



Algorithm and Computing

19/10/2022

Contacts

Jérôme Lacan

Jerome.lacan@isae-supaero.fr

Paul Templier

Paul.templier@isae-supaero.fr

Matthieu Petrou

Matthieu.petrou@isae-supaero.fr

Evaluation

Notebooks (1/3)

- Binômes possibles
- A déposer sur le LMS (un chacun)
- Parties obligatoires / optionnelles

Examen (2/3): 15 décembre 2022

Quizz: non notés

Dates

Projet 1 : Analyse de texte

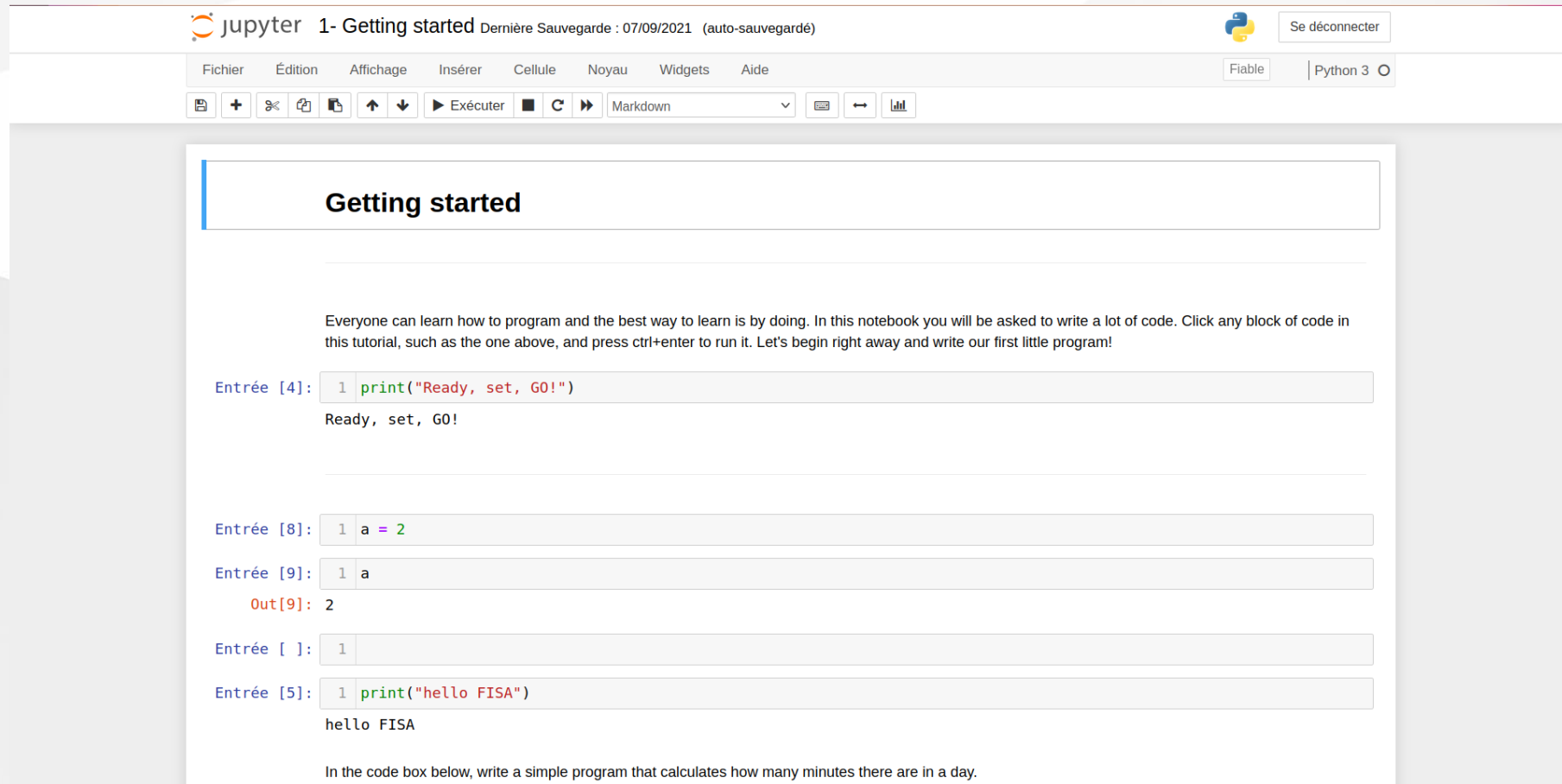
Projet 2 : Planètes 3D

Projet 3 : MicroPython

Projet 4 : Google Maps



Jupyter notebooks



The screenshot displays a Jupyter Notebook interface. At the top, the header shows the Jupyter logo, the title '1- Getting started', and the last save time 'Dernière Sauvegarde : 07/09/2021 (auto-sauvegardé)'. On the right, there is a 'Se déconnecter' button. Below the header is a menu bar with options: Fichier, Édition, Affichage, Insérer, Cellule, Noyau, Widgets, and Aide. To the right of the menu bar are buttons for 'Fiable' and 'Python 3'. Below the menu bar is a toolbar with icons for file operations, execution, and cell management. The main content area is titled 'Getting started' and contains the following text:

Everyone can learn how to program and the best way to learn is by doing. In this notebook you will be asked to write a lot of code. Click any block of code in this tutorial, such as the one above, and press ctrl+enter to run it. Let's begin right away and write our first little program!

Entrée [4]: 1 `print("Ready, set, GO!")`
Ready, set, GO!

Entrée [8]: 1 `a = 2`

Entrée [9]: 1 `a`
Out[9]: 2

Entrée []: 1

Entrée [5]: 1 `print("hello FISA")`
hello FISA

In the code box below, write a simple program that calculates how many minutes there are in a day.

Jupyter notebooks

Exécuter : `Ctrl + Enter` / `Shift + Enter`

Texte

```
1 Everyone can learn how to program and the best way to learn is by doing. In this notebook you will be asked to write a lot of code. Click any block of code in this tutorial, such as the one above, and press ctrl+enter to run it. Let's begin right away and write our first little program!
```

Code

```
Entrée [4]: 1 print("Ready, set, GO!")
```

Spyder

The screenshot displays the Spyder Python IDE interface. The main editor window shows a Python script with the following code:

```
46 #print(frenchOF)
47
48 spanishText = readText('data/donQuijote.txt')
49 spanishOF = occFrequencies(characters,spanishText)
50
51 germanText = readText('data/kritikDerReinenVernunft.txt')
52 germanOF = occFrequencies(characters,germanText)
53
54 def KLDivergence(probal, proba2):
55     # computation of the KL-divergence between probal and proba2
56     temp = 0
57     for p in probal:
58         if probal[p] > 0:
59             if proba2[p] > 0:
60                 temp = probal[p]*log(probal[p]/proba2[p],2)
61     return temp
62
63 print('french-spanish :'+str(KLDivergence(frenchOF,spanishOF)))
64 print('spanish-french :'+str(KLDivergence(spanishOF,frenchOF)))
65 print('french-english :'+str(KLDivergence(frenchOF,englishOF)))
66 print('french-german :'+str(KLDivergence(frenchOF,germanOF)))
67 print('german-spanish :'+str(KLDivergence(germanOF,spanishOF)))
68 print('german-english :'+str(KLDivergence(germanOF,englishOF)))
69 print('english-german :'+str(KLDivergence(englishOF,germanOF)))
70 print('english-spanish :'+str(KLDivergence(englishOF,spanishOF)))
71 print('spanish-english :'+str(KLDivergence(spanishOF,englishOF)))
72
73
74 def findLanguage(fileName):
75     # read the file and compute the frequencies
76     textTemp = readText(fileName)
77     dicoTemp = occFrequencies(characters,textTemp)
78     #compute KL-divergences
79     KL = fabs((KLDivergence(dicoTemp, frenchOF)+KLDivergence(frenchOF,dicoTemp))/2)
80     print('french :'+str(KL))
81     s = 'french'
82     dist = KL
83     KL = fabs((KLDivergence(dicoTemp, englishOF)+KLDivergence(englishOF,dicoTemp))/2)
84     print('english :'+str(KL))
85     if (KL < dist):
86         s = 'english'
87         dist = KL
88     KL = fabs((KLDivergence(dicoTemp, germanOF)+KLDivergence(germanOF,dicoTemp))/2)
```

The right-hand pane shows the 'Explorateur de fichiers' (File Explorer) with a table of files and folders:

Name	Size	Type	Date Modified
__pycache__		File Folder	29/08/2016 09:02:01
data		File Folder	26/08/2016 17:47:28
dataCompression.py	1 KB	py File	29/08/2016 09:03:48
enhancedOccurrenceFrequencies.py	3 KB	py File	29/08/2016 09:01:57
huffman.py	2 KB	py File	26/08/2016 18:26:33
infoTheory2.py	12 KB	py File	20/04/2016 11:03:07
miniProject.py	250 bytes	py File	04/08/2016 17:19:07
occurrenceFrequencies.py	1 KB	py File	26/08/2016 17:00:48
occurrenceFrequenciesCompleted.py	1 KB	py File	26/08/2016 17:02:34

The bottom pane shows the 'Console IPython' output:

```
french-spanish : -0.009813513859734616
spanish-french : 0.01235656049854561
french-english : 0.008571939295836497
french-german : 0.0088475498630267108
german-spanish : -0.010450995744071741
german-english : 0.007572186339670279
english-german : -0.0063161440554510275
english-spanish : -0.015033572771730746
spanish-english : 0.02314980826002872
french : 1.9240562144482614e-06
english : 0.0008609580444380316
german : 1.82909531907013e-05
spanish : 0.0011743664772472847
french
french entropy : 4.209560977492211
average number of bits : 4.237775961701764
compression ratio : 1.6518098321528567
english entropy : 4.363128265565793
average number of bits : 4.396747709823244
compression ratio : 1.592085892115336
german entropy : 4.2130592037082755
average number of bits : 4.239544068484476
compression ratio : 1.6511209429419407
spanish entropy : 4.186034261730855
average number of bits : 4.224533781919018
compression ratio : 1.6569875781228127
```

The status bar at the bottom indicates: 'Droits d'accès : RW', 'Fins de ligne : CRLF', 'Encodage : UTF-8', 'Ligne : 10', 'Colonne : 22', 'Mémoire : 47 %'.

PC ISAE : Linux

Ouvrir un terminal: `Ctrl+Alt+T`

```
module load python/3.7  
source activate Mae1Fisa1  
jupyter notebook &  
spyder &
```

Sur votre machine : Anaconda

- <https://www.anaconda.com/products/individual>
- Python + Spyder + Jupyter + bibliothèques

Slides

<https://github.com/TemplierPaul/Python-class>