DATA 8

Fall 2020

Tutoring Section 6

Conditionals and Iteration

Logistics

- Autograder is working again! Grades will come in soon.
- Feedback Form:
        - Form: https://tinyurl.com/feedbackD8Kevin
- Again, Tutor Office Hours (exclusively open for you all)
    - **Tuesday**: **10:30-11:00am** & **1:00-1:30pm**
    - *Please let me know if you are attending*

All resources can be found on kevin-miao.com

Association vs Causation

After grading the homework, I wanted to discuss these questions:

- What is the difference between an **association** and a **causation**?

association: some kind of pattern/line

causes

★ Causation: directly affects the something; directionality

- What are **confounding factors**?

some factor that can possibly confuse you in establishing causal relationship.

- When do we need to establish a **randomized control experiment**?

getting rid of confounding factors to a establish a causal relationship.

Today

- Mini Review
  - *Conditionals*
  - *Iteration*
  - *What to do or not to do?*
- Worksheet

Conditionals

- **Goal:** Depending on a certain value, we want to use different lines of code.

- **Structure:**

```
if <boolean>:
        do something
elif <boolean>:
        do something else
else:
        do something different
```

- **Example:**

```
if color == ‘Blue’:
    print(“Go Bears!)
else:
    print(“I hate this color”)
```

Iteration

- **Goal:** We want to do same thing **for each item in a list/array.**
- **Structure:**

```
for something in list/array:
        do something
```

- **Example:**

↓

```
for book in [“Book1”, “Book2”, “Book3”]:
        print(book)
```

book = “Book3“

- Another implementation is to do the same thing x number of times:

{0, 1, ... , 99}

↗

```
x = 0
for i in np.arange(100):
        x = x + 1
```

— , 4, t

Common mistakes/issues

- Is this correct?

```
for name in [‘David’, ‘Swupnil’]:
        return name
```

print(name)

↳ only belongs to a function.

- Has to be list/array

100 → Int

```
for i in len(100):
        print(”Repeat 100 times”)
```

np.arange(100) instead!

- Are these two the same?

yes

no

```
if x % 2 == 0:
        print(‘Divisible by 2’)
else:
        print(’Divisible by 4’)
```

Not divisible by 2

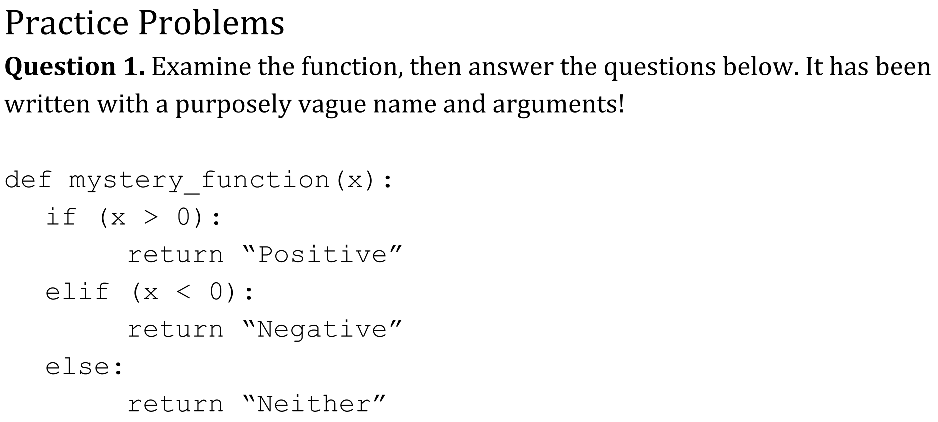
```
if x % 2 == 0:
        print(’Divisible by 2’)
print(‘Not divisible by 2’)
```

always printed

Worksheet

Link: **https://tinyurl.com/d8tutweek6**

Q1



Practice Problems

Question 1. Examine the function, then answer the questions below. It has been written with a purposely vague name and arguments!

```
def mystery_function(x):
   if (x > 0):
         return “Positive”
   elif (x < 0):
         return “Negative”
   else:
         return “Neither”
```

What does each of the following return?

1. Mystery_function(10)

   “positive”

2. Mystery_function(-1)

   “negative”

3. Mystery_function(0)

   “neither”

Q2.1

Question 2. The for loop statement below stores the length of each name in `names` in a new array called `lengths`.

→ []

```
lengths = make_array()
names = make_array('Bob', 'Sarah', 'Michael', 'Sam')

for name in names:
    lengths = np.append(lengths, len(name))
```

↳ 4 items

↳ 4 iterations

2.1 For each iteration below, fill in the value of `name` as well as what `lengths` looks like.

len('Bob')

Iteration 1: `name =` 'Bob' , `lengths =` [3]

Iteration 2: `name =` 'Sarah' , `lengths =` [3,5]

Iteration 3: `name =` 'Michael' , `lengths =` [3,5,7]

Iteration 4: `name =` 'Sam' , `lengths =` [3,5,7,3]

Q2.2-2.3

2.2 Now, let's say that instead of storing lengths, we want to store the name as long as the length of the name is greater than 4. Fill in the following for loop statement such that `longer` contains these names.

```
longer = make_array()

for name in names:
body {  if len(name) > 4:
            longer = np.append((longer, name)
```

2.3 What names would `longer` contain after the for loop executes?

'Sarah' and 'Michael'

Q2.4

2.4 Finally, look at this last for loop below. What values does `i` take on throughout? How is `i` used as compared to the way `name` is used in the previous for loops?

```
counter = 0
for i in np.arange(1000):
    counter = counter + 1
```

body

I i → an item ranging from [0, ..., 999]

[1, ..., 1000]

↳ returns the same

II i is not in the body.

↳ we don't care about the value of i!

Q3.1

Question 3. Suppose you have an array called `salaries`, containing the salary information of 5 individuals. You would like to determine what percentage of the total salaries each individual's salary comprises. You want to output an array, `proportion` where the ith element of `proportion` corresponds to what percentage of the total salary salary.item(i) is.

10

For example, if `salaries` was equal to an array `[1,2,3,1,3]`, then `proportion.item(0)` would be 0.1.

[0.1, 0.2, 0.3, 0.1, 0.3]

3.1 Your friend writes some code, but it doesn't work! Find the error that your friend made. What would the code output if executed as is? How would you fix it?

```
salaries = make_array(25, 50, 100, 25, 100)
total = sum(salaries)

for salary in salaries:
    proportion = make_array()
    percentage = salary/total
    proportion = np.append(proportion, percentage)
```

Fix

empty array in for loop

Result : [0.3333]

Q3.2

3.2 You fix the error described above, but in doing so, break something else. Again, find the error in the code below. What would the code output if executed as is? How would you fix it?

```
salaries = make_array(25, 50, 100, 25, 100)
total = sum(salaries)
proportion = make_array()

for salary in salaries:                    →        []
  percentage = salary/total
proportion =np.append(proportion, percentage)
```

↳ saving the value

fix

End of Section

- Please complete the anonymous Feedback form so I can improve my teaching:
  - **https://tinyurl.com/feedbackD8Kevin**

- Solutions and notes will be posted as soon as possible.

- Email me if you have any questions: kevinmiao@berkeley.edu