

Regular Expressions

Class 5

Overview

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Announcements

- Unix assignments due Feb 15
- Shell assignments due Feb 22
- Shell survey closing tonight!
- No class session next week

Misc special characters

- `.` matches *any* single character
 - `...` matches three consecutive characters
- `|` for an OR between regexes
 - `hello|world` matches a string that is "hello" or "world"
- `\` for special expressions/escapes
 - `\b` matches the empty string at the edge of a "word"
 - There's more: check the GNU `grep` manual for the rest
- `(,)` enclose a whole expression as a *subexpression*

Brackets

- `[,]` enclose a set to match for **one character**
 - `[abc]` matches 'a', 'b', or 'c'
- `-`: range
 - `[A-Za-z0-9]`: capital and lowercase numbers and digits
- `^`: not in set
 - `[^ab]`: everything not 'a' or 'b'
- Named classes
 - e.g. `[:alnum:]` (alphanumeric characters)
 - See the Grep documentation for more

Quantifiers

- Specify how many of a preceding regex to match
- `?`: ≤ 1 time
- `*`: ≥ 0 times
- `+`: ≥ 1 times
- `{n}`: n times
- `{n, }`: $\geq n$ times
- `{, m}`: $\leq m$ times
- `{n, m}`: x times where $n \leq x \leq m$

Exercise 1

- If you want to test these with `grep`, try using `grep -E`
 - Default `grep` uses BRE, which requires you to `\` escape a lot of things (more on this at the end)
- Write regexes that matches against:
 1. "hello" or "world"
 2. 3 of any character, "cat", then at least 5 of any character

Exercise 2

Write regexes that match against:

1. 3 English vowels (a, e, i, o, u) in a row
2. 5 non-number characters in a row
3. "Odd" and a single digit odd number
4. "Even" and an even number
 - For simplicity's sake, leading 0s are allowed

Anchors

- Perform *positional* matching
- `^`: match empty string at the beginning of a line
- `$`: match empty string at the end of a line

Exercise 3

Write regexes that match against:

1. File names that end in ".txt"
2. File names that start with "file" with an odd number after and ends in ".txt"
3. A phone number with an optional country code
 - o In the +X (XXX) XXX-XXXX format

Backreferences

- Match previous parenthesized `()` subexpression
- `\n`: match n th parenthesized subexpression

BRE vs ERE

- In BRE `?`, `+`, `{`, `|`, `(`, and `)` must be escaped with `\`
 - (and `}` if you're specifying an interval)

Exercise 4

- `sed` is a command that performs text transformations
- The `s` command can perform search-and-replace
- `sed 's/hello/world/g'` replaces instances of "hello" with "world"
 - The `g` at the end allows for multiple replacements on a line
 - The first character specifies the delimiter: doesn't have to be `/`
 - `s/pattern/replacement/flags`
 - `-E` as an argument puts `sed` into ERE mode
- Write a `sed` command that replaces instances of four digit numbers with "(XXXX)"
 - To be a number, it can't have letters next to it
 - `\<` and `\>` are positional matches for word boundaries

Q&A

Basic assignment