USING LAMBDA FUNCTIONS

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- What is a Lambda Function?
- Where are Lambda Functions Useful?
- Your First Lambda Functions
- Lambda Functions with Sort, Filter, Map and Reduce
- Testing Lambda Functions

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WHAT IS A LAMBDA FUNCTION?

Also known as:

- Lambda Expressions
- Anonymous Functions
- Lambda Abstractions
- Lambda Form
- Functions Literals

COMPARISON WITH A STANDARD FUNCTION

```
def myfunc(x, y, z):
    result = x + y + z
    return result
```

COMPARISON WITH A STANDARD FUNCTION

```
def myfunc(x, y, z):
    result = x + y + z
    return result
```

```
lambda x, y, z : x + y + z
```

COMPARISON WITH A STANDARD FUNCTION

```
lambda x, y, z : x + y + z

lambda x, y, z : x ** 2 + y + (z % 2)

lambda x : x % 2 == 0
```

COMPARISON BETWEEN STANDARD AND LAMBDA FUNCTIONS

Standard Functions:

- Used many times
- Multiple lines of code
- Named only
- None or more inputs
- None or more returns

Lambda Functions:

- Intended for single use
- Defined in a single line
- Named or Anonymous
- None or more inputs
- One or more return

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WHERE ARE LAMBDA FUNCTIONS USEFUL?

- Lambda functions are useful as small, ‘throwaway’ single-line functions.
- They are often useful to allow quick calculations or processing as the input to other functions.
- They can make code easier to read *if* they are used appropriately.

APPROPRIATE USE OF LAMBDA FUNCTIONS

```
def second(x):
    return x[1]

a = [(1,2),(2,5),(3,1),(4,15)]
a.sort(key=second)
```

APPROPRIATE USE OF LAMBDA FUNCTIONS

```python
def second(x):
    return x[1]

a = [(1,2),(2,5),(3,1),(4,15)]
a.sort(key=second)
```

```python
a = [(1,2),(2,5),(3,1),(4,15)]
a.sort(key=lambda x:x[1])
```

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YOUR FIRST LAMBDA FUNCTIONS

- Squaring a number
- Adding two numbers
- Multiplying three numbers
- Using default values

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LAMBDA FUNCTION EXAMPLES

- `list.sort()`
- `filter()`
- `map()`
- `reduce()`

SORT

`list.sort(key=None, reverse=False)`

- This method sorts the list in place, using only < comparisons between items.
- Lambda functions allow **key** to become much more versatile.

```
names = ['Alf Zed', 'Mike Mo', 'Steve Aardvark']
names.sort(key=lambda x: x.split()[-1].lower())
print(names)
> ['Steve Aardvark', 'Mike Mo', 'Alf Zed']
```

FILTER

`filter(function, iterable)`

- Construct an iterator from those elements of iterable for which function returns true.
- Allows quick creation of iterables of items in another iterable that have passed a test.

```
nums = [1, 2, 3, 4]
even = list(filter(lambda x: x % 2 == 0, nums))
print(even)
> [2, 4]
```

MAP

`map(function, iterable)`

- Return an iterator that applies function to every item of iterable, yielding the results.
- Allows quick application of a function to every element of an iterable.

```
nums = [1, 2, 3, 4]
squared = list(map(lambda x: x ** 2, nums))
print(squared)
> [1, 4, 9, 16]
```

REDUCE

`reduce(function, iterable)`

- Apply function of two arguments cumulatively to the items of sequence, from left to right, so as to reduce the sequence to a single value.
- Allows cumulative application of a function to every element of an iterable.

```
from functools import reduce
nums = [1, 2, 3, 4]
total = reduce(lambda x, y: x + y, nums)
print(total)
> 10
```

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TESTING LAMBDA FUNCTIONS

- Lambda Functions can be tested similarly to regular functions.
- `unittest` handles lambda functions in a similar manner to regular functions.

USING LAMBDA FUNCTIONS: SUMMARY