

# Python String Concept Questions and Answers

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## 1. How would you confirm that 2 strings have the same identity?

The `is` operator returns `True` if 2 names point to the same location in memory. This is what we're referring to when we talk about identity.

Don't confuse `is` with `==`, the latter which only tests equality.

```
>>> animals = ['python', 'gopher']
>>> more_animals = animals
>>> print(animals == more_animals) #=> True
>>> print(animals is more_animals) #=> True
>>> even_more_animals = ['python', 'gopher']
>>> print(animals == even_more_animals) #=> True
>>> print(animals is even_more_animals) #=> False
```

Notice above how `animals` and `even_more_animals` have a different identity even though they are equal.

Additionally, the `id()` function returns the `id` of a memory address associated with a name. Two objects with the same identity will return the same `id`.

```
>>> name = 'object'
>>> id(name) #=> 4408718312
```

## 2. How would you check if each word in a string begins with a capital letter?

The `istitle()` function checks if each word is capitalized.

```
>>> print( 'The Hilton'.istitle() ) #=> True
>>> print( 'The dog'.istitle() ) #=> False
>>> print( 'sticky rice'.istitle() ) #=> False
```

## 3. Check if a string contains a specific substring

The `in` operator will return `True` if a string contains a substring.

```
>>> print( 'plane' in 'The worlds fastest plane' )
#=> True
>>> print( 'car' in 'The worlds fastest plane' )
#=> False
```

## 4. Find the index of the first occurrence of a substring in a string

There are 2 different functions that will return the starting index, `find()` and `index()`. They have slightly different behaviour.

**`find()` returns -1 if the substring is not found.**

```
>>> 'The worlds fastest plane'.find('plane') #=> 19
>>> 'The worlds fastest plane'.find('car') #=> -1
```

**`index()` will throw a `ValueError`.**

```
>>> 'The worlds fastest plane'.index('plane') #=> 19
```

```
>>> 'The worlds fastest plane'.index('car')
#=> ValueError: substring not found
```

## 5. Count the total number of characters in a string

`len()` will return the length of a string.

```
>>> len('The first president of the organization..')
#=> 19
```

## 6. Count the number of a specific character in a string

`count()` will return the number of occurrences of a specific character.

**For example:**

```
>>> 'The first president of the organization..'.count('o')
#=> 3
```

## 7. Capitalize the first character of a string

Use the `capitalize()` function to do this.

**For example:**

```
'florida dolphins'.capitalize() #=> 'Florida dolphins'
```

## 8. What is an f-string and how do you use it?

New in python 3.6, f-strings make string interpolation really easy. Using f-strings is similar to using `format()`.

F-strings are denoted by an `f` before the opening quote.

```
>>> name = 'Chris'

>>> food = 'creme brulee'
```

```
>>> f'Hello. My name is {name} and I like {food}.'  
#=> 'Hello. My name is Chris and I like creme brulee'
```

## 9. Search a specific part of a string for a substring

`index()` can also be provided with optional start and end indices for searching within a larger string.

```
>>> 'the happiest person in the whole wide  
world.'.index('the',10,44)  
  
#=> 23
```

Notice how the above returned 23 rather than 0.

```
>>> 'the happiest person in the whole wide  
world.'.index('the')  
  
#=> 0
```

## 10. Interpolate a variable into a string using `format()`

`format()` is similar to using an f-string. Though in my opinion, it's less user friendly because variables are all passed in at the end of the string.

```
>>> difficulty = 'easy'  
  
>>> thing = 'exam' 'That {} was {}!'.format(thing,  
difficulty)  
  
#=> 'That exam was easy!'
```

## 11. Check if a string contains only numbers

`isnumeric()` returns `True` if all characters are numeric.

```
>>> '80000'.isnumeric() #=> True
```

Note that punctuation is not numeric.

```
>>> '1.0'.isnumeric() #=> False
```

## 12. Split a string on a specific character

The `split()` function will split a string on a given character or characters.

```
>>> 'This is great'.split(' ')
#=> ['This', 'is', 'great']
'not--so--great'.split('--')
#=> ['not', 'so', 'great']
```

## 13. Check if a string is composed of all lower case characters

`islower()` returns `True` only if all characters in a string are lowercase.

```
>>> 'all lower case'.islower() #=> True
>>> 'not aLL lowercase'.islower() # False
```

## 14. Check if the first character in a string is lowercase

This can be done by calling the previously mentioned function on the first index of the string.

```
>>> 'aPPLE'[0].islower() #=> True
```

## 15. Can an integer be added to a string in Python?

In some languages this can be done but python will throw a `TypeError`.

```
>>> 'Ten' + 10 #=> TypeError
```

## 16. Reverse the string “hello world”

We can split the string into a list of characters, reverse the list, then rejoin into a single string.

```
>>> ''.join(reversed("hello world"))  
#=> 'dlrow olleh'
```

## 17. Join a list of strings into a single string, delimited by hyphens

Python's `join()` function can join characters in a list with a given character inserted between every element.

```
>>> '-'.join(['a', 'b', 'c'])  
#=> 'a-b-c'
```

## 18. Check if all characters in a string conform to ASCII

The `isascii()` function returns `True` if all characters in a string are included in ASCII.

```
>>> print( 'Â'.isascii() ) #=> False  
>>> print( 'A'.isascii() ) #=> True
```

## 19. Uppercase or lowercase an entire string

`upper()` and `lower()` return strings in all upper and lower cases.

```
>>> sentence = 'The Cat in the Hat'sentence.upper()  
#=> 'THE CAT IN THE HAT'  
  
>>> sentence.lower()  
#=> 'the cat in the hat'
```

## 20. Uppercase first and last character of a string

As in a past example, we'll target specific indices of the string. Strings aren't mutable in Python so we'll build an entirely new string.

```
>>> animal = 'fish'

>>> animal[0].upper() + animal[1:-1] + animal[-1].upper()

#=> 'FisH'
```

## 21. Check if a string is all uppercase

Similar to `islower()`, `isupper()` returns `True` only if the whole string is capitalized.

```
>>> 'Toronto'.isupper() #=> False

>>> 'TORONTO'.isupper() #= True
```

## 22. When would you use `splitlines()`?

`splitlines()` splits a string on line breaks.

```
>>> sentence = "It was a stormy night\nThe house\ncreaked\nThe wind blew."

>>> sentence.splitlines()

#=> ['It was a stormy night', 'The house creaked', 'The\nwind blew.']
```

## 23. Give an example of string slicing

Slicing a string takes up to 3 arguments like below,

```
string[start_index:end_index:step]
```

**step** is the interval at which characters should be returned. So a step of 3 would return the character at every 3rd index.

```
>>> string = 'I like to eat apples'
string[:6] #=> 'I like'

>>> string[7:13] #=> 'to eat'

>>> string[0:-1:2] #=> 'Ilk oetape' (every 2nd character)
```

## 24. Convert an integer to a string

Use the string constructor, `str()` for this.

```
>>> str(5) #=> '5'
```

## 25. Check if a string contains only characters of the alphabet

`isalpha()` returns `True` if all characters are letters.

```
>>> 'One1'.isalpha() # False

>>> 'One'.isalpha() # True
```

## 26. Replace all instances of a substring in a string

Without importing the regular expressions module, you can use `replace()`.

```
>>> sentence = 'Sally sells sea shells by the sea shore'

>>> sentence.replace('sea', 'mountain')

#=> 'Sally sells mountain shells by the mountain shore'
```

## 27. Return the minimum character in a string

Capitalized characters and characters earlier in the alphabet have lower indexes. `min()` will return the character with the lowest index.



```
>>> min('strings') #=> 'g'
```

## 28. Check if all characters in a string are alphanumeric

Alphanumeric values include letters and integers.

```
>>> 'Ten10'.isalnum() #=> True
>>> 'Ten10.'.isalnum() #=> False
```

## 29. Remove whitespace from the left, right or both sides of a string

`lstrip()`, `rstrip()` and `strip()` remove whitespace from the ends of a string.

```
>>> string = '  string of whitespace  '
>>> string.lstrip() #=> 'string of whitespace  '
>>> string.rstrip() #=> '  string of whitespace'
>>> string.strip() #=> 'string of whitespace'
```

## 30. Check if a string begins with or ends with a specific character?

`startswith()` and `endswith()` check if a string begins and ends with a specific substring.

```
>>> city = 'New York'city.startswith('New') #=> True
>>> city.endswith('N') #=> False
```

## 31. Encode a given string as ASCII

`encode()` encodes a string with a given encoding. The default is `utf-8`. If a character cannot be encoded then a `UnicodeEncodeError` is thrown.

```
>>> 'Fresh Tuna'.encode('ascii')  
  
#=> b'Fresh Tuna' 'Fresh Tuna Â'.encode('ascii')  
  
#=> UnicodeEncodeError: 'ascii' codec can't encode  
character '\xc2' in position 11: ordinal not in  
range(128)
```

### 32. Check if all characters are whitespace characters

`isspace()` only returns `True` if a string is completely made of whitespace.

```
>>> ''.isspace() #=> False  
  
>>> ' '.isspace() #=> True  
  
>>> '   '.isspace() #=> True  
  
>>> ' the '.isspace() #=> False
```

### 33. What is the effect of multiplying a string by 3?

The string is concatenated together 3 times.

```
>>> 'dog' * 3  
  
>>> # 'dogdogdog'
```

### 34. Capitalize the first character of each word in a string

`title()` will capitalize each word in a string.

```
>>> 'once upon a time'.title()
```

### 35. Concatenate two strings

The additional operator can be used to concatenate strings.

```
>>> 'string one' + ' ' + 'string two'
#=> 'string one string two'
```

### 36. Give an example of using the `partition()` function

`partition()` splits a string on the first instance of a substring. A tuple of the split string is returned without the substring removed.

```
>>> sentence = "If you want to be a ninja"
>>> print(sentence.partition(' want '))
#=> ('If you', ' want ', 'to be a ninja')
```

### 37. What does it mean for strings to be immutable in Python?

Once a string object has been created, it cannot be changed. “Modifying” that string creates a whole new object in memory.

We can prove it by using the `id()` function.

```
>>> proverb = 'Rise each day before the sun'
>>> print( id(proverb) )
#=> 4441962336

>>> proverb_two = 'Rise each day before the sun' + ' if
its a weekday'
>>> print( id(proverb_two) )
#=> 4442287440
```

**Note:** Concatenating `'if its a weekday'` creates a new object in memory with a new `id`. If the object was actually modified then it would have the same `id`.

### 38. Does defining a string twice (associated with 2 different variable names) create one or two objects in memory?

For example, writing `animal = 'dog'` and `pet = 'dog'`.

It only creates one. I found this unintuitive the first time I came across it. But this helps python save memory when dealing with large strings.

We'll prove this with `id()`. Notice how both have the same `id`.

```
>>> animal = 'dog'
>>> print( id(animal) )
#=> 4441985688
pet = 'dog'
>>> print( id(pet) )
#=> 4441985688
```

### 39. Give an example of using `maketrans()` and `translate()`

`maketrans()` creates a mapping from characters to other characters. `translate()` then applies that mapping to translate a string.

```
# create mapping
>>> mapping = str.maketrans("abcs", "123S")
# translate string
>>> "abc are the first three letters".translate(mapping)
#=> '123 1re the firSt three letterS'
```

Notice above how we changed the values of every `a`, `b`, `c` and `s` in the string.

### 40. Remove vowels from a string

One option is to iterate over the characters in a string via list comprehension. If they don't match a vowel then join them back into a string.

```
>>> string = 'Hello 1 World 2'

>>> vowels = ('a','e','i','o','u')

>>> ''.join([c for c in string if c not in vowels])

#=> 'Hll 1 Wrld 2'
```

#### 41. When would you use `rfind()`?

`rfind()` is like `find()` but it starts searching from the right of a string and return the first matching substring.

```
>>> story = 'The price is right said Bob. The price is right.'

>>> story.rfind('is')

#=> 39
```

