print(“Hello, World!”)

NCSS Challenge - Beginners
Week 3 Part 1

What will we cover?

- Manipulating strings;
- Uppercase and lowercase;
- Parts of strings;
- Characters in a string.

What does this cover?

- Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and **user input** (ACTDIP011)
- Recognise **different types of data** and explore how the same data can be represented in different ways (ACTDIK008)
- **Define problems in terms of data and functional requirements** drawing on previously solved problems (ACTDIP017)

1 Manipulating strings

Making decisions with strings

- We’ve seen how to make decisions with strings:

```
name = input('What is your name? ')
if name == 'Andrew':
  print("That's my brother's name!")
```

- But what about what we want to check isn’t *exactly* equal?

Substrings within a string

- We can check if a smaller string is *in* a bigger string:

```
msg = 'concatenation is fun'
print('cat' in msg)
    → True
print('dog' in msg)
    → False
```

- we can also check

```
print('cat' not in msg)
    → False
```

Substrings as conditions of `if` statements

- We can use these checks as the condition in `if` statements!

```
name = input('Enter your name? ')
if 'x' in name:
  print('Your name contains an x!')
else:
  print('No "x" in your name.')
```

Pedagogical Philosophy - Think ahead!

- Now is a great time to ask students to consider any limitations of the previous code snippet. Recall that computers are very precise and exact. Will that code really test if any 'x' is in their name? Perhaps get students to shout out names. (Xavier is a good one!)
- This leads on nicely to modify case, which we will look at next.

GROK LEARNING

Test it out!

Try the first question now!

2 UPPERCASE and lowercase

Using string methods to change the case of strings

- We can use string *methods* to modify a string:

```
msg = 'I know my ABC'
print(msg.lower())
   → i know my abc
```

The `msg` string contains a message in mixed case, and when you call the `lower` method it gives back a new message in lowercase only.

String methods don’t change what’s in the variable!

- However, the contents of the variable don’t change!

```
msg = 'I know my ABC'
print(msg.lower())
    → i know my abc
print(msg)
    → I know my ABC
```

- We need to save it in a new variable to keep it!

```
new_msg = msg.lower()
```

Changing text to uppercase

- Just as `lower` changes text to lowercase, `upper` changes it to uppercase!

```
msg = 'I know my ABC'
new_msg = msg.upper()
print(new_msg)
    → I KNOW MY ABC
```

Note that the original contents of `msg` haven’t changed!

```
print(msg)
    → I know my ABC
```

Teacher Aside! Frequent hiccup concept!

- Students are often confused about what makes a change to the variable, and what they need to save in a new variable!
- You can save a changed version in the same variable!

```
msg = 'I know my ABC'
msg = msg.upper()
print(msg)
    → I KNOW MY ABC
```

Testing the case of a string

- Instead of changing the case of a string, we might just want to test it!

```
msg = 'a lowercase string!'
print(msg.islower())
    → True
print(msg.isupper())
    → False
```

- We can also use this as the condition in `if` statements!

Test it out!

Try the second question now!

3 Parts of a string

How long is a (piece of) string?

- We can find out how long a string is using the `len` function:
  ```
  print(len('Hello World!'))
      → 12
  ```
- This counts all the characters, including the 5 letters in `"Hello"`, the space, the 5 letters in `"World"`, and the exclamation mark.

Counting specific characters in a string

- We can find out how long a string is using the `len` function:

```
msg = 'Hello World!'
print(msg.count('l'))
    → 3
```

- You can also count multi-character strings:

```
msg = 'Hello World!'
print(msg.count('ll'))
    → 1
```

Teacher Aside! Method review

- The convention for calling string methods is that the string we are manipulating comes first, and then the method name, with any other information that is required passed in as arguments.

```
msg = 'I know my ABC'
msg.upper()
```

Replacing parts of a string (a *substring*)

- The replace method `replace` a substring:

  ```
  msg = 'Hello World!'
  print(msg.replace('l','X'))
      → HeXXo WorXd!
  ```

- Similarly, can also replace multi-character strings:

  ```
  msg = 'Hello World!'
  print(msg.count('Hello','Goodbye'))
      → Goodbye World!
  ```

Test it out!

Try the third question now!

4 Characters in a string

Accessing parts of a string (a *substring*)

- We can access a single character using the square bracket *subscripting* or *indexing* operation:

```
msg = 'hello world'
print(msg[0])
    → h
print(msg[1])
    → e
```

- Careful! In computer science, we start counting from 0 rather than from 1!

Accessing parts of a string (from the end!)

- We can also access a single character indexing from the *end* of the string, using negative numbers:

```
msg = 'hello world'
print(msg[-1])
    → d
print(msg[-5])
    → w
```

Teacher Aside! Ask the class!

- This is a great opportunity to ask the class to guess at which letter they think would be referenced by a specific index.
- It's also a good chance, before the next slide, to ask them what they think might happen if you entered an index that doesn't exist - e.g. character 15 in a 12 character string.

Teacher Aside!

- A common question is why, if we count from `0` for the beginning of a string, don't we count from `-0` at the end of a string.
- Python works by evaluating things from the inside, out. So Python would evaluate `-0`, which is the same as `0`, and then look up the string index `0`!
- So, `name[0]` is the same as `name[-0]`

Accessing parts of a string that don't exist

- What happens if we index beyond a string's length?

```
msg = 'hello world'
print(msg[10])
    → d
print(msg[11])
    → Traceback (most recent call last)...
    IndexError: string index out of range
```

- The string has 11 characters, but we are trying to access character 12. *(Remember we count up from 0!)*

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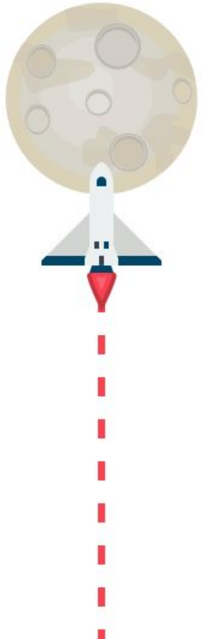
Test it out!

Try the fourth question now!



Any Questions?

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