THE UNIVERSITY OF WESTERN AUSTRALIA

Regular Expressions

Lecture 10

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Regular Expressions

- A regular expression is any string that you want to match with another string. However, regular expressions can also contain “wild-cards”, allowing multiple target strings to match.
- Unfortunately, UNIX has two different formats for regular expressions
  - *Shell pattern matching, i.e. the regular expressions you have already seen in connection with filenames and the case statement.*
  - *A number of UNIX utilities, e.g.* `grep`*, use a different format for regular expressions derived from* `ed` *(predecessor to* `vi`*).*

Wild-card Patterns

ed	shell	Description
.	?	Single character
[ ]	[ ]	Single character from set or range(s)
[^]	[^]	Single character NOT from this set/range(s)
*		Zero or more occurrences of preceding letter
..*	*	One or more occurrences of any letter
^		Start of a matching string
$		End of a matching string
\	\	Take special meaning away from next letter
\(\)		Capture match for later reuse

The last of these is a more advanced facility, but one that I use a lot (more in a bit)

Examples of Ed-Style Patterns

- `malloc  *(`
  - *Note one or more spaces*
- `.*`
  - *Any string (include empty string)*
- `\.`
  - *Dot (as such)*
- `[a-zA-Z][a-zA-Z]*`
  - *Alphabetic string*
- `[0-9][0-9]*\.[0-9][0-9]*`
  - *Floating point number*
- `^$`
  - *Empty line*

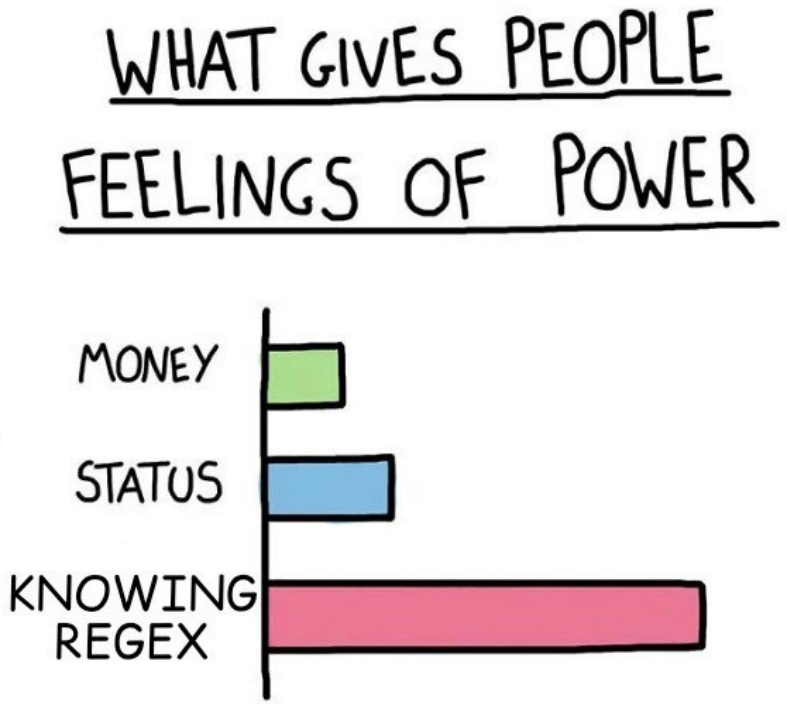
Capturing Matches

- `sed` and `grep` (but not `awk`) provide a way of recording the match you have made and then recalling it for use in later comparisons (or substitutions)
- `\(  \)` around a regular expression records the string that matched that regular expression. You can record up to 9 regular expression matches in a single operation.
- `\<`*N*`>` is used to refer to one of the recorded matches, that is `\1` refers to the first match recorded, `\2` for the second, and so on.

Capturing Matches

- Example: `\([a-z]\)\([a-z]\)\1\2` matches a string where the first letter is repeated as the third letter and the second repeated as the fourth, e.g. `abab`, but not `abba`
  - *Does `xxxx` match?*

Regex Power



Neetish Raj, https://neetishop.medium.com/best-learning-path-to-master-regex-for-javascript-developers-d928960a9d14

grep

`grep` *[<options>] <regular-expression> <file> ...*

- As we saw before, you can search with an ordinary string, but in reality it's a regular expression
- Useful options:

`-i` Make comparisons case insensitive ("i" matches "I")

`-n` Prepend the numbers of the matching lines

`-v` Invert the match so only non-matching lines are reported

Examples

What lines do these patterns match:

- `grep '^\.[VABL][LIE]$' file`
- `grep -v 'warning:' errs | grep -v 'In function'`
- `find . -type f -exec grep -n awk '{}' \; -print`

Demo

- Let's use `grep` to extract lines from `Alice_in_Wonderland.txt`
- Extract the lines that mention both Alice and cat
- Extract the lines that mention oyster or mystery
- In the spirit of Wordle, I want to get a list of 5 letter words from the Alice text.
  - *How about 5 letter palindromes (i.e. words such as radar that read the same right to left, as left to right.*