REPRESENTATION

****pc** — pitch-class representation

DESCRIPTION

The ****pc** representation can be used to characterize *pitch-class* or *chroma* information. Two pitches are said to share the same pitch-class or chroma when they are octave equivalents. No distinction is made between enharmonic spellings. Hence C-sharp4 and D-flat7 belong to the same pitch-class. In traditional set theory, pitch-classes are identified by integer values between 0 and 11, where C=0, C-sharp/D-flat=1 ... B=11.

Three types of data tokens are distinguished by ****pc**: pitch-class tokens, rest tokens, and barlines.

Pitch-class tokens are encoded as either numeric, or mixed alphabetic and numeric values. Following traditional practice, ****pc** encodes pitch-classes using the integer values between 0 and 11, where C=0, C-sharp/D-flat=1 ... B=11. The ****pc** representation provides aliases for the integers 10 and 11 ('A' and 'B' respectively). (Encodings using purely numeric values are especially useful when the representation is to be processed numerically. Encodings using mixed alphanumeric values are often better suited to pattern matching and searching tasks.†)

In addition to the basic pitch-class information, ****pc** also provides limited capabilities for representing articulation marks, ties, slurs, and phrasing. Slurs and phrase markings can be nested (slurs within slurs) and may also be elided to a single depth. Nested markings mean that one slur or phrase is entirely subsumed within another slur or phrase. For example: (( )) means that a short slur has occurred within a longer slur. Elisions are overlaps, for example, where an existing phrase fails to end before a new phrase begins. In ****pc** the ampersand character is used to mark elided slurs or phrases. For example: { &{ } &} means that a phrase begins, but does not end until after another phrase has begun. The ampersand is used to mark a matched pair of slur or phrases marks.

Rests are represented by the single letter 'r'.

Barlines are represented using the "common system" for barlines — see **barlines (2)**.

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† For example, where '10' and '11' are present in a stream of data, the regular expression to search for pitch-class '1' is `(^|[^1])1([^01]|$)`, whereas the corresponding regular expression for alphanumeric pitch-class data is simply `1`.

FILE TYPE

It is recommended that files containing predominantly **pc data should be given names with the distinguishing '.pc' extension.

SIGNIFIERS

The following table summarizes the **pc mappings of signifiers and signifieds.

0-9	pitch-class values specified as integers or as real values; measure numbers
A	alias for pitch-class 10
B	alias for pitch-class 11
E	alias for pitch-class 11
r	rest
I	generic articulation (unspecified articulation)
O	generic ornament (unspecified ornament)
T	alias for pitch-class 10
=	barline; == double barline
[	first note of a tie
]	last note of a tie
_	middle note(s) of a tie (underscore)
(	slur start
)	slur end
{	phrase mark (start)
}	phrase mark (end)
;	pause sign
'	staccato mark
"	pizzicato mark
`	attacka mark
~	tenuto mark
^	accent mark
&	elision marker (for slurs or phases)

Summary of **pc *Signifiers*

EXAMPLES

The following sample document shows a pitch-class representation for the opening measures of Schoenberg's "Sommermüd" from *Three Songs*, opus 48. The left-most spine shows a mixed alphabetic and numeric encoding — where pitch-class 11 is represented by the letter 'B'.

```
!! Arnold Schoenberg, "Sommermued" (1933)
**pc        **pc        **pc        **text
*Ipiano     *Ipiano     *Ivox       *Deutsch
*M4/4       *M4/4       *M4/4       *M4/4
*MM72       *MM72       *MM72       *MM72
=1          =1          =1          =1
r           r           r           .
(7          (11         .           .
.           9^)         r           .
8')         .           1           Wenn
r           .           .           .
r           r           .           .
(9          (11         2           du
.           7^)         .           .
8')         .           0           schon
r           .           .           .
=2          =2          =2          =2
r           r           (0          glaubst ,
9           (7          [6          |
(9'         8           .           .
B)          .           .           .
r           .           .           .
r           7')         6])         |
.           r           .           .
.           (9          3           es
[B          .           3           ist
.           8)          [5          e-
=3          =3          =3          =3
*-          *-          *-          *-
```

Note that pitch-class representations do not preserve pitch-height or contour information.

PERTINENT COMMANDS

The following Humdrum commands accept ****pc** encoded data as inputs:

iv	determine interval vectors for vertical sonorities
nf	determine normal form for vertical sonorities
pc	convert between numerical and alphanumerical forms of ****pc**
pcset	convert to set-theoretic representations
pf	determine prime form for vertical sonorities
reihe	output tone-row variant for a given prime row
vox	determine active and inactive voices in a Humdrum file

The following Humdrum command produces **pc data as output:

pc translates **cents, **freq, **kern, **pc, **pitch, **Tonh, **semits, **solfg, **specC, to **pc

TANDEM INTERPRETATIONS

The following tandem interpretations can be used in conjunction with **pc:

meter signatures	`*M6/8`
key signatures	`*k[f#c#]`
key	`*c#:`
tempo	`*MM96.3`
timebase	`*tb32`

Tandem interpretations for **pc

SEE ALSO

barlines (2), **cents (2), **freq (2), **iv (2), **iv** (4), **kern (2), **nf (2), **nf** (4), **pc** (4), **pcset (2), **pcset** (4), **pf (2), **pf** (4), **pitch (2), **reihe** (4), **semits (2), **solfg (2), **specC (2), **Tonh (2)

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Forte, A. *The Structure of Atonal Music*. New Haven: Yale University Press, 1973.

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