

Introduction to Regex

Learn to recognize when you should use it.

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- `anyNumber = r"^?\s*(\d+\.\d*[eE]?[\-\\+]?\\d*)\s*\\b?"`
- Above: Regex pattern for any number on the form 1, 123.456, 123.456e – 123, 123.456e + 123, etc.

```
>>> import re
>>> text = "asd1 foo 2.0 0.123213 foo foo 1E-2 foo 1e-04 1.2313e123"
>>> anyNumber = "\s*(\d+\.?\d*[eE]?[\-\\+]?\\d*)\s*"
>>> re.findall(anyNumber, text)
['1', '2.0', '0.123213', '1E-2', '1e-04', '1.2313e123']
```

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- `anyNumber` is a pattern representing any number.
- `anyNumber = r"\s*(\d+\.\d*[eE]?[\-+]?(\d*))\s*"`
- `r"string"` is a *raw string*. These strings does not read special string identifiers such as `\n` (which might mess up the regexp).

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- `anyNumber = r"\s*(\d+\.\d*[eE]?[\-\\+]?\\d*)\\s"`
- `? + * .) (` has special functions. Let's focus on them later.

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- Summarized: Any number is isolated by spaces, starts with an integer, then a comma, then an integer, then `e` or `E`, then `+` or `-`, then an integer.
- This is obviously not true, but in the *right combinations* it is true. Let's go back to the special characters.

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- `?` : Optional. It is either there or not. In other words: The comma is optional, e or E is optional, `+` or `-` is optional.

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- `anyNumber = r"\s*(\d+\.\d*[eE]?[\-+]? \d*)\s+"`
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- `*` : Optional combined with allowing any amount of the previous regex to success each other.
- `(...)` : Identifies a *group*. When we apply `re.findall`, we want the numbers returned, not the spaces (`\s*`) (even though they are a part of the regexp pattern); we put the matching number in a group.

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- We do not need a backslash since `-` is only special inside brackets. (`[a-z]` means any character between a and z will match)

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Today's show

1 Regular expressions. What the..?

2 Examples

- Retrieving data from raw output
- Analyzing an Austrian's master thesis

```
...
dmcE: 2.99999| Nw: 998| 92.30000%
dmcE: 3.00000| Nw: 995| 92.40000%
dmcE: 3.00000| Nw: 995| 92.50000%
dmcE: 3.00000| Nw: 996| 92.60000%
...
dmcE: 2.99999| Nw: 998| 94.00000%
dmcE: 3.00000| Nw: 999| 94.10000%
dmcE: 3.00000| Nw: 999| 94.20000%
dmcE: 3.00000| Nw: 998| 94.30000%
dmcE: 3.00000| Nw: 995| 94.40000%
dmcE: 3.00001| Nw: 992| 94.50000%
dmcE: 3.00001| Nw: 993| 94.60000%
...
dmcE: 3.00002| Nw: 984| 99.80000%
dmcE: 3.00001| Nw: 984| 99.90000%
dmcE: 3.00002| Nw: 985| 100.00000%
DMC FIN.
Job fin
```

```
def getDmcE(path):  
    stdout = open(path + "/stdout.txt", 'r')  
    stdoutRaw = "\n".join(stdout.readlines())  
    stdout.close()  
  
    pattern = "dmcE:\\s*(\\d+\\.?.?\\d*)\\s*\\|\\s*Nw:\\s*\\d+\\|\\s*100\\.?.?[0]*%"  
  
    r = re.findall(pattern, stdoutRaw)  
  
    if r:  
        #r[0] = therm; r[1] = production  
  
        #Both thermalization and main cycles succeeded.  
        if len(r) ==2:  
            return float(r[1])  
        else:  
            #Run aborted after thermalization.  
            return "~" + r[0]  
    else:  
        #Run aborted.  
        return "N/A"
```

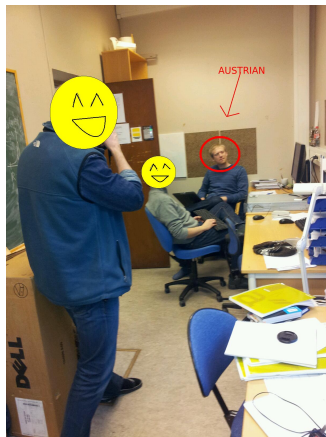
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- Step one: Concatenate all his tex-files into one file:

```
~$ find . -name *.tex -exec cat {} \; > ~/.../christoffer_raw.tex
```

- Use `count_words.py` to count the occurrences of important strings/words such as ...

- Jørgen, Coupled Cluster and Monte Carlo

```
~$ python count_words.py -i -b christoffer_raw.tex Jørgen  
Number of occurrences of word 'Jørgen' (case insensitive): 1
```

```
~$ python count_words.py -i christoffer_raw.tex "coupled cluster"  
Number of occurrences of string 'coupled cluster' (case insensitive): 15
```

```
~$ python count_words.py -i christoffer_raw.tex "monte carlo"  
Number of occurrences of string 'monte carlo' (case insensitive): 2
```

```
...cml-line parsing...

#Adding bounds to the word (pattern=any spacing, word, any ending)
stringOrWord = "string"
if bounded:
    stringOrWord = "word"
    word = "[^\s]" + word + "[\s\b]"

#Flaging case insensitivity
if not caseSense:
    regExtObj = re.compile(word, re.IGNORECASE)
    printCase = " (case insensitive)"
else:
    regExtObj = re.compile(word)
    printCase = ""

Nmatches = len(regExtObj.findall(rawFile))

printfArgs = (stringOrWord, rawWord, printCase, Nmatches)
print "Number of occurrences of %s '%s': %d" % printfArgs
```

- Use `list_occurrences.py` to reveal his most used words:

```
christoffer_raw.tex
word                : n

electron            : 498
tension             : 182
omega               : 134
basis               : 130
particle            : 126
operators           : 126
operator            : 117
delta               : 114
state               : 102
electrons           : 92
states              : 89
...
```

```
import sys, re

#load entire file into a string. Convert to lower case letters.
f1 = open(sys.argv[1]); allwords = f1.read().lower(); f1.close()

max_length = 15; min_length = 5

#Recognize all words
rePattern = r"[a-zA-Z]{%d,%d}" % (min_length, max_length)
allwords = re.findall(rePattern, allwords)

texWords = ... list of texWords such as begin, end, left, right..

#count words
wordCount = {}
for word in allwords:
    if word not in texWords and not re.findall('.*(fmf).*', word):
        if word not in wordCount.keys():
            wordCount[word] = 1
        elif word in wordCount.keys():
            wordCount[word] += 1

#Sort scores from largest to lowest
sort = sorted(wordCount.items(), key=lambda x: x[1], reverse=True)

#Output:
s = max_length
print sys.argv[1].ljust(len(sys.argv[1]))
print "%s: %s" % ("word".ljust(s), "n".ljust(s))
print
for key, value in sort:
    print "%s: %s" % (key.ljust(s), str(value).ljust(s))
```