

Aula Prática 2/ Practical Class 2

Python Exercises

2A. Variables and Data Structures

Unless stated otherwise the following exercises are meant to be performed in jupyter notebook.

Type: activate PMN

Type: jupyter notebook

We can create a new Python notebook by selecting Python 3, usually this is called Python kernel.

Recall that in jupyter notebook to run a cell we issue: **Shift+Enter**

a) Print the sentence “Lisbon is the capital of Portugal” using the string variables **city** and **country** and the following f-String (formatted-String):

```
print(f'{city} is the capital of {country}.')
```

b) Print the number 3579 as a **string** named Odd:

c) What is wrong with the following lines of code? What should be changed to return the string “135792468” to the screen?

```
Odd="13579"  
Even=2468  
OddEven = Odd+Even  
print(OddEven)
```

What should be changed to return the number 16047 to the screen.

Hint: We cannot concatenate strings with other variable types

d) Using the variables Odd and Even write to screen: ('1', '2', '3')

Hint: Odd[0] returns the character in the first position of the string Odd

e) Perform the following operations with the list named Noble:

e1) Create a list with the three elements Ne, Ar, Kr, named Noble.

e2) Check the length of the list.

e3) Answer the following question by printing the appropriate element of the list Noble.

What is the chemical symbol of Ar?

e5) Insert the new element He in the list in position 0.

e6) Append the new element Xe to the list.

e7) Check whether Rn (Radon) and Xe are in the list.

Hint: Try "Xe" in Noble and "Ar" in Noble

e8) Check whether Rn or Xe are in the list.

e9) What is the last element of the list

Hint: Try Noble[-1] and print(Noble [-1]) – what is the difference?

e10) Remove the element Xe from the list

Hint: Try Noble.remove("Xe")

e11) Insert element Rn at the end of the list

e12) Delete the last element of the list

Hint: Try del Noble[len(Noble)-1]

f) Define the following data structure with a list of pure substances and the respective density:

```
Molecules = [("Water", 0.997), ("Ethanol", 0.789), ("Glycerol", 1.261)]  
print(Molecules)
```

Molecules is a list (square brackets) formed by three tuples (round brackets).

Append the **tuple** ("Methanol", 0.791) to the **list** molecules.

g) Define a tuple named Molecules_tuple based on the three tuples of **f)** and try to append the tuple ("Methanol", 0.791).

Why couldn't you append Methanol to your tuple?

h) Classify the following sentence as “true” or “false”.

“The data structure Tuple in Python does not have the attribute “append” because tuples are immutable”

i) Consider the following list:

List_Periodic=["H","He","Li","Be","H","Li","Na"]

Use set to print the unique elements of List_Periodic.

j) Consider the following two tuples:

A = (1,10,100,1000)

B = (0.001,0.01,0.1,1)

Define a set C such that $C = A \cup B$

Define a set D such that $D = A \cap B$

Define a set E such that $E = C \cap D$

Add element 10000 to the set C

Hint: C.add(10000)

k) Write the following list named Molecules in the form of a dictionary called D_Molecules, where each substance is the key and the density is the value.

k1) Molecules = [("Water", 0.997), ("Ethanol", 0.789), ("Glycerol", 1.261)]

k2) Add the following element to the dictionary D_Molecules: ["Glycerol"] = 1.261

k3) Transform the dictionary back to a new list named L_Molecules.