

`str.capitalize()`

Return a copy of the string with its first character capitalized and the rest lowercased.

`str.count(sub[, start[, end]])`

Return the number of non-overlapping occurrences of substring `sub` in the range `[start, end]`. Optional arguments `start` and `end` are interpreted as in slice notation.

`str.endswith(suffix[, start[, end]])`

Return `True` if the string ends with the specified `suffix`, otherwise return `False`. `suffix` can also be a tuple of suffixes to look for. With optional `start`, test beginning at that position. With optional `end`, stop comparing at that position.

`str.index(sub[, start[, end]])`

Like `find()`, but raise `ValueError` when the substring is not found.

`str.isalnum()`

Return `true` if all characters in the string are alphanumeric and there is at least one character, `false` otherwise. A character `c` is alphanumeric if one of the following returns `True`: `c.isalpha()`, `c.isdecimal()`, `c.isdigit()`, or `c.isnumeric()`.

`str.isalpha()`

Return `true` if all characters in the string are alphabetic and there is at least one character, `false` otherwise. Alphabetic characters are those characters defined in the Unicode character database as `Letter`, i.e., those with general category property being one of `Lm`, `Lt`, `Lu`, `Ll`, or `Lo`. Note that this is different from the `Alphabetic` property defined in the Unicode Standard.

`str.isdecimal()`

Return `true` if all characters in the string are decimal characters and there is at least one character, `false` otherwise. Decimal characters are those from general category `Nd`. This category includes digit characters, and all characters that can be used to form decimal-radix numbers, e.g. `U+0660`, `ARABIC-INDIC DIGIT ZERO`.

`str.isdigit()`

Return `true` if all characters in the string are digits and there is at least one character, `false` otherwise. Digits include decimal characters and digits that need special handling, such as the compatibility superscript digits. Formally, a digit is a character that has the property value `Numeric_Type=Digit` or `Numeric_Type=Decimal`.

`str.islower()`

Return `true` if all cased characters [4] in the string are lowercase and there is at least one cased character, `false` otherwise.

`str.isnumeric()`

Return true if all characters in the string are numeric characters, and there is at least one character, false otherwise. Numeric characters include digit characters, and all characters that have the Unicode numeric value property, e.g. U+2155, VULGAR FRACTION ONE FIFTH. Formally, numeric characters are those with the property value `Numeric_Type=Digit`, `Numeric_Type=Decimal` or `Numeric_Type=Numeric`.

`str.isspace()`

Return true if there are only whitespace characters in the string and there is at least one character, false otherwise. Whitespace characters are those characters defined in the Unicode character database as `Other` or `Separator` and those with bidirectional property being one of `WS`, `B`, or `S`.

`str.isupper()`

Return true if all cased characters [4] in the string are uppercase and there is at least one cased character, false otherwise.

`str.join(iterable)`

Return a string which is the concatenation of the strings in the iterable `iterable`. A `TypeError` will be raised if there are any non-string values in `iterable`, including bytes objects. The separator between elements is the string providing this method.

`str.lower()`

Return a copy of the string with all the cased characters [4] converted to lowercase.

`str.replace(old, new[, count])`

Return a copy of the string with all occurrences of substring `old` replaced by `new`. If the optional argument `count` is given, only the first `count` occurrences are replaced.

`str.split(sep=None, maxsplit=-1)`

Return a list of the words in the string, using `sep` as the delimiter string. If `maxsplit` is given, at most `maxsplit` splits are done (thus, the list will have at most `maxsplit+1` elements). If `maxsplit` is not specified or `-1`, then there is no limit on the number of splits (all possible splits are made).

If `sep` is given, consecutive delimiters are not grouped together and are deemed to delimit empty strings (for example, `'1,,2'.split(',')` returns `['1', '', '2']`). The `sep` argument may consist of multiple characters (for example, `'1<>2<>3'.split('<>')` returns `['1', '2', '3']`). Splitting an empty string with a specified separator returns `['']`.

If `sep` is not specified or is `None`, a different splitting algorithm is applied: runs of consecutive whitespace are regarded as a single separator, and the result will contain no empty strings at the start or end if the string has leading or trailing whitespace. Consequently, splitting an empty

string or a string consisting of just whitespace with a None separator returns [].

`str.startswith(prefix[, start[, end]])`

Return True if string starts with the prefix, otherwise return False. prefix can also be a tuple of prefixes to look for. With optional start, test string beginning at that position. With optional end, stop comparing string at that position.

`str.strip([chars])`

Return a copy of the string with the leading and trailing characters removed. The chars argument is a string specifying the set of characters to be removed. If omitted or None, the chars argument defaults to removing whitespace. The chars argument is not a prefix or suffix; rather, all combinations of its values are stripped:

`str.upper()`

Return a copy of the string with all the cased characters [4] converted to uppercase. Note that `str.upper().isupper()` might be False if s contains uncased characters or if the Unicode category of the resulting character(s) is not Lu (Letter, uppercase), but e.g. Lt (Letter, titlecase).

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```
my_int = 42
my_str = "the answer to life the universe and everything"
my_float = 3.14
print("%d is %s, not %f" % (my_int, my_str, my_float))
```

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**dict methods**

`clear()`

Remove all items from the dictionary.

`copy()`

Return a shallow copy of the dictionary.

`get(key[, default])`

Return the value for key if key is in the dictionary, else default. If default is not given, it defaults to None, so that this method never raises a KeyError.

`items()`

Return a new view of the dictionary's items ((key, value) pairs).

`keys()`

Return a new view of the dictionary's keys. .

`pop(key[, default])`

If key is in the dictionary, remove it and return its value, else return default. If default is not given and key is not in the dictionary, a

KeyError is raised.

popitem()

Remove and return an arbitrary (key, value) pair from the dictionary.

popitem() is useful to destructively iterate over a dictionary, as often used in set algorithms. If the dictionary is empty, calling popitem() raises a KeyError.

setdefault(key[, default])

If key is in the dictionary, return its value. If not, insert key with a value of default and return default. default defaults to None.

update([other])

Update the dictionary with the key/value pairs from other, overwriting existing keys. Return None.

update() accepts either another dictionary object or an iterable of key/value pairs (as tuples or other iterables of length two). If keyword arguments are specified, the dictionary is then updated with those key/value pairs: d.update(red=1, blue=2).

values()

Return a new view of the dictionary's values.

x in s True if an item of s is equal to x, else False  
x not in s False if an item of s is equal to x, else True  
s + t the concatenation of s and t  
s \* n or n \* s n shallow copies of s concatenated  
s[i] ith item of s, origin 0  
s[i:j] slice of s from i to j  
s[i:j:k] slice of s from i to j with step k  
len(s) length of s  
min(s) smallest item of s  
max(s) largest item of s  
s.index(x[, i[, j]]) index of the first occurrence of x in s (at or after index i and before index j)  
s.count(x) total number of occurrences of x in s  
s[i] = x item i of s is replaced by x  
s[i:j] = t slice of s from i to j is replaced by the contents of the iterable t  
del s[i:j] same as s[i:j] = []  
s[i:j:k] = t the elements of s[i:j:k] are replaced by those of t  
del s[i:j:k] removes the elements of s[i:j:k] from the list  
s.append(x) appends x to the end of the sequence (same as s[len(s):len(s)] = [x])  
s.clear() removes all items from s (same as del s[:])  
s.copy() creates a shallow copy of s (same as s[:])  
s.extend(t) extends s with the contents of t (same as s[len(s):len(s)] = t)  
s.insert(i, x) inserts x into s at the index given by i (same as s[i:i] = [x])  
s.pop([i]) retrieves the item at i and also removes it from s  
s.remove(x) remove the first item from s where s[i] == x  
s.reverse() reverses the items of s in place

```
L = [3, 2, 10]
L.sort() #L is now [2, 3, 10]
L = [3, 2, 10]
L1 = sorted(L) #L1 is now [2, 3, 10], a new list
L = [3, 2, 10]
L2 = sorted(L, reverse=True) #L2 is now [10, 3, 2], a new list
```

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The following examples all return a dictionary equal to {"one": 1, "two": 2, "three": 3}

```
{'one': 1, 'two': 2, 'three': 3}
dict([('two', 2), ('one', 1), ('three', 3)])
```

Also:

```
list({"one": 1, "two": 2, "three": 3}.items()) == [('three', 3), ('two', 2), ('one', 1)]
```

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$$1 + 2 + 3 + 4 + \dots + n = \frac{n(n+1)}{2}$$

$$1 + r + r^2 + r^3 + \dots + r^n = \frac{1 - r^{n+1}}{1 - r}$$

$$n = a^{\log_a n}$$

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