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Dictionaries and Functions

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Reminders

- Signup for the quiz or submit a conflict request
- Practice quiz is up

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Poll Question: Functions

How many values will this function return if foo is called and bar is of type string?

```python
def foo(bar):
    if type(foo) == str:
        return "lion"
    return "cheetah"
```

Ⓐ 0

Ⓑ 1

Ⓒ 2

Ⓓ Another number

Poll Question: List Copying

How many list objects exist after this code executes?

```
w = [1, 2, 3, 4]
x = w
y = x[:]
z = y[0]
```

Ⓐ 0

Ⓑ 1

Ⓒ 2

Ⓓ 3

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Poll Question: Boolean

What type does the following function return?

```python
def qux(baz):
  return baz[0] == 'folded'
```

A list

B integer

C boolean

D string

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Poll Question: Sorting

What is the value of z after this code has executed?

```
x = [9, 12, 13, 4, 8, 13, 19, 6]
z = x.sort()[0]
```

ⓐ 0

ⓑ 4

ⓒ 19

ⓓ Error

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Sorting

- `list.sort()` $\rightarrow$ Updates the *original* list in place and returns `None`.
- `sorted()` Doesn't modify the original list. Returns a *copy* of the list that is sorted.

Common Errors in EiPE Questions

Code Reading Error Types

Error 1

```
def f(x, y):
  z = 0
  for val in x:
    if val==y:
      z += 1
  return z
```

Error 2

```
# x is a string
# y/z are single
    character
    strings
def f(x, y, z):
  k = x.find(y)
  y = x.find(z)
  return x[k+1: j]
```

Error 3

```
def f(x):
  for i in range(len(x)):
    if x[i] % 2 == 0:
      x[i] = 2 * x[i]
```

- **A** **Error 1** - **Too Low Level:** for every value in x, add 1 to z if that value is equal to y,, then return z.
- **B** **Error 2** - **Type Mismatch:** returns the slice of a string from index y, incremented by 1, until, but not including index z.
- **C** **Error 3** - **Ambiguity/Imprecision:** Double the even indexes in list x

Dictionaries

In Review

- Consists of `key:value` pairs.
- Why do we care? Tracking relationships between things.

```
name_map = {
  "dhsmith2" : {
    "first" : "David",
    "second" : "Smith"
  },
  "zilles" : {
    "first" : "Craig",
    "second" : "Zilles"
  }
}
```

```
def informal_email(names_dict, netid):
  email = "Dear {0}, I wanted you to know ..."
  return email.format(names_dict[netid]['first'])

email_text = informal_email(name_map, "dhsmith2")
```

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Poll Question: Dictionaries

What is the value of x after the following function is called?

```
def get_item_counts(some_list):
    counts = {}
    for item in some_list:
        counts[item] += 1

x = get_item_counts(["This", "This", "This", "Is", "A"])
```

1. {"This": 3, "Is": 1, "A": 1}

2. {This: 3, Is: 1, A: 1}

3. {"This": "3", "Is": "1", "A": "1"}

4. KeyError

Dictionaries: Computing a Histogram

Creating a count map of items in a collection is a common dictionary pattern:

```python
def get_item_counts(some_list):
    counts = {}
    for item in some_list:
        if item not in counts:
            counts[item] = 1
        else:
            counts[item] += 1
```

Functions

Poll Question: Function Parameters

What is the value of `result` after the following code is run?

```python
def arithmetic(x = 2, y = 3, z = 4):
  return x * y * z
result = arithmetic(1, z=5)
```

Ⓐ 10

Ⓑ 20

Ⓒ 24

Ⓓ 30

Ⓔ Some other value

Ⓕ Error

Function Returns

Functions can (kind of) return multiple values by putting them all in a tuple.

```python
def return_first_and_lst(a_list):
  return (a_list[0], a_list[-1])
x, y = return_first_and_last([1, 2, 3])
```

Poll Question: Function Args and Mutability

What is the value of `x[0]` after this code executes:

```
def remove_first(a_list):
    a_list = a_list[1:]

x = [1, 2, 3, 4]
remove_first(x)
```

Ⓐ 1

Ⓑ 2

Ⓒ 3

Ⓓ 4

Ⓔ Something else

Ⓕ An error occurs

Poll Question: Functions

What, if anything, gets printed to the screen after this code executes?

```
def add1(x): return x + 1
def mul2(x): return x * 2

x = 1
fns = [add1, mul2, mul2, print]
for f in fns:
  x = f(x)
```

Ⓐ   Nothing

Ⓑ   1

Ⓒ   4

Ⓓ   8

Ⓔ   Something else

Ⓕ   SyntaxError

Poll Question: Scope

What are the values of `w`, `x`, `y` and `z` after this code executes?

```python
x, y, z = (7, 5, 10)

def a_function(y):
    x = 2 * y
    return x * z

w = a_function(x)
```

Ⓐ   50, 7, 5, 10

Ⓑ   100, 10, 5, 10

Ⓒ   140, 7, 5, 10

Ⓓ   140, 14, 5, 10

Ⓔ   SyntaxError