

04. Python Control Structure Loops

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Outline

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- What are loops?
- While loops
- Iterables
- range() and len()
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Objectives

- Understand loops
- Understand loop control with the Boolean True
- Understand infinite loops
- Understand iterables
- Understanding increments
- Mixing Logic and Loops
- Introducing new functions today
 - range()
 - len()

- enumerate()
- Introducing a new method for dictionaries
 - dict.items()

Quick review of things we should know...

- Python datatypes
- Python operators
- Control Structure Logic
- How and why are these relevant?
- Some functions we now know
 - print
 - type

What are loops?

- Loops are - loops! Synonyms may include cycles.
- Repeated actions that continue till a condition stops them

While loops

- Very similar to English language.

```
i = 1
while i < 10:
    print(i)
    i = i + 1
```

While loops

- When making while loops remember to increment your counter!
- Else you may end up with a loop that never ends!!!
- Infinite loops are a bad thing.

Iterables

- Anything that you can iterate over is an iterable
- Examples
 - Lists
 - Tuples
 - Sets

- Dictionaries
- Others...
 - * range(1, 10)
- Usually you can find how many items are in an iterable using the `len` function even if you cant index them
 - Sets
 - range()

range() and len()

- range() takes 1, 2 or 3 **arguments**
- Function arguments are what are passed into a function
- If only one argument it is assumed to be from 0 to that argument
 - range(10) implies range(0, 10, 1) and will return => **0, 1, 2, 3, 4, 5, 6, 7, 8, 9**
- If two arguments its is assumed to be start and stop
 - range(0, 7) implies range(0, 7, 1) and will return => **0, 1, 2, 3, 4, 5, 6**
- If three arguments then it is assumed to be start, stop and step
 - range(0, 10, 2) is a full and will return => **0, 2, 4, 6, 8**

For loops

- These are used when dealing with iterables

```
for item in items:
    'do something with item'

fruits = ['apple', 'pineapple', 'banana', 'guava']
for fruit in fruits:
    print(fruit)
```

For loops showing indexes - The enumerate() function

- Sometimes you want to see not just the items in a collection but ther indexes too.
- Remember when you were asked to enumerate in an exam or test in school? it simply meant number your answers.
- The same principle can be used in python. Another reason python is mostly English language.

```
for i, item in enumerate(items):
    print(i, item)

days = ['Sunday', 'Monday', 'Tuesday', 'Wednesday', 'Thursday', 'Friday', 'Saturday']
for day in days:
    print(day)

for i, day in enumerate(days):
    print(i)
```

```

        #print(f"This is day {i}") or
        #print(f"This is day {(i+1)}")

for i, day in enumerate(days):
    print(i, day)
    #print(f"{day} is listed as number {(i+1)} in the week")

```

For loops with dictionaries (key, value pairs) - The .items() method

- Remember dictionaries are not indexed by numbers counting from 0
- Dictionaries are indexed by keys
- example:

```

details = {'name': 'Trevor Donald', 'location': 'Eldorado', 'age': 32}

print(details['name'])
print(details['age'])

for info in details:
    print(info)

for key, value in details.items():
    print(key)
    #print(value)
    #print(f"His {key} is {value}")

```

Combining Logic and Loops

- Sometimes we may want something in a collection or to select a subset based on some criteria
- An example is knowing how many defenders are in a team
- Another may be selecting only those students that are attackers in a school
- Or even knowing those who have jersey numbers less than a particular number

```

#lets create a list of students with each students information being in a dictionary form
team = [
    {'name': 'JJ Okocha', 'number': 10, 'position': 'midfield'},
    {'name': 'Garba Lawal', 'number': 12, 'position': 'midfield'},
    {'name': 'Ruben Agboola', 'number': 5, 'position': 'defence'},
    {'name': 'Rashidi Yekini', 'number': 9, 'position': 'attack'},
    {'name': 'Peter Rufai', 'number': 1, 'position': 'goalkeeper'},
    {'name': 'Onazi', 'number': 4, 'position': 'midfield'},
    {'name': 'Troost Ekong', 'number': 5, 'position': 'defence'},
    {'name': 'Sunday Oliseh', 'number': 15, 'position': 'midfield'},
    {'name': 'Samson Siasia', 'number': 8, 'position': 'attack'},
    {'name': 'Daniel Amokachi', 'number': 14, 'position': 'attack'},
    {'name': 'John Utaka', 'number': 8, 'position': 'attack'},
    {'name': 'Celestine Babayaro', 'number': 3, 'position': 'defence'},
    {'name': 'Manga Mohammed', 'number': 22, 'position': 'midfield'},
    {'name': 'Augustine Eguavoen', 'number': 2, 'position': 'defence'},

```

```

    {'name': 'Leon Balogun', 'number': 6, 'position': 'defence'},
    {'name': 'Finidi George', 'number': 7, 'position': 'midfield'},
    {'name': 'Emmanuel Amunike', 'number': 11, 'position': 'midfield'},
]

for player in team:
    print(f"{player['name']} with jersey number {player['number']} is an {player['position']}")

```

Review of objectives

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Gist of the day

- Get the pdf version
- Get the python gist
- Jupyter Notebook will be uploaded

Q&A

Thanks for listening!