Regular Expressions Overview

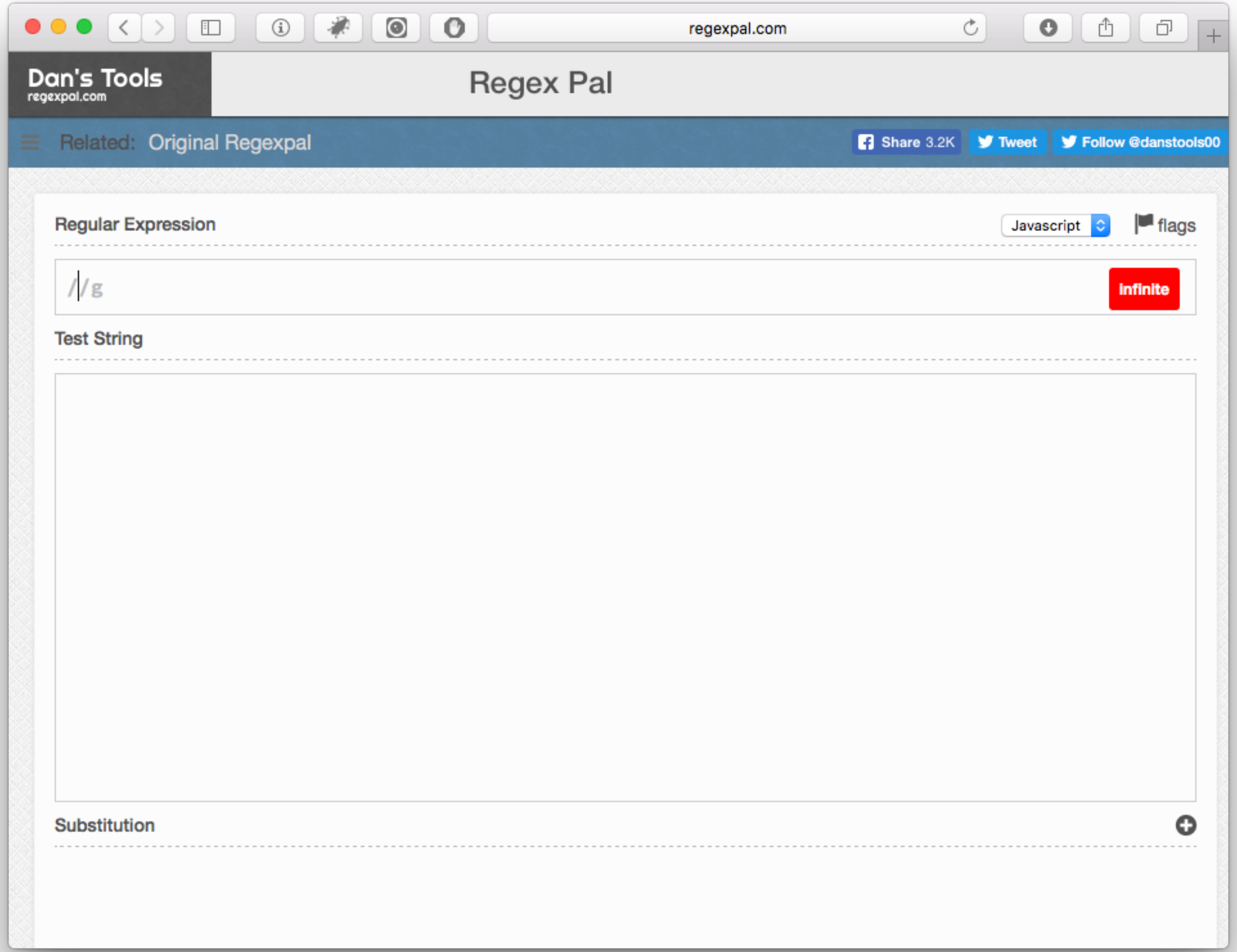
What is a Regular Expression?

A regular expression defines a pattern of characters.

Can be used for:
Validation
Data Extraction

One pattern can match one or many sets of characters

English	Pattern	Matches	Does Not Match
4 numbers in a row	\d\d\d\d or \d{4}	1234 2222 3333	a1234 AAsaaaa 123
2 numbers, a slash, two numbers, a slash, 4 numbers	\d\d/\d\d/ \d\d\d\d or \d{2}/\d{2}/\d{4}	11/01/2013 10/22/2015 23/45/2222	11/1/2013 1/11/2015 aa/aa/aaaa dsifjosdijfoas



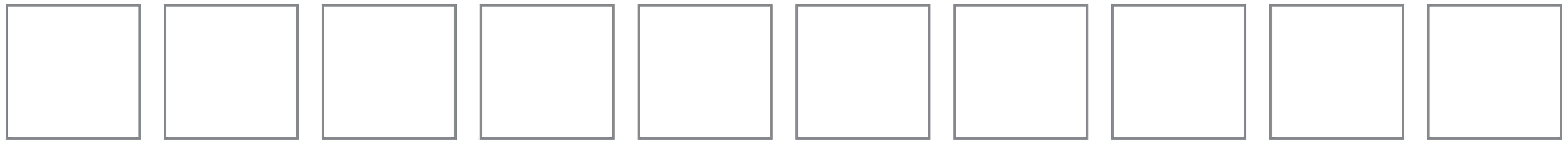
regexpal.com

Challenge 1

Let's write a pattern that matches a date. Such as…

07/30/2016

Each Regex Character Represents a Character in a String



10 boxes for 10 characters

0	7	/	3	0	/	2	0	1	6

But this will only
match our one date.

Literal vs Special Characters

Literal Characters

0	7	/	3	0	/	2	0	1	6

Character Sets

\d	\d	/	\d	\d	/	\d	\d	\d	\d

Wildcards

.	.	/	.	.	/	.	.	.	.

Literal Characters

- Escape certain characters that have special meaning
    - \ can define a character set or escape a special character (\d or \. or \\)

Character Sets

- Can explicitly define a set of characters
  - [aeoiu]
- Can define a range of characters
  - [a-z0-9]
- Can represent a set of characters
  - \d
  - \w
- Can represent *not* characters
  - [^aeiou]
  - \D

Shorthand for Character Sets

There are shortcuts for commonly used character sets:

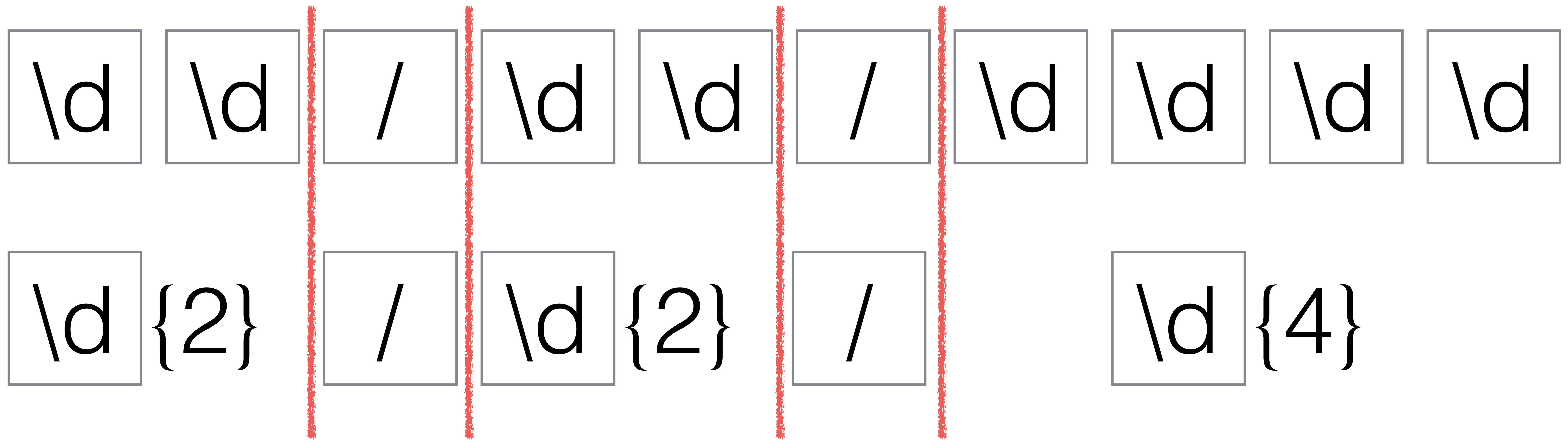
Shortcut	Definition	Example
\s	Any whitespace character	/a\sb/ matches: a b
\S	Any non-whitespace character	/a\Sb/ matches : abb
\d	Any digit	\d\d-\d matches 12-3
\D	Any non-digit	/a\Db/ matches aBc or abc
\w	Any alpha-numeric character	
\W	Any non-alpha-numeric character	

Wildcard

.

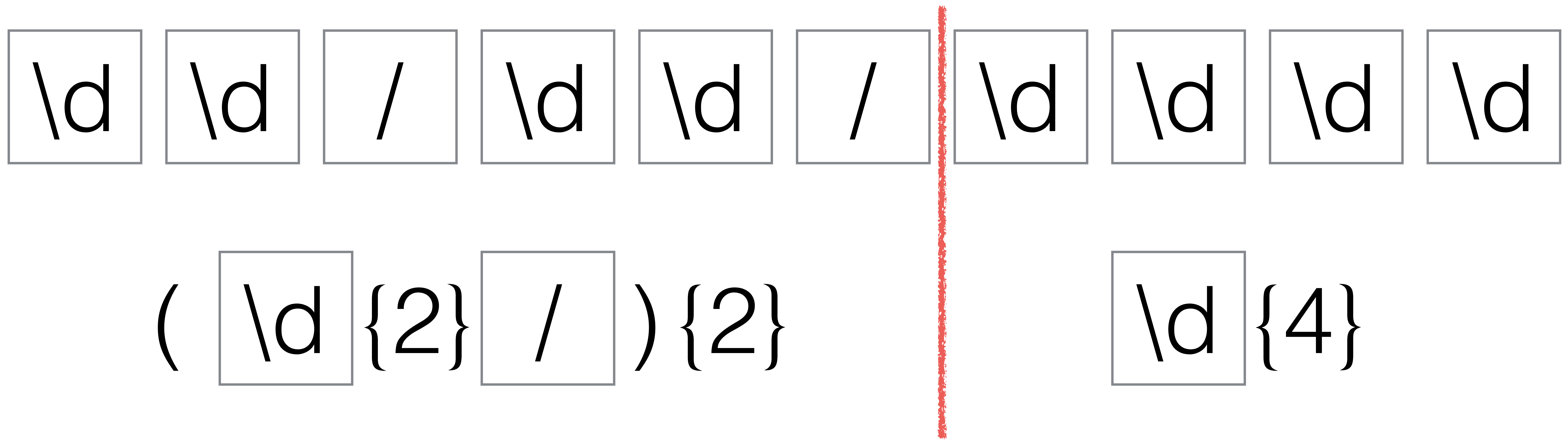
Repetition

We don’t have to use 10 boxes when we have repeated characters.



Grouping

Parentheses articulate groups of characters that can be extracted or repeated.



Challenge 2

Let’s write a pattern that matches an email. Such as…

guy9@gmail.com

You try! Write a pattern that uses characters sets and repetition to match the email.

Less defined repetition

Literal Characters

g	u	y	9	@	g	m	a	i	l	\.	c	o	m

Character Sets

\w	\w	\w	\w	@	\w	\w	\w	\w	\w	\.	\w	\w	\w

Repetition

\w	{4}			@	\w	{5}				\.	\w	{3}	

But what if there are 6 characters in the first part of the email?

Question, Star, and Plus

? match the previous character 0 or 1 times

***** match the previous character 0 or more times

+ match the previous character 1 or more times

Greedy vs Lazy

Sometimes **.+** can match too much.

If we throw **<.+>** at *<h1>Welcome</h1>* to find opening tags, we get back the entire string when we only wanted the beginning.

Using **.+?** makes the **+** lazy, meaning it will only grab as many characters are needed in order to continue the match.

Application

$$\boxed{\backslash w}\ \{4\}\ \boxed{@}\ \boxed{\backslash w}\{5\}\ \boxed{\backslash .}\ \boxed{\backslash w}\ \{3\}$$

$$\boxed{\backslash w}\ +\ \boxed{@}\ \boxed{\backslash w}\ +\ \boxed{\backslash .}\ \boxed{\backslash w}\ +$$

Exercises

Rewrite regexes using shortcuts:

- Filenames in the following format: yyyymmdd-data.xls
- IP Addresses in the format XXX.XXX.XXX.XXX
- Social Security Numbers in the format XXX-XX-XXXX
- Any 4 letter word beginning with a vowel
- Any 4 letter word with a number at the end