



Interactive Programming F#

Luis Quintanilla
@ljquintanilla

Hello



Luis Quintanilla
Content
Developer @
Microsoft



GitHub:
lqdev



Blog:
<http://luisquintanilla.me>



Twitter:
@ljquintanilla



E-Mail:
lqdev@outlook.com

Code & Slides

<http://bit.ly/NYCNETDevs072019>



Agenda



Development Experience



Development
Environments

REPL / F# Scripts
Fsharp.Formatting
FsLab Journal



Jupyter

Notebooks
Ecosystem



F# and Jupyter
Notebooks

Local
Hosted

.NET – A unified platform



What Do You Want Out of Your Development Experience/ Environment?



Interactive



Reproducible



Documented



Collaborative



Extensible

Read- Evaluate-Print Loop (REPL)



Interactive



Reproducible?



Documented?



Collaborative?



Extensible?



Demo Fsharp.Formatting

Fsharp .Formatting



Interactive?



Reproducible



Documented



Collaborative?



Extensible



Demo FsLab Journal

FsLab Journal



Interactive



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Collaborative?

Jupyter



Open Source
Interactive
Computing
Environment



Over 40
languages



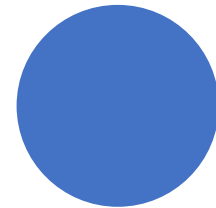
Notebooks



Hub

- Anaconda
 - Data Science Platform
 - Package Management
 - Tooling
 - IDE

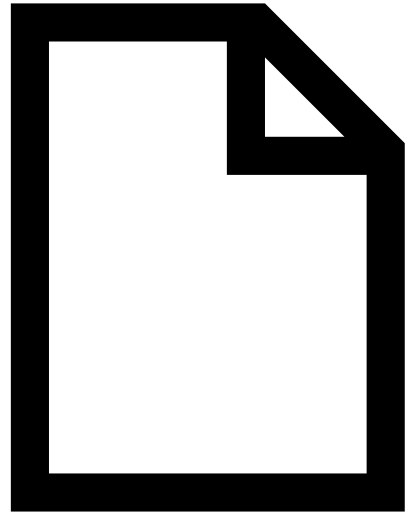
Getting Started Jupyter Notebooks



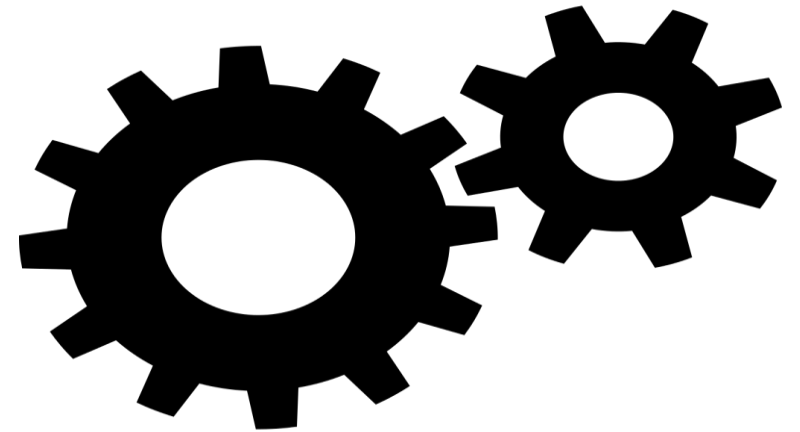
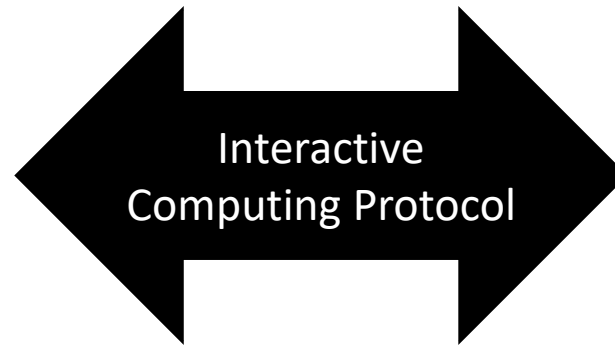


Demo Jupyter Notebooks

Jupyter Notebooks Internals



Notebook
Document
Format

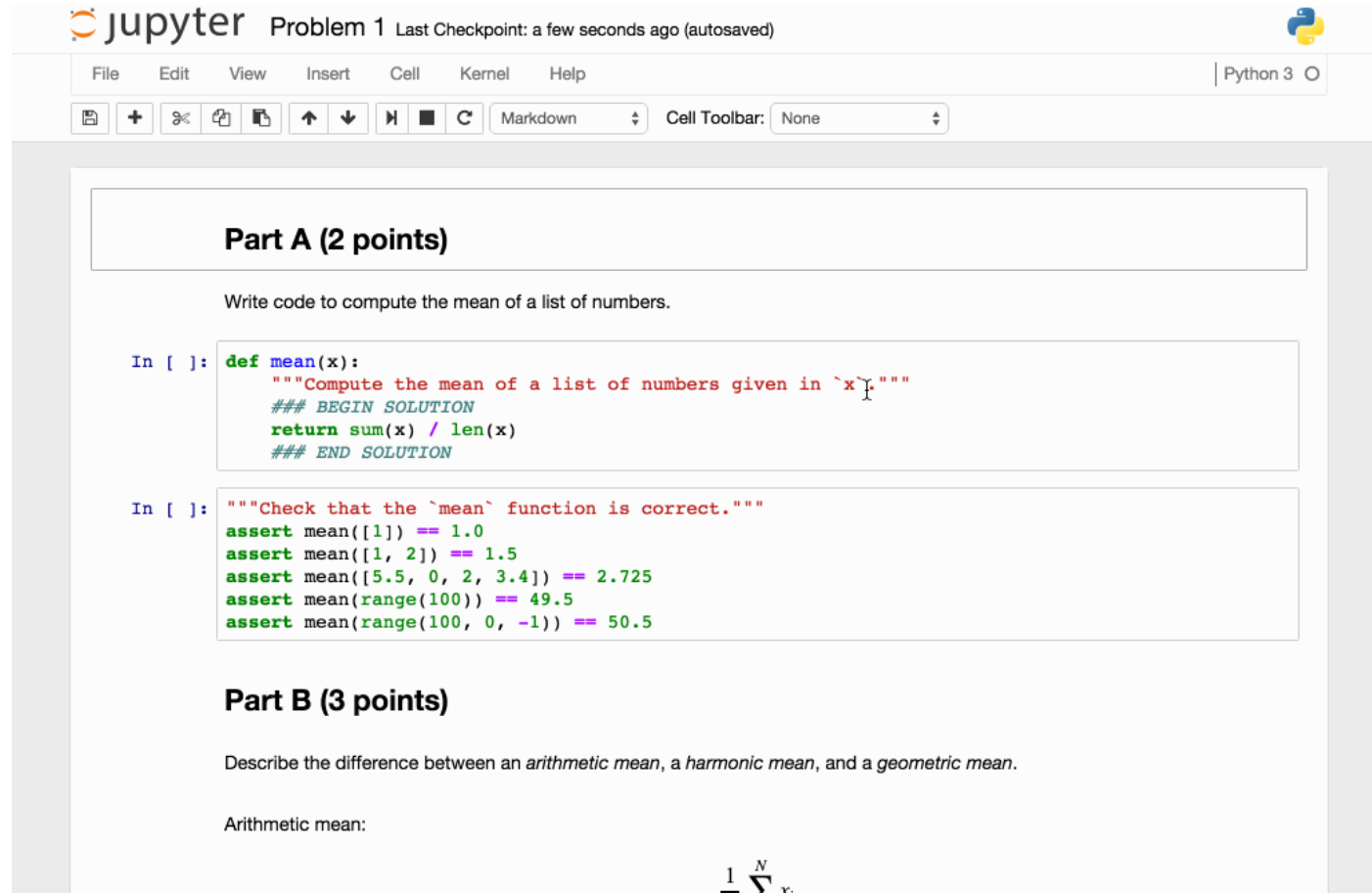


Kernel

- Extensions
 - NBGrader
 - Papermill
 - Many more...

Jupyter Ecosystem

NBGrader



jupyter Problem 1 Last Checkpoint: a few seconds ago (autosaved)

File Edit View Insert Cell Kernel Help Python 3

Part A (2 points)

Write code to compute the mean of a list of numbers.

```
In [ ]: def mean(x):  
        """Compute the mean of a list of numbers given in `x`"""  
        ### BEGIN SOLUTION  
        return sum(x) / len(x)  
        ### END SOLUTION
```

```
In [ ]: """Check that the `mean` function is correct."""  
assert mean([1]) == 1.0  
assert mean([1, 2]) == 1.5  
assert mean([5.5, 0, 2, 3.4]) == 2.725  
assert mean(range(100)) == 49.5  
assert mean(range(100, 0, -1)) == 50.5
```

Part B (3 points)

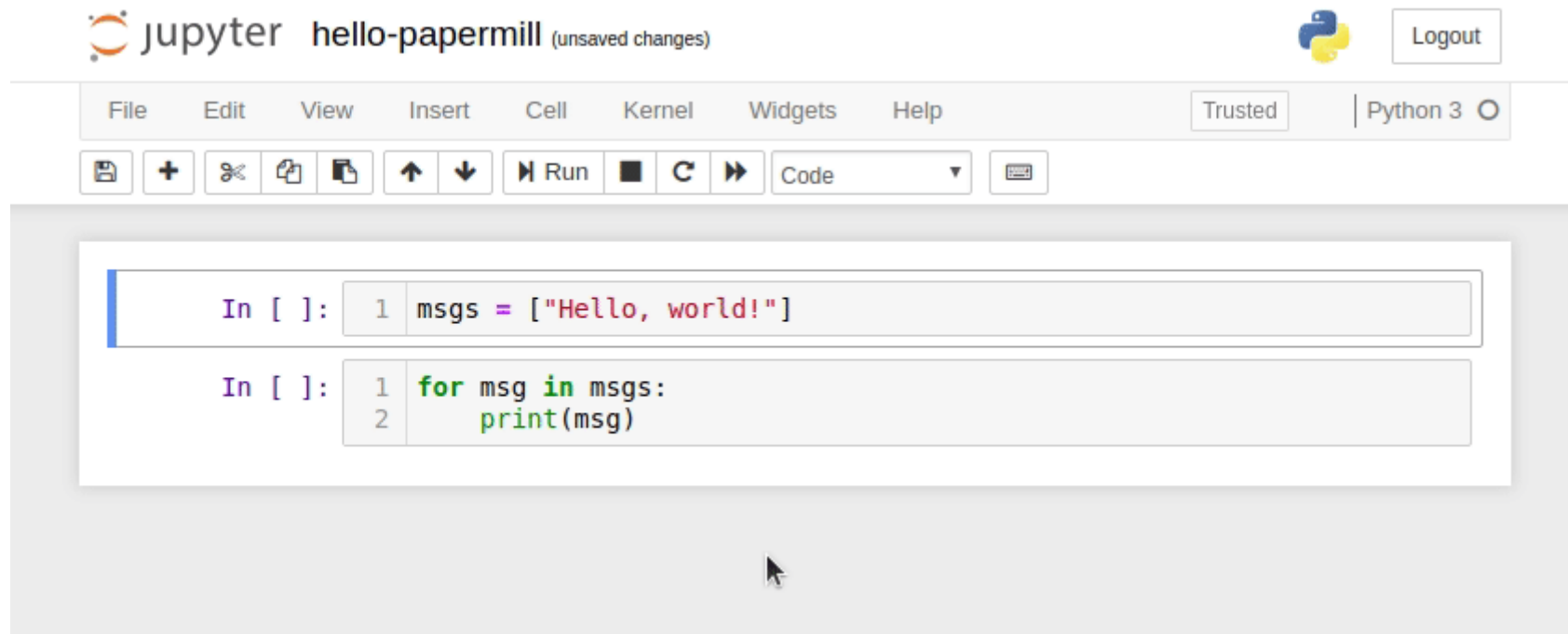
Describe the difference between an *arithmetic mean*, a *harmonic mean*, and a *geometric mean*.

Arithmetic mean:

$$\frac{1}{N} \sum_{i=1}^N x_i$$

Source: <https://github.com/jupyter/nbgrader>

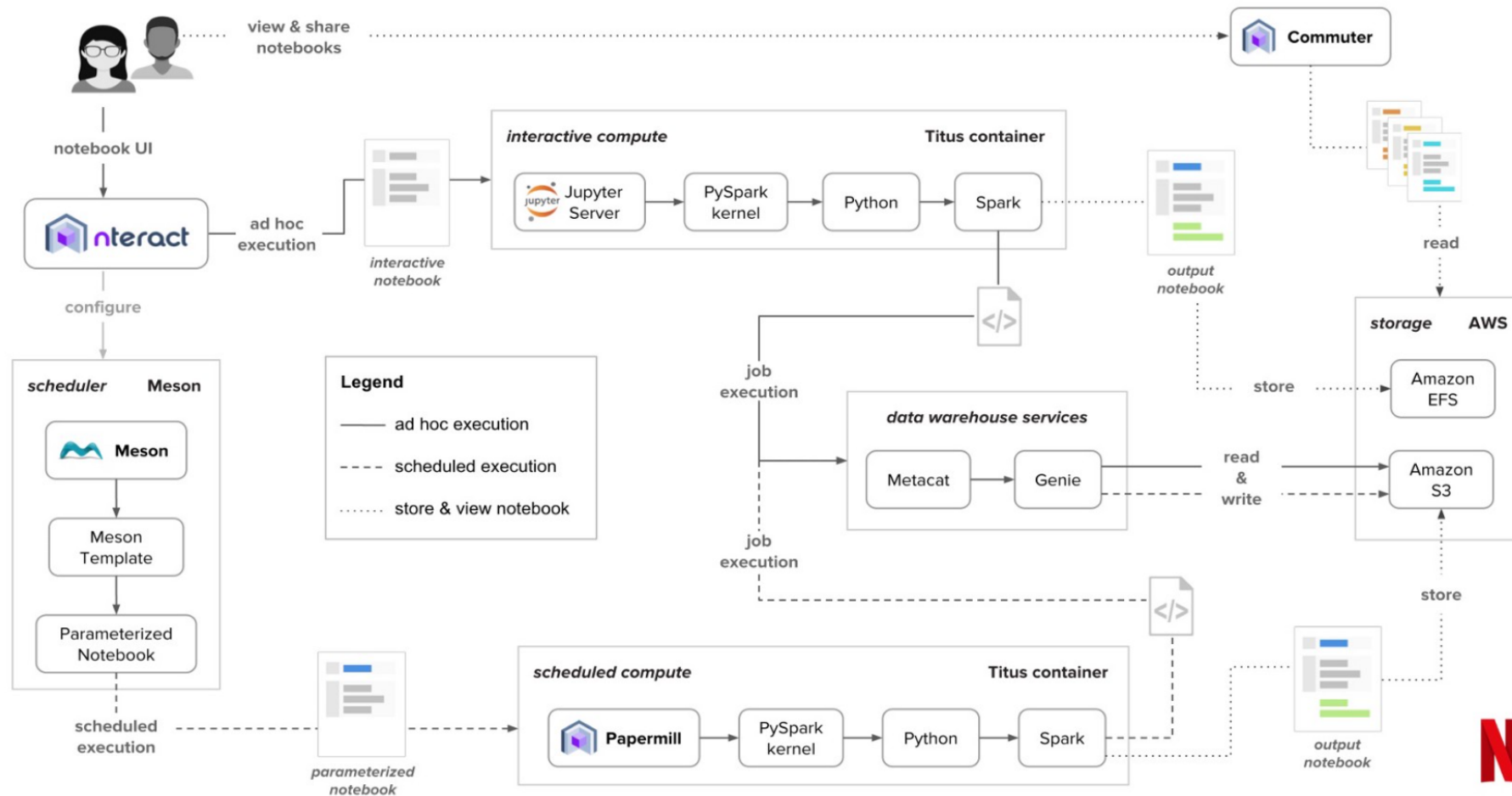
Papermill



```
$ papermill local/input.ipynb s3://bkt/output.ipynb -p alpha 0.6 -p ll_ratio 0.1
```

Source: <https://github.com/nteract/papermill>

Notebooks in Production



Source: <https://medium.com/netflix-techblog/notebook-innovation-591ee3221233>

Jupyter



Interactive



Reproducible



Documented



Collaborative



Extensible

Jupyter Notebooks F#



F# 4.1



Jupyter 5.7.7



Cross-Platform



Local – IFSharp



Hosted – Azure Notebooks



Demo IFSsharp

Demo Azure Notebooks

Takeaways



F# provides several environments



Choose your own adventure



Jupyter Notebooks make prototyping, documentation and learning easy



Jupyter Notebooks open standards make it easy to extend the tool



Questions



Resources

- <http://fsprojects.github.io/FSharp.Formatting/literate.html>
- <https://fslab.org/download/>
- <https://jupyter.org/>
- <https://github.com/fsprojects/IfSharp>
- <https://github.com/jupyter/nbgrader>
- <https://github.com/nteract/papermill>
- <https://notebooks.azure.com/lqdev/projects/nycnetdevs201907>