Regular expressions Pattern matching syntax

CONCEPTS

A regex is matched left to right: at each position the engine tries the whole pattern and moves on if it fails.

Anchor ^ \b \A
↓ then
Atom a . \d [abc] (...)
↓ repeated by
Quantifier ? * + {n,m}
↓ joined by
Alternation a|b

Flavours differ. This sheet follows PCRE2 (Perl-style), also used by PHP and grep -P; JavaScript, Python and POSIX tools lack some features.

Prefer a specific class over .* : greedy wildcards cause surprising matches and slow backtracking.

CHARACTERS

.
Any char except newline

\d \w \s
Digit, word char, space

[abc]
Any one of a, b, c

[^abc]
Any char except a, b, c

[a-z0-9]
Ranges inside a set

\.
Escape a metacharacter

\n \t \r
Newline, tab, carriage return

\x41 \x{263A}
Character by hex code

[[:alpha:]]
POSIX class inside a set

\h \v \R
Horizontal space, vertical space, any line break

\Q...\E
Treat text literally

\p{L} \p{Lu}
Unicode letter, uppercase letter

\p{Greek}
Unicode script

QUANTIFIERS

*****
Zero or more

+
One or more

?
Zero or one (optional)

{n}
Exactly n times

{n,m}
Between n and m times

{n,}
At least n times

***? +? ??**
Lazy: as few as possible

***+ ++ ?+**
Possessive: never give back

ANCHORS

^ $
Start, end of line

\b
Word boundary

\B
Not a word boundary

\A \z
Start, end of text

GROUPS

(...)
Capture group

a|b
Alternation

(?:...)
Group without capturing

(?*<name>*...)
Named capture group

\1 \2
Backreference to group n

\k*<name>*
Backreference by name

(?>...)
Atomic group

LOOKAROUND

(?=...)
Followed by (lookahead)

(?!...)
Not followed by

LOOKAROUND (cont.)

(?<=...)
Preceded by (lookbehind)

(?<!...)
Not preceded by

\K
Reset start of reported match

Zero-width checks

Syntax	Asserts
(?=x)	x comes next
(?!x)	x does not come next
(?<=x)	x comes before
(?<!x)	x does not come before

FLAGS

(?i)
Ignore case

(?m)
^ and $ match at each line

(?s)
Dot matches newline

(?x)
Free-spacing: ignore blanks, allow #comments

(?i:...)
Flag for one group only

(?-i)
Turn a flag off

(*UCP)
Make \d \w \s Unicode-aware

ADVANCED

(?R)
Recurse the whole pattern

(?1) (?&name)
Call a group as a subroutine

RECIPES

Integer or decimal

```
^-?\d+(?:\.\d+)?$
```

ISO date with named parts

```
(?<y>\d{4})-(?<m>\d{2})-(?
<d>\d{2})
```

Trim trailing whitespace

```
# match, replace with nothing
[ \t]+$   (with (?m))
```

Value after a key

```
# match only the number
price=\K\d+
# or with lookbehind
(?<=price=)\d+
```