



# Python RegEx

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A RegEx, or Regular Expression, is a sequence of characters that forms a search pattern.

RegEx can be used to check if a string contains the specified search pattern.

## RegEx Module

Python has a built-in package called `re`, which can be used to work with Regular Expressions.

Import the `re` module:

```
import re
```

## RegEx in Python

When you have imported the `re` module, you can start using regular expressions:

### Example

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Search the string to see if it starts with "The" and ends with "Spain":

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## RegEx Functions

The `re` module offers a set of functions that allows us to search a string for a match:

Function	Description
<a href="#"><u>findall</u></a>	Returns a list containing all matches
<a href="#"><u>search</u></a>	Returns a <a href="#"><u>Match object</u></a> if there is a match anywhere in the string
<a href="#"><u>split</u></a>	Returns a list where the string has been split at each match
<a href="#"><u>sub</u></a>	Replaces one or many matches with a string

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## Metacharacters

Metacharacters are characters with a special meaning:



\	Signals a special sequence (can also be used to escape special characters)	"\d"	<a href="#">Try it »</a>
.	Any character (except newline character)	"he..o"	<a href="#">Try it »</a>
^	Starts with	"^hello"	<a href="#">Try it »</a>
\$	Ends with	"planet\$"	<a href="#">Try it »</a>
*	Zero or more occurrences	"he.*o"	<a href="#">Try it »</a>
+	One or more occurrences	"he.+o"	<a href="#">Try it »</a>
?	Zero or one occurrences	"he.?o"	<a href="#">Try it »</a>
{}	Exactly the specified number of occurrences	"he.{2}o"	<a href="#">Try it »</a>
	Either or	"falls stays"	<a href="#">Try it »</a>
()	Capture and group		

## Special Sequences

A special sequence is a `\` followed by one of the characters in the list below, and has a special meaning:

Character	Description	Example	Try it
\A	Returns a match if the specified characters are at the beginning of the string	"\AThe"	<a href="#">Try it »</a>
\b	Returns a match where the specified characters are at the beginning or at the end of a word (the "r" in the beginning is making sure that the string is being treated as a "raw string")	r"\bain" r"ain\b"	<a href="#">Try it »</a> <a href="#">Try it »</a>



	(the first in the beginning is making sure that the string is being treated as a "raw string")		
<code>\d</code>	Returns a match where the string contains digits (numbers from 0-9)	<code>"\d"</code>	<a href="#">Try it »</a>
<code>\D</code>	Returns a match where the string DOES NOT contain digits	<code>"\D"</code>	<a href="#">Try it »</a>
<code>\s</code>	Returns a match where the string contains a white space character	<code>"\s"</code>	<a href="#">Try it »</a>
<code>\S</code>	Returns a match where the string DOES NOT contain a white space character	<code>"\S"</code>	<a href="#">Try it »</a>
<code>\w</code>	Returns a match where the string contains any word characters (characters from a to Z, digits from 0-9, and the underscore _ character)	<code>"\w"</code>	<a href="#">Try it »</a>
<code>\W</code>	Returns a match where the string DOES NOT contain any word characters	<code>"\W"</code>	<a href="#">Try it »</a>
<code>\Z</code>	Returns a match if the specified characters are at the end of the string	<code>"Spain\Z"</code>	<a href="#">Try it »</a>

## Sets

A set is a set of characters inside a pair of square brackets `[]` with a special meaning:

Set	Description	Try it
<code>[arn]</code>	Returns a match where one of the specified characters ( <code>a</code> , <code>r</code> , or <code>n</code> ) is present	<a href="#">Try it »</a>
<code>[a-n]</code>	Returns a match for any lower case character, alphabetically between <code>a</code> and <code>n</code>	<a href="#">Try it »</a>
<code>[^arn]</code>	Returns a match for any character EXCEPT <code>a</code> , <code>r</code> , and <code>n</code>	<a href="#">Try it »</a>



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[0-9]	Returns a match for any digit between 0 and 9								Try it »
[0-5][0-9]	Returns a match for any two-digit numbers from 00 and 59								Try it »
[a-zA-Z]	Returns a match for any character alphabetically between a and z, lower case OR upper case								Try it »
[+]	In sets, +, *, .,  , (), \$, {} has no special meaning, so [+] means: return a match for any + character in the string								Try it »

## The findall() Function

The `findall()` function returns a list containing all matches.

### Example

Print a list of all matches:

```
import re

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

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The list contains the matches in the order they are found.

If no matches are found, an empty list is returned:

### Example

Return an empty list if no match was found:



```
x = re.findall('for loop', txt)
print(x)
```

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## The search() Function

The `search()` function searches the string for a match, and returns a Match object if there is a match.

If there is more than one match, only the first occurrence of the match will be returned:

### Example

Search for the first white-space character in the string:

```
import re

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

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

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If no matches are found, the value `None` is returned:

### Example

Make a search that returns no match:

```
import re

txt = "The rain in Spain"
```



# The split() Function

The `split()` function returns a list where the string has been split at each match:

## Example

Split at each white-space character:

```
import re

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

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You can control the number of occurrences by specifying the `maxsplit` parameter:

## Example

Split the string only at the first occurrence:

```
import re

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

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## Example

Replace every white-space character with the number 9:

```
import re

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

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You can control the number of replacements by specifying the **count** parameter:

## Example

Replace the first 2 occurrences:

```
import re

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

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# Match Object

A Match Object is an object containing information about the search and the result.





## Example

Do a search that will return a Match Object:

```
import re

txt = "The rain in Spain"
x = re.search("ai", txt)
print(x) #this will print an object
```

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The Match object has properties and methods used to retrieve information about the search, and the result:

- `.span()` returns a tuple containing the start-, and end positions of the match.
- `.string` returns the string passed into the function
- `.group()` returns the part of the string where there was a match

## Example

Print the position (start- and end-position) of the first match occurrence.

The regular expression looks for any words that starts with an upper case "S":

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```
import re

txt = "The rain in Spain"
x = re.search(r"\bS\w+", txt)
print(x.span())
```

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## Example

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```
in Spain"  
"\bS\w+", txt)
```



e string where there was a match.

sion looks for any words that starts with an upper case "S":

```
in Spain"  
"\bS\w+", txt)  
)
```

**Note:** If there is no match, the value **None** will be returned, instead of the Match Object.

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