:[1] In

```
import re

txt = "The rain in Spain"

#Find all lower case characters alphabetically between "a" and "m":

x = re.findall("[a-m]", txt)
print(x)
```

```
['h', 'e', 'a', 'i', 'i', 'a', 'i']
```

:[2] In

```
txt = "That will be 59 dollars"

#Find all digit characters:

x = re.findall("\d", txt)
print(x)
```

```
['9' ,'5']
```

:[3] In

```
txt = "hello world"

#Search for a sequence that starts with "he", followed by two (any) characters, and an "o":

x = re.findall("he..o", txt)
print(x)
```

```
['hello']
```

:[4] In

```
txt = "hello world"

#Check if the string starts with 'hello':

x = re.findall("^hello", txt)
if x:
  print("Yes, the string starts with 'hello'")
else:
  print("No match")
```

```
'Yes, the string starts with 'hello
```

:[5] In

```
txt = "hello world"

#Check if the string ends with 'world':

x = re.findall("world$", txt)
if x:
  print("Yes, the string ends with 'world'")
else:
  print("No match")
```

```
'Yes, the string ends with 'world
```

:[6] In

```
txt = "The rain in Spain falls mainly in the plain!"

#Check if the string contains "ai" followed by 0 or more "x" characters:

x = re.findall("aix*", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['ai', 'ai', 'ai', 'ai']
!Yes, there is at least one match
```

:[7] In

```
txt = "The rain in Spain falls mainly in the plain!"

#Check if the string contains "ai" followed by 1 or more "x" characters:

x = re.findall("aix+", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[]
No match
```

:[8] In

```
txt = "The rain in Spain falls mainly in the plain!"

#Check if the string contains "a" followed by exactly two "l" characters:

x = re.findall("al{2}", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['all']
!Yes, there is at least one match
```

:[9] In

```
txt = "The rain in Spain falls mainly in the plain!"

#Check if the string contains either "falls" or "stays":

x = re.findall("falls|stays", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['falls']
!Yes, there is at least one match
```

:[10] In

```
xt = "The rain in Spain"

#Check if the string starts with "The":

x = re.findall("\AThe", txt)

print(x)

if x:
  print("Yes, there is a match!")
else:
  print("No match")
```

```
['The']
!Yes, there is a match
```

:[11] In

```
txt = "The rain in Spain"

#Check if "ain" is present at the beginning of a WORD:

x = re.findall(r"\bain", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[]
No match
```

:[12] In

```
txt = "The rain in Spain"

#Check if "ain" is present, but NOT at the beginning of a word:

x = re.findall(r"\Bain", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['ain', 'ain']
!Yes, there is at least one match
```

:[13] In

```
txt = "The rain in Spain"

x = re.findall("\d", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[]
No match
```

:[14] In

```
txt = "The rain in Spain"

#Return a match at every no-digit character:

x = re.findall("\D", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
 T', 'h', 'e', ' ', 'r', 'a', 'i', 'n', ' ', 'i', 'n', ' ', 'S', 'p', 'a','']
['i', 'n
!Yes, there is at least one match
```

:[15] In

```
txt = "The rain in Spain"

#Return a match at every white-space character:

x = re.findall("\s", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[' ' ,' ' ,' ']
!Yes, there is at least one match
```

:[16] In

```
txt = "The rain in Spain"

#Return a match at every NON white-space character:

x = re.findall("\S", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['T', 'h', 'e', 'r', 'a', 'i', 'n', 'i', 'n', 'S', 'p', 'a', 'i', 'n']
!Yes, there is at least one match
```

:[17] In

```
txt = "The rain in Spain"

#Return a match at every word character (characters from a to Z, digits from 0-9, and the u

x = re.findall("\w", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['T', 'h', 'e', 'r', 'a', 'i', 'n', 'i', 'n', 'S', 'p', 'a', 'i', 'n']
!Yes, there is at least one match
```

:[18] In

```
txt = "The rain in Spain"

#Return a match at every NON word character (characters NOT between a and Z. Like "!", "?"

x = re.findall("\W", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[' ' ,' ' ,' ']
!Yes, there is at least one match
```

:[19] In

```
txt = "The rain in Spain"

#Check if the string ends with "Spain":

x = re.findall("Spain\Z", txt)

print(x)

if x:
  print("Yes, there is a match!")
else:
  print("No match")
```

```
['Spain']
!Yes, there is a match
```

:[20] In

```
txt = "The rain in Spain"

#Check if the string has any a, r, or n characters:

x = re.findall("[arn]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['r', 'a', 'n', 'n', 'a', 'n']
!Yes, there is at least one match
```

:[21] In

```
txt = "The rain in Spain"

#Check if the string has any characters between a and n:

x = re.findall("[a-n]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['h', 'e', 'a', 'i', 'n', 'i', 'n', 'a', 'i', 'n']
!Yes, there is at least one match
```

:[22] In

```
txt = "The rain in Spain"

#Check if the string has other characters than a, r, or n:

x = re.findall("[^arn]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['T', 'h', 'e', ' ', 'i', ' ', 'i', ' ', 'S', 'p', 'i']
!Yes, there is at least one match
```

:[23] In

```
txt = "The rain in Spain"

#Check if the string has any 0, 1, 2, or 3 digits:

x = re.findall("[0123]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[]
No match
```

:[24] In

```
txt = "8 times before 11:45 AM"

#Check if the string has any digits:

x = re.findall("[0-9]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['5' ,'4' ,'1' ,'1' ,'8']
!Yes, there is at least one match
```

:[25] In

```
txt = "8 times before 11:45 AM"

#Check if the string has any digits:

x = re.findall("[0-9]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['5' ,'4' ,'1' ,'1' ,'8']
!Yes, there is at least one match
```

:[26] In

```
txt = "8 times before 11:45 AM"

#Check if the string has any characters from a to z lower case, and A to Z upper case:

x = re.findall("[a-zA-Z]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
['t', 'i', 'm', 'e', 's', 'b', 'e', 'f', 'o', 'r', 'e', 'A', 'M']
!Yes, there is at least one match
```

:[27] In

```
txt = "8 times before 11:45 AM"

#Check if the string has any + characters:

x = re.findall("[+]", txt)

print(x)

if x:
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[]
No match
```

:[28] In

```
txt = "The rain in Spain"
x = re.findall("ai", txt)
print(x)
```

```
['ai', 'ai']
```

:[29] In

```
txt = "The rain in Spain"

#Check if "Portugal" is in the string:

x = re.findall("Portugal", txt)
print(x)

if (x):
  print("Yes, there is at least one match!")
else:
  print("No match")
```

```
[]
No match
```

:[30] In

```
txt = "The rain in Spain"
x = re.search("\s", txt)

print("The first white-space character is located in position:", x.start())
```

```
The first white-space character is located in position: 3
```

:[31] In

```
txt = "The rain in Spain"
x = re.search("Portugal", txt)
print(x)
```

```
None
```

:[32] In

```
txt = "The rain in Spain"
x = re.split("\s", txt)
print(x)
```

```
['The', 'rain', 'in', 'Spain']
```

:[33] In

```
txt = "The rain in Spain"
x = re.split("\s", txt, 1)
print(x)
```

```
['The', 'rain in Spain']
```

:[34] In

```
txt = "The rain in Spain"
x = re.sub("\s", "9", txt)
print(x)
```

```
The9rain9in9Spain
```

:[35] In

```
txt = "The rain in Spain"
x = re.sub("\s", "9", txt, 2)
print(x)
```

```
The9rain9in Spain
```

Exercise 1

:[36] In

```
import re
txt = ''' Regular expression is a sequence of character(s)
mainly used to find and replace patterns in a string or file'''

## find everything between 'Regular' and 'file'
start = txt.find("Regular") + len("Regular")
end = txt.find("file")
substring = txt[start:end]
print(substring)
```

```
(expression is a sequence of character(s
mainly used to find and replace patterns in a string or
```

:[37] In

```
replacement_patterns = [
(r'won\'t', 'will not'),
(r'can\'t', 'cannot'),
(r'i\'m', 'i am'),
(r'ain\'t', 'is not'),
(r'(\w+)\'ll', '\g<1> will'),
(r'(\w+)n\'t', '\g<1> not'),
(r'(\w+)\'ve', '\g<1> have'),
(r'(\w+)\'s', '\g<1> is'),
(r'(\w+)\'re', '\g<1> are'),
(r'(\w+)\'d', '\g<1> would')]


class RegexReplacer(object):
    def __init__(self, patterns=replacement_patterns):
        self.patterns = [(re.compile(regex), repl) for (regex, repl)in patterns]
    def replace(self, text):
        s = text
        for (pattern, repl) in self.patterns:
            (s, count) = re.subn(pattern, repl, s)
        return s

replacer = RegexReplacer()
```

Exercise 2

:[38] In

```
Sentence='''We'll see how to replace words using regular
expressions such doesn't, can't and so on'''

print(replacer.replace(Sentence))
```

```
We will see how to replace words using regular
expressions such does not, cannot and so on
```

:[39] In

```
class RepeatReplacer(object):
    def __init__(self):
        self.repeat_regexp = re.compile(r'(\w*)(\w)\2(\w*)')
        self.repl = r'\1\2\3'
    def replace(self, word):
        repl_word = self.repeat_regexp.sub(self.repl, word)
        if repl_word != word:
            return self.replace(repl_word)
        else:
            return repl_word

repeat = RepeatReplacer()
```

Exercise 3

:[40] In

```
Sentence = 'We love python'

print(repeat.replace(Sentence))
```

```
We love python
```

Exercise 4

:[41] In

```
import requests
import re

## get the data from website that have a table full of emails and phone numbers
data = requests.get('http://www.mg-cc.org/club-information/club-contacts')

## extract the phone numbers and emails using Regular Expressions
phones = re.findall(r'[\+\(]?[1-9][0-9 .\-\(\)]{8,}[0-9]', data.text)
emails = re.findall(r'([\d\w\.]+@[\d\w\.\-]+\.\w+)', data.text)

print(phones)
print(emails)
```

```
2)' ,'361-2926 (215)' ,'246-8656 (267)' ,'241-3239 (267)' ,'886-3033 (215)']
['886-3200 (15
mdwyer@mg-cc.org', 'morme@mg-cc.org', 'bfritz@mg-cc.org', 'bfritz@mg-cc.or']
g', 'alazovitz@mg-cc.org', 'alazovitz@mg-cc.org', 'glenhart@mg-cc.org', 'gle
 nhart@mg-cc.org', 'lhower@mg-cc.org', 'lhower@mg-cc.org', 'kbeck@mg-cc.org',
'kbeck@mg-cc.org', 'bdoheny@mg-cc.org', 'bdoheny@mg-cc.org', 'ljcorr@mg-cc.o
rg', 'ljcorr@mg-cc.org', 'DiningManager@mg-cc.org', 'DiningManager@mg-cc.or
g', 'cgiampa@mg-cc.org', 'cgiampa@mg-cc.org', 'jccotto@mg-cc.org', 'sfalatek
@mg-cc.org', 'selmarobinson@gmail.com', 'selmairobinson@gmail.com', 'freycc@
['npenn.org', 'freycc@npenn.org', 'kmurphy@mg-cc.org', 'kmurphy@mg-cc.org
```

:[ ] In

```

```