Atelier Python | Python workshop

- Pandas, tracer et l'analyse des données | Pandas, plotting and data analysis

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Note: This session will be recorded

Getting Started

- Download the slides: jarno.ca/python.pdf

- Go to syzygy.ca

  – Click on LAUNCH in top-right corner

  – Choose UOTTAWA

  – Click on the red house with "Log in" in small print

  – Use your uoAccess credentials to log in

- If you don't have uoAccess credentials, leave a message in Zoom

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Program

DAY 1	13:00	Intro
	13:30	Reading data
	14:30	Break
	14:45	Plotting
	16:00	END

DAY 2	13:00	Data manipulation
	14:30	Break
	14:45	Basic scripting with if-then and for loops
	16:00	END

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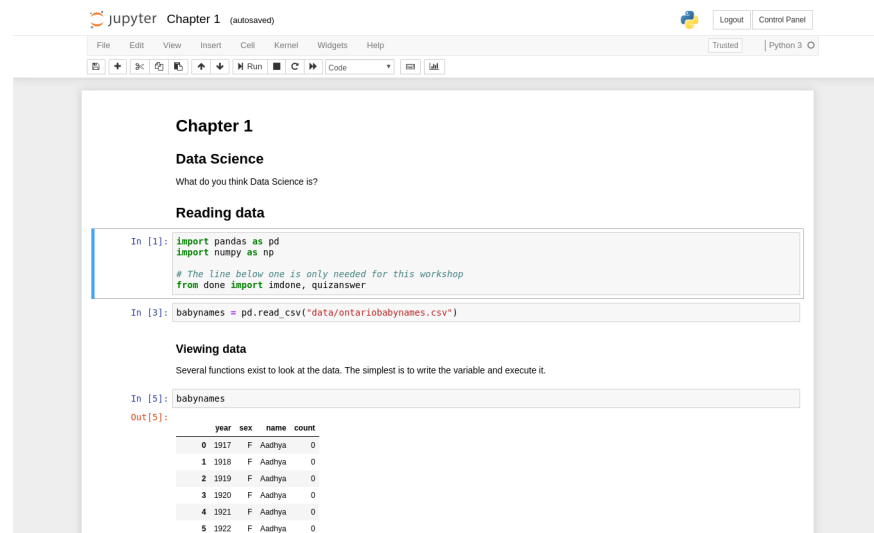Université d'Ottawa | University of Ottawa

Say Hello!

- We will use the chat function in Zoom for interactivity

- Say hello and introduce yourself!

  - Why are you here?

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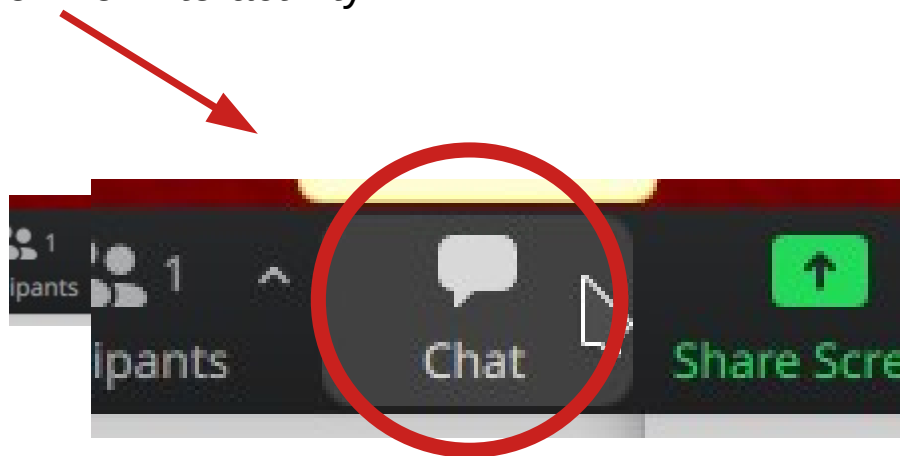
Reproducible Science

- Programs are reproducible

- Using Jupyter Notebook

- Mix between program and report

- Takes data and reproduces conclusions

Python

- High-level

- General-purpose

- Interpreted

- Huge ecosystem

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Python – The Language

- Values: -1   1.3   "Ottawa"

- Object: n = -1   x = 1.3   city_name = "Ottawa"

- Functions: print(n)   len(city_name)

- Special values:
  - Lists: [1,2,3,4]   ["Hello", "world"]
  - Dictionaries: {"num": 12, "name": "something"}

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Warm Up

- Which of these are numbers?

1   "1"   "one"   one

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Warm Up

- Which one of these will work? (assume one=1)

  log(1)   log("1")   log("one")   log(one)

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Speed test

- Numerical integration of $f(x,y) = x^2 + x\,y + y^2$ from -10 to 10 with steps of 0.001.

- Python

```
Integral of f(x,y) = x^2 + xy + y^2 is 66.67333333332641

real    1m44.903s
user    1m44.866s
sys     0m0.004s
```

- C

```
Integral of f(x,y) = x^2 + xy + y^2 is 66.673
real    0m1.097s
user    0m1.097s
sys     0m0.000s
```

Factor of 96 difference!!

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Well, that sucks... but!

- The power of Python is in its ecosystem.

- Thousands of packages are available. Many written in C but usable from Python.

- Python is the glue to connect them all

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Python Packages

- Python Package Index (PyPI)

  - https://pypi.org

- 233,536 projects

- Package installation depends on how Python was installed, most common is conda or pip.

- Our environment already has the most common packages installed

- Using packages with import

```python
import math
print("sin(3) = ", math.sin(3))
```

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Jupyter Notebooks

- Open your browser and go to
  - https://uottawa.syzygy.ca
  - Open Chapter 1.ipynb

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