print("Hello, World!")

NCSS Challenge - Beginners
Week 5 Part 1
What will we cover?

- Storing lists of values;
- List methods;
- Separating strings into lists;
- Modifying a list;
- Constructing lists with loops.
What does this cover?

- Design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019)
- Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input (ACTDIP020)
- Implement... iteration and functions in a general-purpose programming language (ACTDIP030)
- Implement modular programs, applying selected algorithms and data structures including using an object-oriented programming language (ACTDIP041)
Storing lists of values
List motivation - case study!

- Jump over to the notes for a motivating example of why data structures, e.g. lists, are useful!
Lists of (all the) things!

- You can make lists anything!
  - Strings, integers, floats, even other lists!
- Lists use square bracket notation

```python
odds = [1, 3, 5, 7, 9]
colours = ['red', 'blue', 'green', 'yellow']
authors = []
```
Lists of (all the) things!

You can use some familiar methods on lists:

○ Checking the length of a list:
  ```python
  colours = ['red', 'blue', 'green', 'yellow']
  print(len(colours))
  ```

○ Checking if item ‘a’ is in the list:
  ```python
  words = ['apple', 'banana', 'mango', 'kiwi fruit']
  if 'mango' in words:
    print('The word "mango" is in the list!')
  ```
Items in a list vs. substrings in a string

Compare checking if an item is in a list to if a substring in is a string:

```python
line = 'apple banana mango kiwi fruit'
words = ['apple', 'banana', 'mango', 'kiwi fruit']
print('kiwi' in line)
   → True
print('kiwi' in words)
   → False
```
Test it out!

Try the first question now!
List methods!
Now that we have a list data structure, we can use some handy list methods like `sort` and `reverse`:

```python
pets = ['dog', 'mouse', 'fish', 'cat']
pets.sort()
print(pets)
→ ['cat', 'dog', 'fish', 'mouse']
pets.reverse()
print(pets)
→ ['mouse', 'fish', 'dog', 'cat']
```
Teacher Aside! List methods vs. string methods

- The `sort` method sorts the items in order, e.g. strings in alphabetical order and numbers in ascending order. It modifies the original list, called sorting in-place, rather than returning a new sorted list.

```python
pets = ['dog', 'mouse', 'fish', 'cat']
incorrect = pets.sort()
print(incorrect)  # → None
print(incorrect[0])  # TypeError
```
3 Constructing lists
We can use `split` to split up a string into list elements:

```python
data = input('Enter your subjects: ')
subjects = data.split()
print(subjects)
→ Enter your subjects: maths english science
→ ['maths', 'english', 'science']
```
We can use `split` to split up a string into list elements:

data = input('Enter your subjects: ')
subjects = data.split()
for subject in subjects:
    print(subject)

→ Enter your subjects: maths english science
→ maths
→ english
→ science
Test it out!
Try the second question now!
4 Accessing list items
Printing out a list line by line

- An item in a list can be accessed using an index just like characters in a string:

```python
colours = ['red', 'blue', 'green', 'yellow']
print(colours[1])
print(colours[-1])
→ blue
→ yellow
```
Teacher Aside! Test the boundaries & edge cases!

- Try out what happens if you try to access an item outside of the length of the list!
Modifying and creating lists
Adding to the end of a list

- The append method adds a new item to the end of the list:

```python
pets = ['dog', 'mouse', 'fish']
print(pets)
→ ['dog', 'mouse', 'fish']
pets.append('cat')
pets
print(pets)
→ ['dog', 'mouse', 'fish', 'cat']
```
Looping with append:

```python
books = []
book = input('What book are you returning? ')
while book:
    books.append(book)
    book = input('What book are you returning? ')
books.sort()
print(books)
```
books = []
book = input('What book are you returning? ')
while book:
    books.append(book)
    book = input('What book are you returning? ')
books.sort()
for book in books:
    print(book)
Test it out!

Try the fourth question now!
Any Questions?

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