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Python

Functions

Centre for Environmental Data Analysis
SCIENCE AND TECHNOLOGY FACILITIES COUNCIL
NATURAL ENVIRONMENT RESEARCH COUNCIL

software carpentry

National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

National Centre for Earth Observation
NATURAL ENVIRONMENT RESEARCH COUNCIL

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Define functions to create higher-level operations

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Define functions to create higher-level operations

"Create a language in which the solution to your original problem is trivial."

Define functions using `def`

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```
def greet():
    return 'Good evening, master'
```

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```
def greet():
    return 'Good evening, master'

temp = greet()
print(temp)
Good evening, master
```

Give them parameters

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```
def greet(name):
    answer = 'Hello, ' + name
    return answer
```

Give them parameters

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def greet(name):
    answer = 'Hello, ' + name
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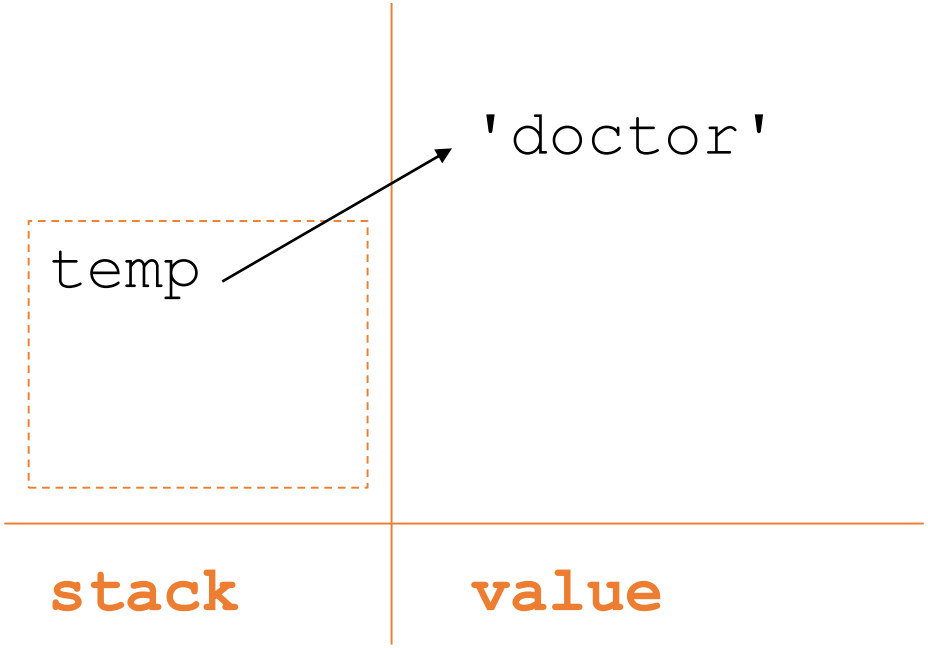
temp = 'doctor'
```



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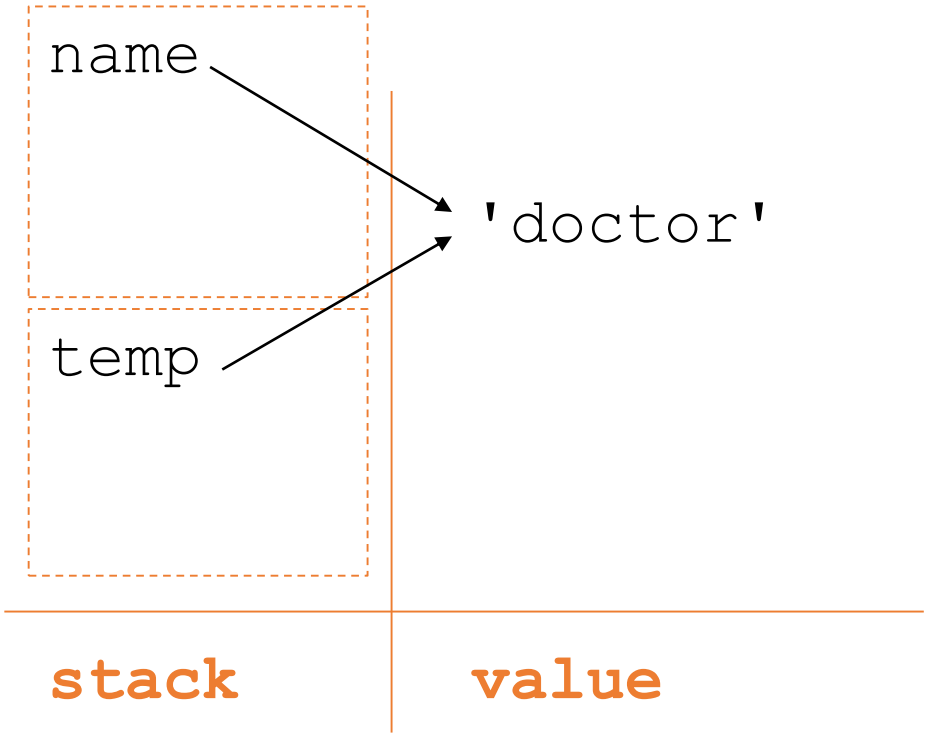
    return answer

temp = 'doctor'
result = greet(temp)
```



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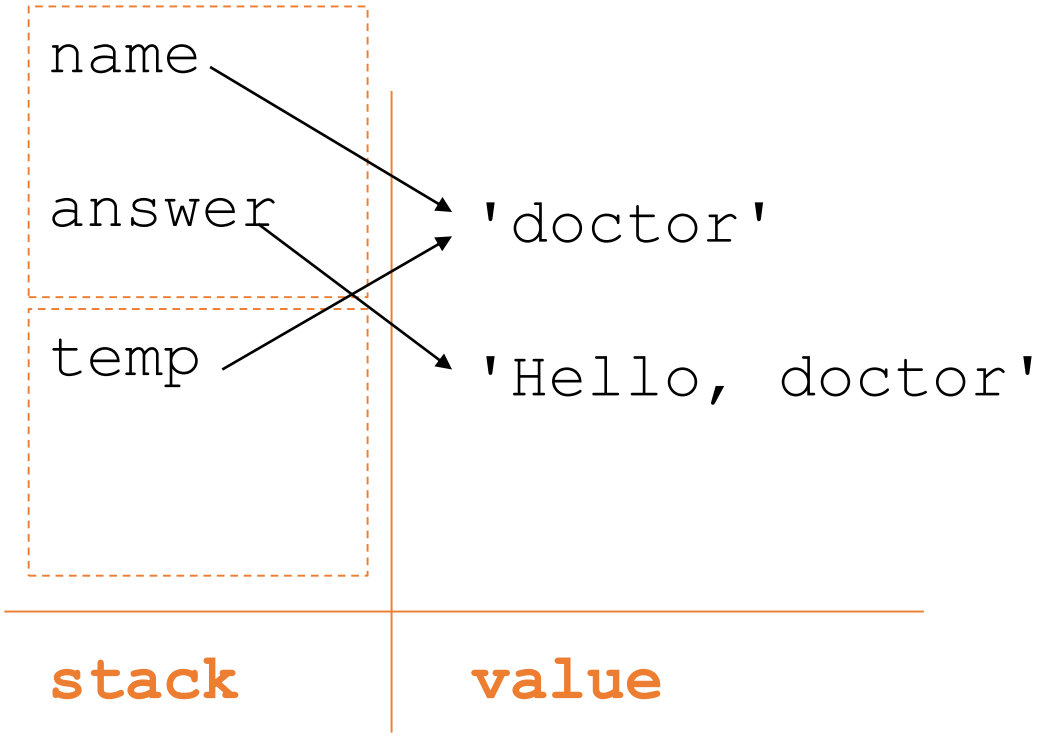

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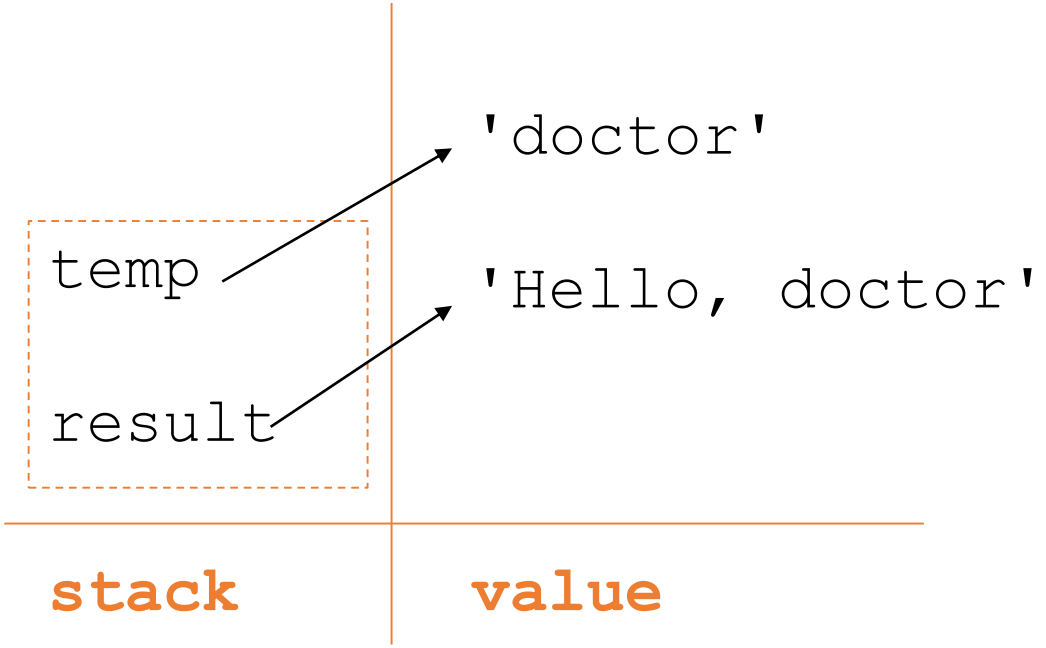

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    temp = 'Hello, ' + name
    return temp

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```

Can pass values in and accept results directly

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```
def greet(name):
    return 'Hello, ' + name

print(greet('doctor'))
```

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def sign(num):
    if num > 0:
        return 1
    elif num == 0:
        return 0
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print(sign(3))
```

```
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```

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def sign(num):
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print(sign(3))
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print(sign(-9))
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Over-use makes functions

hard to understand

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Over-use makes functions

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No prescription possible, but:

- a few at the beginning

  to handle special cases
- one at the end for the

  "general" result

Every function returns something

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print(sign(-9))
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```

If the function doesn't return a value, Python returns `None`

Every function returns something

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def sign(num):
    if num > 0:
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# else:
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print(sign(3))
1
print(sign(-9))
None
```

If the function doesn't return a value, Python returns `None`

Yet another reason why commenting out blocks of code is a bad idea...

Functions and parameters don't have types

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    return 2 * x
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Only use this when the function's behavior depends *only* on properties that all possible arguments share

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def double(x):
    return 2 * x

print(double(2))
4
print(double('two'))
twotwo
```

Only use this when the function's behavior depends *only* on properties that all possible arguments share

```
if type(arg) == int:
    ...
elif type(arg) == str:
    ...
...
```

Can define *default parameter values*

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```
def adjust(value, amount=2.0):
    return value * amount
```

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```
def adjust(value, amount=2.0):
    return value * amount

print(adjust(5))
10.0
```

Can define *default parameter values*

```
def adjust(value, amount=2.0):
    return value * amount

print(adjust(5))
10.0
print(adjust(5, 1.001))
5.004999999999999
```

"When should I write a function?"

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Break it into comprehensible pieces with functions

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Break it into comprehensible pieces with functions

Even if each function is only called once