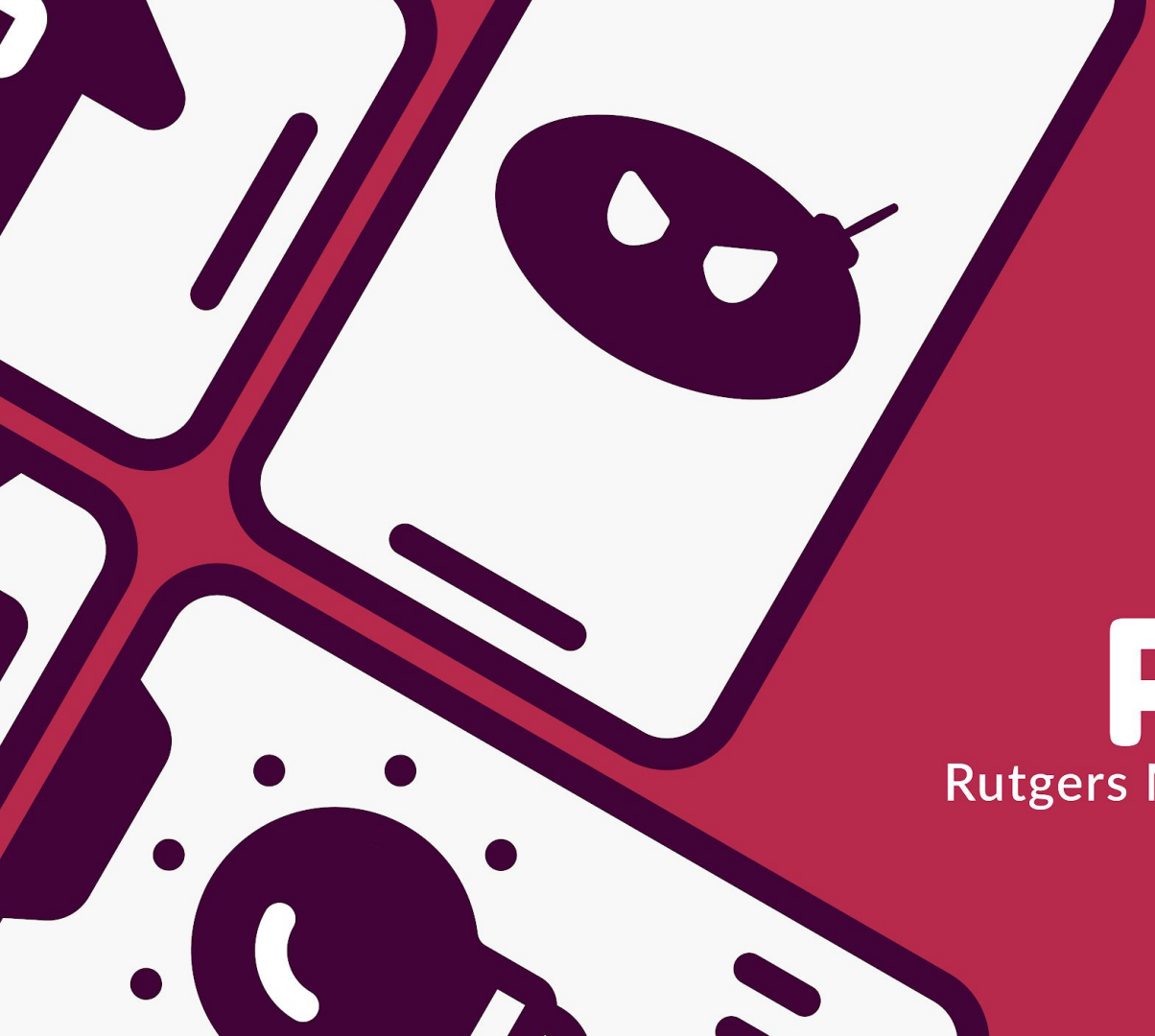


RUMAD

Rutgers Mobile App Development

Bonus Workshop 1: Regex, Overview

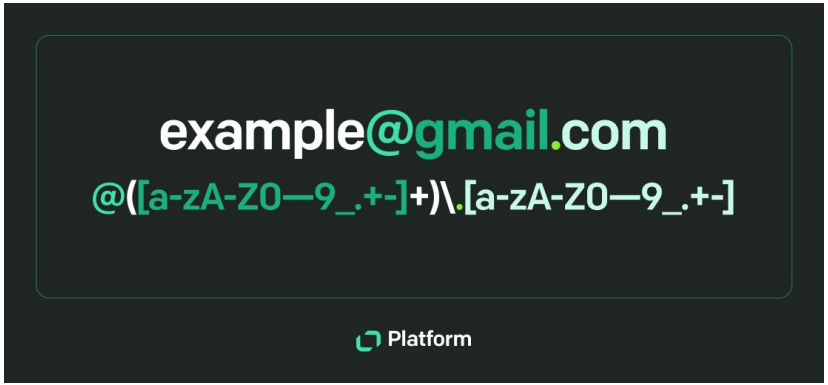
For this bonus workshop, we'll be covering:

- Fundamentals of Regular Expressions
- Its applications
- Implementations in JavaScript

What are Regular Expressions (RegEx)?

Simple definition:

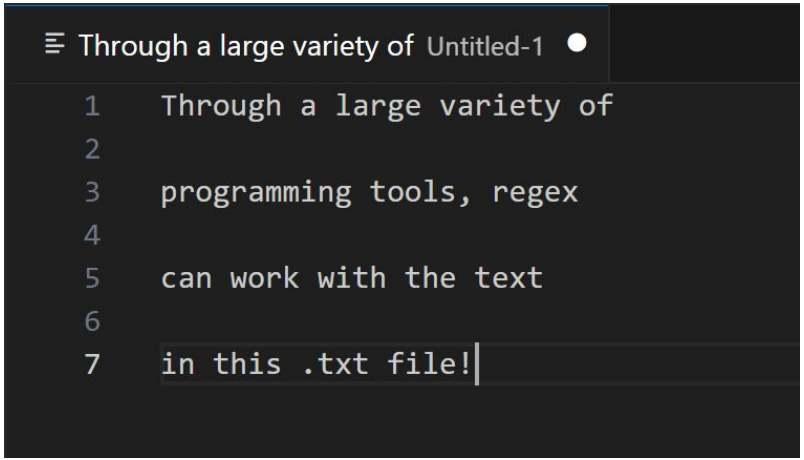
- Sequences of characters used to find and manipulate strings based on patterns



Example of regex, *Text Platform*

Why do we need RegEx?

- Concise and efficient way to work with text
  - Text processing is extensive in most computational fields
  - Small syntax, large impact
  - Supported by many programming tools



Example .txt file

Applications of RegEx

- Text searching/replacing within files and strings
- Text input validation
  - Ex. emails, passwords, phone numbers
- Data extraction front text
  - Ex. web scraping

Web scraping flow chart, *CrawlNow*

RegEx Symbols

Symbols

These symbols are paired together to extract/match structured pieces of text.

Symbol	Description	Symbol	Description
^	Start of line +	?	0 or 1 +
\A	Start of string +	{3}	Exactly 3 +
$	End of line +	{3,}	3 or more +
\Z	End of string +	{3,5}	3, 4 or 5 +
\b	Word boundary +	\	Escape Character +
\B	Not word boundary +	\n	New line +
\<	Start of word	\r	Carriage return +
\>	End of word	\t	Tab +
\s	White space	.	Any character except new line (\n) +
\S	Not white space	(a|b)	a or b +
\d	Digit	[abc]	Range (a or b or c) +
\D	Not digit	[^abc]	Not a or b or c +
\w	Word	[0-7]	Digit between 0 and 7 +
\W	Not word	[a-q]	Letter between a and q +
*	0 or more +	[A-Q]	Upper case letter + between A and Q +
+	1 or more +		

Quantity

- x{p} matches exactly p repetitions of x
- x{p,} matches p or more repetitions of x
- x{p,q} matches p to q repetitions of x (Inclusive)
- x* matches 0 or more repetitions of x
- x+ matches 1 or more repetitions of x

Quick Examples

w{3} matches **www**

w{3,4} matches www, wwww

w* matches “ ”, w, wwwwww (any number of ws)

w+ matches w, wwwwww, any number of w>=1

Grouped Matching

- (cat|dog) matches **cat** or **dog** *vs.*
  [cat|dog] matches ‘c’, ‘a’, ‘t’, ‘|’, ‘d’, ‘o’, ‘g’
- [0-9] matches any digit 0-9 **once**
- [a-zA-Z0-9] matches any alphanumeric
- [**^**0-9] matches any non-digit character, **“^” = not**

Quick Examples

(cat|dog){2} matches:
catcat, dogdog, catdog, dogcat

[a-zA-Z0-9]* matches:
Cs112 or any word that has **alphanumerics** as well as **“”**

[^a-zA-Z]+ matches:
1 or more combination of digits or special characters like **1&234$@**

- Doesn’t match ABC123

Shortcuts

- Easy encodings for common matching patterns:
  - alphanumeric:[a-zA-Z0-9]
  - digit [0-9].

For your reference 

- **Extra Symbols:**
  - escape character: \
  - . matches any character so .* would match any sequence of characters

Shortcut	Equivalent to
\d \d\d or \d{2} \D	[0-9] [0-9]{2} [^0-9] = “NOT” digit
\w \W	[a-zA-Z0-9_] [^a-zA-Z0-9_] = “NOT” word
\s \S	Captures space characters like “ ”, tabs, new-lines, carriage returns, etc. [\t\n\r\f\v] [^ \t\n\r\f\v] = “NOT” space

Examples

Matching Rutgers emails

hpm27@scarletmail.rutgers.edu

What is constant in this format?

- The @ symbol
- ".rutgers.edu"

What varies?

- The netID, it could be any combination of letters and numbers
- "scarletmail" or could be a different domain such as "rwjms", "cs", etc.

Matching Rutgers emails

hpm27@scarletmail.rutgers.edu

So far we have: ___@_____\.rutgers\.edu

We can match a combination of letters & numbers using **[a-z0-9]+**

- Interpret this as a or b or c… or 0 or 1 or 2…
- The **+** indicates that we're trying to **match 1 or more**

This gives us: [a-z0-9]+@[a-z]+\.rutgers\.edu

Gene Matching with RegEx

- A genome sequence consists of the letters **A, C, T, G**.
- A potential gene is represented by a string of the form:
  - (prefix) **gene** (postfix)
  - **Prefix** = ATG
  - **Postfix** = TAG/TAA/TGA
  - **Gene** = stuff in between

We want to capture what's in between!

Gene Matching with Regex

So far we have:
ATG____(TAG|TAA|TGA)

- **Prefix** = ATG
- **Postfix** = TAG/TAA/TGA
- **Gene** = stuff in between

What's wrong with this expression?
ATG.*(TAG|TAA|TGA)

- This will match the entire expression including prefix and postfix, what if we want what's in between without extra preprocessing?
- How do we do this? → **Capture Group**

Gene Matching with Regex

- **Prefix** = ATG
- **Postfix** = TAG/TAA/TGA
- **Gene** = stuff in between

To capture what's between the prefix and postfix, we need a **capture group!**

- Surround parts of a pattern string in parentheses to indicate that we want to specifically capture that information

Final Expression:

ATG(.*)(TAG|TAA|TGA)

```
const sequence =
"AGTATGCATTAGCAT"

const regex =
/ATG(.*)(TAG|TAA|TGA)/;

const match =
sequence.match(regex);

//Out:
// [ATGCATTAG, CAT, TAG]
```

Implementing RegEx in Code

Match a Palindrome!

Write a **regular expression** that matches strings which contain **exactly five non-whitespace characters** forming a **5-character palindrome**, while **ignoring any amount of whitespace** (spaces, tabs, newlines) between those characters and at the ends.

Examples that should match:

- `a1b1a`
- `a 1b 1a`
- `#a? a# (with spaces anywhere)`

Match a Palindrome!

Write a **regular expression** that matches strings which contain **exactly five non-whitespace characters** forming a **5-character palindrome**, while **ignoring any amount of whitespace** (spaces, tabs, newlines) between those characters and at the ends.

Examples that should match:

- `a1b1a`
- `a 1b 1a`
- `#a? a# (with spaces anywhere)`

```
const isPal5 = /^\s*(\S)\s*(\S)\s*(\S)\s*\2\s*\1\s*$/;
const is5CharPalindromeIgnoringWS = s => isPal5.test(s);
```

Practice

Break into groups of 3-4 and try the next few problems!

Question #1

- **What does /go+gle/ match?**

  a) "gogle"

  b) "google"

  c) "gooogle"

  d) All of the above

-

Question #2

- **Identify all web URL's in the form:**

  https://www.somesite.[com/io/ai]

- 

Question #3

Side Note:
\b = boundary tag
^...$ are anchor tags

- **Verify all valid dates in the format DD/MM/YYYY.**
  Ex: 05/10/25

Questions?

Please fill out the feedback form when you have a chance!

Next Bonus Workshop...

Postman and OpenAPI

- Friday 10/24/2025, 3:30 PM–4:30 PM
- Using backend tools, like Postman, to test your APIs
- Getting familiar with OpenAPI standard

Attendance

Please let us know where we can improve the format of the lessons!