Python exam : numpy, matplotlib and opencv part

Jacques BOONAERT-LEPERS

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Family Name :

First Name :

1 numpy (5 points)

(a) What is the purpose of the **numpy** Python library (*chose only **one** item in the following list* :

1. Providing a set of classes of functions for linear algebra and extensive numerical computations 1 ◯
2. Proposing a set of functions for image processing ◯
3. This is a sound processing library ◯
4. This is a library targeted to the **n**on **u**niform **m**odelization (**num**). 4 ◯

(b) Given a **two** dimensions numpy array **A** and the following line of code :

```
x = A[0,:]
```

the variable **x** corresponds to (*chose only **one** item in the following list* :

1. a copy of **A** ◯
2. a matrix of the same size as **A**, with all its coefficients equal to 0 ◯
3. the first line of A ◯
4. None of the above ◯

(c) What is the name of the numpy array's property representing it's dimension (*chose only **one** item in the following list* :

1. size ◯
2. dim ◯

3. shape ◯
4. length ◯

(d) What is the name of the numpy array's method that transforms an array into a mono-dimensional serial of values (*chose only **one** item in the following list* :

1. makeflat() ◯
2. resize() ◯
3. flatten() ◯
4. serialize() ◯

(e) What is the effect of the following lines of Python :

```
import numpy as np
A = np.array([[1,2,3],[4,5,6],[7,8,9]])
B = np.eye(3, dtype=float)
C = A @ B
```

(*chose only **one** item in the following list* :

1. compute the array **C** that finally equals **A** ◯
2. compute **C** that finally equals $3 \times A$ ◯
3. compute the matrix $C = \begin{pmatrix} 4 & 5 & 6 \\ 7 & 8 & 9 \\ 10 & 11 & 12 \end{pmatrix}$ ◯
4. None of the above ◯

2 matplotlib (5 points)

(a) What is the name of the function to use if we want to draw a **2D** curve (*chose only **one** item in the following list*) :

1. pyplot() 1 ◯
2. draw() 2 ◯
3. curve() 3 ◯
4. plot() 4 ◯

(b) How do we add a comment to the horizontal axis of a 2D drawing (*chose only **one** item in the following list*) :

1. legend() 1 ◯

2. addLabel() 2 ◯

3. xlabel() 3 ◯

4. horizontalLabel() 4 ◯

(c) What is the name of the function we need to call to **actually** display a matplotlib 2D drawing (*chose only **one** item in the following list*) :

1. display() ◯

2. show() ◯

3. view() ◯

4. None of the above ◯

(d) What is the name of the function that writes the content of a matplotlib 2D drawing to a graphic file (*chose only **one** item in the following list*) :

1. saveplot() ◯

2. savefig() 2 ◯

3. writeplot() 3 ◯

4. writefig() 4 ◯

(e) One of the purpose of the **matplotlib** library is to provide a set of functions that "look like" the ones provided by softwares such as **MATLAB** : (*chose only **one** item in the following list*) :

1. Yes ◯

2. No ◯

3 opencv (5 points)

(a) What is aim of the opencv library (*chose only **one** item in the following list*) :

1. Featuring a powerfull alternative to libraries such as *pandas* to **open** and **c**onvert data from one format to another. ◯

2. Providing a complete set of functions related to image processing and pattern recognition, among many other functionalities. 2 ◯

3. This an open library to easily write my CV and publish it on every type of social networks ◯

4. None of the above.◯

(b) What is the data-type used by opencv to represent images (*chose only **one** item in the following list*) :

1. lists (possibly recursive)◯
2. numpy array. ◯
3. Dictionnaries. ◯
4. None of the above. ◯

(c) What is the name of the opencv function that displays the content of an image inside a window (*chose only **one** item in the following list*) :

1. display() ◯
2. view() ◯
3. show() ◯
4. draw() ◯

(d) What is the name of the opencv function to be called to "trigger" the actual display of an image (*chose only **one** item in the following list*) :

1. render() ◯
2. trigger() ◯
3. activate() ◯
4. waitKey() ◯

(e) The set of functions provided by opencv is stricly limited to images : (*chose only **one** item in the following list*) :

1. Yes ◯
2. No ◯