

# Reference guide: Python concepts from module 3

Google Cybersecurity Certificate

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## Built-in functions

The following built-in functions are commonly used in Python.

**`str()`**

Converts the input object to a string

```
str(10)
```

Converts the integer `10` to the string `"10"`

## **len()**

Returns the number of elements in an object

```
print(len("security"))
```

Returns and displays 8, the number of characters in the string "security"

## String methods

The following methods can be applied to strings in Python.

### **.upper()**

Returns a copy of the string in all uppercase letters

```
print("Security".upper())
```

Returns and displays a copy of the string "Security" as "SECURITY"

### **.lower()**

Returns a copy of the string in all lowercase letters

```
print("Security".lower())
```

Returns and displays a copy of the string "Security" as "security"

### **.index()**

Finds the first occurrence of the input in a string and returns its location

```
print("Security".index("c"))
```

Finds the first occurrence of the character "c" in the string "Security" and returns and displays its index of 2

## List methods

The following methods can be applied to lists in Python.

### **.insert()**

Adds an element in a specific position inside the list

```
username_list = ["elarson", "fgarcia", "tshah"]  
username_list.insert(2, "wjaffrey")
```

Adds the element "wjaffrey" at index 2 to the username\_list; the list becomes ["elarson", "fgarcia", "wjaffrey", "tshah"]

### **.remove()**

Removes the first occurrence of a specific element inside a list

```
username_list = ["elarson", "bmoreno", "wjaffrey", "tshah"]  
username_list.remove("elarson")
```

Removes the element "elarson" from the username\_list; the list becomes ["fgarcia", "wjaffrey", "tshah"]

### **.append()**

Adds input to the end of a list

```
username_list = ["bmoreno", "wjaffrey", "tshah"]  
username_list.append("btang")
```

Adds the element "btang" to the end of the username\_list; the list becomes ["fgarcia", "wjaffrey", "tshah", "btang"]

### **.index()**

Finds the first occurrence of an element in a list and returns its index

```
username_list = ["bmoreno", "wjaffrey", "tshah", "btang"]  
print(username_list.index("tshah"))
```

Finds the first occurrence of the element "tshah" in the username\_list and returns and displays its index of 2

## Additional syntax for working with strings and lists

The following syntax is useful when working with strings and lists.

### + (concatenation)

Combines two strings or lists together

```
device_id = "IT"+"nwp12"
```

Combines the string "IT" with the string "nwp12" and assigns the combined string of "ITnwp12" to the variable `device_id`

```
users = ["elarson", "bmoreno"] + ["tshah", "btang"]
```

Combines the list ["elarson", "bmoreno"] with the list ["tshah", "btang"] and assigns the combined list of ["elarson", "bmoreno", "tshah", "btang"] to the variable `users`

### [] (bracket notation)

Uses indices to extract parts of a string or list

```
print("h32rb17"[0])
```

Extracts the character at index 0, which is ("h"), from the string "h32rb17"

```
print("h32rb17"[0:3])
```

Extracts the slice [0:3], which is ("h32"), from the string "h32rb17"; the first index in the slice (0) is included in the slice but the second index in the slice (3) is excluded

```
username_list = ["elarson", "fgarcia", "tshah"]
```

```
print(username_list[2])
```

Extracts the element at index 2, which is ("tshah"), from the `username_list`

## Regular expressions

The following `re` module function and regular expression symbols are useful when searching for patterns in strings.

### `re.findall()`

Returns a list of matches to a regular expression

```
import re
re.findall("a53", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"a53"` in the string `"a53-32c .E"`; returns the list `["a53"]`

### `\w`

Matches with any alphanumeric character; also matches with the underscore (`_`)

```
import re
re.findall("\w", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"\w"` in the string `"a53-32c .E"`; matches to any alphanumeric character and returns the list `["a", "5", "3", "3", "2", "c", "E"]`

### `.`

Matches to all characters, including symbols

```
import re
re.findall(".", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"."` in the string `"a53-32c .E"`; matches to all characters and returns the list `["a", "5", "3", "-", "3", "2", "c", " ", ".", "E"]`

### `\d`

Matches to all single digits

```
import re
re.findall("\d", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"\d"` in the string `"a53-32c .E"`; matches to all single digits and returns the list `["5", "3", "3", "2"]`

`\s`

Matches to all single spaces

```
import re
re.findall("\d", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"\s"` in the string `"a53-32c .E"`; matches to all single spaces and returns the list `[" "]`

`\.`

Matches to the period character

```
import re
re.findall("\.", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"\."` in the string `"a53-32c .E"`; matches to all instances of the period character and returns the list `["."]`

`+`

Represents one or more occurrences of a specific character

```
import re
re.findall("\w+", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"\w+"` in the string `"a53-32c .E"`; matches to one or more occurrences of any alphanumeric character and returns the list `["a53", "32c", "E"]`

**\***

Represents, zero, one or more occurrences of a specific character

```
import re
re.findall("\w*", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"\w*"` in the string `"a53-32c .E"`; matches to one or more occurrences of any alphanumeric character and returns the list `["a53", " ", "32c", " ", " ", "E"]`

**{ }**

Represents a specified number of occurrences of a specific character; the number is specified within the curly brackets

```
import re
re.findall("\w{3}", "a53-32c .E")
```

Returns a list of matches to the regular expression pattern `"\w{3}"` in the string `"a53-32c .E"`; matches to exactly three occurrences of any alphanumeric character and returns the list `["a53", "32c"]`