REGEX AND REGEXR

An Introduction to Regular Expressions and Their Applications in Technical Services

WHAT IS REGEX?

Regular Expressions

Regular expressions are patterns of characters that allow for more options when searching and editing documents

What does that mean?

Example: Let's search Mother Goose

Jack and Jill went up the hill
To fetch a pail of water;
Jack fell down, and broke his crown,
And Jill came tumbling after.

Let's find words that rhyme end in -ill

Search term:	Result:
ill	The pattern "ill" anywhere in the document

Jack and Jill went up the hill
To fetch a pail of water;
Jack fell down, and broke his crown,
And Jill came tumbling after.

The problem?

We're looking for words that end in -ill. What if the poem went like this?

Jack and Jill went up the hill
To fetch a filling of water;
Jack fell down, and broke his crown,
And Jill came tumbling after.

The search would return the "ill" in "filling," and that isn't what we want.

The solution?

With regular expressions, one can search for words that end in -ill, giving us only those words which rhyme

Search term:	Result:
\w*ill\b	A pattern of characters ending in "ill" anywhere in the document

So what can regular expressions do?

- Search by character type
- Search by character variations
- Search by character quantity
- Search by position
- Find and replace

REGEX BASICS

Character Classes

- Character classes allow you to search for patterns by character type

\w	• Word characters
\d	• Digit characters
\s	• Space characters

Using word characters \w A-Za-z0-9_

Search term:	Result:
h\wt	A pattern containing “h,” followed by one word character, followed by “t”

It was hot so I wore a hat when I hit a home run.

Using digit characters \d 0-9

Search term:	Result:
\d	A pattern of a single digit

Why was 6 afraid of 7? Because 7, 8, 9.

Also: g2g, bye!

Using space characters (spaces, tabs, breaks)

Search term:	Result:
\s	Matches all spaces, tabs, and breaks in the document
\t	Matches all tabs in the document
\r\n	Matches all patterns of line feed and carriage return (all new line feeds)

BONUS: The wildcard character .

Search term:	Result:
.	Any character anywhere in the document
.ill	Any character followed by the pattern “ill” (see below)

Jack and Jill went up the hill
To fetch a filling of water;
Jack fell down, and broke his crown,
And Jill came tumbling after.

Character Sets

- Character sets allow you to search for patterns using character variations

[ ]	• Character set
[^]	• Negated character set
[-]	• Character set range
(|)	• Alternation

Using character sets [ ]

Search term:	Result:
h[oa]t	A pattern containing “h,” followed by an “o” or an “a,” followed by “t”

It was hot so I wore a hat when I hit a home run.

Using negated character sets [^]

Search term:	Result:
h[^oa]t	A pattern containing “h,” followed by one letter that is not an “o” or an “a,” followed by “t”

It was hot so I wore a hat when I hit a home run.

Using character set ranges [-]

Search term:	Result:
h[a-i]t	A pattern containing “h,” followed by a character within the range of “a” through “i,” followed by “t”

It was hot so I wore a hat when I hit a home run.

Using character set alternation (|)

Search term:	Result:
h(a|i|o)t	A pattern containing “h,” followed by either an “a” or an “i” or an “o,” followed by “t”

It was hot so I wore a hat when I hit a home run.

Character Quantifiers

- Character quantifiers allow you to search for patterns by character quantity

{ }	• Single quantifier for the previous character
{ , }	• Quantifier range for the previous character
?	• 0 to 1 of the previous character
*	• 0 or more of the previous character
+	• 1 or more of the previous character

Using a character quantifier { }

Search term:	Result:
be{2}	A pattern containing a “b” and two “e’s”

If I could be a thing with wings, I’d be a bee.

Using a character quantifier range { , }

Search term:	Result:
be{1,2}	A pattern containing a “b” followed at least 1 “e” and at most 2 “e’s”

If I could be a thing with wings, I’d be a bee.

Using the 0-1 character quantifier ?

Search term:	Result:
g?lass	A pattern with 0 or 1 “g” followed by “lass”

Pour a glass for the lass!

(Of lemonade, that is.)

Using the 0 or more character quantifier *

Search term:	Result:
Pas*	A pattern of a “P,” an “a”, and 0 or more “s’s”

Pass the peas, please, Pa!

Using the 1 or more character quantifier +

Search term:	Result:
princes+	The pattern “prince” followed by at least one “s”

Many princes wanted to marry the princess.

Location Anchors

- Location anchors allow you to search for patterns by their position

^	• Searches at the beginning of a line
$	• Searches at the end of a line
\b	• Word boundary

Searching the beginning of a line ^

Search term:	Result:
^Mary	Finds the pattern "Mary" at the beginning of a line

Mary had a little lamb,
His fleece was white as snow,
And everywhere that Mary went,
The lamb was sure to go.

Searching the end of a line $

Search term:	Result:
merrily,$	Finds the pattern "merrily," at the end of a line

Row, row, row your boat,
Gently down the stream;
Merrily, merrily, merrily, merrily,
Life is but a dream.

Searching with a word boundary \b

Search term:	Result:
fish\b	Finds the pattern “fish” followed by a word boundary

The little stars were the herring fish
That lived in that beautiful sea —
"Now cast your nets wherever you wish —
Never afraid are we";
So cried the stars to the fishermen three:
Wynken, Blynken, and Nod.

Capturing Groups

- Capturing groups allow you to perform find and replace

( )	• Captures a regular expression
$1, $2, $3, etc.	• References the capture

Using a capture ( )

Search term:	Result:
(a) (penny)	Finds the pattern “a” and stores it as the first reference; finds the pattern “penny” and stores it as the second reference

Hot cross buns!
Hot cross buns!
one a penny, two a penny,
Hot cross buns!

Using a capture ( ) $1 $2

Search term:	Result:
(a) (penny)	Finds the pattern "a" and stores it for reference as the first capture; finds the pattern "penny" and stores it as the second reference
$1	References the first capture
$2	References the second capture

Hot cross buns!
Hot cross buns!
one a penny, two a penny,
Hot cross buns!

Using a capture ( ) $1 $2

Find:	Replace:
(a) (penny)	$1-$2

Hot cross buns!

Hot cross buns!

one a-penny, two a-penny,

Hot cross buns!

PRACTICAL APPLICATIONS

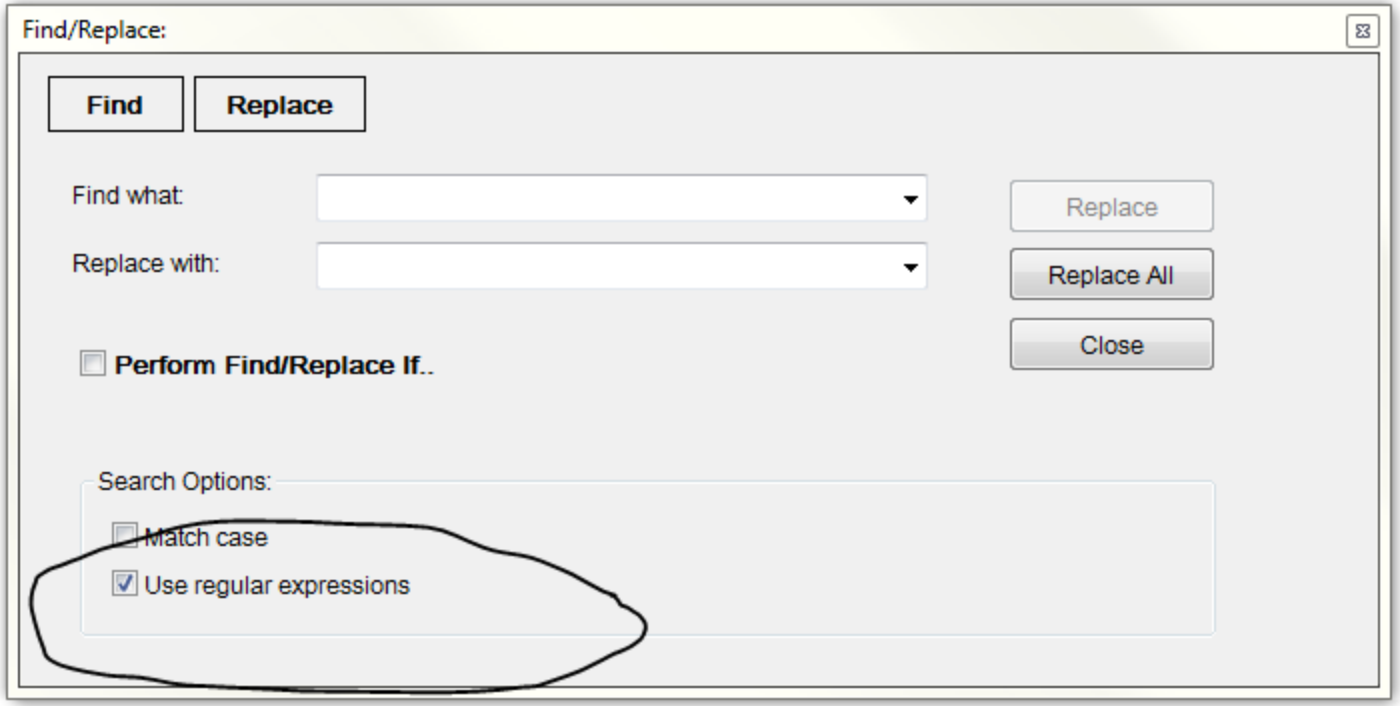
How would you…

- Search for an author when you aren't sure if his last name is Larson, Larsson, or Larsen?

- Find all the 12-digit barcodes in a document?
  - And then capture just the last 7 digits of that barcode?

- Add a full-stop to 100 fields that don't have one?

- Change all the "$a Bible $x Dictionaries" subject headings to "$a Bible $v Dictionaries"
  - And, while incorrect, for fun: how would we reorder those subfields if we wanted to?


Find/Replace:
Find
Replace
Find what:
Replace with:
Replace
Replace All
Close
Perform Find/Replace If..
Search Options:
Match case
Use regular expressions

PRACTICE WITH REGEXR

RegExr http://www.regexr.com/

- RegExr is one of several websites which allows you to practice regular expressions on a block of text

Regex goes here

Document text goes here (the text which matches the regex is highlighted in blue)

RegExr http://www.regexr.com/