encoded notes between the parts.

Fryderyk Chopin. Etude, Opus 25, No. 7, first three measures.

```

!! Fryderyk Chopin,
!! Etude, Opus 25, No. 7
!! First three measures.
!! Illustrates groupetto/cadenza notation,
!! and acciaccaturas.

```

```

**kern  **kern  **kern
!! Lento
*MX/X   *MX/X   *MX/X
*k[f#c#g#d#]  *k[f#c#g#d#]  *k[f#c#g#d#]
*c#:      *c#      *c#:
*MM40    *MM40    *MM40
=1-      =1-      =1-
{4GG#/Q 1rX   1rX
4.D#\Q .      .
8C#/Q .      .
8C#/LQ .     .
8BB#/JQ .    .
4.A\Q   2.rX   2.rX
8G#\Q .      .
16F#\LQ .     .
16G#\Q .      .
16A\Q .      .
16G#\JQ .     .
16Bn\LQ 2.rX   2.rX
16A\Q .      .
16E\Q .      .
16E#\JQ .     .
16F#\LQ .     .
16E#\Q .      .
16G#\Q .      .
16F#\JQ .     .
16A\LQ .      .
16G#\Q .      .
16C#\Q .      .
16D#\JQ .     .
=||2    =||2    =||2
**MM66  **MM66  **MM66
*M3/4   *M3/4   *M3/4
Enq/    .      .
2e\     8r      2.rX
.        8g# 8cc#\L .
.        8g# 8cc#\ .
.        8g# 8cc#\ .
8.d#\L  8g# 8cc#\ .
.        8g# 8cc#\J .
16c#\Jk .      .
=3      =3      =3
4..c#\  8e 8a\L {2ee/
.        8e 8a\ .
.        8e 8a\ .
.        8e 8a\ .
32d#\L .      .
32c#\J .      .
8.B\L   8e 8a\ 8.dd#/L
.        8e 8a\J .
16A\Jk .      16cc#/Jk
=4      =4      =4
*_      *_      *_

```

The piece begins with a cadenza-like measure that contains no meter signature. The lack of meter signature has been explicitly encoded in this rendering, via the ***MX/X** tandem interpretation. An alternative rendering might simply omit any meter signature until the second measure.

All of the notes in the first measure have been encoded as ****kern** groupettos -- designated by the upper-

case letter "Q".

In general, the entire study lends itself to encoding with three spines. The middle spine consists predominantly of repeating eighth-note double-stops -- forming a harmonic accompaniment to the melodic interplay of the bass and treble lines.

The upper staff of the first notated measure is empty -- without any rests. In this rendering, the upper two spines have been encoded with implicit rests. The rests include the ****kern** "XX" signifiers -- meaning that they are absent from the printed score, but implied.

An acciaccatura (grace note) occurs at the beginning of the second measure. Acciaccaturas are encoded as durationless notes, so rather than a duration signifier (number), the lower-case letter `q' is encoded. Grace notes are always assumed to be "slurred" to the subsequent note in the same spine. Some Humdrum tools (such as "timebase") treat acciaccaturas as "non-existent" -- and discard them. As a result, grace notes cannot take attributes that link them to non-grace notes -- such as slurs, phrase marks, ties, or beams. This explains why the slur between the acciaccatura and the subsequent E4 is absent. If necessary, the user might encode this note with a question mark (?) to mark an editorial comment in a neighbouring local comment.

Bela Bartok. Measures 48 to 52 from Roumanian Folk Dance No. 6 Copyright Universal Edition, 1918; copyright renewed by Boosey & Hawkes, 1945.

The image shows a musical score for Bela Bartok's Roumanian Folk Dance No. 6, measures 48 to 52. The score is written for piano and consists of two systems. The first system has two staves: a treble staff and a bass staff. The second system has three staves: a treble staff, a middle staff, and a bass staff. The music features a complex rhythmic pattern with many eighth notes and rests. There are several 'A' markings above the notes, indicating accents. An 'Ossia' section is shown in the middle of the second system, with a treble staff and a bass staff. The key signature has one flat (B-flat) and the time signature is 2/4.

!! Bartok, Bela
!! Roumanian Folk Dance No. 6

```

!! Universal Edition, 1918
!! copyright renewed by Boosey & Hawkes, 1945
!! page 9, mm.48-52
**kern **kern
*staff2 *staff1
*ClefF4 *ClefG2
*M2/4 *M2/4
8AA' 8a')
8E' (16a
. 16g
4c#~^ 4a~^)
*strophe *
*^ *
*S/sic *S/ossia *
* *staff3 *
! ! Ossia !
=50 =50 =50
8B-' 8B-' 8gg'
8e' 8g' 8e' 8g' 8cc' 8ccc'
8A' 8A' (16ccc^
. 16bb-
8d' 8fn' 8a' 8d' 8fn' 8cc' 16aa
. 16bb-
=51 =51 =51
8B-' 8B-' 8gg')
8e' 8g' 8e' 8g' 8cc' 8ccc'
8A' 8A' 8ccc^
8e' 8g 8e' 8g' 8cc' (16ccc
. 16ddd
=52 =52 =52
8A^' 8A^' 8eee'^)
8c' 8e' 8a' 8e' 8a' 8cc' (16ccc
. 16bb
8c' 8e' 8a' 8e' 8a' 8cc' 4ccc~)
8c' 8e' 8a' 8e' 8a' 8cc' .
*S/fin *S/fin *
*v *v *
*S-
=53 =53
8G' 8e' 8gg'
etc. etc.
*_ *_

```

The encoding for this excerpt begins at the fifth measure shown.

This excerpt illustrates the use of the Humdrum ***strophe** structure to encode an "Ossia" (literally "or maybe"). The composer has provided two versions of the left hand accompaniment for measures 49 to 52. By encoding this passage using the strophe structure, the user can invoke the Humdrum "strophe" command to select one or the other interpretation when processing.

Strophe structures begin with the presence of a strophic passage initiator (***strophe**) and end with a strophic passage terminator (***S-**) marker. Following the ***strophe**, a spine-path splitter is used to spawn an alternative data path. This is followed by the the strophe labels -- in this case, the labels are "sic" and "ossia" (***S/sic** and ***S/ossia**). At the end of each strophic path is the strophe end indicator (***S/fin**). There is no limit to the number of concurrent paths used in a strophic passage.