Mar 24, 2016

CSCI 0931 - Intro. to Comp. for the Humanities and Social Sciences

Today

- Review ACT 2-7
- Regular Expressions
- Using regular expressions in Python
- If we have time, a new data structure: *Iterator*

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- Review ACT 2-7
- Regular Expressions a way to match strings
- Using regular expressions in Python
- If we have time, a new data structure: *Iterator*

Distance Matrix

This matrix looks kind of familiar...

Instead of printing to the screen, write it to a file in CSV (comma-separated value) format.

```
myNum = 1
myFile = open('output.csv','w')
myFile.write('this is an output file\n')
myFile.write(str(myNum))
myFile.write('\n')
myFile.close()
```

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```

Generating the file

```
#For each file, create a string row with all the values in the
#corresponding list row in distMatrix, with commas in between
for i in range(0,len(FILE_LIST))
```

```
row = '' + FILE_LIST[i]
```

```
# Loop through the columns in the current list row
for val in distMatrix[i]:
```

```
row = row + ', ' + str(val)
```

```
#At this point, we created our string row.
#We want to write this row into our csv
outFile.write(row)
```

```
#Need a newline at the end of each string row
outFile.write('\n')
```

```
# Finalize the new file by closing it
outFile.close()
```

What's Your Answer?

Discern the **Outlier**: The one book that is NOT in the series of the others.

File	Title	Series	Author
file1.txt			
file2.txt			
file3.txt			
file4.txt			
file5.txt			
file6.txt			

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What's Your Answer?

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File	Title	Series	Author
file1.txt	Wonder Wizard of Oz	Oz	
file2.txt	Alice's Adventures in Wonderland	Alice in Wonderland	
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file4.txt	Emerald City of Oz	Oz	
file5.txt	Royal Book of Oz	Oz	
file6.txt	Glinda of Oz	Oz	

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The Wizard of OZ

• About 40 Books, written by 7 different authors



http://www.ssc.wisc.edu/~zzeng/soc357/OZ.pdf

What's Your Answer?

Discern the **Outlier**:

The one book that is NOT in the series of the others.

File	Title	Series	Author
file1.txt	Wonder Wizard of Oz	Oz	Lyman Frank Baum
file2.txt	Alice's Adventures in Wonderland	Alice in Wonderland	Lewis Carroll
file3.txt	Dorothy and the Wizard in Oz	Oz	Lyman Frank Baum
file4.txt	Emerald City of Oz	Oz	Lyman Frank Baum
file5.txt	Royal Book of Oz	Oz	Ruth Plumly Thompson
file6.txt	Glinda of Oz	Oz	Lyman Frank Baum

What's Your Answer?

	file1.txt	file2.txt	file3.txt	file4.txt	file5.txt	file6.txt
file1.txt	0	0.16824579	0.08785724	0.08832557	0.13960696	0.10485192
file2.txt	0.16824579	0	0.1688084	0.1623172	0.18100267	0.17304682
file3.txt	0.08785724	0.1688084	0	0.07196412	0.11099609	0.07941847
file4.txt	0.08832557	0.1623172	0.07196412	0	0.13234903	0.09274778
file5.txt	0.13960696	0.18100267	0.11099609	0.13234903	0	0.14705212
file6.txt	0.10485192	0.17304682	0.07941847	0.09274778	0.14705212	0

File	Title	Series	Author
file1.txt	Wonder Wizard of Oz	Oz	Lyman Frank Baum
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Busted!

Tools you've learned

- Reading and writing files (ACT 2-2, 2-7)
- String processing: split(), find(), etc. (ACT 2-2, 2-6)
- Lists and dictionaries (ACT 2-5)
- Iterating over data: two approaches to for-loops (HW 2-4)
- Summaries statistics like counts, averages, min/max (ACT 2-3)

Play Time!



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Play Time!

Go to <u>http://regexpal.com/</u> and copy this text into the lower box:

Ahab was born in 1802. Starbuck, in '98 --- 1998, that is. And (as everyone knows), Ishmael was born in 2036 but died in 1879 (making him [1879-2036=]-57 years old at the time of his death, or 48, depending on how you count). And the white whale was immortal.

Am I telling this story right? Anyhow, each of them had access to a time machine, a harpoon, and 20+ sheep for barter. Including the whale. As was common in his era, Starbuck had his own name tattooed on the back of his arm: "*\$", it read, "Star-buck", a kind of pun.

Our story begins in interstellar space, in the year 2000 BC...

Try entering different things (letters, numbers, symbols, brackets) in the upper box. Any surprises?

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- Patterns that are used to match character sequences in strings (texts)
- Patterns are laid out in a sequential order
- Use '\' to represent special characters or a defined set of characters
- Use '[]' to define a range of characters
- Use '+' or '*' for repetitions

Special Syntax	Meaning	R.E Example	Result
[]	Match anything between brackets		

Special Syntax	Meaning	R.E Example	Result
[]	Match anything between brackets	[qjd]u	

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[]	Match anything between brackets	[qjd]u	qu ju

Special Syntax	Meaning	R.E Example	Result
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\w	Match any alphanumeric		

Special Syntax	Meaning	R.E Example	Result
[]	Match anything between brackets	[qjd]u	qu ju
\w	Match any alphanumeric	o\w	

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Special Syntax	Meaning	R.E Example	Result
[]	Match anything between brackets	[qjd]u	qu ju
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\s	Match any whitespace		

Special Syntax	Meaning	R.E Example	Result
[]	Match anything between brackets	[qjd]u	qu ju
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\s	Match any whitespace	e\s\w	

Special Syntax	Meaning	R.E Example	Result
[]	Match anything between brackets	[qjd]u	qu ju
\w	Match any alphanumeric	o/w	OW OX OV
\s	Match any whitespace	e\s\w	'e q' 'e l'

Special Syntax	Meaning	R.E Example	Result
[]	Match anything between brackets	[qjd]u	qu ju
\w	Match any alphanumeric	o∖w	OW OX OV
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	Match any character	s.+s	

The	qulck brown fox jum	ped over t	the lazy d0q.
Syntax	Meaning	R.E Example	Result
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\w	Match any alphanumeric	0/w	OW OX OV
\s	Match any whitespace	e/s/w	'e q' 'e l'
\d	Match any digit	\d\w	1c 0g
+	Match one or more of the previous things.	\s\w+\s	qulck fox over lazy
*	Match zero or more of the previous things.	\w\d*\w	Th qu lc br ow fo ju mp ed ov er th la zy d0g
•	Match any character	s.+s	qulck brown fox jumped over

Today

- Regular Expressions a way to match strings
- Using regular expressions in Python
- If time, new data structure: *Iterator*

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+	Match one or more of the previous things.	\s\w+\s	qulck fox over lazy
*	Match zero or more of the previous things.	\w\d*\w	Th qu lc br ow fo ju mp ed ov er th la zy d0g
•	Match any character	s.+s	qulck brown fox

Just the beginning... see the 'PythonRE' link for lots more:

Pattern	Description
٨	Matches beginning of line.
\$	Matches end of line.
	Matches any single character except newline. Using m option allows it to match newline as well.
[]	Matches any single character in brackets.
[^]	Matches any single character not in brackets
re*	Matches 0 or more occurrences of preceding expression.
re+	Matches 1 or more occurrence of preceding expression.
re?	Matches 0 or 1 occurrence of preceding expression.
re{ n}	Matches exactly n number of occurrences of preceding expression.
re{ n,}	Matches n or more occurrences of preceding expression.
re{ n, m}	Matches at least n and at most m occurrences of preceding expression.
a b	Matches either a or b.
(re)	Groups regular expressions and remembers matched text.

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- Using regular expressions in Python

If time...

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Lists

'a' 'b' 'c' 'd' 'e' 'f' 'g' 'h' 'i' 'j'

Lists	content	'a'	ʻb'	'c'	'd'	'e'	'f'	ʻg'	'h'	ʻi'	ʻj'
	indices	0	1	2	3	4	5	6	7	8	9

Lists	content	'a'	ʻb'	ʻc'	'd'	'e'	'f'	ʻg'	'h'	ʻi'	ʻj'
	indices	0	1	2	3	4	5	6	7	8	9









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The cat in the hat sat on a mat

The cat in the hat sat on a mat

Regular Expression: '\wat'





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The cat in the hat sat on a mat





The cat in the hat sat on a mat



The cat in the hat sat on a mat



Using Regular Expressions in Python

def printRegEx(regex,myStr):

'''Prints all occurrences of the regular expression.''`

myIter = re.finditer(regex,myStr) # Iterator!

This iterator contains MATCHES of the regex. # The following functions work on regex matches: # group(0): returns the string that matches the regex # start(0): the starting position of the string in myStr # end(0): the ending position of the string in myStr

```
# For loops work on iterators in addition to lists
# Each match of the regex in myStr is stored in
# a variable called 'occ'
for occ in myIter:
    print('matches',occ.group(0), \
        'at positions',occ.start(0),'-',occ.end(0))
return
```

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