Python for Programmers

## Welcome

### Welcome

### Python 2 vs 3

### Mac Setup

### Windows setup

## Numbers

### Intro

### Variables and ints

Variable do not need to be declared. Like matlab juts introduce them

### Floats

### Math

### Advanced Math

import math  # need for pi

5\*\*3  # \*\* is exponential like in Fortran

5 // 3 # integer division

5 % 3   # remainder

round(math.pi,2)

int(math.pi)

# \_ gives most recent result

2\*\_

int(pi)

float(8)

### Conversion

### Outro

## Strings

# can use single or double quotes

'hello'

"hello"

# use 3 quotes of either type for multi-line strings

'''hello

world'''

"""hello

world"""

# can use strings as comments

# + is the concatination operator

print("hello"+" "+'world!')

# \* is used for repition of a string

print(9\*"9")

# printing variables

age = 30

print("My age is {}".format(age))

print("My age is {} and pi is {}".format(age, 3.1415))

"Hello".upper()

"Hello".lower()

"Hello world".title()

len("hello")

s="Hi my name is Bob".replace("Bob","Jim")

print(s)

s[0]

s[-1]

s[-17]   # gives same as s[0]

s[16]   # gives same as s[-1]

s[-18]    # gives an error

s[17]    # gives an error

# slices. s[n:m] goes from s[n] to s[m-1]  !

s[0:2]

s[6:10]

s[3:-4]

s[:10]  # same as 0:9

s[3:]   # same as 0:len

s[3:0]  # gives "" empty string

s[-1:]  # final character

## IF statements

# booleans

True

False

sunny = False

# use indentation instead of brackets!

if sunny:

    print("Sunny!")

    print("Yes Sunny!")

else:

    print("cloudy")

print("done")

# also have elif for convenience

x = -11

if x > 0:

    print("positive!")

elif x == 0:

    print("zero")

else:

    print("negative")

# python has ability to tell if between two nums!

y = 9

if 5 < y < 10:

    print("Tween")

#  and, or, not keywords

a=6.3

if a % 2 == 0 and 7 >= a >= 5:

    print("Even and between 7 and 5")

if not False:

    print("not")

# None is liek null in Java and Javascript

if not None:

    print("not")

## PROJECT 1 – GRADE CALC

pointspossible = 100

score = 84

percentage = score / pointspossible

studentname = "Bill"

print("Percentage is {}".format(percentage))

if 0 <= percentage < .60:

lettergrade="F"

elif .60 <= percentage < .70:

lettergrade="D"

elif .70 <= percentage < .80:

lettergrade="C"

elif .80 <= percentage < .90:

lettergrade="B"

else:

lettergrade="A"

print("{} {}".format(studentname, lettergrade))

## User Input

Capture a line of text

age=input("What is your age?: \n")

print("Your age is "+age+" years old!")

type of a variable

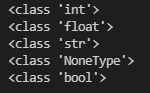
print( type(14) )

print( type(14.5) )

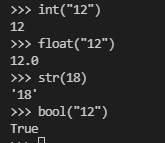
print( type(“14”) )

print( type(None) )

print( type(True) )



Type conversion is performed via int(), float(), str() etc



Exception handling

try:

    age = int(input("enter age:"))

    print("Valid age!")

except Exception:

    print("You need to provide a valid number")

## Functions

Simple function definition

def hello():

    print("Hello World")

hello()

function with paramters

def add(x1,x2):

    print(x1+x2)

add(3,4)

named parameters

def sub(x1,x2):

    print(x1-x2)

sub(4,3)

sub(x2=4,x1=3)

default parameters

def pname(name="nobody"):

    print(name)

pname("Ron")

pname()

**return value**

return causes end of function execution

def addtwo(num1, num2):

    return num1 + num2

print( addtwo(3,6) )

no return value means that the None object is returned

def hey():

    print("hey")

print( hey()   )

## Lists, Tuples, Sets

Type is **list**

games = ["Mario Bros 3", "Earthbound", "Pilotwings", "Mario Party"]

print(games)

print(type(games))

print(games[1])

games.insert(0, "Zelda")

print(games)

games[1] = 'Mario Bros 1'

print(games)

del(games[2])

print(games)

games = ["Zelda", "Mario Bros 3", "Earthbound", "Pilotwings", "Zelda", "Mario Party"]

# remove will remove the FIRST element that matches

games.remove("Zelda")

print(games)

print(len(games))

# **tuples** use parantheses.  both size and values are immutable!

tuple = ("Zelda", "Mario Bros 3", "Earthbound", "Pilotwings", "Zelda", "Mario Party")

print(tuple)

#to create an tuple of one element, you need to include a trailing comma

y = [ "hello" ]   # array

w = ( "hello" ) # value,, not a tuple

z = ( "hello", )  # tuple

shoes = ("Spizikes","Air Force 1","Curry 2","Melo 5")

# + operator does concatination for both arrays and tuples

# \* operator replicates

q = ["hello"] + 2\*[ "there" ]

def appendtotuple(thetuple, value):

    x = ( value, )

    t =  thetuple + x

    return t

print(appendtotuple(shoes,"loafers"))

**sets**: use curly braces {}. Empty set is set() not {}, which is an empty dictionary

myset= { "hello", "there "}

print(myset)

myset.discard("there")

myset.add("hi")

print(myset)

myset = set(games)

print(myset)

## Loops

# rang(10) -> class of type range. iterates over 0 to 9

for x in range(10):

    print(x)

numbers = [76, 83, 16, 69, 52, 78, 10, 77, 45, 52, 32, 17, 58, 54, 79, 72, 55, 50, 81, 74, 45, 33, 38, 10, 40, 44, 70, 81, 79, 28, 83, 41, 14, 16, 27, 38, 20, 84, 24, 50, 59, 71, 1, 13, 56, 91, 29, 54, 65, 23, 60, 57, 13, 39, 58, 94, 94, 42, 46, 58, 59, 29, 69, 60, 83, 9, 83, 5, 64, 70, 55, 89, 67, 89, 70, 8, 90, 17, 48, 17, 94, 18, 98, 72, 96, 26, 13, 7, 58, 67, 38, 48, 43, 98, 65, 8, 74, 44, 92]

odds = set([])

for n in numbers:

    if n % 2 == 1:

        odds.add(n)

print(odds)

# while loop

age = 27

while age <= 30:

    print(age)

    age += 1

n=0

y=1

while y <= 1000000000:

    n += 1

    y = 2\*\*n

print("n={}",n)

# break

for x in range(10):

    print(x)

    if (x == 5):

        break

# continue

for x in range(10):

    if (x == 5):

        continue

    print(x)

# else runs after loop finishes, but not if break eneded it

for x in range(10):

    if (x == 5):

        continue

    print(x)

else:

    print("All done")

# else won't run here

for x in range(10):

    if (x == 5):

        break

    print(x)

else:

    print("All done")

nums = [99, 20, 30, 35, 16, 49, 39, 11, 69, 48, 85, 32, 10, 47, 24, 80, 37, 21, 3, 99, 13, 11, 23, 12, 40, 50, 24, 14, 10, 62, 21, 24, 55, 57, 38, 55, 83, 63, 34, 31, 15, 26, 82, 47, 37, 14, 64, 72, 90, 39, 70, 50, 67, 61, 23, 28, 30, 13, 87, 58, 80, 62, 15, 49, 33, 7, 38, 2, 92, 76, 80, 18, 6, 25, 22, 25, 91, 9, 37, 83, 46, 98, 69, 3, 40, 6, 48, 1, 63, 51, 32, 19, 77, 74, 22, 75, 41, 19, 27, 82, 60, 6, 1, 55, 5, 71, 18, 84, 47, 16, 1, 8, 41, 6, 17, 100, 62, 36, 45, 32, 4, 33, 68, 15, 2, 92, 50, 54, 34, 12, 17, 16, 74, 95, 2, 61, 75, 12, 6, 39, 28, 18, 30, 39, 8, 34, 62, 31, 57, 8, 69, 19, 71, 70, 40, 79, 76, 96, 84, 76, 85, 4, 40, 64, 45, 11, 46, 100, 56, 9, 86, 5, 78, 81, 18, 70, 76, 46, 85, 69, 64, 88, 17, 91, 49, 93, 18, 29, 38, 42, 77, 63, 46, 32, 83, 88, 48, 68, 89, 80]

n = 0

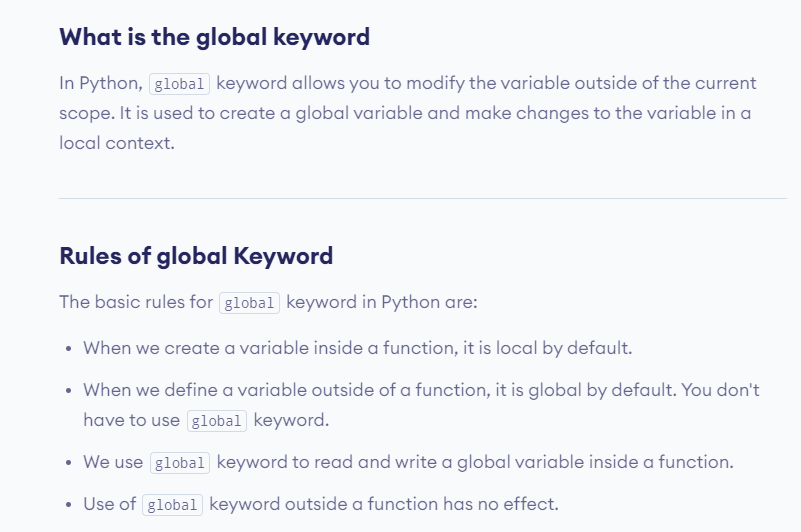
for x in nums:

    if (x == 68): break

    n += 1

print(n)

## PROJECT 2: Hangman



import time

lives = 10

stringword = "Apple"

word = list(stringword.lower())  # converts to a list of letters

winner = False

incorrectletters = []

guess = ["\_"] \* len(word)

def printscore():

    print("\n\nLives: ", str(lives))

    print("Incorrect Letters: ", end="")

    for i in range(len(incorrectletters)):

        if i == len(incorrectletters) - 1:

            print(incorrectletters[i], end="")

        else:

            print(incorrectletters[i], end=",")

    print("")

    print("Guess: ", end="")

    for i in range(len(guess)):

       print(guess[i], end="")

    print("")

def askforletter():

    letter = input("Please guess a letter: ").lower()

    correct = False

    for i in range(len(word)):

        if letter == word[i]:

            guess[i] = letter

            correct = True

    if correct:

        print("You got one!")

    else:

        print("Sorry there is no '"+letter+"'.")

        incorrectletters.append(letter)

        global lives

        lives -= 1

    time.sleep(1)

def checkwinner():

    if "\_" not in guess:

        global winner

        winner = True

while lives > 0 and not winner:

    printscore()

    askforletter()

    checkwinner()

if lives <= 0:

    print("You lost. The word was "+ stringword +".")

else:

    print("Congrats! The word is '"+stringword+"'. You won with " + str(lives) + " lives left!" )

bugs:

* Doesn’t check is entered string is a single letter (len(letter)==1 and letter in “a-z”
* Doesn’t check is already guessed

## Dictionaries

## Classes

## Advanced Python

## PORJECT 3: Word Counter

## Random Twitter Follower

## BONUS SECTION