Python

9/6/17

Preliminary Definition

Algorithm: A well ordered sequence of operations that produce a result from some input and halt in a finite amount of time.

Computing: The activity of using or creating algorithmic processes to complete some task

Computer Science: The study of algorithms including their mathematical properties, their linguistic realizations(programs), their physical realizations(computers), and their application.

Program: A formal specification of an algorithm that can be understood by computers and other programmers. (“A human-readable essay on computing”)

Different python program for the same algorithm.

Programming Language: A programming language is used to formally specify algorithms. Programming languages come in many different flavors and for different applications. In this course we will be using Python.

Interpretive language not compiler

How much water is there in an inch of rain?

One inch per acre

How many gallons per acre?

43560 sqft per acre

12 inches per feet

7.48052 gallons per cubic feet

9/11/17

Homework due September 25th

Find all the evn numbers between 10 and 20

[i for i in range (10, 21): if i%2 ==0]

In python: variable can contain data of different types, variables don’t have types

Data objects do have type

A=6 data type:int

A= “hello world” data type: string

Variable = A

A=3

27==27 🡪 true

my\_int = 27

my\_int == “27” 🡪 false

27 == 27.0 🡪 true

int (“27.5”) wont work 🡪 value error

How should you name variables

A name may be of arbitrary length and may contain letters, digits, and underscore

Every name must begin with a letter or underscore

A name must be a keyword (i.e: type)

Don’t use print as a variable

variable name that doesn’t change should we uppercase

ex: THIS\_IS\_A\_MAGIC\_NUMBER = 42

List:

x= [‘a’, ‘b’]

y=x

y[0] = ‘c’

now its [‘c’, ‘b’]

gretting = “hello”

id(greeting) = some id number #spcify the id (“memory location”) of variable

variable 🡪 objects in memory

a 🡪 object ID\_NUMBER, Int 42

b 🡪 str “fourty two”

a,b = b,a

a= str”fourtytwo”

b=42

how to remove an object from memory

c= None🡪 points to no objects in particular

frees up memory space

b=a two variables point to the same object

now is b==a? true

is operator, are they point to same object

a is b 🡪true

B=4

A+B= 7-integer

a/b=0.75 floating point number

a//b =0 cuts off remainder

a= hello

a

output: hello

b

output:2

3.0\*2: float type 6.0

x=5/2=2.5

int(2.5)=2

round up:

import math

Math.floor

Math.ceil(x)

Or int(x+1)

Can use double or single quotes for strings

Type(0.8)= float

Type(x)=str

Len(5) 🡪 type error

greeting.capitalize() 🡪’Hello’

every object has a type and this type never changes

variable do not have a type. They can point to any object

“x”\*3 🡪 xxx

a=5

b=5

a is b🡪 true

python reuses things

a= “abc”\*128

b=”abc”\*128

a is b 🡪 false ## too long string

a = [1,2,3]

b = [1,2,3]

a is b 🡪 false // are these variables attached to the same thing?

a == b 🡪 true // are the objects equal?

A = set([1,2,3])

X = [1,2,3,4]

X(0) = [‘a’,’b’,’c’,’d’]

x🡪[‘a’,’b’,’c’,’d’] 2,3,4]

y=x[0]

Y[0]= ‘d’ 🡪 [d,b,c,d]

x🡪 [‘d’,’b’,’c’,’d’] 2,3,4]

z.insert(0, ‘a’)🡪 adds at the beginning

**statement vs expression**

expression: are evaluated and return a value. The value need to be captured

Statement: can print something but doesn’t return a value

A= 27 🡪 statement

X=(a=27) 🡪 syntax error, right side must be an expression