MODULE 02 - 032: Python - Finding and Replacing String Values with `.replace()`

`.replace()` - Manipulating string values in Python while respecting immutability!

Understanding String Immutability in Python

Before diving into the `.replace()` method, it's crucial to understand a fundamental property of strings in Python: **immutability**.

- **Strings in Python cannot be changed** after they are created.
- If you come from other programming languages, this might seem unusual, but in Python, modifying a string **directly** is not possible.
- Instead, we use **workarounds** to achieve similar effects.

This is where the `.replace()` method comes in.

---

1 Using the `.replace()` Method

Python provides the `.replace()` method to **find and replace** substrings within a string. However, since strings are immutable, `.replace()` does not modify the original string—instead, it returns a **new** string.

Let's look at an example:

```python
sentence = 'The quick brown fox jumped over the lazy dog.'

# Using replace()
new_sentence = sentence.replace('quick', 'slow')
print(new_sentence)  # Output: 'The slow brown fox jumped over the lazy dog.'
```

How does `.replace()` work?

- The first argument is the **substring to find** (`'quick'`).
- The second argument is the **replacement substring** (`'slow'`).
- A **new string** is returned with the replacement applied.

Important: The original `sentence` variable remains unchanged unless reassigned.

---

2 Reassigning a String After Using `.replace()`

Since `.replace()` returns a new string, we can reassign the variable to update its value:

```python
sentence = sentence.replace('quick', 'slow')
print(sentence)  # Output: 'The slow brown fox jumped over the lazy dog.'
```

Why is reassignment necessary?

- The original string remains unchanged (`.replace()` does not modify in-place).
- By reassigning, we update `sentence` to reference the new modified string.

Best Practice: Always reassign the variable if you want to keep the changes.

---

3 Multiple Replacements in a Single Call

The `.replace()` method can replace **all occurrences** of a substring:

```python
sentence = 'The quick quick quick brown fox.'
new_sentence = sentence.replace('quick', 'slow')
print(new_sentence)  # Output: 'The slow slow slow brown fox.'
```

It replaces **every instance** of `'quick'` in the string.

Best Practice: Use `.replace()` for bulk replacements when modifying repeated substrings.

---

4 Limiting the Number of Replacements

You can specify the **number of replacements** by adding a third argument:

```python
sentence = 'The quick quick quick brown fox.'
new_sentence = sentence.replace('quick', 'slow', 2)
print(new_sentence)  # Output: 'The slow slow quick brown fox.'
```

How does it work?

- The **third argument** (2) specifies the **maximum** number of replacements.
- Here, only **two occurrences** of `'quick'` are replaced, leaving the third one unchanged.

Best Practice: Use this feature when you want to replace only a limited number of occurrences.

Summary: Key Takeaways

Feature	Behavior
Immutability	Strings in Python cannot be modified in place.
Return Value	`.replace()` returns a **new** string (it does not modify the original).
Reassignment	To keep the changes, reassign the variable (`sentence = sentence.replace(...)`).
Multiple Replacements	Replaces **all** occurrences by default.
Limited Replacements	A third argument allows you to limit the number of replacements.

Python Documentation Reference

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

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

Video lesson Speech

Continuing our journey on this string data type in Python. We're going

to come back and discuss immutability if you remember back a few guides ago we talked about how strings in python are immutable which means that they can't be changed and that may sound like a weird concept because if you're coming from other programming languages it is incredibly easy to change the values of strings.

In Python, it's not even possible. So thankfully there are a number of workarounds and in this guide, I want to talk about the Replace function and it is not possible to leverage Replace in order to completely replace a string. So what we're going to do is leverage the ability to replace and then reassign a string value.

Now if that entire process sounds about as clear as mud. Don't worry we're going to work through an example. So yes a sentence and we'll go with our favorite one. The quick brown fox jumped over the lazy dog

sentence = 'The quick brown fox jumped over the lazy dog'

and now let's talk about how we can perform reassignment. So reassignment is simply just like it sounds, it gives us the ability to reassign a value. So if we wanted to say write over the sentence value I could say "sentence" and then say new value. If I come down here and print out the sentence you may guess what is going to be printed out. Right here we get new value.

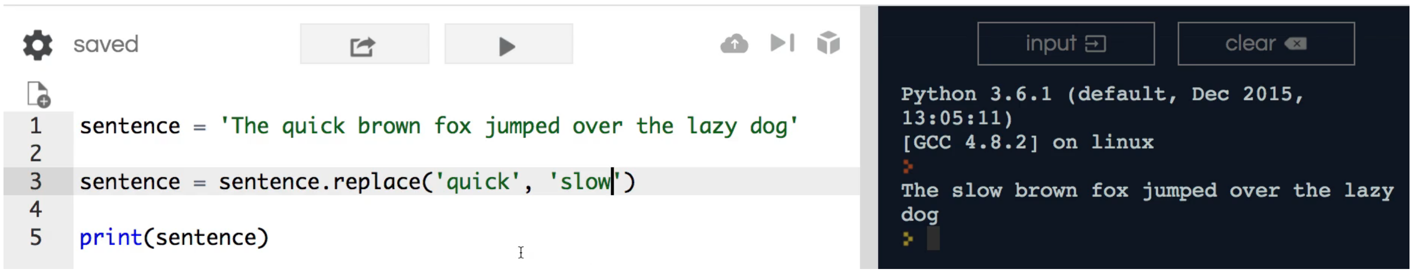
large

Figure 1: large

Now we did not change this string. Remember when we did that very slow break out where I showed that a string is not the variable? That these are different elements, that we have a variable we have an assignment operator then we have the string itself and so what we're doing here is when we are redefining this or when we're reassigning a new value to be in the sentence. We are not touching the string. All we're telling the Python interpreter is that the sentence variable now is equal to this string. But these are completely different strings and when this new value got printed out it is pointing to this exact string where we assigned it to be 'New value'.

So with this knowledge what we can do is not worry about changing the string because that's not possible in python but what we can do is we can take that string, perform any changes that we want on it, and then reassign it and we can even reassign it back into the sentence variable. So what I'm going to do here is I am going to call sentence and then here I'm going to say sentence.replace

Replace takes two arguments it takes the word that you're looking for and then it takes the word you want to replace it with. So here I'm going to say I want you to try to find quick and I want to replace it with slow. So now if I return you can see that it says the slow brown fox jumped over the lazy dog.



```
sentence = 'The quick brown fox jumped over the lazy dog'

sentence = sentence.replace('quick', 'slow')

print(sentence)
```

```
Python 3.6.1 (default, Dec 2015,
13:05:11)
[GCC 4.8.2] on linux
>
The slow brown fox jumped over the lazy
dog
>
```

Figure 2: large

So what happened here? We took the sentence right here which was assigned to this specific string and then we reassigned it into the same name and this is the same variable but we took the reference to that string so we took that sentence and we said I want you to replace quick with slow and so that is the process of being able to not change a string because that's not possible. But to leverage the replace keyword the replace function with a reassignment process and so we're able to accomplish the exact same type of goal we had which was to take one string and to change it but we were able to do it within the rules that Python gives us.

That's how you can leverage the replace function inside of Python.

Code

```
sentence = 'The quick brown fox jumped over the lazy dog.'

sentence = sentence.replace('quick', 'slow')
print(sentence.replace('quick', 'slow'))
print(sentence)
```