|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Anchors**   |  |  | | --- | --- | | ^ | Start of string, or start of line in multi-line pattern | | \A | Start of string | | $ | End of string, or end of line in multi-line pattern | | \Z | End of string | | \b | Word boundary | | \B | Not word boundary | | \< | Start of word | | \> | End of word |   **Character Classes**   |  |  | | --- | --- | | \c | Control character | | \s | White space | | \S | Not white space | | \d | Digit | | \D | Not digit | | \w | Word | | \W | Not word | | \x | Hexade­cimal digit | | \O | Octal digit |   **POSIX**   |  |  | | --- | --- | | [:upper:] | Upper case letters | | [:lower:] | Lower case letters | | [:alpha:] | All letters | | [:alnum:] | Digits and letters | | [:digit:] | Digits | | [:xdigit:] | Hexade­cimal digits | | [:punct:] | Punctu­ation | | [:blank:] | Space and tab | | [:space:] | Blank characters | | [:cntrl:] | Control characters | | [:graph:] | Printed characters | | [:print:] | Printed characters and spaces | | [:word:] | Digits, letters and underscore | |  | **Quanti­fiers**   |  |  |  |  | | --- | --- | --- | --- | | \* | 0 or more | {3} | Exactly 3 | | + | 1 or more | {3,} | 3 or more | | ? | 0 or 1 | {3,5} | 3, 4 or 5 |   Add a ? to a quantifier to make it ungreedy.  **Escape Sequences**   |  |  | | --- | --- | | \ | Escape following character | | \Q | Begin literal sequence | | \E | End literal sequence |   "­Esc­api­ng" is a way of treating characters which have a special meaning in regular expres­sions literally, rather than as special charac­ters.  **Common Metach­ara­cters**   |  |  |  |  | | --- | --- | --- | --- | | ^ | [ | . | $ | | { | \* | ( | \ | | + | ) | | | ? | | < | > | | |   The escape character is usually \  **Special Characters**   |  |  | | --- | --- | | \n | New line | | \r | Carriage return | | \t | Tab | | \v | Vertical tab | | \f | Form feed | | \xxx | Octal character xxx | | \xhh | Hex character hh |  |  |  | | --- | --- | | ?= | Lookahead assertion | | ?! | Negative lookahead | | ?<= | Lookbehind assertion | | ?!= or ?<! | Negative lookbehind | | ?> | Once-only Subexp­ression | | ?() | Condition [if then] | | ?()| | Condition [if then else] | | ?# | Comment |   **Assertions:** |  | **Groups and Ranges**   |  |  | | --- | --- | | . | Any character except new line (\n) | | (a|b) | a or b | | (...) | Group | | (?:...) | Passive (non-c­apt­uring) group | | [abc] | Range (a or b or c) | | [^abc] | Not (a or b or c) | | [a-q] | Lower case letter from a to q | | [A-Q] | Upper case letter from A to Q | | [0-7] | Digit from 0 to 7 | | \x | Group/­sub­pattern number "­x" |   Ranges are inclusive.  **Pattern Modifiers**   |  |  | | --- | --- | | g | Global match | | i \* | Case-i­nse­nsitive | | m \* | Multiple lines | | s \* | Treat string as single line | | x \* | Allow comments and whitespace in pattern | | e \* | Evaluate replac­ement | | U \* | Ungreedy pattern |   \* PCRE modifier  **String Replac­ement**   |  |  | | --- | --- | | $n | nth non-pa­ssive group | | $2 | "­xyz­" in /^(abc­(xy­z))$/ | | $1 | "­xyz­" in /^(?:a­bc)­(xyz)$/ | | $` | Before matched string | | $' | After matched string | | $+ | Last matched string | | $& | Entire matched string |   Some regex implem­ent­ations use \ instead of $. |