

# Perl Regular Expression Quick Reference Card

Revision 0.1 (draft) for Perl 5.8.5

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This is a quick reference to Perl's regular expressions. For full information see the *perlre* and *perlop* manual pages.

## Operators

`=~` determines to which variable the regex is applied. In its absence, `$_` is used.

```
$var =~ /foo/;
```

`!~` determines to which variable the regex is applied, and negates the result of the match; it returns false if the match succeeds, and true if it fails.

```
$var !~ /foo/;
```

`m/pattern/igmsocx` searches a string for a pattern match, applying the given options.

- `i` case-insensitive
- `g` global – all occurrences
- `m` multiline mode – `^` and `$` match internal lines
- `s` match as a single line – `.` matches `\n`
- `o` compile pattern once
- `x` extended legibility – free whitespace and comments
- `c` don't reset pos on failed matches when using `/g`

If *pattern* is an empty string, the last successfully matched regex is used. Delimiters other than `'/'` may be used for both this operator and the following ones.

`qr/pattern/imsox`

lets you store a regex in a variable, or pass one around. Modifiers as for `m//` and are stored within the regex.

`s/pattern/replacement/igmsocxe`

substitutes matches of *pattern* with *replacement*. Modifiers as for `m//` with one addition:

- `e` evaluate replacement as an expression
- 'e' may be specified multiple times. *replacement* is interpreted as a double quoted string unless a single-quote (') is the delimiter.

`?pattern?`

is like `m/pattern/` but matches only once. No alternate delimiters can be used. Must be reset with `reset`.

## Syntax

- `\` Escapes the character immediately following it
- `.` Matches any single character except a newline (unless `/s` is used)
- `^` Matches at the beginning of the string (or line, if `/m` is used)
- `$` Matches at the end of the string (or line, if `/m` is used)
- `*` Matches the preceding element 0 or more times
- `+` Matches the preceding element 1 or more times
- `?` Matches the preceding element 0 or 1 times
- `{...}` Specifies a range of occurrences for the element preceding it
- `[...]` Matches any one of the characters contained within the brackets
- `(...)` Groups subexpressions for capturing to `$1`, `$2`...
- `(?:...)` Groups subexpressions without capturing (cluster)
- `|` Matches either the subexpression preceding or following it
- `\1, \2 ...` The text from the Nth group

## Escape sequences

These work as in normal strings.

- `\a` Alarm (beep)
  - `\e` Escape
  - `\f` Formfeed
  - `\n` Newline
  - `\r` Carriage return
  - `\t` Tab
  - `\038` Any octal ASCII value
  - `\x7f` Any hexadecimal ASCII value
  - `\x{263a}` A wide hexadecimal value
  - `\cx` Control-x
  - `\N{name}` A named character
  - `\l` Lowercase next character
  - `\u` Titlecase next character
  - `\L` Lowercase until `\E`
  - `\U` Uppercase until `\E`
  - `\Q` Disable pattern metacharacters until `\E`
  - `\E` End case modification
- This one works differently from normal strings:
- `\b` An assertion, not backspace, except in a character class

## Character classes

- `[amy]` Match 'a', 'm' or 'y'
- `[f-j]` Dash specifies *range*
- `[f-j-]` Dash escaped or at start or end means 'dash'
- `[^f-j]` Caret indicates "match any character *except* these"

The following sequences work within or without a character class. The first six are locale aware, all are Unicode aware. The default character class equivalent are given. See the *perllocale* and *perluunicode* man pages for details.

- `\d` A digit [0-9]
- `\D` A nondigit [^0-9]
- `\w` A word character [a-zA-Z0-9\_]
- `\W` A non-word character [^a-zA-Z0-9\_]
- `\s` A whitespace character [ \t\n\r\f]
- `\S` A non-whitespace character [^\t\n\r\f]
- `\C` Match a byte (with Unicode, `'.'` matches a character)
- `\pP` Match P-named (Unicode) property
- `\p{...}` Match Unicode property with long name
- `\PP` Match non-P
- `\P{...}` Match lack of Unicode property with long name
- `\X` Match extended unicode sequence

POSIX character classes and their Unicode and Perl equivalents:

<code>alnum</code>	<code>IsAlnum</code>
<code>alpha</code>	<code>IsAlpha</code>
<code>ascii</code>	<code>IsASCII</code>
<code>blank</code>	<code>IsSpace</code>
<code>cntrl</code>	<code>IsCntrl</code>
<code>digit</code>	<code>IsDigit</code>
<code>graph</code>	<code>IsGraph</code>
<code>lower</code>	<code>IsLower</code>
<code>print</code>	<code>IsPrint</code>
<code>punct</code>	<code>IsPunct</code>
<code>space</code>	<code>IsSpace</code>
	<code>IsSpacePerl</code>
<code>upper</code>	<code>IsUpper</code>
<code>word</code>	<code>IsWord</code>
<code>xdigit</code>	<code>IsXDigit</code>

Within a character class:

POSIX	traditional	Unicode
<code>[:digit:]</code>	<code>\d</code>	<code>\p{IsDigit}</code>
<code>[:^digit:]</code>	<code>\D</code>	<code>\P{IsDigit}</code>

## Anchors

All are zero-width assertions.

- `^` Match string start (or line, if `/m` is used)
- `$` Match string end (or line, if `/m` is used) or before newline
- `\b` Match word boundary (between `\w` and `\W`)
- `\B` Match except at word boundary (between `\w` and `\w` or `\W` and `\W`)
- `\A` Match string start (regardless of `/m`)
- `\Z` Match string end (before optional newline)
- `\z` Match absolute string end
- `\G` Match where previous `m//g` left off

## Quantifiers

Quantifiers are greedy by default – match the **longest** leftmost.

Maximal	Minimal	Allowed range
<code>{n,m}</code>	<code>{n,m}?</code>	Must occur at least n times but no more than m times
<code>{n,}</code>	<code>{n,}??</code>	Must occur at least n times
<code>{n}</code>	<code>{n}?</code>	Must occur exactly n times
<code>*</code>	<code>*?</code>	0 or more times (same as <code>{0,}</code> )
<code>+</code>	<code>+</code>	1 or more times (same as <code>{1,}</code> )
<code>?</code>	<code>??</code>	0 or 1 time (same as <code>{0,1}</code> )

There is no quantifier `{,n}` – that gets understood as a literal string.

## Extended constructs

<code>(?#text)</code>	A comment
<code>(?ixms-imsx:...)</code>	Enable/disable option (as per <code>m//</code> modifiers)
<code>(?=...)</code>	Zero-width positive lookahead assertion
<code>(?!...)</code>	Zero-width negative lookahead assertion
<code>(?&lt;=...)</code>	Zero-width positive lookbehind assertion
<code>(?&lt;!...)</code>	Zero-width negative lookbehind assertion
<code>(?&gt;...)</code>	Grab what we can, prohibit backtracking
<code>{? {code} }</code>	Embedded code, return value becomes <code>\$^R</code>
<code>{?? {code} }</code>	Dynamic regex, return value used as regex
<code>{?(cond)yes no}</code>	cond being integer corresponding to capturing parens
<code>{?(cond)yes}</code>	or a lookahead/eval zero-width assertion

## Variables

<code>\$_</code>	Default variable for operators to use
<code>\$*</code>	Enable multiline matching (deprecated; not in 5.9.0 or later)
<code>\$&amp;</code>	Entire matched string
<code>\$'</code>	Everything prior to matched string
<code>\$'</code>	Everything after to matched string

The use of those last three will slow down **all** regex use within your program. Consult the *perlvar* man page for `@LAST_MATCH_START` to see equivalent expressions that won't cause slow down. See also `Devel::SawAmpersand`.

<code>\$1, \$2 ...</code>	Hold the Xth captured expr
<code>\$+</code>	Last parenthesized pattern match
<code>\$^N</code>	Holds the most recently closed capture
<code>\$^R</code>	Holds the result of the last <code>{...}</code> expr
<code>@-</code>	Offsets of starts of groups. <code>\$-[0]</code> holds start of whole match
<code>@+</code>	Offsets of ends of groups. <code>\$+[0]</code> holds end of whole match

Captured groups are numbered according to their *opening* paren.

## Functions

<code>lc</code>	Lowercase a string
<code>lcfirst</code>	Lowercase first char of a string
<code>uc</code>	Uppercase a string
<code>ucfirst</code>	Titlecase first char of a string
<code>pos</code>	Return or set current match position
<code>quotemeta</code>	Quote metacharacters
<code>reset</code>	Reset <i>pattern?</i> status
<code>study</code>	Analyze string for optimizing matching
<code>split</code>	Use regex to split a string into parts

The first four of these are like the escape sequences `\L`, `\l`, `\U`, and `\u`. For Titlecase, see below.

## Terminology

### Titlecase

Unicode concept which most often is equal to uppercase, but for certain characters like the German 'sharp s' (ß) there is a difference.

### See also

- *perlretut* for a tutorial on regular expressions.
- *perlquick* for a rapid tutorial.
- *perlre* for more details.
- *perlvar* for details on the variables.
- *perlop* for details on the operators.
- *perlfunc* for details on the functions.
- *perlfaq6* for FAQs on regular expressions.
- The *remodule* to alter behaviour and aid debugging.
- “Debugging regular expressions” in *perldebug*
- *perluniintro*, *perlunicode*, *charnings* and *locale* for details on regexes and internationalisation.
- *Mastering Regular Expressions* by Jeffrey Friedl (<http://regex.info/>) for a thorough grounding and reference on the topic.

## Authors

This card was created by Andrew Ford.

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