Lists in Python

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Adina Howe Instructor



Lists - square brackets []

```
months = ['January', 'February', 'March', 'April', 'May', 'June']
```



Python is zero-indexed

```
months = ['January', 'February', 'March', 'April', 'May', 'June']
Index: 0 1 2 3 4 5
```

Subset lists

```
months = ['January', 'February', 'March', 'April', 'May', 'June']

months[0]

'January'

months[2]
```



Negative indexing of lists

```
months = ['January', 'February', 'March', 'April', 'May', 'June']
months[-1]
'June'
months[-2]
'May'
```



Subsetting multiple list elements with slicing

Slicing syntax

```
# Includes the start and up to (but not including) the end
mylist[startAt:endBefore]
```

Example

```
months = ['January', 'February', 'March', 'April', 'May', 'June']

months[2:5]

['March', 'April', 'May']

['March', 'April', 'May']
```



Extended slicing with lists

```
months = ['January', 'February', 'March', 'April', 'May', 'June']
months[3:]
['April', 'May', 'June']
months[:3]
['January', 'February', 'March']
```

Slicing with Steps

```
# Includes the start and up to (but not including) the end
mylist[startAt:endBefore:step]
months = ['January', 'February', 'March', 'April', 'May', 'June']
months[0:6:2]
['January', 'March', 'May']
months[0:6:3]
['January', 'April']
```



Let's practice!

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Lists in Lists

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Lists in Lists

- Lists can contain various data types, including lists themselves.
- Example: a nested list describing the month and its associated consumer price index

```
cpi = [['Jan', 'Feb', 'Mar'], [238.11, 237.81, 238.91]]
```

Subsetting Nested Lists

```
months = ['Jan', 'Feb', 'Mar']
print(months[1])
```

'Feb'

```
cpi = [['Jan', 'Feb', 'Mar'], [238.11, 237.81, 238.91]]
print(cpi[1])
```

```
[238.11, 237.81, 238.91]
```

More on Subsetting Nested Lists

How would one subset out a specific price index?

```
cpi = [['Jan', 'Feb', 'Mar'], [238.11, 237.81, 238.91]]
print(cpi[1])
```

```
[238.11, 237.81, 238.91]
```

```
print(cpi[1][0])
```

238.11

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Methods and functions

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Methods vs. Functions

Methods

- All methods are functions
- List methods are a subset of built-in functions in Python

- Used on an object
 - o prices.sort()

Functions

Not all functions are methods

- Requires an input of an object
 - o type(prices)

List Methods - sort

- Lists have several built-in methods that can help retrieve and manipulate data
- Methods can be accessed as list.method()

list.sort() sorts list elements in ascending order

```
prices = [238.11, 237.81, 238.91]
prices.sort()
print(prices)
```

```
[237.81, 238.11, 238.91]
```

Adding to a list with append and extend

list.append() adds a single element to a list

```
months = ['January', 'February', 'March']
months.append('April')
print(months)

['January', 'February', 'March', 'April']
```

list.extend() adds each element to a list

```
months.extend(['May', 'June', 'July'])
print(months)
```

```
['January', 'February', 'March', 'April', 'May', 'June', 'July']
```



Useful list methods - index

list.index(x) returns the lowest index where the element x appears $\frac{1}{2}$

```
months = ['January', 'February', 'March']
prices = [238.11, 237.81, 238.91]
months.index('February')
print(prices[1])
237.81
```



More functions ...

- min(list): returns the smallest element
- max(list) : returns the largest element

Find the month with smallest CPI

```
months = ['January', 'February', 'March']
prices = [238.11, 237.81, 238.91]
# Identify min price
min_price = min(prices)
# Identify min price index
min_index = prices.index(min_price)
# Identify the month with min price
min_month = months[min_index]
print(min_month)
```

February



Let's practice!

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