

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

homework 2

In [1]:

```
1 # add an element to tuples
2 a = (1, 2, 3)
3
4 # Trick:
5 # Step1: convert to list
6 a = list(a)
7
8 # Step 2: append to the list
9 a.append(4)
10
11 # Step 3: convert list to tuple
12 a = tuple(a)
13
14 print(a)
```

(1, 2, 3, 4)

Operators

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

In [2]:

```
1 # Arithmetic
2 print('2 + 3 =' , 2 + 3)
3 print('2 - 3 =' , 2 - 3)
4 print('2 * 3 =' , 2 * 3)
5 print('2 / 3 =' , 2 / 3)
6 print('9 // 3 =' , 9 // 3)
7 print('10 % 3 =' , 10 % 3)
8 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]:

```

1  # Assignment ----> While
2  a = 1
3
4  # a += 1 ---> a = a + 1
5  a += 1
6  print('a += 1 :', a)
7
8  a -= 3 # a = a - 3
9  print('a -= 3 :', a)
10
11 a *= 3 # a = a * 3
12 print('a *= 3 :', a)
13
14 a /= 3 # a = a / 3
15 print('a /= 3 :', a)
16
17 a //= 3 # a = a // 3
18 print('a //= 3 :', a)
19
20 a %= 3 # a = a % 3
21 print('a %= 3 :', a)
22
23 a **= 3 # a = a ** 3
24 print('a **= 3 :', a)
25
26
27 print("\n")
28 b = 1
29 while b < 5:
30     print(b)
31     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]: 1  # Comparison ---> If conditions
        2  a = 1
        3  b = 3
        4
        5  print(a == b)
        6  print(a != b)
        7  print(a >= b)
        8  print(a <= b)
        9  print(a > b)
       10  print(a < b)
```

False

True

False

True

False

True

In [5]:

```

1  # logical ---> for more info go to if conditions part
2
3
4  # and
5  a = 'food'
6  b = 'camping'
7
8  '''
9  and:
10 True   True ---> True
11 True   False ---> False
12 False  True  ---> False
13 False  False ---> False
14
15  '''
16
17 print(a == 'food' and b == 'camping')
18 print(a == 'food' and b == 'stuff')
19
20 print("\n")
21 # or
22 a = "sugar"
23 b = "honey"
24 '''
25 or:
26 True True ---> True
27 True False ---> True
28 False True ---> True
29 False False ---> False
30 '''
31
32 print(a == 'sugar' or b == 'honey')
33 print(a == 'sugar' or b == 'salt')
34 print(a == 'pepper' or b == 'salt')
35
36
37 print("\n")
38 print("-----")
39 # not
40 a = 'food'
41 b = 'camping'
42
43 print(not(a == 'food' and b == 'camping'))
44 print(not(a == 'food' and b == 'stuff'))
45 print("\n")
46
47 # Think more
48 print(not(a == 'sugar' or b == 'honey'))
49 print(not(a == 'sugar' or b == 'salt'))
50 print(not(a == 'pepper' or b == 'salt'))

```

True
False

True

True
False

False
True

True
True
True

In [6]:

```
1 # identity
2 a = 1
3 b = 2
4
5 # is
6 print(a is b)
7
8 # is not
9 print(a is not b)
```

False
True

In [7]:

```
1 # Membership
2 a = ['ali', 'Mammad', 1, 2, 3]
3 # in
4 print(0 in a)
5 print('ali' in a)
6 print(1 in a)
7
8 print("\n")
9 # not in ---> for more info go to removing vowels from a String: Mammad --
10 print(0 not in a)
11 print('ali' not in a)
12 print(1 not in a)
```

False
True
True

True
False
False

if conditions

```
1 if condition(with comparisons or booleans):
2     instruction
3 elif condition(with comparisons or booleans):      ---> else if
4     instruction
```

```
5 .  
6 .  
7 .  
8 else:  
9     instruction
```

```
In [ ]: 1 # input is built-in functions  
2 name = input("What is your name?")  
3 print(name)
```

```
In [ ]: 1 a = input("what is your name? ")  
2  
3 if a == "Mohammad":  
4     print("yes! I know you Mammad")  
5 elif a == "Ali":  
6     print("Oh! I think I saw him before.")  
7 else:  
8     print("sorry I don't who you are")
```

```
In [2]: 1 a = 1  
2  
3 if a != 2:  
4     print("Please choose a variable equal to 2")  
5 else:  
6     print('Right')
```

Please choose a variable equal to 2

functions

In [10]:

```
1  '''
2  Approach for functions:
3  1) def
4  2) lambda ---> for math
5
6  methods for def:
7  1) return ---> original
8  2) print
9  '''
10
11
12 # f(x) = x ** 2
13 def f(x):
14     return x ** 2
15
16 a = f(2)
17 print(a)
18 print(f(2))
19
20 print("\n")
21 def g(x):
22     print(x ** 2)
23
24 print("we are here")
25 g(2)
26
27
28 print("\n")
29 f = lambda x: x ** 3
30 print(f(2))
31 print(f(5))
```

4

4

we are here

4

8

125


```
In [13]: 1 import math
2
3 def f(x, y):
4     return math.sqrt(x ** 2 + y ** 2)
5
6 a = f(3, 4)
7 print(a)
8
9 f = lambda x, y: math.sqrt(x ** 2 + y ** 2)
10 print(f(3, 4))
```

5.0

5.0

```
In [14]: 1 def a():
2     print('hey, I\'m a function')
3 a()
4
5
6 def b():
7     return 'hey, I\'m b function'
8 c = b()
9 print(c)
```

hey, I'm a function

hey, I'm b function

```
1 # import math ---> math: functions like sqrt()
2 # we want to create a package like math:
3 """
4 In main directory you can create .py file ---> module OR Package
5 create all functions you need on it like:
6 def add(x, y):
7     return x + y
8
9 then you can import this on all of your .py existed in the same directory
and use them.
10
11 There is multi-methods that you can import your modules in your .py file,
like:
12
13 1. import numpy
14 2. import numpy as np(or something else)
15 3. from numpy import *
16 4. from numpy import name_of_function_you need
17
18
19 1.
20 import numpy
21 a = numpy.randint(1, 9)
22
23
24 2.
25 import numpy as np
26 a = np.randint(1, 9)
```

```

27
28 3.
29 from numpy import *
30 a = randint(1, 9)
31
32 4.
33 from numpy import randint
34 a = randint(1, 9)
35
36
37 *** you can create a folder in your directory. cut and paste your module
   on this then:
38 from name_of_your_folder.name_of_your_module import
   name_of_expected_function
39
40 for example:
41 from main.mmhath import add
42
43 """

```

In []:

1

In [2]:

```

1 def f(x):
2     return 2 * x
3
4
5 def g(x):
6     return 2**x
7
8
9 print(f(g(2)))

```

8

In []:

```

1 # you can define parameters of a function by default
2
3 # without define defaults
4 def info(firstname, lastname, studentid):
5     print(f"This is {} {} and The student id is {}".format(firstname, lastname, studentid))
6
7 # with default parameters
8 def info(firstname="Mohammad", lastname="Foroughi", studentid=123456789):
9     print(f"This is {} {} and The student id is {}".format(firstname, lastname, studentid))

```

In []:

```
1  """
2  install packages by pip:
3
4  step1: open Terminal or WindowsPowerShell
5  step2: pip install package_name
6  step3: waiting for install the package
7
8
9  *** see all of the packages installed on your computer: pip freeze
10
11 *** access to all packages:
12     1) go to www.python.org
13     2) go to pypy
14 """
```

In []:

```
1  """
2  create virtual environment (It works like an Embassy on foreign country)
3
4  step1: open Terminal or windowpowershell
5  step2: pip instal virtualenv
6  step3: virtualenv name_of_your_virtual_environment
7  step4: name_of_your_virtual_environment\Scripts\activate
8
9
10 *** for deactivate virtual environment: name_of_your_virtual_environment\Scr
11 """
```

```
1  PLEASE REMEMBER WHAT I SAID IN THIS CLASS:
2      # IndentationError: unexpected indent
3      # IndentationError: expected an indented block
4
5
6  # Wrong way
7  # 1
8      print("hi")
9  output: IndentationError: unexpected indent
10
11 # 2
12 def f(x):
13     return 2 * x
14 output: IndentationError: expected an indented block
```

```
In [ ]: 1 """
2 Variables:
3     1) Local variables
4     2) Global Variables
5 """
6 a = 1 # global
7 b = "Mohammad" # global
8
9
10 def f():
11     a = 2 # local
12     c = 4
13     print(c)
14
15
16 print(a)
17 f()
```

Projects (THINK PYTHON PLEASE)

project 1:

```
In [*]: 1 age = input("How old are you? ")
2
3 age_range_str = []
4 for element in list(range(121)):
5     age_range_str.append(str(element))
6
7 print(age_range_str)
8
9 # Nested if conditions
10 if age in age_range_str:
11     if int(age) < 18:
12         print("you are a teenager")
13     elif int(age) >= 18:
14         print("you are an adult")
15 elif age == "":
16     print("you didn't say anything")
17 else:
18     print("What? Am i talking to the Noah?")
```

How old are you?

project 2

```
In [ ]: 1 """
2 coder: Mohammad
3 Date:
4 description:
5     We want to write a function that
6     recognize the number is even or odd
7
8 example:
9     6 % 2 = 0
10    7 % 2 = 1
11 """
12
13 number = int(input("What is The number: "))
14 if number % 2 == 0:
15     print("it's even")
16 elif number % 2 == 1:
17     print('this is odd')
```

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

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

project 3

```
In [ ]: 1 print("Please choose weight(kg) and height(m):")
2 weight = int(input("your weight: "))
3 height = float(input("your height: "))
4
5 BMI = weight / (height**2)
6 print("your BMI is: ", BMI)
7
8 if BMI < 18.5:
9     print("You are underweight")
10 elif 18.5 <= BMI < 25:
11     print("You are Normal")
12 elif 25 <= BMI < 30:
13     print("You are overweight")
14 else:
15     print("You are Obese")
```

```
In [ ]: 1 def calc_BMI(weight, height):
2       BMI = weight / (height ** 2)
3
4       if BMI < 18.5:
5           print("You are underweight")
6       elif 18.5 <= BMI < 25:
7           print("You are Normal")
8       elif 25 <= BMI < 30:
9           print("You are overweight")
10      else:
11          print("You are Obese")
12
13
14      calc_BMI(81, 1.76)
```

project 4

```
In [ ]: 1 """
2       Composite functions:
3           f(x) = 2 * x
4           g(x) = 2 ** x
5           f(g(x)) -->
6           step1: x = 2
7           step2: g(2) = 4
8           step3: f(g(2))=f(4)=8
9       """
10
11
12      # nested functions
13      def compose(f, g):
14          def h(x):
15              return f(g(x))
16          return h
17
18
19      def f(x):
20          return 2 * x
21
22
23      def g(x):
24          return 2**x
25
26
27      h = compose(f, g)
28      print(h(2))
```

project 5

In []:

```
1  """
2  coder:
3  date:
4
5  remember:
6      'hello' ---> 'h' + 'e' + 'l' + 'l' + 'o'
7
8  point:
9      Mohammad --> Mhmmd
10
11  """
12
13
14  user1 = input("your word: ")
15  user2 = user1.lower() # method
16
17
18  vowels = ['a', 'o', 'e', 'i', 'u']
19
20  point = ''
21  for element in user2:
22      if element not in vowels:
23          point += element # point = point + element
24
25  print(point)
26
```

In []:

```
1
2  def remove_vowels():
3      user1 = input("your word: ")
4      user2 = user1.lower() # method
5
6      vowels = ['a', 'o', 'e', 'i', 'u']
7
8      point = ''
9      for element in user2:
10         if element not in vowels:
11             point += element # point = point + element
12
13         print(point)
14
15
16  remove_vowels()
17
```

project 6

```
In [ ]: 1 choices = 'ABCDEFGHJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz1234567890123
2 pass_range = r.randint(8, 30)
3
4 for element in range(pass_range):
5     password += r.choice(choices)
6
7 print(password)
```

```
In [ ]: 1 def pass_generator():
2     password = ''
3     choices = 'ABCDEFGHJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789
4     pass_range = r.randint(8, 30)
5
6     for element in range(pass_range):
7         password += r.choice(choices)
8
9     print(password)
10
11
12 pass_generator()
```

```
In [ ]: 1 def pass_generator(number):
2     password = ''
3     choices = 'ABCDEFGHJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz123456789
4
5     for element in range(number):
6         password += r.choice(choices)
7
8     print(password)
```

project 7

In []:

```
1  """
2  coder =
3  date =
4  stone paper scissor
5  win:
6      stone > scissor
7      paper > stone
8      scissor > paper
9  """
10
11 import random
12 import time
13
14
15 result = []
16 while True:
17     user = int(input("""
18     what is your choice number:
19     1) stone
20     2) paper
21     3) scissor
22     """))
23
24     computer_choices = ["stone", "paper", "scissor"]
25     computer = random.choice(computer_choices)
26     print("computer choice is: ", computer)
27
28     if user == 1 and computer == "scissor" or user == 2 and computer == "stone" or user == 3 and computer == "paper":
29         print("you win")
30         result.append("win")
31     elif user == 1 and computer == "stone" or user == 2 and computer == "paper" or user == 3 and computer == "scissor":
32         print("the choices is equal. start again")
33         pass
34     else:
35         print("computer win")
36         result.append("lose")
37
38     print("The result of this match is: ")
39     print("you: ", result.count("win"), "computer: ", result.count("lose"))
40
41     if result.count("win") == 3:
42         print("WOOOW, you hat trick")
43     elif result.count("lose") == 3:
44         print("Haaa Haaa, It's Me. Your Computer. I hat tick")
45     else:
46         pass
47
48     print("waiting for 5 second")
49     time.sleep(1)
50     print("4s")
51     time.sleep(1)
52     print("3s")
53     time.sleep(1)
54     print("2s")
55     time.sleep(1)
56     print("1s")
```

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

In []:

```
1  def stone_paper_scissor():
2      result = []
3      while True:
4          user = int(input("""
5              what is your choice number:
6              1) stone
7              2) paper
8              3) scissor
9              """))
10
11         computer_choices = ["stone", "paper", "scissor"]
12         computer = random.choice(computer_choices)
13         print("computer choice is: ", computer)
14
15         if user == 1 and computer == "scissor" or user == 2 and computer ==
16             print("you win")
17             result.append("win")
18         elif user == 1 and computer == "stone" or user == 2 and computer ==
19             print("the choices is equal. start again")
20             pass
21         else:
22             print("computer win")
23             result.append("lose")
24
25         print("The result of this match is: ")
26         print("you: ", result.count("win"), "computer: ", result.count("lose")
27
28         if result.count("win") == 3:
29             print("WOOOW, you hat trick")
30         elif result.count("lose") == 3:
31             print("Haaa Haaa, It's Me. Your Computer. I hat tick")
32         else:
33             pass
34
35         print("waiting for 5 second")
36         time.sleep(1)
37         print("4s")
38         time.sleep(1)
39         print("3s")
40         time.sleep(1)
41         print("2s")
42         time.sleep(1)
43         print("1s")
44         time.sleep(1)
45         print("go")
46
47
48     stone_paper_scissor()
```

project 8

```
In [ ]: 1 def sum_list(list):
2         sum1 = 0
3         sum2 = 0
4         for element in list:
5             if element % 2 == 0:
6                 sum1 += element
7             elif element % 2 == 1:
8                 sum2 += element
9
10        print("This is sum of even elements in your list: ", sum1)
11        print("This is sum of odd elements in your list: ", sum2)
12
13
14 a = [1, 2, 3, 4, 5, 6, 7]
15 # even: 2 + 4 + 6 = 12
16 # odd: 1 + 3 + 5 + 7 = 16
17 sum_list(a)
```

project 9

```
In [ ]: 1 """
2 add element to tuple:
3     step1: convert tuple to list
4     step2: append to list
5     step3: convert list to tuple
6 """
7
8
9 def add_tuple(mytuple, element):
10     a = list(mytuple)
11     a.append(element)
12     b = tuple(a)
13
14     print(b)
15
16
17 # a = (1, 2, 3)
18 # add_tuple(a, 4)
```

project 10

```
In [ ]: 1 """
2 convert list to dictionary
3
4 example:
5     a = [1, 2, 3]
6     b = ["one", "two", "three"]
7     print(list(zip(a, b)))
8
9 a = [(1, "one"), (2, "two"), (3, "three")]
10 c = [1, 2, 3]
11 d = ["one", "two", "three"]
12 dict(zip(c, d))
13 """
14
15
16 def list_to_dic(a, b):
17     c = dict(zip(a, b))
18     print(c)
19
20
21 list_to_dic([1, 2, 3], ["one", "two", "three"])
```

project 11

```
In [ ]: 1 print('hi'
2         'how are you?')
3 print("""
4 hi
5 how are you?
6 """)
7 a = [1, 2, 3, 4, 5, 6, 7]
8 for element in a: # element : 1
9     print(element)
10
11 b = a[::2]
12 print(b)
13 sum1 = 0
14 for element in b:
15     sum1 += element
16
17 print(sum1)
18
```