Functions

Motivation: We often want to re-use code blocks

```
In [1]: sentence = "Time flies like an arrow."
        # first we count, using a dict
        counts = {} # empty dict
        for c in sentence:
            if c in counts:  # have we seen this letter before?
                counts[c]+=1 # yes, increase count by 1
            else:
                counts[c]=1      # no, set count to 1

        # now that we have the counts, we print them
        for c in counts:     # loop over all letters in the dict
            print(c, "appears", counts[c], "times.")
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generic letter-counting code

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```

Motivation: We often want to re-use code blocks

```
In [1]: sentence = "Time flies like an arrow."
        # count letters using function
        counts = count_letters(sentence)
```

function

```
        # now that we have the counts, we print them
        for c in counts:      # loop over all letters in the dict
            print(c, "appears", counts[c], "times.")
```

Code for letter-counting function

```
In [1]: def count_letters(str):
            counts = {} # empty dict
            for c in str:
                if c in counts:     # does letter exist in dict?
                    counts[c]+=1    # yes, increase count by 1
                else:
                    counts[c]=1     # no, set count to 1
            return counts           # return result
```

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keyword indicating function definition

Code for letter-counting function

function argument

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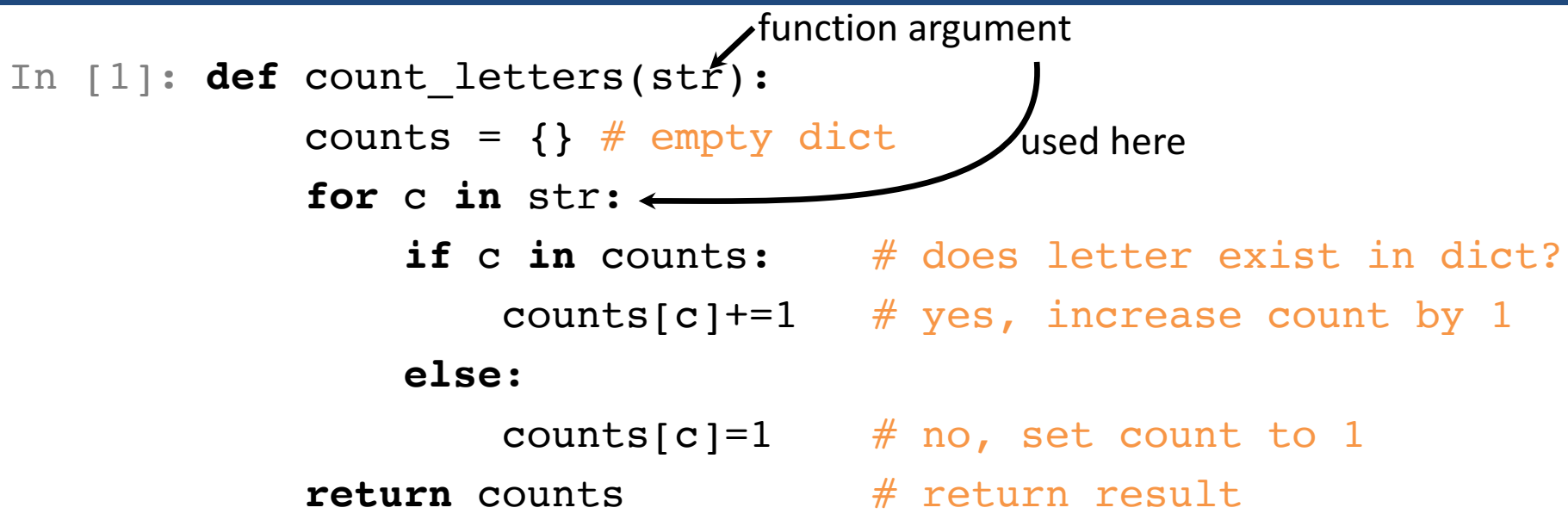
Code for letter-counting function



Code for letter-counting function

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```

function returns its result here

General form for function definitions

```
def name(argument1, argument2, ...):
    code, making use of variables
    argument1, argument2, etc
    return result
```

Indentation determines which lines belong to a function

```
def f():
    print("A")    # part of function
    print("B")    # part of function
    print("C")    # part of function
print("D")    # not part of function
```

Note: A **`return`** statement is not required in a function definition.

Important guidelines for writing functions

- You can never write too many functions
- If your code doesn't fit on your screen, or uses more than 3 levels of indentation, break it into functions