```
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Map:
0) homework 2
1) Operators
2) if conditions
3) functions
4) Modules
5) projects
```

homework 2

In [1]:
```
# add an element to tuples
a = (1, 2, 3)

# Trick:
# Step1: convert to list
a = list(a)

# Step 2: append to the list
a.append(4)

# Step 3: convert list to tuple
a = tuple(a)

print(a)
```

```
(1, 2, 3, 4)
```

Operators

```
1) Arthimetic: +, -, *, /, //, %, **
2) Asiignment: +=, -=, *=, /=, //=, %=, **=
3) comparison: ==, !=, >, <, >=, <=
4) logical: and, or, not
5) Identity: is, is not
6) membership: in, not in
7) Bitwise
```

In [2]:

```
# Arthimetic
print('2 + 3 =' , 2 + 3)
print('2 - 3 =', 2 - 3)
print('2 * 3 =', 2 * 3)
print('2 / 3 =', 2 / 3)
print('9 // 3 =', 9 // 3)
print('10 % 3 =', 10 % 3)
print('2 ** 3 =', 2 ** 3)
```

```
2 + 3 = 5
2 - 3 = -1
2 * 3 = 6
2 / 3 = 0.6666666666666666
9 // 3 = 3
10 % 3 = 1
2 ** 3 = 8
```

In [3]:

```
# Assignment  ----> While
a = 1

# a += 1 ---> a = a + 1
a += 1
print('a += 1 :' , a)

a -= 3  # a = a - 3
print('a -= 3 :', a)

a *= 3  # a = a * 3
print('a *= 3 :', a)

a /= 3  # a = a / 3
print('a /= 3 :', a)

a //= 3  # a = a // 3
print('a //= 3 :', a)

a %= 3  # a = a % 3
print('a %= 3 :', a)

a **= 3  # a = a ** 3
print('a **= 3 :', a)


print("\n")
b = 1
while b < 5:
    print(b)
    b += 1
```

```
a += 1 : 2
a -= 3 : -1
a *= 3 : -3
a /= 3 : -1.0
a //= 3 : -1.0
a %= 3 : 2.0
a **= 3 : 8.0


1
2
3
4
```

In [4]:

```
# Comparison ---> If conditions
a = 1
b = 3

print(a == b)
print(a != b)
print(a >= b)
print(a <= b)
print(a > b)
print(a < b)
```

```
False
True
False
True
False
True
```

In [5]:

```
# logical ---> for more info go to if conditions part


# and
a = 'food'
b = 'camping'

'''
and:
True   True --->  True
True   False ---> False
False  True  ---> False
False  False ---> False

'''

print(a == 'food' and b == 'camping')
print(a == 'food' and b == 'stuff')

print("\n")
# or
a = "sugar"
b = "honey"
'''
or:
True True ---> True
True False ---> True
False True ---> True
False False  ---> False
'''

print(a == 'sugar' or b == 'honey')
print(a == 'sugar' or b == 'salt')
print(a == 'pepper' or b == 'salt')


print("\n")
print("----------------------")
# not
a = 'food'
b = 'camping'

print(not(a == 'food' and b == 'camping'))
print(not(a == 'food' and b == 'stuff'))
print("\n")

# Think more
print(not(a == 'sugar' or b == 'honey'))
print(not(a == 'sugar' or b == 'salt'))
print(not(a == 'pepper' or b == 'salt'))
```

```
True
False


True
```

```
True
False


---------------------
False
True


True
True
True
```

In [6]:

```
# identity
a = 1
b = 2

# is
print(a is b)

# is not
print(a is not b)
```

```
False
True
```

In [7]:

```
# Membership
a = ['ali', 'Mammad', 1, 2, 3]
# in
print(0 in a)
print('ali' in a)
print(1 in a)

print("\n")
# not in  ---> for more info go to removing vowels from a String: Mammad  --
print(0 not in a)
print('ali' not in a)
print(1 not in a)
```

```
False
True
True


True
False
False
```

if conditions

```
if condition(with comparisons or booleans):
    instruction
elif condition(with comparisons or booleans):       ---> else if
    instruction
```

```
.
.
.
else:
    instruction
```

In [ ]:
```
# input is built-in functions
name = input("What is your name?")
print(name)
```

In [ ]:
```
a = input("what is your name? ")

if a == "Mohammad":
    print("yes! I know you Mammad")
elif a == "Ali":
    print("Oh! I think I saw him before.")
else:
    print("sorry I don't who you are")
```

In [2]:
```
a = 1

if a != 2:
    print("Please choose a variable equal to 2")
else:
    print('Right')
```

```
Please choose a variable equal to 2
```

functions

In [10]:

```
'''
Approach for functions:
1) def
2) lambda  ---> for math

methods for def:
1) return  --->  original
2) print
'''


# f(x) = x ** 2
def f(x):
    return x ** 2

a = f(2)
print(a)
print(f(2))

print("\n")
def g(x):
    print(x ** 2)

print("we are here")
g(2)


print("\n")
f = lambda x: x ** 3
print(f(2))
print(f(5))
```

```
4
4


we are here
4


8
125
```

In [13]:
```
import math

def f(x, y):
    return math.sqrt(x ** 2 + y ** 2)

a = f(3, 4)
print(a)

f = lambda x, y: math.sqrt(x ** 2 + y ** 2)
print(f(3, 4))
```

```
5.0
5.0
```

In [14]:
```
def a():
    print('hey, I\'m a function')
a()


def b():
    return 'hey, I\'m b function'
c = b()
print(c)
```

```
hey, I'm a function
hey, I'm b function
```

```
# import math ---> math: functions like sqrt()
# we want to create a package like math:
"""
In main directory you can create .py file ---> module OR Package
create all functions you need on it like:
def add(x, y):
    return x + y

then you can import this on all of your .py existed in the same directory
and use them.

There is multi-methods that you can import your modules in your .py file,
like:

1. import numpy
2. import numpy as np(or something else)
3. from numpy import *
4. from numpy import name_of_function_you need


1.
import numpy
a = numpy.randint(1, 9)


2.
import numpy as np
a = np.randint(1, 9)
```

```

3.
from numpy import *
a = randint(1, 9)

4.
from numpy import randint
a = randint(1, 9)


*** you can create a folder in your directory. cut and paste your module on this then:
from name_of_your folder.name_of_your_module import name_of_expected_function

for example:
form main.mmath import add

"""
```

In [ ]:

```

```

In [2]:

```
def f(x):
    return 2 * x


def g(x):
    return 2**x


print(f(g(2)))
```

```
8
```

In [ ]:

```
# you can define parameters of a function by default

# without define defaults
def info(firstname, lastname, studentid):
    print(f"This is {} {} and The student id is {}.".(firstname, lastname, s

# with default parameters
def info(firstname="Mohammad", lastname="Foroughi", studentid=123456789):
    print(f"This is {} {} and The student id is {}.".(firstname, lastname, s
```

In [ ]:
```
"""
install packages by pip:

step1: open Terminal or WindowsPowerShell
step2: pip install package_name
step3: waiting for install the package


*** see all of the packages installed on your computer: pip freeze

*** access to all packages:
    1) go to www.python.org
    2) go to pypy
"""
```

In [ ]:
```
"""
create virtual environment (It works like an Embassy on foreign country)

step1: open Terminal or windowspowershell
step2: pip instal virtualenv
step3: virtualenv name_of_your_virtual_environment
step4: name_of_your_virtual_environment\Scripts\activate


*** for deactivate virtual environment: name_of_your_virtual_environment\Scr
"""
```

```
PLEASE REMEMBER WHAT I SAID IN THIS CLASS:
    # IndentationError: unexpected indent
    # IndentationError: expected an indented block


# Wrong way
# 1
     print("hi")
output: IndentationError: unexpected indent

# 2
def f(x):
return 2 * x
output: IndentationError: expected an indented block
```

In [ ]:
```
"""
Variables:
    1) Local variables
    2) Global Variables
"""
a = 1  # global
b = "Mohammad"  # global


def f():
    a = 2  # local
    c = 4
    print(c)


print(a)
f()
```

Projects (THINK PYTHON PLEASE)

project 1:

In [*]:
```
age = input("How old are you? ")

age_range_str = []
for element in list(range(121)):
    age_range_str.append(str(element))

print(age_range_str)

# Nested if conditions
if age in age_range_str:
    if int(age) < 18:
        print("you are a teenager")
    elif int(age) >= 18:
        print("you are an adult")
elif age == "":
    print("you didn't say anything")
else:
    print("What? Am i talking to the Noah?")
```

```
How old are you?
```

project 2

In [ ]:
```
"""
coder: Mohammad
Date:
description:
    We want to write a function that
    recognize the number is even or odd

example:
    6 % 2 = 0
    7 % 2 = 1
"""

number = int(input("What is The number: "))
    if number % 2 == 0:
        print("it's even")
    elif number % 2 == 1:
        print('this is odd')
```

In [ ]:
```
def even_or_odd1(number):
    if number % 2 == 0:
        print("it's even")
    elif number % 2 == 1:
        print('this is odd')
```

In [ ]:
```
def even_or_odd2():
    number = int(input("What is The number: "))
    if number % 2 == 0:
        print("it's even")
    elif number % 2 == 1:
        print('this is odd')
```

project 3

In [ ]:
```
print("Please choose weight(kg) and height(m):")
weight = int(input("your weight: "))
height = float(input("your height: "))

BMI = weight / (height**2)
print("your BMI is: ", BMI)

if BMI < 18.5:
    print("You are underweight")
elif 18.5 <= BMI < 25:
    print("You are Normal")
elif 25 <= BMI < 30:
    print("You are overweight")
else:
    print("You are Obese")
```

In [ ]:
```
def calc_BMI(weight, height):
    BMI = weight / (height ** 2)

    if BMI < 18.5:
        print("You are underweight")
    elif 18.5 <= BMI < 25:
        print("You are Normal")
    elif 25 <= BMI < 30:
        print("You are overweight")
    else:
        print("You are Obese")


calc_BMI(81, 1.76)
```

project 4

In [ ]:
```
"""
Composite functions:
    f(x) = 2 * x
    g(x) = 2 ** x
    f(g(x)) -->
    step1: x = 2
    step2: g(2) = 4
    step3: f(g(2))=f(4)=8
"""


# nested functions
def compose(f, g):
    def h(x):
        return f(g(x))
    return h


def f(x):
    return 2 * x


def g(x):
    return 2**x


h = compose(f, g)
print(h(2))
```

project 5

In [ ]:
```
"""
coder:
date:

remember:
    'hello' ---> 'h' + 'e' + 'l' + 'l' + 'o'

point:
    Mohammad --> Mhmmd

"""


user1 = input("your word: ")
user2 = user1.lower()  # method


vowels = ['a', 'o', 'e', 'i', 'u']

point = ''
for element in user2:
    if element not in vowels:
        point += element  # point = point + element

print(point)

```

In [ ]:
```

def remove_vowels():
    user1 = input("your word: ")
    user2 = user1.lower()  # method

    vowels = ['a', 'o', 'e', 'i', 'u']

    point = ''
    for element in user2:
        if element not in vowels:
            point += element  # point = point + element

    print(point)


remove_vowels()

```

project 6

In [ ]:
```
choices = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz1234567890123
pass_range = r.randint(8, 30)

for element in range(pass_range):
    password += r.choice(choices)

print(password)
```

In [ ]:
```
ef pass_generator():
    password = ''
    choices = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789
    pass_range = r.randint(8, 30)

    for element in range(pass_range):
        password += r.choice(choices)

    print(password)


pass_generator()
```

In [ ]:
```
def pass_generator(number):
    password = ''
    choices = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789

    for element in range(number):
        password += r.choice(choices)

    print(password)
```

project 7

In [ ]:

```
"""
coder =
date =
stone paper scissor
win:
    stone > scissor
    paper > stone
    scissor > paper
"""

import random
import time


result = []
while True:
    user = int(input("""
    what is your choice number:
    1) stone
    2) paper
    3) scissor
    """))

    computer_choices = ["stone", "paper", "scissor"]
    computer = random.choice(computer_choices)
    print("computer choice is: ", computer)

    if user == 1 and computer == "scissor" or user == 2 and computer == "sto
        print("you win")
        result.append("win")
    elif user == 1 and computer == "stone" or user == 2 and computer == "pap
        print("the choices is equal. start again")
        pass
    else:
        print("computer win")
        result.append("lose")

    print("The result of this match is: ")
    print("you: ", result.count("win"), "computer: ", result.count("lose"))

    if result.count("win") == 3:
        print("WOoOW, you hat trick")
    elif result.count("lose") == 3:
        print("Haaa Haaa, It's Me. Your Computer. I hat tick")
    else:
        pass

    print("waiting for 5 second")
    time.sleep(1)
    print("4s")
    time.sleep(1)
    print("3s")
    time.sleep(1)
    print("2s")
    time.sleep(1)
    print("1s")
```

```
    time.sleep(1)
    print("go")
```

In [ ]:

```
def stone_paper_scissor():
    result = []
    while True:
        user = int(input("""
        what is your choice number:
        1) stone
        2) paper
        3) scissor
        """))

        computer_choices = ["stone", "paper", "scissor"]
        computer = random.choice(computer_choices)
        print("computer choice is: ", computer)

        if user == 1 and computer == "scissor" or user == 2 and computer ==
            print("you win")
            result.append("win")
        elif user == 1 and computer == "stone" or user == 2 and computer ==
            print("the choices is equal. start again")
            pass
        else:
            print("computer win")
            result.append("lose")

        print("The result of this match is: ")
        print("you: ", result.count("win"), "computer: ", result.count("lose

        if result.count("win") == 3:
            print("WOoOW, you hat trick")
        elif result.count("lose") == 3:
            print("Haaa Haaa, It's Me. Your Computer. I hat tick")
        else:
            pass

        print("waiting for 5 second")
        time.sleep(1)
        print("4s")
        time.sleep(1)
        print("3s")
        time.sleep(1)
        print("2s")
        time.sleep(1)
        print("1s")
        time.sleep(1)
        print("go")


stone_paper_scissor()
```

project 8

In [ ]:
```
def sum_list(list):
    sum1 = 0
    sum2 = 0
    for element in list:
        if element % 2 == 0:
            sum1 += element
        elif element % 2 == 1:
            sum2 += element

    print("This is sum of even elements in your list: ", sum1)
    print("This is sum of odd elements in your list: ", sum2)


a = [1, 2, 3, 4, 5, 6, 7]
# even: 2 + 4 + 6 = 12
# odd: 1 + 3 + 5 + 7 = 16
sum_list(a)
```

project 9

In [ ]:
```
"""
add element to tuple:
    step1: convert tuple to list
    step2: append to list
    step3: convert list to tuple
"""


def add_tuple(mytuple, element):
    a = list(mytuple)
    a.append(element)
    b = tuple(a)

    print(b)


# a = (1, 2, 3)
# add_tuple(a, 4)
```

project 10

In [ ]:
```
"""
convert list to dictionary

example:
    a = [1, 2, 3]
    b = ["one", "two", "three"]
    print(list(zip(a, b)))

a = [(1, "one"), (2, "two"), (3, "three)]
c = [1, 2, 3]
d = ["one", "two", "three"]
dict(zip(c, d))
"""


def list_to_dic(a, b):
    c = dict(zip(a, b))
    print(c)


list_to_dic([1, 2, 3], ["one", "two", "three"])
```

project 11

In [ ]:
```
print('hi'
      'how are you?')
print("""
hi
how are you?
""")
a = [1, 2, 3, 4, 5, 6, 7]
for element in a:   # element : 1
    print(element)

b = a[::2]
print(b)
sum1 = 0
for element in b:
    sum1 += element

print(sum1)

```