Session11-Pandas (RegEx in Python, Data Input and Output)

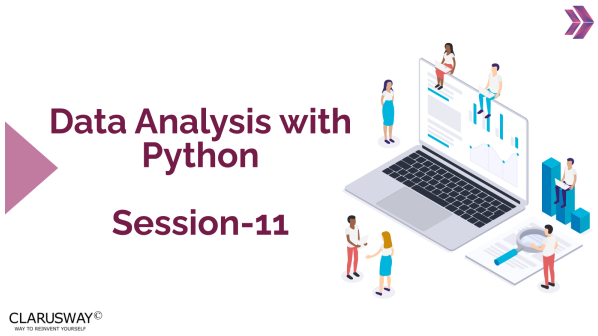
DAwithPython S11
Training Clarusway
Pear Deck - May 12, 2022 at 7:33PM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1



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Slide 2

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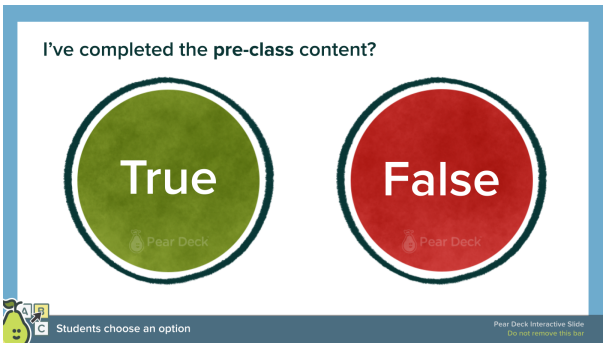
Slide 3



Your Response

You Chose
- **False**

Other Choices
- True

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Slide 4

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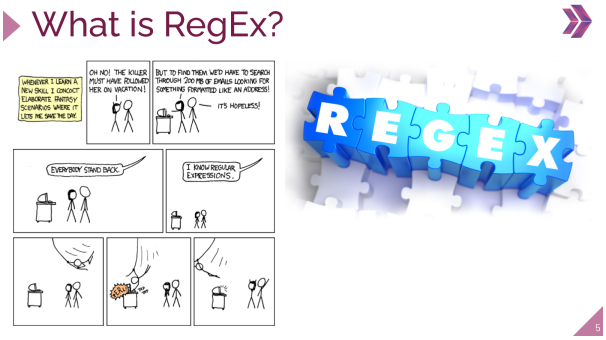

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What is RegEx?

- A regular expression is a **sequence of characters** that specifies a **search pattern** in text.
- Fields of application range from validation to **parsing/replacing strings**, passing through **translating data to other formats** and **web scraping**.
- It can be used in (almost) all programming languages (JavaScript, Java, VB, C #, C / C++, **Python**, Perl, Ruby, Delphi, R, Tcl, and many others) with the **slightest distinctions** about the support of the most advanced features and syntax versions supported by the engines.

6

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Slide 7

Common Expressions

`\d`
Matches any decimal digit; this is equivalent to the class `[0-9]`.

`\D`
Matches any non-digit character; this is equivalent to the class `[^0-9]`.

`\s`
Matches any whitespace character; this is equivalent to the class `[ \t\n\r\f\v]`.

`\S`
Matches any non-whitespace character; this is equivalent to the class `[^ \t\n\r\f\v]`.

`\w`
Matches any alphanumeric character; this is equivalent to the class `[a-zA-Z0-9_]`.

`\W`
Matches any non-alphanumeric character; this is equivalent to the class `[^a-zA-Z0-9_]`.

7

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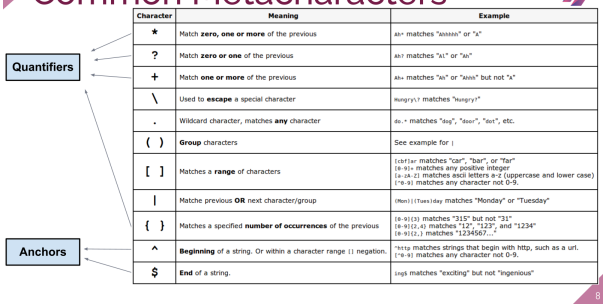
Common Metacharacters



Character	Meaning	Example
*	Match **zero, one or more** of the previous	`ab*` matches "a", "ab", or "abbbb"
?	Match **zero or one** of the previous	`ab?` matches "a" or "ab"
+	Match **one or more** of the previous	`ab+` matches "ab" or "abbb" but not "a"
\	Used to **escape** a special character	`Hungry\?` matches "Hungry?"
.	Wildcard character, matches **any** character	`do.*` matches "dog", "door", "dot", etc.
( )	**Group** characters	See example for |
[ ]	Matches a **range** of characters	`[cbf]ar` matches "car", "bar", or "far" `[0-9]+` matches any positive integer `[a-zA-Z]` matches ascii letters a-z (uppercase and lower case) `[^0-9]` matches any character not 0-9.
|	Matche previous **OR** next character/group	`(Mon)|(Tues)day` matches "Monday" or "Tuesday"
{ }	Matches a specified **number of occurrences** of the previous	`[0-9]{3}` matches "315" but not "31" `[0-9]{2,4}` matches "12", "123", and "1234" `[0-9]{2,}` matches "1234567..."
^	**Beginning** of a string. Or within a character range [] negation.	`^http` matches strings that begin with http, such as a url. `[^0-9]` matches any character not 0-9.
$	**End** of a string.	`ing$` matches "exciting" but not "ingenious"

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Raw String (r/R"string")

- Python raw string is created by prefixing a string literal with **'r'** or **'R'**.
- Python raw string treats backslash (\) as a literal character. This is useful when we want to have a string that contains backslash and don't want it to be treated as an escape character.


```
my_string = "Hello\nWorld"
print(my_string)
```

```
Hello
World
```

```
my_string = r"Hello\nWorld"
print(my_string)
```

```
Hello\nWorld
```


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Expressions and Special Characters

expression	matches...
abc	abc (that exact character sequence, but anywhere in the string)
^abc	abc at the *beginning* of the string
abc$	abc at the *end* of the string
a|b	either of a and b
^abc|abc$	the string abc at the beginning or at the end of the string
ab{2,4}c	an a followed by two, three or four b's followed by a c
ab{2,}c	an a followed by at least two b's followed by a c
ab*c	an a followed by any number (zero or more) of b's followed by a c
ab+c	an a followed by one or more b's followed by a c
ab?c	an a followed by an optional b followed by a c; that is, either abc or ac
a.c	an a followed by any single character (not newline) followed by a c
a\.c	a.c exactly
[abc]	any one of a, b and c
[Aa]bc	either of Abc and abc
[abc]+	any (nonempty) string of a's, b's and c's (such as a, abba, acbabcacaa)
[^abc]+	any (nonempty) string which does *not* contain any of a, b and c (such as defg)
\d\d	any two decimal digits, such as 42; same as \d{2}
\w+	a "word": a nonempty sequence of alphanumeric characters and low lines (underscores), such as foo and 12bar8 and foo_1
100\s*mk	the strings 100 and mk optionally separated by any amount of white space (spaces, tabs, newlines)
abc\b	abc when followed by a word boundary (e.g. in abc! but not in abcd)

Some Basic Examples

10

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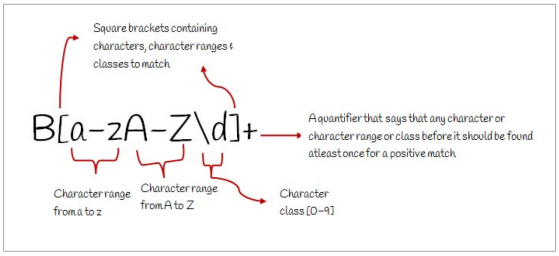
Expressions and Special Characters



11

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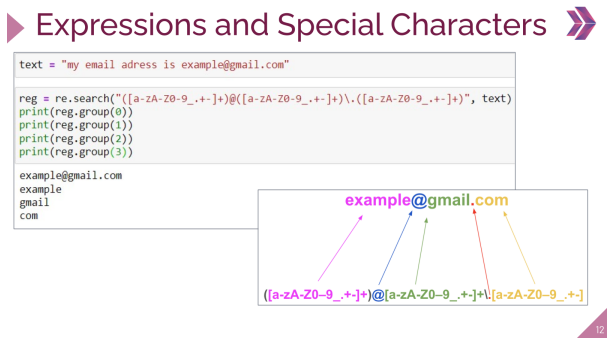

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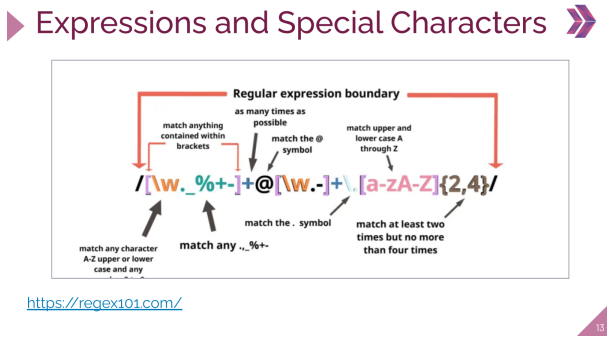

Link(s) on this slide:

- https://regex101.com/

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Common Python RegEx Functions

- **re.search()** : Scan through string looking for a match to the pattern.
- **re.match()** : Try to apply the pattern at the start of the string.
- **re.fullmatch()** : Try to apply the pattern to all of the string.
- **re.findall()** : Return a list of all non-overlapping matches in the string.
- **re.sub()** : Return the string obtained by replacing the leftmost non-overlapping occurrences of the pattern in string by the replacement repl.
- **re.split()** : Split the source string by the occurrences of the pattern, returning a list containing the resulting substrings.

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Pandas Functions Accepting RegEx

- **count()** : Count occurrences of pattern in each string of the Series/Index
- **replace()** : Replace each occurrence of pattern/regex in the Series/Index.
- **contains()**: Test if pattern or regex is contained within a string of a Series or Index.
- **findall()** : Find all occurrences of pattern or regex in the Series/Index.
- **match()** : Determine if each string matches a regular expression.
- **split()** : Split strings around given separator/delimiter.
- **extract()** : Extract capture groups in the regex pat as columns in a DataFrame and returns the captured groups

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RegEx Func. vs Pandas Func.

Common Python RegEx Func	Pandas Func. Accepting RegEx
re.search()	count()
re.match()	replace()
re.fullmatch()	contains()
re.findall()	findall()
re.sub()	match()
re.split()	split()
	extract()

16

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Data Input & Output

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Data Input & Output

Input	Output
pd.read_csv("file_name")	df.to_csv("file_name")
pd.read_excel()	pd.to_excel()
pd.read_jason()	pd.to_jason()
pd.read_html()	pd.to_html()
pd.read_sql()	pd.to_sql()

18

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Slide 19

Data Analysis with Python

let's start the hands-on phase

19

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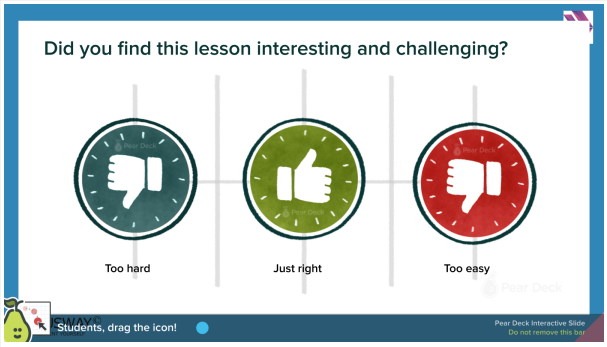
Slide 20	Your Response



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