PYTHON FOR MATLAB USERS

Looping through Python data structures

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How for loops work in Python

MATLAB

```
for i=1:5
  disp(i);
end
disp('done');

1
2
3
4
5
done
```

Python

```
for i in [1, 2, 3, 4, 5]:
    print(i)
print('done')

1
2
3
4
5
done
```

Looping through a list of strings

```
groceries = ['bread', 'tea', 'banana']

print(groceries)

['bread', 'tea', 'banana']
```

```
for item in groceries:
    print(item)

bread
tea
banana
```

Looping through a dictionary

```
abbreviations = {'New York': 'NY',
                 'California': 'CA',
                 'Illinois': 'IL',
                 'Texas': 'TX'}

print(abbreviations)
```

```
{'New York': 'NY', 'California': 'CA', 'Illinois': 'IL', 'Texas': 'TX'}
```

```
for state, abbv in abbreviations.items():
    print(state, abbv)
```

```
New York NY
California CA
Illinois IL
Texas TX
```

Looping through a 1D NumPy array

```
import numpy as np
arr = np.array([1, 2, 3])

print(arr)

[1 2 3]
```

```
for element in arr:
    print(element)

1
2
3
```

Looping through a 2D NumPy array

```
import numpy as np
X = np.array([[1, 2, 3], [4, 5, 6]])

print(X)

[[1 2 3]
 [4 5 6]]
```

```
for row in X:
    print(row)

[1 2 3]
[4 5 6]
```

Looping through pandas DataFrames

```
import pandas as pd
d = [{'fruit': 'apple', 'color': 'red'},
     {'fruit': 'banana', 'color': 'yellow'},
     {'fruit': 'pear', 'color': 'green'}]

df = pd.DataFrame(d)
print(df)

    color   fruit
0     red   apple
1  yellow  banana
2   green    pear
```

```
for ii, row in df.iterrows():
    print(ii, row['fruit'], row['color'])

0 apple red
1 banana yellow
2 pear green
```

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Let's practice!

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Comparison operators

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Using comparison operators

```
value = 0.967
threshold = 0.85

meets_criteria = value > threshold

print(meets_criteria)

True
```

The comparison operators

Comparison	Python	MATLAB
Equal	==	==
Not equal	!=	~=
Less than	<	<
Less than or equal	<=	<=
Greater than	>	>
Greater than or equal	>=	>=

If

```
value = 0.967
threshold = 0.85

meets_criteria = value > threshold

if meets_criteria:
   print('PASS')
```

```
PASS
```

Else

```
value = 0.275
threshold = 0.85

meets_criteria = value > threshold

if meets_criteria:
   print('PASS')
else:
   print('FAIL')
```

```
FAIL
```

Else if

```
porridge_temperature = 74.6

if porridge_temperature > 130:
   print('Too hot! :(')
elif porridge_temperature < 110:
   print('Too cold! :(')
else:
   print('Just right :D')
```

```
Too cold! :(
```

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Filtering data

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Comparison operators and NumPy Arrays

```
data = np.array([0.967, 0.56, 0.171, 0.872])
threshold = 0.85

meets_criteria = data > threshold

print(meets_criteria)
```

```
[True, False, False, True]
```

Filtering NumPy arrays

```
data = np.array([-1, 0.56, -1, 0.872, 1.26])

is_valid = data >= 0

valid_data = data[is_valid]

print(valid_data)

[0.56, 0.872, 1.26]
```

Filtering DataFrames

```
monkeys = df['animal'] == 'monkey'
bears = df['animal'] == 'bear'

monkey_weight = df[monkeys]['weight'].mean()
bear_weight = df[bears]['weight'].mean()

print(monkey_weight)

35.0

print(bear_weight)

800.0
```

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Let's practice

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Well done!

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More courses to explore

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Have fun!