Loop statements

Lecture five

practical

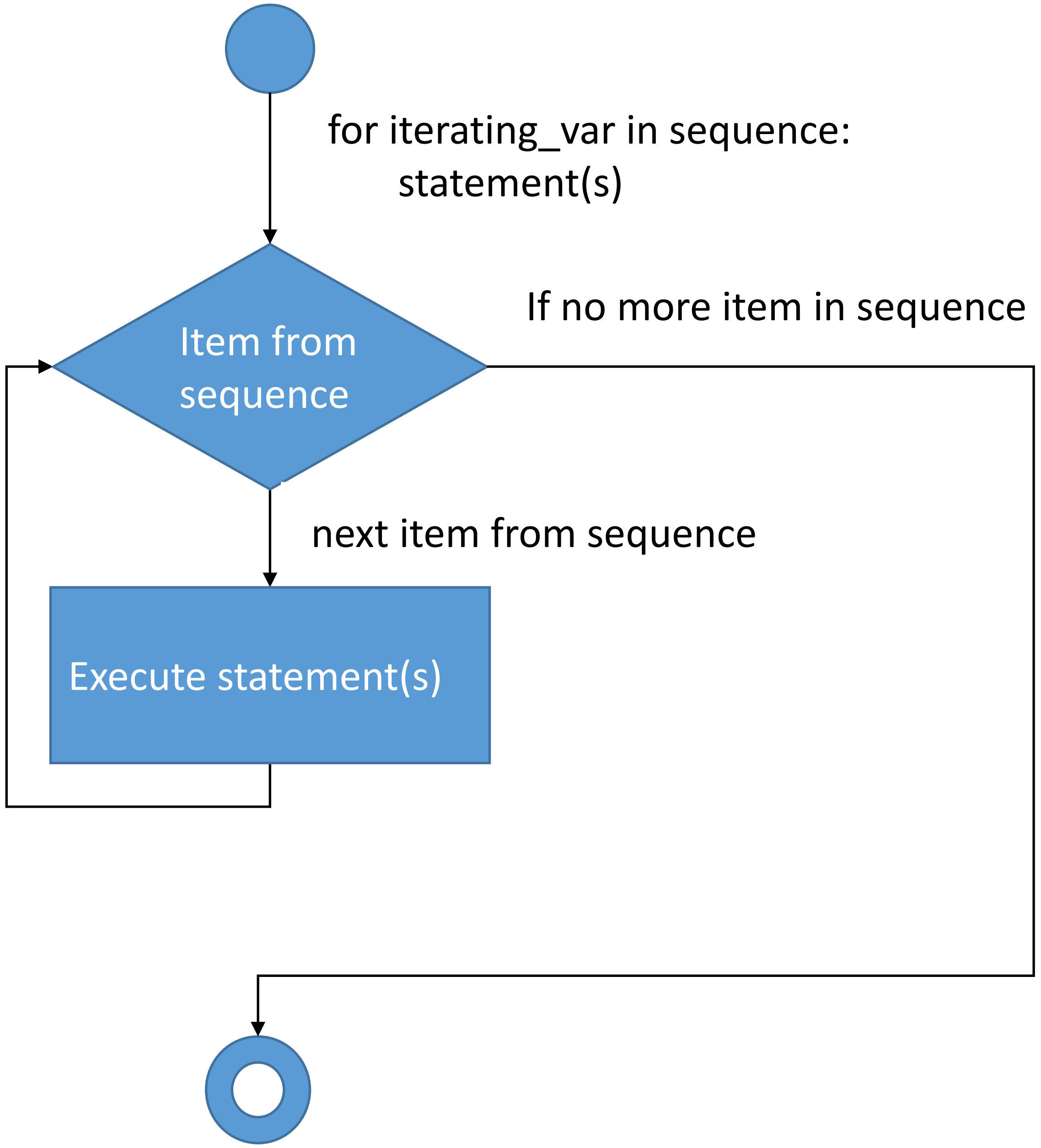
for Loop Statements

- It has the ability to iterate over the items of any sequence, such as a list or a string.
- Syntax

```
for iterating_var in sequence:
    statements(s)
```

- If a sequence contains an expression list, it is evaluated first.
- Then, the first item in the sequence is assigned to the iterating variable iterating_var.
- Next, the statements block is executed.
- Each item in the list is assigned to iterating_var and the statement(s) block is executed until the entire sequence is exhausted.

Flow diagram of for statement



for statement example

```
for letter in 'Python':
    print('Current Letter :',letter)
fruits=['banana','apple','mango']
for fruit in fruits:
    print('Current fruit :',fruit)
print("Good bye!")
```

- When the above code is executed, it produces the following result:

```
Current Letter : P
Current Letter : y
Current Letter : t
Current Letter : h
Current Letter : o
Current Letter : n
Current fruit : banana
Current fruit : apple
Current fruit : mango
Good bye!
```

Iterating by Sequence Index

- An alternative way of iterating through each item is by index offset into the sequence itself.

```
fruits=['banana','apple','mango']
for index in range(len(fruits)):
    print('Current fruit :',fruits[index])
print("Good bye!")
```

- Here, we took the assistance of the len() built-in function, which provides the total number of elements in the tuple, as well as the range() built-in function to give us the actual sequence to iterate over.

Using else Statement with for Loop

- Python supports to have an else statement associated with a loop statement
- If the else statement is used with a for loop, the else loop statement is executed when the loop has exhausted iterating the list.
- The following example illustrates the combination of an else statement with a for statement that searches for prime numbers from 10 through 20.

else statement with for loop example

```
for num in range(10,20):    #iterate between 10 to 20
   for i in range(2,num):     #iterate on the factors of the number
      if num%i==0:             #determine the first factor
         j=num/i                #to calculate the second factor
         print('%d equals %d * %d'%(num,i,j))
         break                  #to move to the next number, the #first FOR
      else:                    # else part of the loop
         print(num,'is a prime number')
         break
```

- When the above code is executed, it produces the following result

```
10 equals 2 * 5
11 is a prime number
12 equals 2 * 6
13 is a prime number
14 equals 2 * 7
15 is a prime number
16 equals 2 * 8
17 is a prime number
18 equals 2 * 9
19 is a prime number
```

nested loops

- Python programming language allows to use one loop inside another loop. Following section few examples to illustrate the concept.
- Syntax for nested for loop statement

```
for iterating_var in sequence:
        for iterating_var in sequence:
                statements(s)
        statements(s)
```

- Syntax for a nested while loop statement

```
while expression:
        while expression:
                statement(s)
        statement(s)
```

- A final note on loop nesting is that you can put any type of loop inside of any other type of loop. For example a for loop can be inside a while loop or vice versa.