PYTHON REGULAR EXPRESSIONS

Notebook

Keep this at hand!

This document contains additional concepts and examples for Python Regular Expressions

Mihai Catalin Teodosiu

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PYTHON REGULAR EXPRESSIONS – NOTEBOOK
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THE 'RE' MODULE

First steps:

```
>>>  import re

>>>  help(re)

>>>  dir(re)
```

Documentation:

https://docs.python.org/3/library/re.html

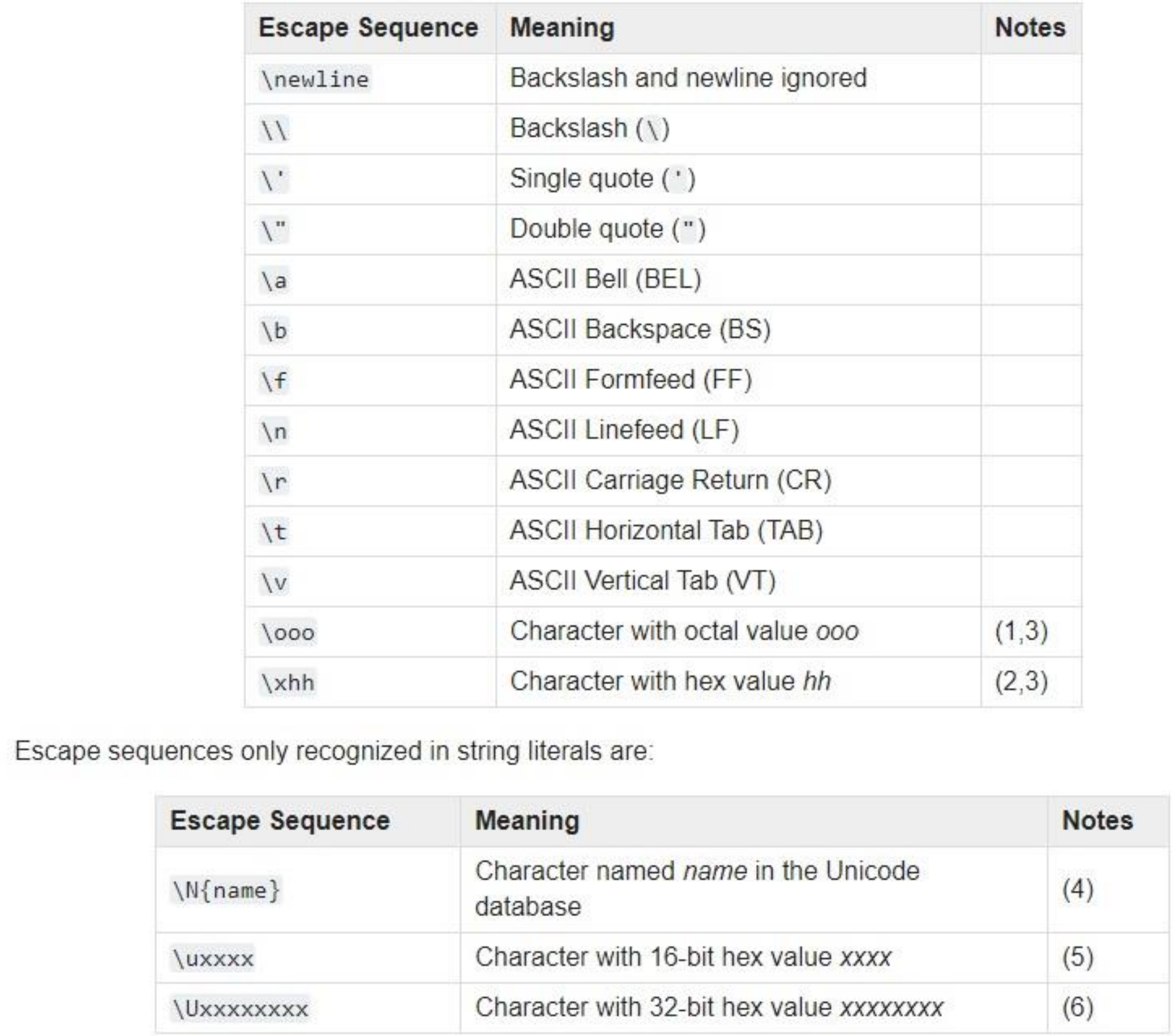
https://docs.python.org/3/howto/regex.html

RAW STRINGS

Syntax:

```
r"C:\Users\new\tenthfolder"
```

Escape sequences/characters:



Escape Sequence	Meaning	Notes
`\newline`	Backslash and newline ignored	
`\\`	Backslash (`\`)	
`\'`	Single quote (`'`)	
`\"`	Double quote (`"`)	
`\a`	ASCII Bell (BEL)	
`\b`	ASCII Backspace (BS)	
`\f`	ASCII Formfeed (FF)	
`\n`	ASCII Linefeed (LF)	
`\r`	ASCII Carriage Return (CR)	
`\t`	ASCII Horizontal Tab (TAB)	
`\v`	ASCII Vertical Tab (VT)	
`\ooo`	Character with octal value *ooo*	(1,3)
`\xhh`	Character with hex value *hh*	(2,3)

Escape sequences only recognized in string literals are:

Escape Sequence	Meaning	Notes
`\N{name}`	Character named *name* in the Unicode database	(4)
`\uxxxx`	Character with 16-bit hex value *xxxx*	(5)
`\Uxxxxxxxx`	Character with 32-bit hex value *xxxxxxxx*	(6)

Source: https://docs.python.org/3/reference/lexical_analysis.html#string-and-bytes-literals

RE.COMPILE()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> s = r"\d{4}"
>>> t = re.compile(s)
>>> result = re.findall(t, string)
```

RE.SEARCH()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.search(r"\d{3}", string)
>>> result
<re.Match object; span=(15, 18), match='600'>
```

RE.MATCH()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.match(r"\w{3}", string)
>>> result
<re.Match object; span=(0, 3), match='The'>
```

RE.FULLMATCH()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.fullmatch(r".{285}", string)
>>> result
<re.Match object; span=(0, 285), match='The Euro
STOXX 600 index, which tracks all stock >
```

RE.FINDALL()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\d{3}", string)
>>> result
['600', '199', '600']
```

RE.SPLIT()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.split(r"\s", string)
>>> result
['The', 'Euro', 'STOXX', '600', 'index,',
'which', 'tracks', 'all', 'stock', 'markets',
'across', 'Europe', 'including', 'the', 'FTSE,',
'fell', 'by', '11.48%', '–', 'the', 'worst',
'day', 'since', 'it', 'launched', 'in', '1998.',
'The', 'panic', 'selling', 'prompted', 'by',
'the', 'coronavirus', 'has', 'wiped', '£2.7tn',
'off', 'the', 'value', 'of', 'STOXX', '600',
'shares', 'since', 'its', 'all-time', 'peak',
'on', '19', 'February.']
```

RE.SUB()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.sub(r"[A-Z]{2,}", "INDEX",
string)
>>> result
'The Euro INDEX 600 index, which tracks all stock
markets across Europe including the INDEX, fell
by 11.48% – the worst day since it launched in
1998. The panic selling prompted by the
coronavirus has wiped £2.7tn off the value of
INDEX 600 shares since its all-time peak on 19
February.'
```

```
>>> import re
>>> result = re.sub(r"[A-Z]{2,}", "INDEX",
string, 2)
>>> result
'The Euro INDEX 600 index, which tracks all stock
markets across Europe including the INDEX, fell
by 11.48% – the worst day since it launched in
1998. The panic selling prompted by the
coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February.'
```

RE.SUBN()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.subn(r"[A-Z]{2,}", "INDEX",
string)
>>> result
('The Euro INDEX 600 index, which tracks all stock
markets across Europe including the INDEX, fell
by 11.48% – the worst day since it launched in
1998. The panic selling prompted by the
coronavirus has wiped £2.7tn off the value of
INDEX 600 shares since its all-time peak on 19
February.', 3)
```

```
>>> import re
>>> result = re.subn(r"[A-Z]{2,}", "INDEX",
string, 2)
>>> result
('The Euro INDEX 600 index, which tracks all stock
markets across Europe including the INDEX, fell
by 11.48% - the worst day since it launched in
1998. The panic selling prompted by the
coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February.', 2)
```

GROUP() AND GROUPS()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result =
re.search(r".+\s(.+ex).+(\d\d\s.+).", string)
>>> result.groups()
('index', '19 February')
>>> result.group(1)
'index'
>>> result.group(2)
'19 February'
```

```
>>> result.group()
'The Euro STOXX 600 index, which tracks all stock
markets across Europe including the FTSE, fell by
11.48% – the worst day since it launched in 1998.
The panic selling prompted by the coronavirus has
wiped £2.7tn off the value of STOXX 600 shares
since its all-time peak on 19 February.'
>>> result.group(0)
'The Euro STOXX 600 index, which tracks all stock
markets across Europe including the FTSE, fell by
11.48% – the worst day since it launched in 1998.
The panic selling prompted by the coronavirus has
wiped £2.7tn off the value of STOXX 600 shares
since its all-time peak on 19 February.'
>>> result.group(1, 2)
('index', '19 February')

>>> result =
re.findall(r".+\s(.+ex).+(\d\d\s.+).", string)
>>> result
[('index', '19 February')]
>>> result.group()
Traceback (most recent call last):
  File "<pyshell#130>", line 1, in <module>
    result.group()
AttributeError: 'list' object has no attribute
'group'
>>> result.groups()
Traceback (most recent call last):
  File "<pyshell#131>", line 1, in <module>
    result.groups()
AttributeError: 'list' object has no attribute
'groups'
```

START(), END(), SPAN()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

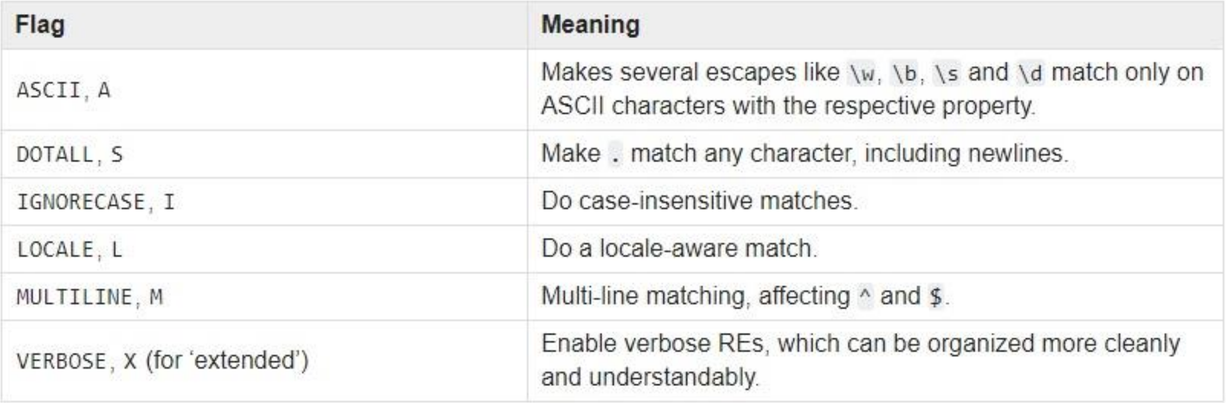
Example:

```
>>> import re
>>> result =
re.search(r".+\s(.+ex).+(\d\d\s.+).", string)
>>> result.group(1)
'index'
>>> result.group(2)
'19 February'
>>> result.start(1)
19
>>> result.start(2)
273
>>> result.end(1)
24
>>> result.end(2)
284
>>> result.span(1)
(19, 24)
>>> result.span(2)
(273, 284)
```

OPTIONAL FLAGS

Regex flags:

https://docs.python.org/3/howto/regex.html#compilation-flags



Flag	Meaning
ASCII, A	Makes several escapes like \w, \b, \s and \d match only on ASCII characters with the respective property.
DOTALL, S	Make . match any character, including newlines.
IGNORECASE, I	Do case-insensitive matches.
LOCALE, L	Do a locale-aware match.
MULTILINE, M	Multi-line matching, affecting ^ and $.
VERBOSE, X (for 'extended')	Enable verbose REs, which can be organized more cleanly and understandably.

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks all stock markets across Europe including the FTSE, fell by 11.48% – the worst day since it launched in 1998. The panic selling prompted by the coronavirus has wiped £2.7tn off the value of STOXX 600 shares since its all-time peak on 19 February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"the", string)
>>> result
['the', 'the', 'the', 'the']
```

```
>>> result = re.findall(r"the", string, re.I)
>>> result


['The', 'the', 'the', 'The', 'the', 'the']

>>> string2 = "Hello\nPython"
>>> result = re.search(r".+", string2)
>>> result
<re.Match object; span=(0, 5), match='Hello'>
>>> result = re.search(r".+", string2, re.S)
>>> result
<re.Match object; span=(0, 12),
match='Hello\nPython'>

>>> result = re.search(r""".+\s #Beginning of
the string
            (.+ex) #Searching for index
            .+ #Middle of the string
            (\d\d\s.+). #Date at the end""",
string, re.X)
>>> result.groups()
('index', '19 February')
```

ATTRIBUTEERROR: 'NONETYPE' OBJECT HAS NO ATTRIBUTE …

Important!

Whenever you get the **AttributeError: 'NoneType' object has no attribute 'group' or 'groups'** exception, it means that your pattern syntax is incorrect, a match was not found and the value being returned is None, thus you must rethink your pattern or spot your mistakes. Nothing to freak out about, just another opportunity to learn and improve.

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result =
re.search(r".+\s(.+ex).+(\d\d\d\d\s.+).",
string)

>>> result.group(1)
Traceback (most recent call last):
  File "<pyshell#202>", line 1, in <module>
    result.group(1)
AttributeError: 'NoneType' object has no
attribute 'group'
```

```
>>> result.group(2)
Traceback (most recent call last):
  File "<pyshell#203>", line 1, in <module>
    result.group(2)
AttributeError: 'NoneType' object has no
attribute 'group'

>>> result.groups()
Traceback (most recent call last):
  File "<pyshell#204>", line 1, in <module>
    result.groups()
AttributeError: 'NoneType' object has no
attribute 'groups'
```

METACHARACTERS - THE DOT (.)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.search(r"(.+)", string)
>>> result.group(1)
'The Euro STOXX 600 index, which tracks all stock
markets across Europe including the FTSE, fell by
11.48% – the worst day since it launched in 1998.
The panic selling prompted by the coronavirus has
wiped £2.7tn off the value of STOXX 600 shares
since its all-time peak on 19 February.'
```

METACHARACTERS - THE CARET (^)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.search(r"^\w{3}", string)
>>> result
<re.Match object; span=(0, 3), match='The'>
```

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998.\nThe panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"^\w{3}", string, re.M)
>>> result
['The', 'The']
```

METACHARACTERS - THE DOLLAR SIGN ($)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998.\nThe panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: *https://www.theguardian.com/*

Example:

```
>>> import re
>>> result = re.findall(r"\s(\w{2,})\W$",
string, re.M)
>>> result
['1998', 'February']
```

METACHARACTERS - THE ASTERISK (*)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\d\d\d*", string)
>>> result
['600', '11', '48', '1998', '600', '19']

>>> result = re.findall(r"E.* ", string)
>>> result
['Euro STOXX 600 index, which tracks all stock
markets across Europe including the FTSE, fell by
11.48% – the worst day since it launched in 1998.
The panic selling prompted by the coronavirus has
wiped £2.7tn off the value of STOXX 600 shares
since its all-time peak on 19 ']

>>> result
>>> result = re.findall(r"E\w*", string)
['Euro', 'Europe', 'E']
```

METACHARACTERS - THE PLUS SIGN (+)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\d\d\d+", string)
>>> result
['600', '1998', '600']

>>> result = re.findall(r"E.+ ", string)
>>> result
['Euro STOXX 600 index, which tracks all stock
markets across Europe including the FTSE, fell by
11.48% – the worst day since it launched in 1998.
The panic selling prompted by the coronavirus has
wiped £2.7tn off the value of STOXX 600 shares
since its all-time peak on 19 ']

>>> result = re.findall(r"E\w+", string)
>>> result
['Euro', 'Europe']
```

METACHARACTERS - THE QUESTION MARK (?)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\d\d\d?", string)
>>> result
['600', '11', '48', '199', '600', '19']

>>> result = re.findall(r"E.? ", string)
>>> result
['E, ']

>>> result = re.findall(r"E\w?", string)
>>> result
['Eu', 'Eu', 'E']
```

METACHARACTERS - GREEDY VS. NON-GREEDY (*?, +?, ??)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\d\d\d*", string)
>>> result
['600', '11', '48', '1998', '600', '19']
>>> result = re.findall(r"\d\d\d*?", string)
>>> result
['60', '11', '48', '19', '98', '60', '19']

>>> result = re.findall(r"\d\d\d+", string)
>>> result
['600', '1998', '600']
>>> result = re.findall(r"\d\d\d+?", string)
>>> result
['600', '199', '600']
```

```
>>> result = re.findall(r"\d\d\d?", string)
>>> result
['600', '11', '48', '199', '600', '19']
>>> result = re.findall(r"\d\d\d??", string)
>>> result
['60', '11', '48', '19', '98', '60', '19']
```

METACHARACTERS - THE BACKSLASH (\ )

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\d", string)
>>> result
['6', '0', '0', '1', '1', '4', '8', '1', '9',
'9', '8', '2', '7', '6', '0', '0', '1', '9']

>>> result = re.findall(r"\.", string)
>>> result
['.', '.', '.', '.']
```

METACHARACTERS - THE SQUARE BRACKETS ([])

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"[wxkq]", string)
>>> result
['x', 'w', 'k', 'k', 'k', 'w', 'w', 'k']

>>> result = re.findall(r"[a-d]", string)
>>> result
['d', 'c', 'a', 'c', 'a', 'c', 'a', 'a', 'c', 'c',
'd', 'b', 'd', 'a', 'c', 'a', 'c', 'd', 'a', 'c',
'd', 'b', 'c', 'a', 'a', 'd', 'a', 'a', 'c', 'a',
'a', 'b', 'a']

>>> result = re.findall(r"[S-W]", string)
>>> result
['T', 'S', 'T', 'T', 'S', 'T', 'S', 'T']
```

```
>>> result = re.findall(r"[0-5]", string)
>>> result
['0', '0', '1', '1', '4', '1', '2', '0', '0', '1']

>>> result = re.findall(r"[a-f][c-w]", string)
>>> result
['de', 'ch', 'ac', 'al', 'ck', 'ar', 'et', 'ac',
'cl', 'di', 'fe', 'ce', 'au', 'ch', 'ed', 'an',
'el', 'ed', 'co', 'av', 'as', 'ed', 'ff', 'al',
'ar', 'es', 'ce', 'al', 'ak', 'br', 'ar']

>>> result = re.findall(r"[0-5][7-9]", string)
>>> result
['48', '19', '19']

>>> result = re.findall(r"[0-9][a-z]", string)
>>> result
['7t']

>>> result = re.findall(r"[^X]", string)
>>> result
['T', 'h', 'e', ' ', 'E', 'u', 'r', 'o', ' ', 'S',
'T', 'O', ' ', '6', '0', '0', ' ', 'i', 'n', 'd',
'e', 'x', ',', ' ', 'w', 'h', 'i', 'c', 'h', ' ',
't', 'r', 'a', 'c', 'k', 's', ' ', 'a', 'l', 'l',
' ', 's', 't', 'o', 'c', 'k', ' ', 'm', 'a', 'r',
'k', 'e', 't', 's', ' ', 'a', 'c', 'r', 'o', 's',
's', ' ', 'E', 'u', 'r', 'o', 'p', 'e', ' ', 'i',
'n', 'c', 'l', 'u', 'd', 'i', 'n', 'g', ' ', 't',
'h', 'e', ' ', 'F', 'T', 'S', 'E', ',', ' ', 'f',
'e', 'l', 'l', ' ', 'b', 'y', ' ', '1', '1', '.',
'4', '8', '%', ' ', '-', ' ', 't', 'h', 'e', ' ',
'w', 'o', 'r', 's', 't', ' ', 'd', 'a', 'y', ' ',
's', 'i', 'n', 'c', 'e', ' ', 'i', 't', ' ', 'l',
'a', 'u', 'n', 'c', 'h', 'e', 'd', ' ', 'i', 'n',
' ', '1', '9', '9', '8', '.', ' ', 'T', 'h', 'e',
' ', 'p', 'a', 'n', 'i', 'c', ' ', 's', 'e', 'l',
'l', 'i', 'n', 'g', ' ', 'p', 'r', 'o', 'm', 'p',
't', 'e', 'd', ' ', 'b', 'y', ' ', 't', 'h', 'e',
' ', 'c', 'o', 'r', 'o', 'n', 'a', 'v', 'i', 'r',
'u', 's', ' ', 'h', 'a', 's', ' ', 'w', 'i', 'p',
'e', 'd', ' ', '£', '2', '.', '7', 't', 'n', ' ',
'o', 'f', 'f', ' ', 't', 'h', 'e', ' ', 'v', 'a',
'l', 'u', 'e', ' ', 'o', 'f', ' ', 'S', 'T', 'O',
' ', '6', '0', '0', ' ', 's', 'h', 'a', 'r', 'e',
's', ' ', 's', 'i', 'n', 'c', 'e', ' ', 'i', 't',
's', ' ', 'a', 'l', 'l', '-', 't', 'i', 'm', 'e',
' ', 'p', 'e', 'a', 'k', ' ', 'o', 'n', ' ', '1',
'9', ' ', 'F', 'e', 'b', 'r', 'u', 'a', 'r', 'y',
'.']

>>> result = re.findall(r"[(.+?)]", string)
>>> result
['.', '.', '.', '.']

>>> result = re.findall(r"[^[0-5\]]", string)
>>> result
['T', 'h', 'e', ' ', 'E', 'u', 'r', 'o', ' ', 'S',
'T', 'O', 'X', 'X', ' ', '6', ' ', 'i', 'n', 'd',
'e', 'x', ',', ' ', 'w', 'h', 'i', 'c', 'h', ' ',
't', 'r', 'a', 'c', 'k', 's', ' ', 'a', 'l', 'l',
' ', 's', 't', 'o', 'c', 'k', ' ', 'm', 'a', 'r',
'k', 'e', 't', 's', ' ', 'a', 'c', 'r', 'o', 's',
's', ' ', 'E', 'u', 'r', 'o', 'p', 'e', ' ', 'i',
'n', 'c', 'l', 'u', 'd', 'i', 'n', 'g', ' ', 't',
'h', 'e', ' ', 'F', 'T', 'S', 'E', ',', ' ', 'f',
'e', 'l', 'l', ' ', 'b', 'y', ' ', '.', '8', '%',
' ', '–', ' ', 't', 'h', 'e', ' ', 'w', 'o', 'r',
's', 't', ' ', 'd', 'a', 'y', ' ', 's', 'i', 'n',
'c', 'e', ' ', 'i', 't', ' ', 'l', 'a', 'u', 'n',
'c', 'h', 'e', 'd', ' ', 'i', 'n', ' ', '9', '9',
'8', '.', ' ', 'T', 'h', 'e', ' ', 'p', 'a', 'n',
'i', 'c', ' ', 's', 'e', 'l', 'l', 'i', 'n', 'g',
' ', 'p', 'r', 'o', 'm', 'p', 't', 'e', 'd', ' ',
'b', 'y', ' ', 't', 'h', 'e', ' ', 'c', 'o', 'r',
'o', 'n', 'a', 'v', 'i', 'r', 'u', 's', ' ', 'h',
'a', 's', ' ', 'w', 'i', 'p', 'e', 'd', ' ', '£',
'.', '7', 't', 'n', ' ', 'o', 'f', 'f', ' ', 't',
'h', 'e', ' ', 'v', 'a', 'l', 'u', 'e', ' ', 'o',
'f', ' ', 'S', 'T', 'O', 'X', 'X', ' ', '6', ' ',
's', 'h', 'a', 'r', 'e', 's', ' ', 's', 'i', 'n',
'c', 'e', ' ', 'i', 't', 's', ' ', 'a', 'l', 'l',
'-', 't', 'i', 'm', 'e', ' ', 'p', 'e', 'a', 'k',
' ', 'o', 'n', ' ', '9', ' ', 'F', 'e', 'b', 'r',
'u', 'a', 'r', 'y', '.']
```

METACHARACTERS - CHARACTER CLASSES

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"[0-9]", string)
>>> result
['6', '0', '0', '1', '1', '4', '8', '1', '9', '9',
'8', '2', '7', '6', '0', '0', '1', '9']

>>> result = re.findall(r"[a-zA-Z]", string)
>>> result
['T', 'h', 'e', 'E', 'u', 'r', 'o', 'S', 'T', 'O',
'X', 'X', 'i', 'n', 'd', 'e', 'x', 'w', 'h', 'i',
'c', 'h', 't', 'r', 'a', 'c', 'k', 's', 'a', 'l',
'l', 's', 't', 'o', 'c', 'k', 'm', 'a', 'r', 'k',
'e', 't', 's', 'a', 'c', 'r', 'o', 's', 's', 'E',
'u', 'r', 'o', 'p', 'e', 'i', 'n', 'c', 'l', 'u',
'd', 'i', 'n', 'g', 't', 'h', 'e', 'F', 'T', 'S',
'E', 'f', 'e', 'l', 'l', 'b', 'y', 't', 'h', 'e',
'w', 'o', 'r', 's', 't', 'd', 'a', 'y', 's', 'i',
'n', 'c', 'e', 'i', 't', 'l', 'a', 'u', 'n', 'c',
'h', 'e', 'd', 'i', 'n', 'T', 'h', 'e', 'p', 'a',
'n', 'i', 'c', 's', 'e', 'l', 'l', 'i', 'n', 'g',
'p', 'r', 'o', 'm', 'p', 't', 'e', 'd', 'b', 'y',
't', 'h', 'e', 'c', 'o', 'r', 'o', 'n', 'a', 'v',
'i', 'r', 'u', 's', 'h', 'a', 's', 'w', 'i', 'p',
'e', 'd', 't', 'n', 'o', 'f', 'f', 't', 'h', 'e',
'v', 'a', 'l', 'u', 'e', 'o', 'f', 'S', 'T', 'O',
'X', 'X', 's', 'h', 'a', 'r', 'e', 's', 's', 'i',
'n', 'c', 'e', 'i', 't', 's', 'a', 'l', 'l', 't',
'i', 'm', 'e', 'p', 'e', 'a', 'k', 'o', 'n', 'F',
'e', 'b', 'r', 'u', 'a', 'r', 'y']

>>> result = re.findall(r"[^0-9]", string)
>>> result
['T', 'h', 'e', ' ', 'E', 'u', 'r', 'o', ' ', 'S',
'T', 'O', 'X', 'X', ' ', ' ', 'i', 'n', 'd', 'e',
'x', ',', ' ', 'w', 'h', 'i', 'c', 'h', ' ', 't',
'r', 'a', 'c', 'k', 's', ' ', 'a', 'l', 'l', ' ',
's', 't', 'o', 'c', 'k', ' ', 'm', 'a', 'r', 'k',
'e', 't', 's', ' ', 'a', 'c', 'r', 'o', 's', 's',
' ', 'E', 'u', 'r', 'o', 'p', 'e', ' ', 'i', 'n',
'c', 'l', 'u', 'd', 'i', 'n', 'g', ' ', 't', 'h',
'e', ' ', 'F', 'T', 'S', 'E', ',', ' ', 'f', 'e',
'l', 'l', ' ', 'b', 'y', ' ', '.', '%', ' ', '–',
' ', 't', 'h', 'e', ' ', 'w', 'o', 'r', 's', 't',
' ', 'd', 'a', 'y', ' ', 's', 'i', 'n', 'c', 'e',
' ', 'i', 't', ' ', 'l', 'a', 'u', 'n', 'c', 'h',
'e', 'd', ' ', 'i', 'n', ' ', '.', ' ', 'T', 'h',
'e', ' ', 'p', 'a', 'n', 'i', 'c', ' ', 's', 'e',
'l', 'l', 'i', 'n', 'g', ' ', 'p', 'r', 'o', 'm',
'p', 't', 'e', 'd', ' ', 'b', 'y', ' ', 't', 'h',
'e', ' ', 'c', 'o', 'r', 'o', 'n', 'a', 'v', 'i',
'r', 'u', 's', ' ', 'h', 'a', 's', ' ', 'w', 'i',
'p', 'e', 'd', ' ', '£', '.', 't', 'n', ' ', 'o',
'f', 'f', ' ', 't', 'h', 'e', ' ', 'v', 'a', 'l',
'u', 'e', ' ', 'o', 'f', ' ', 'S', 'T', 'O', 'X',
'X', ' ', ' ', 's', 'h', 'a', 'r', 'e', 's', ' ',
's', 'i', 'n', 'c', 'e', ' ', 'i', 't', 's', ' ',
'a', 'l', 'l', '-', 't', 'i', 'm', 'e', ' ', 'p',
'e', 'a', 'k', ' ', 'o', 'n', ' ', ' ', 'F', 'e',
'b', 'r', 'u', 'a', 'r', 'y', '.']

>>> result = re.findall(r"[ \n\t\r\f\v]",
string)
>>> result
[' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '
']

>>> result = re.findall(r"[^ \n\t\r\f\v]",
string)
>>> result
['T', 'h', 'e', 'E', 'u', 'r', 'o', 'S', 'T', 'O',
'X', 'X', '6', '0', '0', 'i', 'n', 'd', 'e', 'x',
',', 'w', 'h', 'i', 'c', 'h', 't', 'r', 'a', 'c',
'k', 's', 'a', 'l', 'l', 's', 't', 'o', 'c', 'k',
'm', 'a', 'r', 'k', 'e', 't', 's', 'a', 'c', 'r',
'o', 's', 's', 'E', 'u', 'r', 'o', 'p', 'e', 'i',
'n', 'c', 'l', 'u', 'd', 'i', 'n', 'g', 't', 'h',
'e', 'F', 'T', 'S', 'E', ',', 'f', 'e', 'l', 'l',
'b', 'y', '1', '1', '.', '4', '8', '%', '-', 't',
'h', 'e', 'w', 'o', 'r', 's', 't', 'd', 'a', 'y',
's', 'i', 'n', 'c', 'e', 'i', 't', 'l', 'a', 'u',
'n', 'c', 'h', 'e', 'd', 'i', 'n', '1', '9', '9',
'8', '.', 'T', 'h', 'e', 'p', 'a', 'n', 'i', 'c',
's', 'e', 'l', 'l', 'i', 'n', 'g', 'p', 'r', 'o',
'm', 'p', 't', 'e', 'd', 'b', 'y', 't', 'h', 'e',
'c', 'o', 'r', 'o', 'n', 'a', 'v', 'i', 'r', 'u',
's', 'h', 'a', 's', 'w', 'i', 'p', 'e', 'd', '£',
'2', '.', '7', 't', 'n', 'o', 'f', 'f', 't', 'h',
'e', 'v', 'a', 'l', 'u', 'e', 'o', 'f', 'S', 'T',
'O', 'X', 'X', '6', '0', '0', 's', 'h', 'a', 'r',
'e', 's', 's', 'i', 'n', 'c', 'e', 'i', 't', 's',
'a', 'l', 'l', '-', 't', 'i', 'm', 'e', 'p', 'e',
'a', 'k', 'o', 'n', '1', '9', 'F', 'e', 'b', 'r',
'u', 'a', 'r', 'y', '.']

>>> result = re.findall(r"[a-zA-Z0-9_]", string)
>>> result
['T', 'h', 'e', 'E', 'u', 'r', 'o', 'S', 'T', 'O',
'X', 'X', '6', '0', '0', 'i', 'n', 'd', 'e', 'x',
'w', 'h', 'i', 'c', 'h', 't', 'r', 'a', 'c', 'k',
's', 'a', 'l', 'l', 's', 't', 'o', 'c', 'k', 'm',
'a', 'r', 'k', 'e', 't', 's', 'a', 'c', 'r', 'o',
's', 's', 'E', 'u', 'r', 'o', 'p', 'e', 'i', 'n',
'c', 'l', 'u', 'd', 'i', 'n', 'g', 't', 'h', 'e',
'F', 'T', 'S', 'E', 'f', 'e', 'l', 'l', 'b', 'y',
'1', '1', '4', '8', 't', 'h', 'e', 'w', 'o', 'r',
's', 't', 'd', 'a', 'y', 's', 'i', 'n', 'c', 'e',
'i', 't', 'l', 'a', 'u', 'n', 'c', 'h', 'e', 'd',
'i', 'n', '1', '9', '9', '8', 'T', 'h', 'e', 'p',
'a', 'n', 'i', 'c', 's', 'e', 'l', 'l', 'i', 'n',
'g', 'p', 'r', 'o', 'm', 'p', 't', 'e', 'd', 'b',
'y', 't', 'h', 'e', 'c', 'o', 'r', 'o', 'n', 'a',
'v', 'i', 'r', 'u', 's', 'h', 'a', 's', 'w', 'i',
'p', 'e', 'd', '2', '7', 't', 'n', 'o', 'f', 'f',
't', 'h', 'e', 'v', 'a', 'l', 'u', 'e', 'o', 'f',
'S', 'T', 'O', 'X', 'X', '6', '0', '0', 's', 'h',
'a', 'r', 'e', 's', 's', 'i', 'n', 'c', 'e', 'i',
't', 's', 'a', 'l', 'l', 't', 'i', 'm', 'e', 'p',
'e', 'a', 'k', 'o', 'n', '1', '9', 'F', 'e', 'b',
'r', 'u', 'a', 'r', 'y']

>>> result = re.findall(r"[^a-zA-Z0-9_]",
string)
>>> result
[' ', ' ', ' ', ' ', ',', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', ',', ' ', ' ', ' ',
'.', '%', ' ', '_', ' ', ' ', ' ', ' ', ' ', ' ',
' ', ' ', '.', ' ', ' ', ' ', ' ', ' ', ' ', ' ',
' ', ' ', ' ', '£', '.', ' ', ' ', ' ', ' ', ' ',
' ', ' ', ' ', ' ', ' ', '_', ' ', ' ', ' ', ' ',
'.']
```

METACHARACTERS - THE CURLY BRACES ({})

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\b\w{4}\b", string)
>>> result
['Euro', 'FTSE', 'fell', '1998', 'time', 'peak']

>>> result = re.findall(r"\b\w{3,5}\b", string)
>>> result
['The', 'Euro', 'STOXX', '600', 'index', 'which',
'all', 'stock', 'the', 'FTSE', 'fell', 'the',
'worst', 'day', 'since', '1998', 'The', 'panic',
'the', 'has', 'wiped', '7tn', 'off', 'the',
'value', 'STOXX', '600', 'since', 'its', 'all',
'time', 'peak']
```

```
>>> result = re.findall(r"\b\w{3,}\b", string)
>>> result
['The', 'Euro', 'STOXX', '600', 'index', 'which',
'tracks', 'all', 'stock', 'markets', 'across',
'Europe', 'including', 'the', 'FTSE', 'fell',
'the', 'worst', 'day', 'since', 'launched',
'1998', 'The', 'panic', 'selling', 'prompted',
'the', 'coronavirus', 'has', 'wiped', '7tn',
'off', 'the', 'value', 'STOXX', '600', 'shares',
'since', 'its', 'all', 'time', 'peak',
'February']

>>> number = "123918271728209190110019 11"
>>> result = re.search(r"\d{3,6}", number)
>>> result
<re.Match object; span=(0, 6), match='123918'>
>>> result = re.search(r"\d{3,6}?", number)
>>> result
<re.Match object; span=(0, 3), match='123'>
```

METACHARACTERS - THE PIPE (|)

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.search(r"\d{3}|\d{4}|\b[A-
Z]{4}\b", string)
>>> result
<re.Match object; span=(15, 18), match='600'>

>>> result = re.search(r"\d{8}|\d{4}|\b[A-
Z]{4}\b", string)
>>> result
<re.Match object; span=(85, 89), match='FTSE'>
```

SPECIAL SEQUENCES - \A AND \Z

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998.\nThe panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\A([A-Z].*?)\s",
string, re.M)
>>> result
['The']
>>> result = re.findall(r"^([A-Z].*?)\s",
string, re.M)
>>> result
['The', 'The']

>>> result = re.findall(r"\W\Z", string, re.M)
>>> result
['.']
>>> result = re.findall(r"\W$", string, re.M)
>>> result
['.', '.']
```

SPECIAL SEQUENCES - \B AND \B

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\b\w{10,}\b", string)
>>> result
['coronavirus']

>>> result = re.findall(r"\bEuro\b", string)
>>> result
['Euro']

>>> result = re.findall(r"\Bcross", string)
>>> result
['cross']

>>> result = re.findall(r"cross\B", string)
>>> result
[]
```

```
>>> result = re.findall(r"\Bcross\B", string)
>>> result
[]
```

SPECIAL SEQUENCES - \D AND \D

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks all stock markets across Europe including the FTSE, fell by 11.48% – the worst day since it launched in 1998. The panic selling prompted by the coronavirus has wiped £2.7tn off the value of STOXX 600 shares since its all-time peak on 19 February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"(\d)[a-z]", string)
>>> result
['7']

>>> result = re.findall(r"\W\D\W", string)
>>> result
['% –']

>>> result = re.findall(r"\W(\D)\W", string)
>>> result
[' ']
```

SPECIAL SEQUENCES - \S AND \S

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998.\nThe panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\s", string)
>>> result
[' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', '\n', ' ', ' ',
' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ',
' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ', ' ',
' ']

>>> result = re.findall(r"\S{8,}", string)
>>> result
['including',     'launched',     'prompted',
'coronavirus', 'all-time', 'February.']
```

SPECIAL SEQUENCES - \W AND \W

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\s(\w{3,5})\s",
string)
>>> result
['Euro', '600', 'which', 'all', 'the', 'fell',
'the', 'day', 'The', 'the', 'has', 'off', 'value',
'STOXX', 'since', 'peak']

>>> result = re.findall(r"\W", string)
>>> result
[' ', ' ', ' ', ' ', ',', ' ', ' ', ' ', ' ', '
', ' ', ' ', ' ', ' ', ' ', ',', ' ', ' ', ' ',
'.', '%', ' ', '-', ' ', ' ', ' ', ' ', ' ', ' ',
' ', ' ', '.', ' ', ' ', ' ', ' ', ' ', ' ', ' ',
' ', ' ', ' ', '£', '.', ' ', ' ', ' ', ' ', ' ',
' ', ' ', ' ', ' ', ' ', '-', ' ', ' ', ' ', ' ',
'.']
```

EXTENSION NOTATIONS AND NON-CAPTURING GROUPS

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: *https://www.theguardian.com/*

Example:

```
>>> import re
>>> result = re.search(r".+(\b.+ex\b).+(\b[A-
Z]{4}\b).+(\d\d\s.+)\.", string)
>>> result.groups()
('index', 'FTSE', '19 February')
>>> result.group(1)
'index'
>>> result.group(2)
'FTSE'
>>> result.group(3)
'19 February'

>>> result = re.search(r".+(?:\b.+ex\b).+(\b[A-
Z]{4}\b).+(\d\d\s.+)\.", string)
>>> result.groups()
```

```
('FTSE', '19 February')
>>> result.group(1)
'FTSE'
>>> result.group(2)
'19 February'
>>> result.group(3)
Traceback (most recent call last):
  File "<pyshell#92>", line 1, in <module>
    result.group(3)
IndexError: no such group
```

NAMED GROUPS AND GROUPDICT()

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result =
re.search(r".+(?P<wordex>\b.+ex\b).+(?P<uppercas
e>\b[A-Z]{4}\b).+(?P<date>\d\d\s.+)\.", string)
>>> result.groups()
('index', 'FTSE', '19 February')
>>> result.group("wordex")
'index'
>>> result.group("uppercase")
'FTSE'
>>> result.group("date")
'19 February'
>>> result.group(1)
'index'
```

```
>>> result.group(2)
'FTSE'
>>> result.group(3)
'19 February'

>>> result.groupdict()
{'wordex': 'index', 'uppercase': 'FTSE', 'date':
'19 February'}
```

POSITIVE LOOKAHEAD ASSERTIONS

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"[A-Z]{5}\s(?=[0-
9]{3})", string)
>>> result
['STOXX ', 'STOXX ']
>>> result = re.findall(r"([A-Z]{5})\s(?=[0-
9]{3})", string)
>>> result
['STOXX', 'STOXX']

>>> result = re.findall(r"Euro(?=[a-z]+)",
string)
>>> result
['Euro']
```

NEGATIVE LOOKAHEAD ASSERTIONS

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"\d(?![5-9]|\D)",
string)
>>> result
['6', '0', '1', '6', '0']

>>> result = re.findall(r"\b\w+\b(?!\s)",
string)
>>> result
['index', 'FTSE', '11', '48', '1998', '2',
'all', 'February']
```

POSITIVE LOOKBEHIND ASSERTIONS

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"(?<=\s)\d{1,}",
string)
>>> result
['600', '11', '1998', '600', '19']

>>> result = re.findall(r"(?<=,\s)\b\w+\b",
string)
>>> result
['which', 'fell']
```

NEGATIVE LOOKBEHIND ASSERTIONS

Initial target string:

```
string = "The Euro STOXX 600 index, which tracks
all stock markets across Europe including the
FTSE, fell by 11.48% – the worst day since it
launched in 1998. The panic selling prompted by
the coronavirus has wiped £2.7tn off the value of
STOXX 600 shares since its all-time peak on 19
February."
```

Source: https://www.theguardian.com/

Example:

```
>>> import re
>>> result = re.findall(r"(?<!\s)\d{1,}",
string)
>>> result
['00', '1', '48', '998', '2', '7', '00', '9']

>>> result = re.findall(r"(?<!x)x(?!x)", string,
re.I)
>>> result
['x']
```

Check out my [LinkedIn Profile]() to see my latest courses. Cheers!