



Getting Started with F# and Jupyter Notebooks

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Hello



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Code & Slides

<http://bit.ly/SouthernFriedFSharp2019>



Agenda



Development Experience



Development
Environments

REPL
Fsharp.Formatting
FsLab Journal



Jupyter

Notebooks
Ecosystem



F# and Jupyter
Notebooks

Local
Hosted

What Do You Want Out of Your Development Experience?



Interactive



Reproducible



Documented



Collaborative



Extensible

Read- Evaluate-Print Loop (REPL)



Interactive



Reproducible?



Documented?



Collaborative?

FsLiterate



Interactive?



Reproducible



Documented



Collaborative?



Extensible



Demo Fsharp.Formatting

FsLab Journal



Interactive



Reproducible



Documented



Extensible



Collaborative?



Demo FsLab Journal

Jupyter



Open Source
Interactive Computing
Environment



Over 40 languages



Notebooks – Single
User

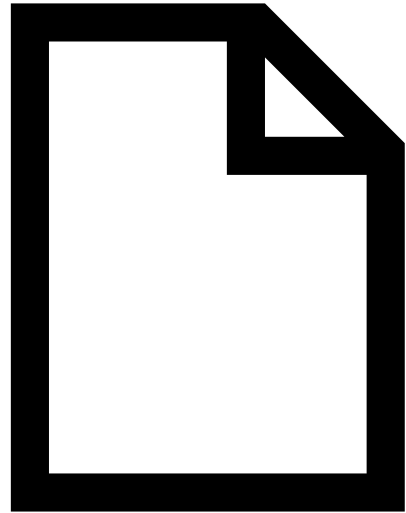


Hub – Multiple Users

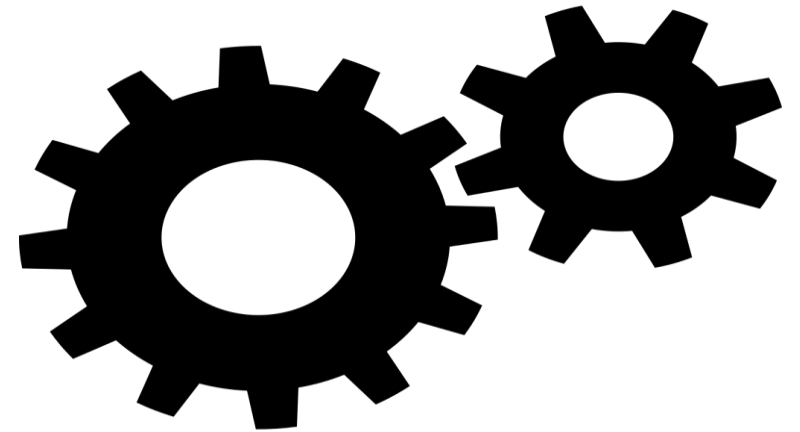
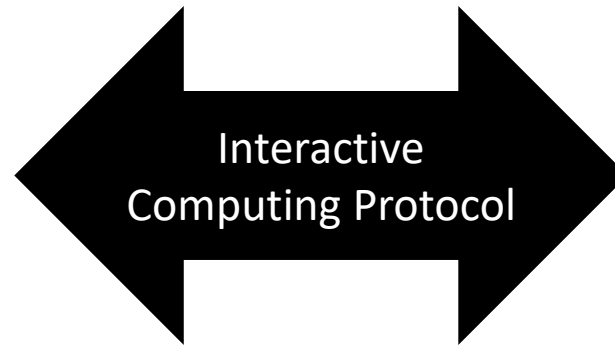


Demo Jupyter Notebooks

Jupyter Notebooks Internals



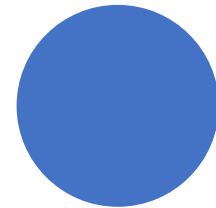
Notebook
Document
Format



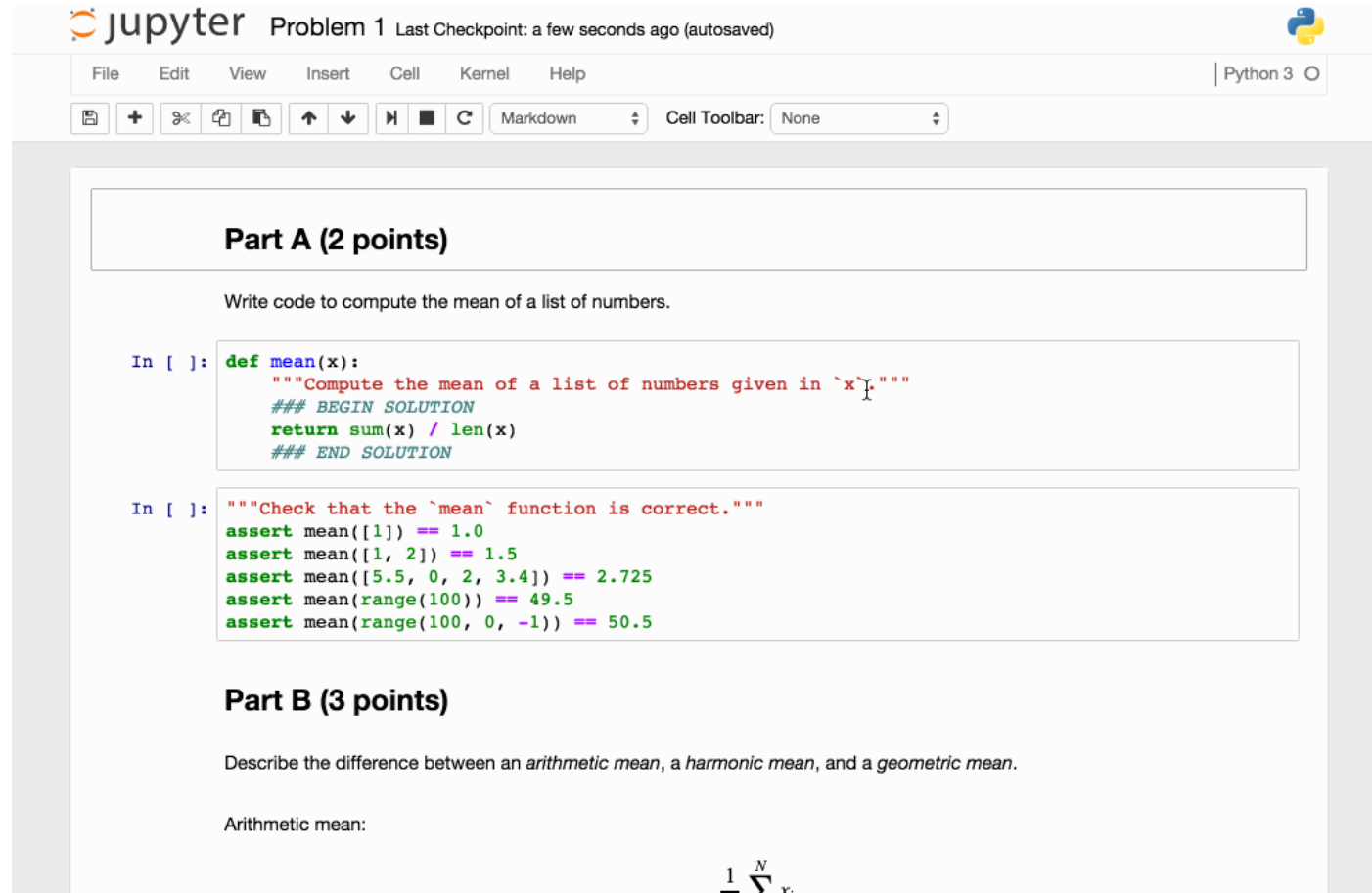
Kernel

- Extensions
 - NBGrader
 - Nteract
 - 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)

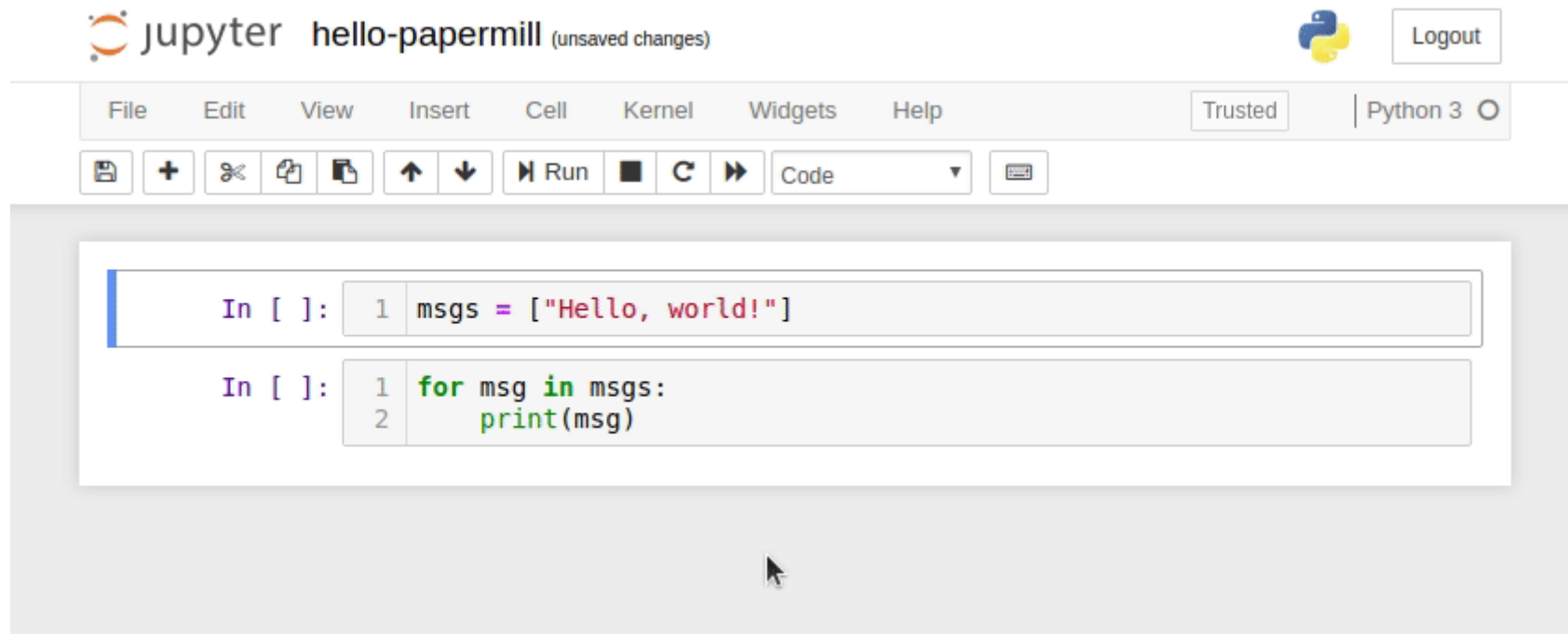
Describe the difference between an *arithmetic mean*, a *harmonic mean*, and a *geometric mean*.

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/jupyter/nbgrader>

Jupyter Notebooks F#



F# 4.1



Jupyter 5.7.7



Cross-Platform



Local – IFSharp



Hosted – Azure Notebooks



Demo IFSHarp

Demo Azure Notebooks



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/southernfriedfsharp2019>