Jupyter Notebooks

Madhavan Mukund

https://www.cmi.ac.in/~madhavan

Programming, Data Structures and Algorithms using Python

Week 1

Writing and running code

- Manual
  - Text editor to write code
  - Run at the command line

emacs@mmcarbon

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```
def factors(n):
  factorlist = []
  for i in range(1,n+1):
    if n%i == 0:
      factorlist.append(i)
  return(factorlist)

def prime(n):
  return(factors(n) == [1,n])

primelist = []
for i in range(1,101):
  if (prime(i)):
    primelist.append(i)

print(primelist)
```

-:--- main.py All L1 (Python ElDoc)

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```
$ python3
Python 3.7.3 (default, Jan 22 2021, 20:04:44)
[GCC 8.3.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> from main import *
[2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73,
 79, 83, 89, 97]
>>>
```

Writing and running code

- Manual
  - Text editor to write code
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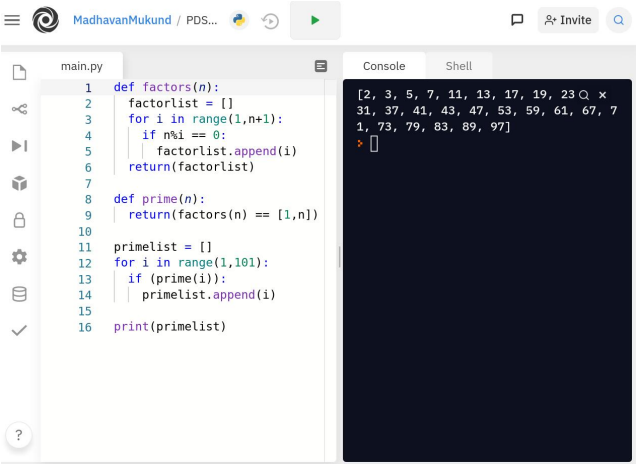
- Integrated Development Environment (IDE)
  - Single application to write and run code
  - On desktop or online, `replit`
  - Quick update-run cycle
  - Debugging, testing, . . .



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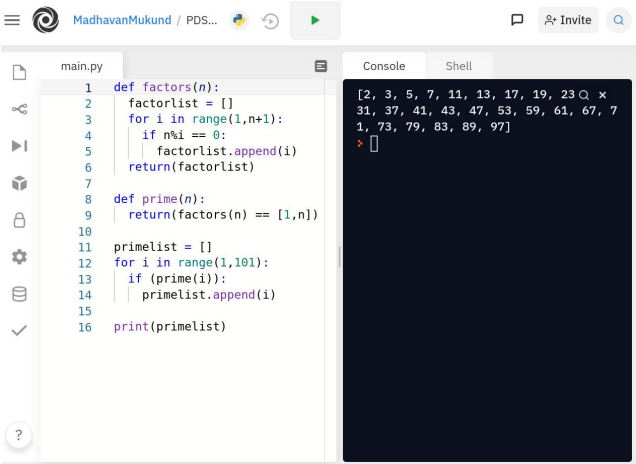
- What more could one want?



Collaboration

- Share your code
  - Collaborative development
  - Report your results

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Compute primes from 1 to 100

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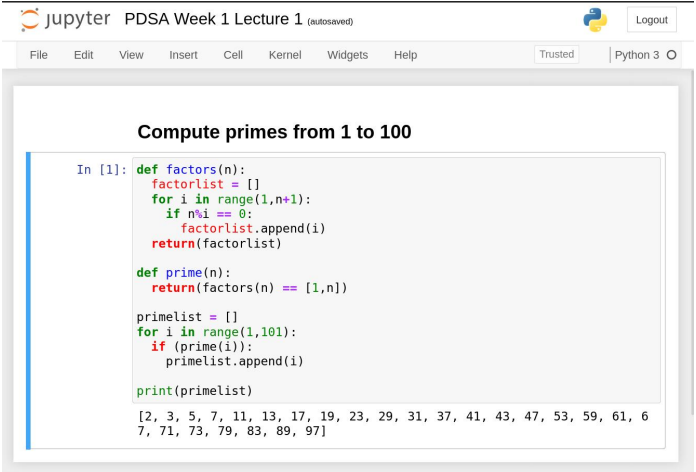

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- Switch between different versions of code

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Collaboration

- Share your code
  - Collaborative development
  - Report your results
- Documentation
  - Interleave with the code
- Switch between different versions of code
- Export and import your project
- Preserve your output

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In [6]:
```
import matplotlib.pyplot as plt
import numpy as np

# Data for plotting
t = np.arange(0.0, 2.0, 0.01)
s = 1 + np.sin(2 * np.pi * t)

fig, ax = plt.subplots()
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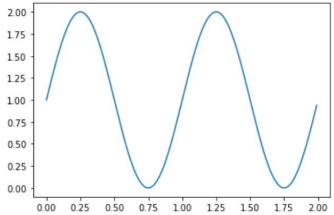

Jupyter notebook

- A sequence of cells
  - Like a one dimensional spreadsheet

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  - Markdown notation for formatting
  - `https://www.markdownguide.org/`

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  - Julia, Python, R
  - We will use it only for Python

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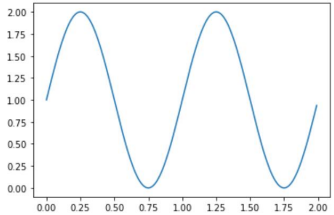

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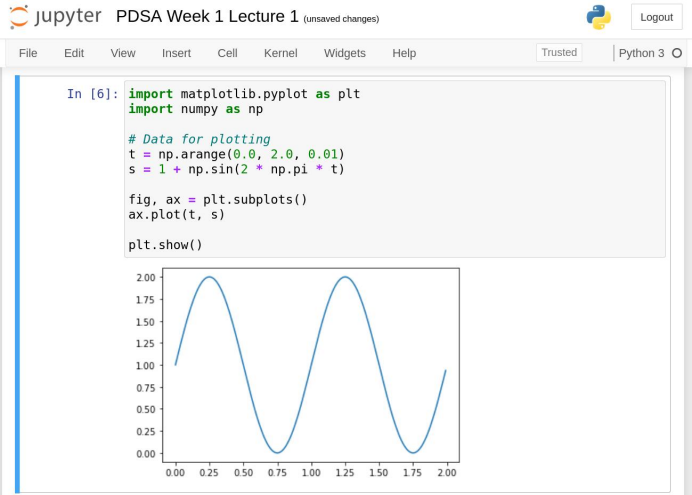

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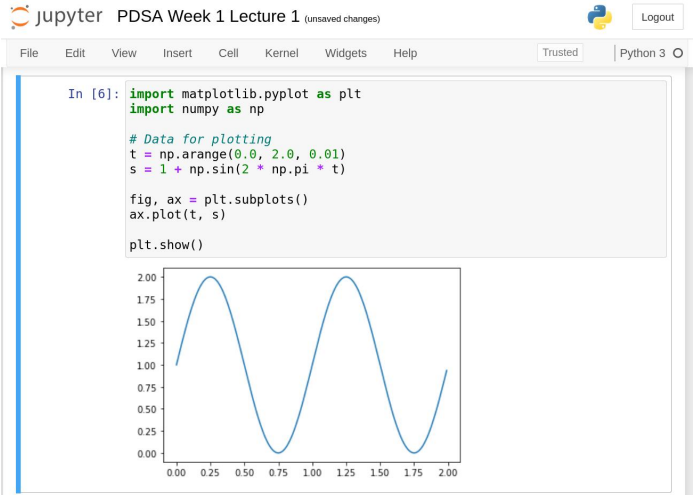

Google Colab

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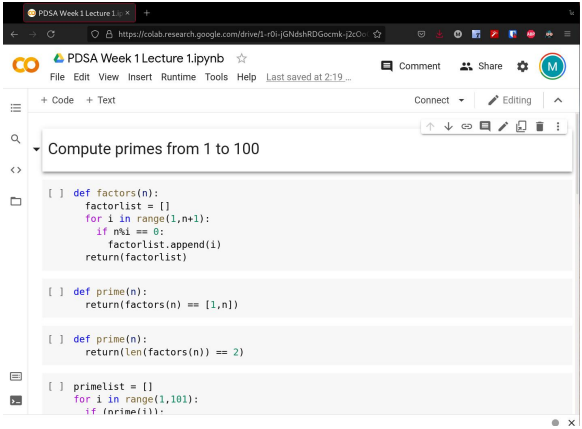
  - Free to use



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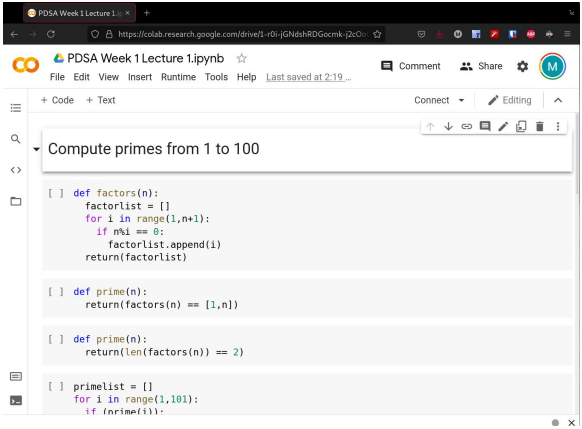

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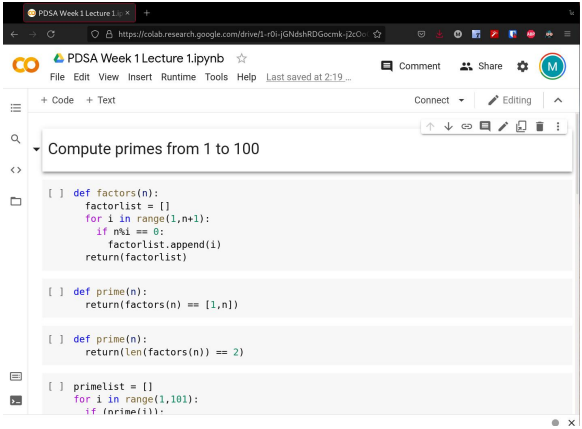
  - `colab.research.google.com`
  - Free to use
- Customized Jupyter notebook
- All standard packages required for ML are preloaded
  - `scikit-learn`, `tensorflow`
  - Access to GPU hardware



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