DS2000
9/13 - Friday (the 13th! !!)

Admin

- HW1 out! due 9/20 9pm

Agenda

1. Arithmetic operators
2. Gather data / communication
3. Python

0. Review

1. where/why are constants?
2. why have float(), int()?
3. where/why are comments?

- Constants: to reuse values that don't change
- int/float: input gives string, want to be number
- Comments: # inline, describe code below
  """ block comment """ for header

```
'''
    DS2000
    Fall 2024
    Sample code from class - converting data about dogs
    9/10/24

    Ways to improve what we started with:
    * input("Enter value") gives us a string. Convert with
      float(input("Enter value")) or
      int(input("Enter value"))
    * use round(height_in) so the user sees a whole number
     instead of tons of digits
'''

LBS_PER_KILO = 2.2
CMS_PER_INCH = 2.54

def main():
    # step one: gather data from the user about the dog
    # in the metric system
    weight_kg = float(input("What is weight in kilos?"))
    height_cm = int(input("What is height in cm?"))

    # step two: convert both data points from metric
    # to imperial
    weight_lbs = weight_kg * LBS_PER_KILO
    height_in = height_cm / CMS_PER_INCH

    # step three: report results to the user
    print("Weight in pounds:", weight_lbs)
    print("Height in inches:", round(height_in))


main()
```

1. Arithmetic Operators

Basic math: +, −, *, /

make it happen first: ( )

Fun ones: **, //, %

exponent int division modulo

ex

10/5	2.0
10//5	2
10%15	10

49//24	2
49%24	1

13%2	1
22%2	0
23%2	1

→ even/odd?

557//12	46
557%12	5

months → years and months

mod → remainder

hours → days, hours

10%8 = 2 b/c 10 = 8x1 + 2

10%3 = 1 b/c 10 = 3x3 + 1

10%15 = 10 b/c 10 = 15x0 + 10

2. Gather Data + Communication ☆

- gather data ⇝ from user

```
var = input("...")
```

var → variable, saves what user types

"..." → string

var will have a string value unless:

```
var = int(input(...))
var = float(input(...))
```

"\n" ⇝ creates a linebreak

- communication: print and data viz

print("...") print("...", var, "...", var2)

string literal variable

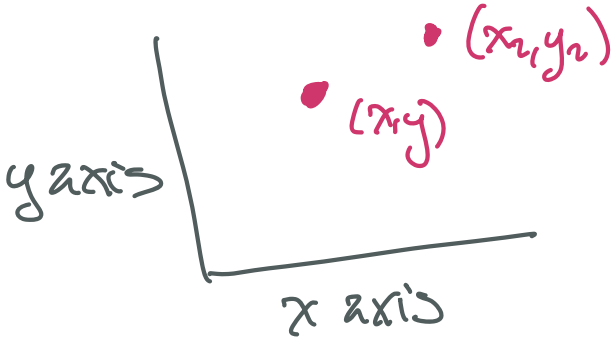
round(var) ⇝ rounds to whole #

round(var, x) ⇝ rounds to x digits after decimal point

only in printing

not for computations!

Data Viz!!! plots



making plots in Python

1. install matplotlib (once per project)
2. in code: import matplotlib.pyplot as plt
3. make/save the plot: in code
   - plt.plot(x, y, "o")
   - plt.show()
   - save icon

3. Python

- more dog themes
- test cases first!

- dog 1 energy 1-10
- dog 2 energy 1-10
- # minutes at park

Test cases

① What is dog 1's energy level compared to dog 2?

"dog 1 has — % or — x energy of dog 2"

dog1 = 10
dog2 = 5

② How many hours and minutes at park?

"that is — hours and — minutes"

102 minutes