

What are Regular Expressions?

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Use regex for:

- ▶ Finding needles in haystacks.
- ▶ Changing one string to another.
- ▶ Pulling data out of strings.

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- ▶ `grep REGEX FILES`: Search `FILES` for `REGEX` and print matches.
- ▶ If you don't specify `FILES`, `grep` will read `STDIN` (so you can pipe stuff into it).

Looking for stuff with `grep`

- ▶ `grep`: Global Regular Expression Print
- ▶ `grep REGEX FILES`: Search `FILES` for `REGEX` and print matches.
- ▶ If you don't specify `FILES`, `grep` will read `STDIN` (so you can pipe stuff into it).
- ▶ `-C LINES` gives `LINES` lines of context around the match.
- ▶ `-v` prints every line that doesn't match (invert).
- ▶ `-i` Ignore case when matching.
- ▶ `-P` Use Perl-style regular expressions.
- ▶ `-o` Only print the part of the line the regex matches.

Basic Patterns

- ▶ `.` Matches one of any character.
- ▶ `\w` Matches a word character (letters, numbers, and `_`).
- ▶ `\W` Matches everything `\w` doesn't.
- ▶ `\d` Matches a digit.
- ▶ `\D` Matches anything that isn't a digit.
- ▶ `\s` Matches whitespace (space, tab, newline, carriage return, etc.).
- ▶ `\S` Matches non-whitespace (everything `\s` doesn't match).
- ▶ `\` is also the escape character.

Variable-length Patterns

- ▶ $\{n\}$ matches n of the previous character.
- ▶ $\{n,m\}$ matches between n and m of the previous character (inclusive).
- ▶ $\{n, \}$ matches at least n of the previous character.

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- ▶ $\{n, \}$ matches at least n of the previous character.
- ▶ $*$ matches 0 or more of the previous character ($\{0, \}$).
- ▶ $+$ matches 1 or more of the previous character ($\{1, \}$).
- ▶ $?$ matches 0 or 1 of the previous character ($\{0,1\}$).

DIY character classes

- ▶ `[abc\d]` matches a character that is either a, b, c, or a digit.
- ▶ `[a-z]` matches characters between a and z.
- ▶ `^` negates a character class: `[^abc]` matches everything except a, b, and c.

Anchors

- ▶ `^` forces the pattern to start matching at the beginning of the line.
- ▶ `$` forces the pattern to finish matching at the end of the line.
- ▶ `\b` forces the next character to be a word boundary.
- ▶ `\B` forces the next character to not be a word boundary.

Groups

- ▶ `(ab|c)` matches either 'ab' or 'c'.
- ▶ You can use length modifiers on groups, too: `(abc)+` matches one or more 'abc'
- ▶ The real power of grouping is backreferences. You can refer to the thing matched by the 1st group, etc.
- ▶ For example, `(ab|cd)\1` matches 'abab' or 'cdcd' but not 'abcd' or 'cdab'.

Greedy vs. Polite matching

- ▶ Regular expressions are greedy by default: they match as much as they possibly can.
- ▶ Usually this is what you want, but sometimes it isn't.
- ▶ You can make a variable-length match non-greedy by putting a `?` after it.
- ▶ For example: `.+\.` vs. `.+?\.`

Sed: Editing with regex

- ▶ `sed` is a stream editor-use it for editing files or STDIN.
- ▶ It uses regular expressions to perform edits to text.
- ▶ `-r` enables extended regular expressions.
- ▶ `-n` makes `sed` only print the lines it matches.

The Print Command

- ▶ `sed -n /regex/ p` works pretty much exactly like `grep`.
- ▶ Use this to make sure your regexes are matching what you want them to.
- ▶ (You can also use `p` in conjunction with `s`, which we'll talk about immediately.)

The Substitute Command

- ▶ `s/PATTERN/REPLACEMENT/` replaces the thing matched by PATTERN with REPLACEMENT.
- ▶ Patterns can be any regular expression that we've talked about so far.
- ▶ Replacements can be plain text and/or backreferences!

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- ▶ Patterns can be any regular expression that we've talked about so far.
- ▶ Replacements can be plain text and/or backreferences!
- ▶ `s/ / /g` makes the substitution global (every match on each line).
- ▶ `s/ / /i` makes the match case-insensitive.