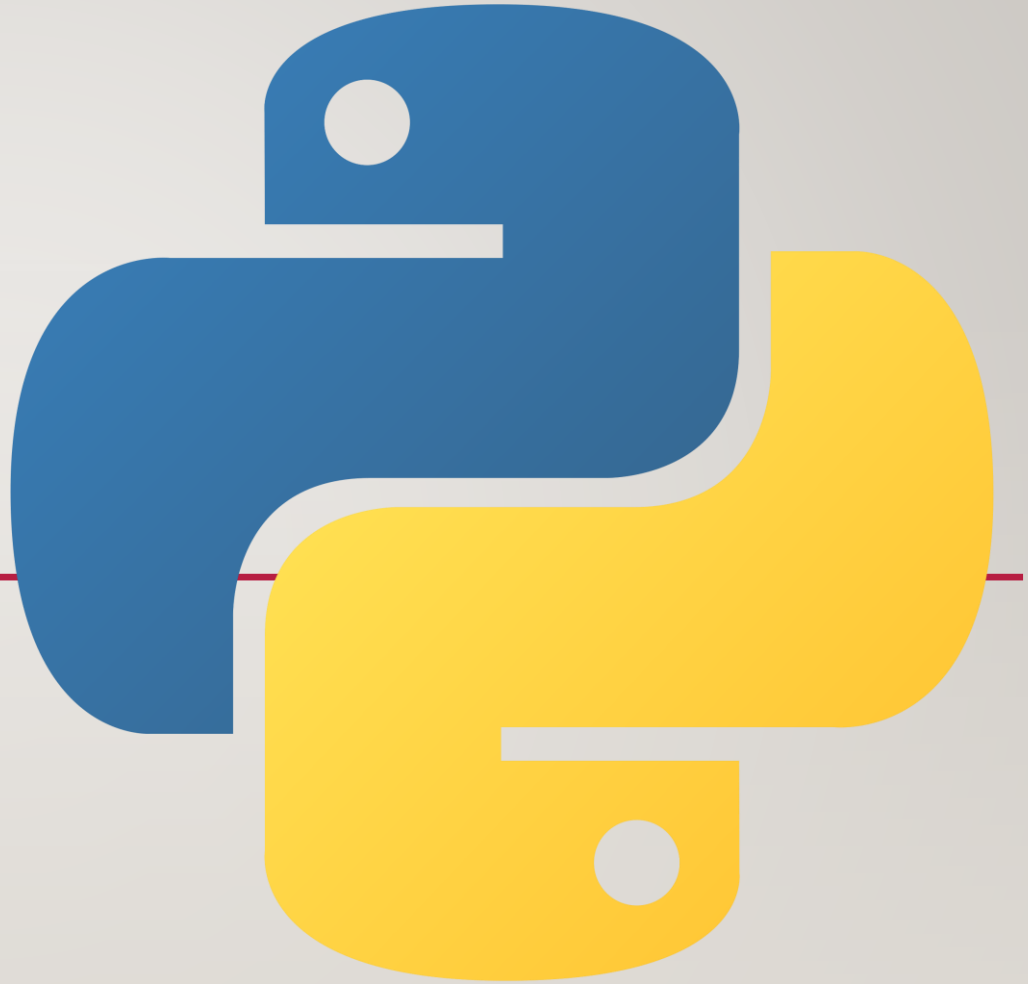
# PYTHON CLASS 13

INDENTATION REVIEW AND LISTS



# INDENTATION

- In Python, code with the same level of indentation is grouped together.

```
import datetime

user_name = "Mr. Hunter"

name = input("What is your name?")
if name == user_name:
        print("Hello, " + user_name)
else:
        print("You are a new user")
        b_day_str = input("What is your birthday? (YYYY-MM-DD)")
        b_day_str = b_day_str.split("-") #creates a list [YYYY,MM,DD]
if b_day_str[0] >=  datetime.date.today().year: #causes error if user
                                                #name is Mr. Hunter
        print("you are too young, or you are from the future")
```

```
import datetime

user_name = "Mr. Hunter"

name = input("What is your name?")
if name == user_name:
        print("Hello, " + user_name)
else:
        print("You are a new user")
        b_day_str = input("What is your birthday? (YYYY-MM-DD)")
        b_day_str = b_day_str.split("-") #creates a list [YYYY,MM,DD]
        if b_day_str[0] >=  datetime.date.today().year:
                print("you are too young, or you are from the future")
```

# INDENTATION, 2

- Grouping code is a really important idea in programming.
- Every modern programming language allows programmers to group code -> Java, Python, C#, C++, etc.
- Grouping is a little different in other languages.

# C#/C++/JAVA GROUPING

```
int number = 0;
public void Add(int x)
{
        number +=x;
}

public void Subtract(int x)
{
        number -=x;
}

bool BiggerThan(int x)
{
        return number > x;
}
```

```
if (BiggerThan(7))
{
        Add(20)
        if(BiggerThan(20))
        {
                printf("Really big")
        }
        else
        {
                printf("OK")
        }

}
else
{
        Subtract(5)
        if(BiggerThan(12))
        {
                printf("Still big")
        }
}
```

# INDENTATION, 3

- Each group of code has the same indentation level.

```
import datetime


def GetBirthYear(b_day):
        b_day = b_day.split("-") #creates a list [YYYY,MM,DD]
        return int(b_day[0]) #change to an integer and give back

b_day_str = input("What is your birthday? (YYYY-MM-DD)")

year = GetBirthYear(b_day_str)

if year <= 1996 and year > 1980:
        print("You are a Mi")
        print("You are a Mil")
        print("You are a Millennial")
        if year == 1982:
                print("You were born in the best year!")
elif year <= 1980 and year > 1965:
        print("You are a Gen Xer")
elif year > 1996:
        print("You are a Zoomer")
        print("You are a Zoomer")
else:
        print("You are really old")
```

# LIST PRACTICE, 3

- Go back to the Vending Machine Project.
- Replace the product variables with one list → product_list = ["Black Coffee", *other products*]
- Fix the rest of the code so that the program runs correctly.
- Let's make a new variable, current_product_index.
- This will make the next step easier.

# LIST PRACTICE, 3

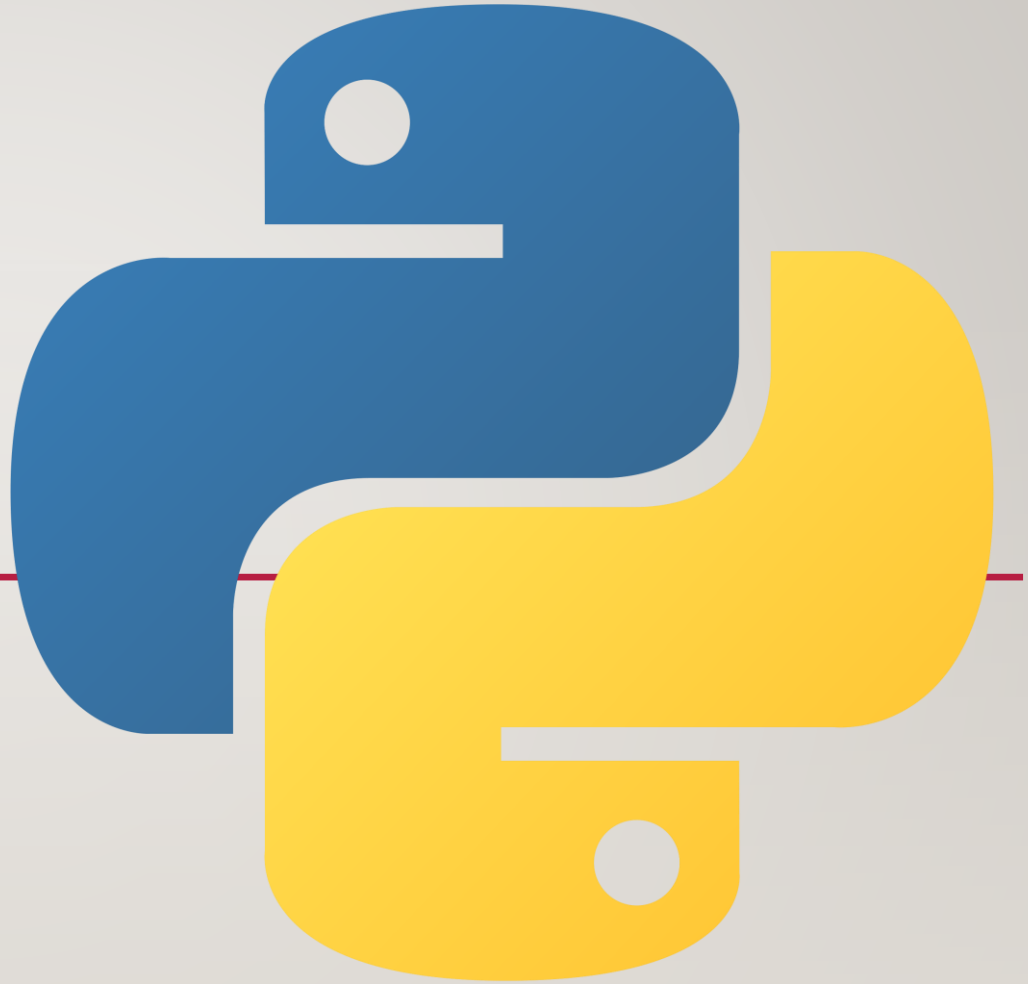
- Make a list of product prices. → product_price_list = [130, 160, *other products' prices*]
- Make a list of product amounts. → product_amount_list = [50, 20, *other products' amounts*]
- Fix the rest of the code so that the program runs correctly.

# EVALUATE THE CHANGES IN VENDING MACHINE

Do you think using lists is better or worse than before?

Why?

# COMMON ERRORS



# SPELLING

- Name error

```
n = “Tom”

print(na)
```

```
if x.isupper():
        print(“It’s upper! Yay!”)
```

- Capitalization

```
import datetime

date = datetime.date(2022,6,21)
print(Date.weekday())
```

# INDENTATION

- Your indentation doesn't match the rest of the code.

```
import datetime

    date = datetime.date(2022,6,21)
  print(Date.weekday())
```

- Your indentation doesn't match what you want to do.

```
import datetime
date = datetime.date(2022,6,21)
if Date.weekday() == 1:
        print("It's Tuesday!")

print("It's a weekday")
```

# NUMBERS

- Zero division error
  - you are trying to divide a number by 0. Check where it happens.

```
b = 0
a = 7 / b
```

- Index error
  - you tried to use an index that is larger (smaller) than the list

```
li = [“Arthur”, “Lancelot”, “Gawain”, “Kay” ]
print(li[4])
print(li[-5])
```

# TYPE/ASSIGNMENT

- Type error

```
import datetime
s = “Tuesday”
d = datetime.date(2022,6,22)
x = d + s
```

- Using assignment instead of equality
  - = versus ==

```
li = [“Arthur”, “Lancelot”, “Gawain”, “Kay” ]
li2 = [“Arthur”, “Lancelot”, “Gawain”, “Kay” ]

li = li2
print(li == li2)
```

# FUNCTION RESULTS

- Remember, some functions give a return value, but some give None.
- You need to know which is which.

```
l = ["Hayao Miyazaki", "Kentarou Miura", "Takehiko Inoue"]

l = l.append("Kohei Horikoshi")
```

append doesn't have a return value, so now l is lost!!!

# FUNCTION ARGUMENTS

- Python always expects a function's arguments to be in the same order.

```
name =  "Kentarou Miura"

name = name.replace("Taro", "Kentarou") # name.replace("taro", "Kentarou")

print(name) # name is still Kentarou Miura!!
```

this will not give an error, but the replace function expects the part we want to find **first**, **then** what we want to change it to

# GLOBAL VS. LOCAL / ATTRIBUTE

- Unbound local error
  - You tried to assign a value to a global variable inside a function

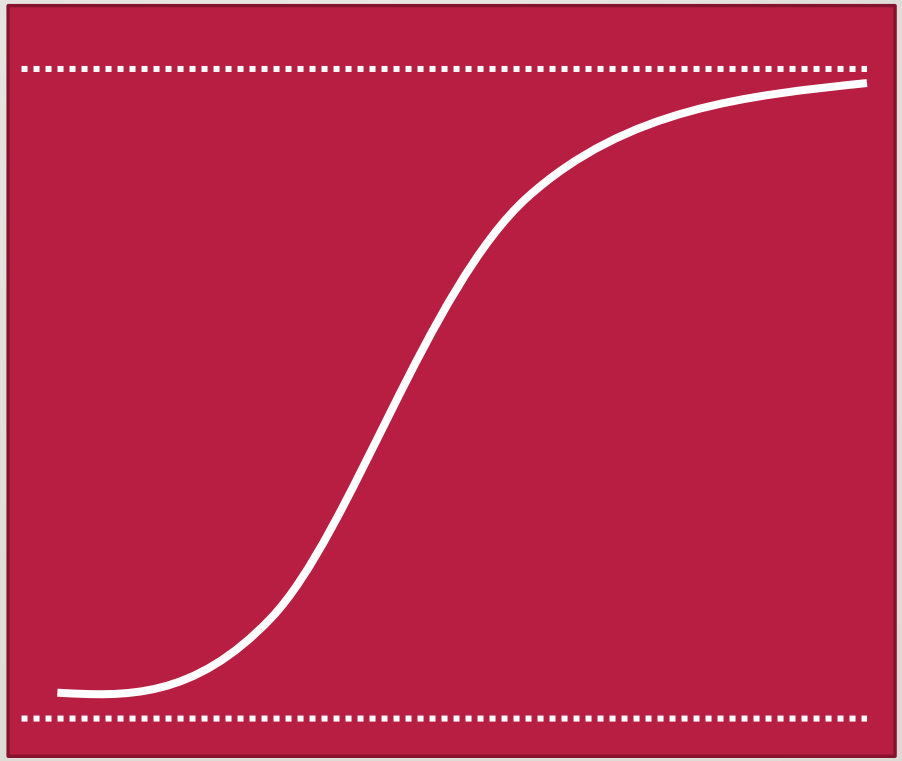
```
x = 5
def sq():
    x = x**2
```

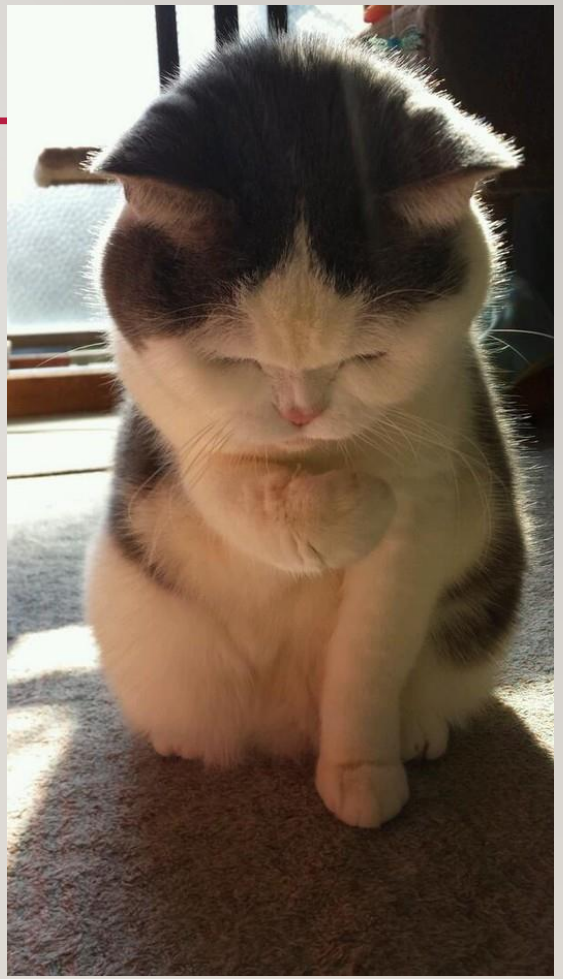
- Attribute error
  - you tried to access a function or piece of information that doesn't exist

```
li = ["Arthur", "Lancelot", "Gawain", "Kay" ]
li.isupper() #only exists for str variables
li.ascii_uppercase # only exists for the special string library, which you need to import
```

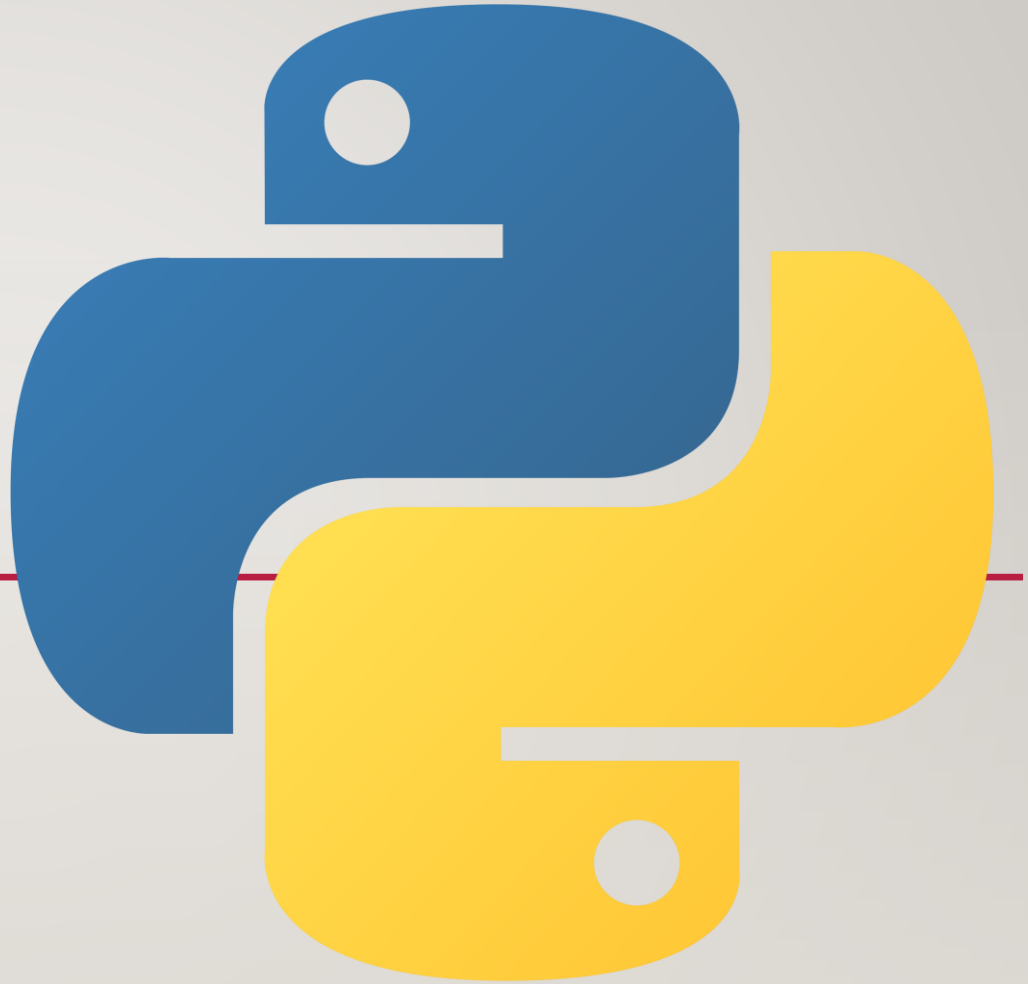
# AND MANY MANY MANY MANY MORE

- As you get more experience as a programmer, you will encounter lots of other bugs and errors while you program.
- Also, you will become faster at finding them.
- You will never write perfect code, but that is OK!
- In life, we are all on a journey and we can try to get better as we go.





# LOOPS AND LOOPING



# REPETITION

- https://youtu.be/KbiSxunJatM?t=34

# GROUNDHOG DAY

- Groundhog Day (Clip 3) - Repeated Dying Sequence - YouTube

# LOOPS

- A loop is a way to repeat a statement or command.

```
for x in range(5):
    print("Hi, Nezuko!")
```

```
print("Hi, Nezuko!")
print("Hi, Nezuko!")
print("Hi, Nezuko!")
print("Hi, Nezuko!")
print("Hi, Nezuko!")
```

# LOOPS

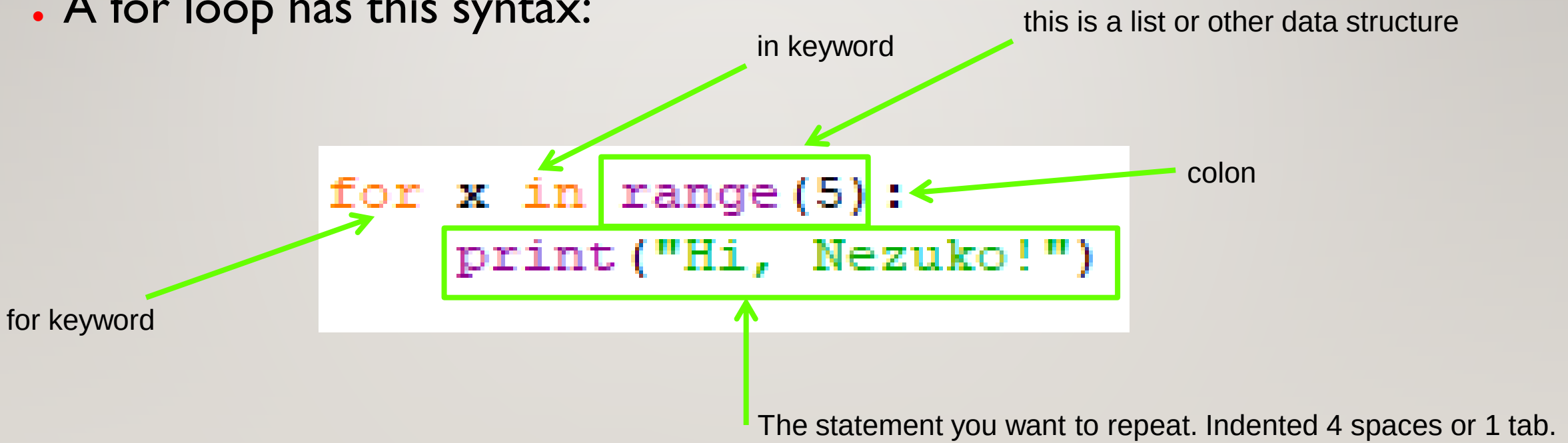
```
print("Hi, Nezuko!")
print("Hi, Nezuko!")
print("Hi, Nezuko!")
print("Hi, Nezuko!")
print("Hi, Nezuko!")
```

```
for x in range(5):
    print("Hi, Nezuko!")
```

What are loops good for?

# LOOPS, CONTINUED

- In Python, the most basic kind of loop is a for loop.
- A for loop has this syntax:



# SPACES VERSUS TABS

- https://www.youtube.com/watch?v=SsoOG6ZeyUI

# LOOPS AND LISTS

```
days = ["Mon", "Tues", "Wed" , "Thurs" , "Fri", "Sat", "Sun"]

for x in days:
    print(x)
```

# WAYS TO CONTROL A FOR-LOOP

- Use range(a)
- Use range(a,b)
- Use in + a list (or dictionary, or other data structure)

# LOOPS, IF AND SCOPE

- Loops and **if** work very differently than functions.

```
def my_func(a):
        x = 5 * (a*a) + 11

my_func(10)

print(x) # this gives an error
```

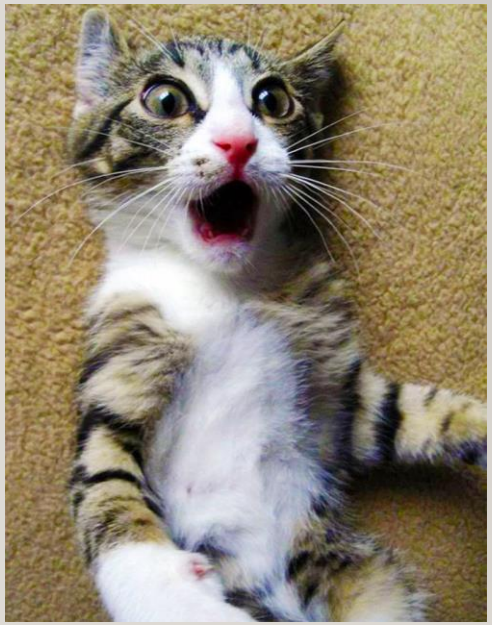
```
for x in range(10):
    a = 2 * x
    print(a)

print(a) #this is fine!
print(x) #this is fine, too!
```

```
n = "y"

if n == "w":
    b = "y2"
else:
    c = "x"

print(b) #this gives an error
print(c) #this is fine!
```



# LOOPS AND SCOPE

- If you need to keep a value while running a for-loop, you should make the variable before it.

```
for x in range(10):
    a = 0
    a = a + x

print(a)
```

a is set to 0 each time you run through the loop, so the last value is 9…

```
a = 0

for x in range(10):
    a = a + x

print(a)
```

a is set to 0 outside the loop, so previous value gets added to it each time

# LOOP EXERCISES

- Create a loop that counts from 0 to 100
- Create a loop that multiplies the numbers from 1-20.
- Create a loop that adds random numbers to a list.
- Use a loop to find the largest and smallest numbers, and the average.

# WAYS TO CONTROL ACTION INSIDE A LOOP

- You can use if-statements and break or continue to control action

```
li = [2,4,6,8,10,11,14,16,18]

for x in li:
    if x % 2 != 0:
        break
    print(x)
```

we want to stop the loop completely if we have an odd number

```
li = [1,4,9,16,25,0,36,49,64]

for x in li:
    if x == 0:
        continue
    else:
        print((li.index(x) +1) / x)
```

we just want to skip the number to avoid dividing by 0