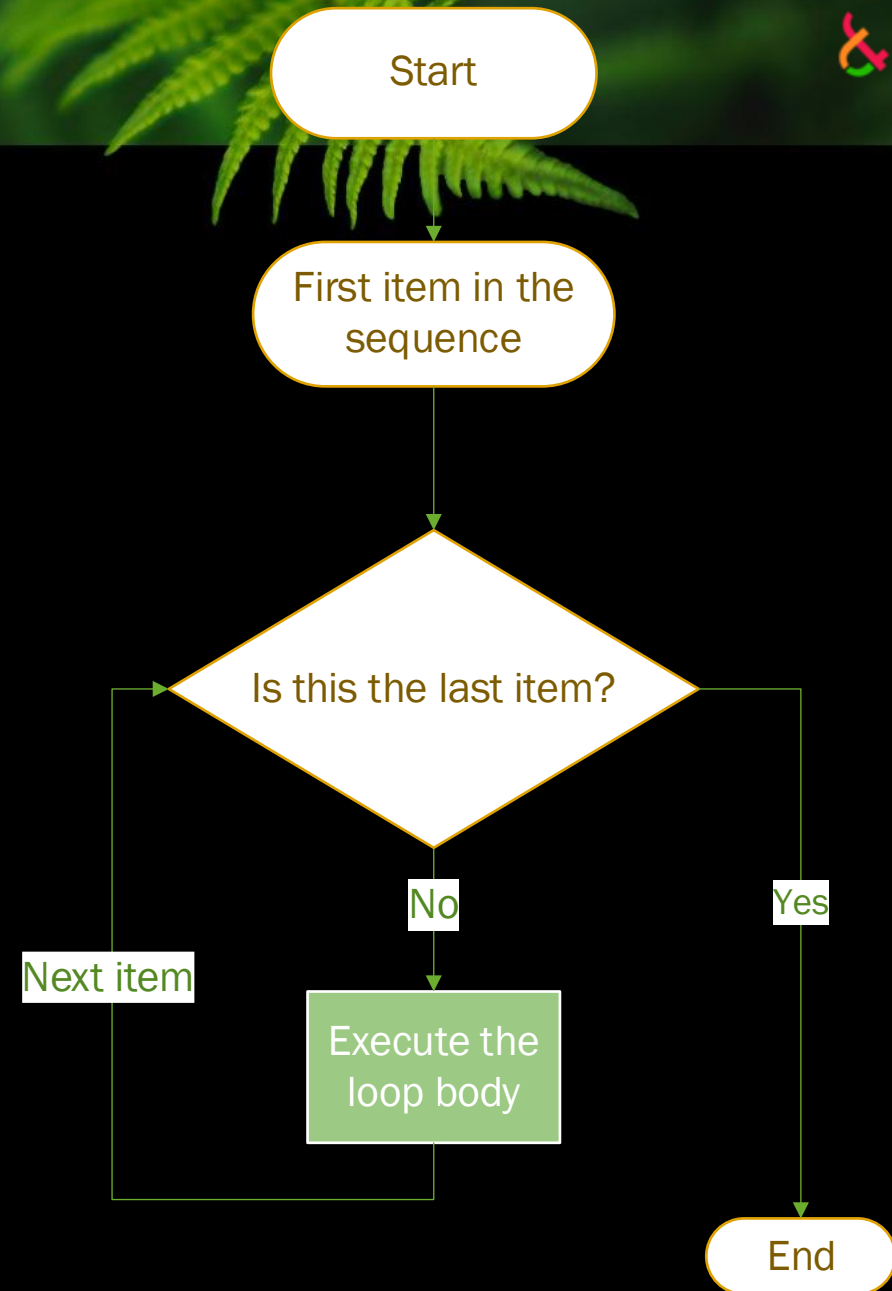# FOR LOOP

FOR LOOP

A **for** loop is executed as follows:
• The loop variable is assigned the first item in the sequence, and the loop block is executed.
• The loop variable is then assigned the second item in the sequence and the loop body is executed again.
...
• Finally, the loop variable is assigned the last item of the sequence, and the loop body is executed one last time.

Start

First item in the sequence

Is this the last item?

No

Yes

Next item

Execute the loop body

End

HOW TO USE A FOR LOOP?

▶▶ Syntax for a for loop is as follows:

```python
Python

for variable in sequence:
    # block of code to be executed
```

Variable is a current element in the sequence.
Sequence can be a list, a range of numbers, or any iterable object

FOR ITERATION STRUCTURE: STRING

for <variable> in <str>:

    <Do something>

```python
# Lecture 4, Example 1
# Combine the capital letters of each word in the sentence
# e.g. Central Processing Unit => CPU

print("Lecture 4, Example 1")
print("Combine the capital letters of each word in the sentence")

sentence = input("Enter a sentence with capital letters: ")
print("The capital letters of ", sentence, "are: ")
for character in sentence:
    # If the character is uppercase
    if character.isupper():
        # Print the uppercase character
        print(character, end="")
```

FOR ITERATION STRUCTURE: LIST

for <variable> in <list>:

    <Do something>

```python
# Lecture 4, Example 2
# Priting elements in a list

print("Lecture 4, Example 2")
values = [1, 2, 3, 7, 44, 98, 360]
print("List:", values)

# Calling each separately
print("Printing values separately is tedious...")
print(values[1])
print(values[4])
# and so on...

# Using loop
print("Using loop to print the values")
for val in values:
    print(val)
```

NEW FUNCTION: RANGE()

▸▸ range() is used to create a sequence of numbers

▸▸ range() can take up to three arguments: start, stop and step

▸▸ range(<start>, <stop>, <step>):

    ▸▸ start: The starting value (defaults to 0)

    ▸▸ stop: The value when to stop

    ▸▸ step: How much to increment for each step (defaults to 1)

EXAMPLE: RANGE()

▶▶ range(0, 10)

```
>>> range(10) # range(0, 10), range(start, stop[, step])
range(0, 10)
>>> list(range(10))
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
>>> list(range(1, 10, 2))
[1, 3, 5, 7, 9]
>>> list(range(10, 1, -3))
[10, 7, 4]
>>>
```

FOR ITERATION STRUCTURE: RANGE()

for <variable> in range(<start>, <end>):

    <Do something>

```python
# Lecture 4, Example 3
# Examples of for loop with range() function

print("Lecture 4, Example 3")
# printing the results in sequence 1+2+3+4+...+100
seq_sum = 0
for i in range(1, 100+1):
    seq_sum = seq_sum + i
print("1 + 2 + 3 + 4 + ... + 100 =", seq_sum)

# printing the results for sequence 11*9*7*...*3*1
seq_mul = 1
for i in range(11, 0, -2):
    seq_mul = seq_mul * i
print("11 * 9 * 7 * ... * 1 =", seq_mul)
```