

Kern music representation for analysis



Humdrum file contents:

```
**kern
*clefF4
*k[b-e-a-d-]
*M4/4
{4D
=1
4.G
8F#
4G
4A
=2
4.B
8A
4G}
{4d
=3
4.B
8B
4.A
8A
=4
2G}
4r
==
*-
```

Kern Mappings:

- **Rhythm:** numbers based on divisions of a whole note.
 - 4 → quarter note
 - 8 → eighth note
 - 2 → half note
 - 4. → dotted quarter note
- **Pitch:** letter names plus “#” for sharps, and “-” for flats. Octaves are indicated by duplication of letter names as demonstrated in the examples below.
 - c → middle C
 - cc → one octave above middle C
 - ccc → three octaves above middle C
 - C → one octave below middle C
 - CC → two octaves below middle C
 - B → note just below middle c
 - d → note a major second above middle c
 - c# → note a minor second above middle c
- **Other Music Symbols shown in example:**
 - = → measure lines (+ optional bar num.)
 - == → final measure
 - {...} → slur markers
 - *clefF4 → F-clef on 4th line (Bass clef)
 - *k[b-e-a-d-] → key sig. with 4 flats (bb, eb, ab, and db)
 - *M4/4 → 4/4 time signature

● Primary *Humdrum* data formatting components in this example:

**kern indicates the beginning of a data column (called a *spine*) which is composed of musical information in the kern format. A *Humdrum* spine contains one ** command which is called an *exclusive interpretation*.

*- indicates the end of the data for the spine started with **kern.

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The diagram illustrates the mapping between a list of Kern notation commands and their visual representation in a musical staff. The list on the left contains the following entries:

- **kern
- *clefF4
- *k[b-e-a-d-]
- *M4/4
- {4D
- =1
- 4.G
- 8F#
- 4G
- 4A
- =2
- 4.B
- 8A
- 4G}
- {4d
- =3
- 4.B
- 8B
- 4.A
- 8A
- =4
- 2G}
- 4r
- ==
- *-

Arrows indicate the following correspondences:

- *clefF4 points to the F-clef on the first line.
- *k[b-e-a-d-] points to the key signature change to one flat (Bb).
- *M4/4 points to the 4/4 time signature.
- {4D points to the first measure of the first system.
- =1 points to the first note (G4) in the first measure.
- 4.G points to the second note (G4) in the first measure.
- 8F# points to the sharp sign on the F line in the second measure.
- 4G points to the first note (G4) in the second measure.
- 4A points to the second note (A4) in the second measure.
- =2 points to the second measure of the first system.
- 4.B points to the first note (B4) in the second measure.
- 8A points to the sharp sign on the A line in the third measure.
- 4G} points to the first note (G4) in the third measure.
- {4d points to the first measure of the second system.
- =3 points to the first note (D4) in the first measure of the second system.
- 4.B points to the second note (B4) in the first measure of the second system.
- 8B points to the sharp sign on the B line in the second measure of the second system.
- 4.A points to the first note (A4) in the second measure of the second system.
- 8A points to the sharp sign on the A line in the third measure of the second system.
- =4 points to the second measure of the second system.
- 2G} points to the first note (G4) in the third measure of the second system.
- 4r points to the first note (G4) in the first measure of the third system.
- == points to the second measure of the third system.
- *- points to the final measure of the third system.