Document with Some Tools

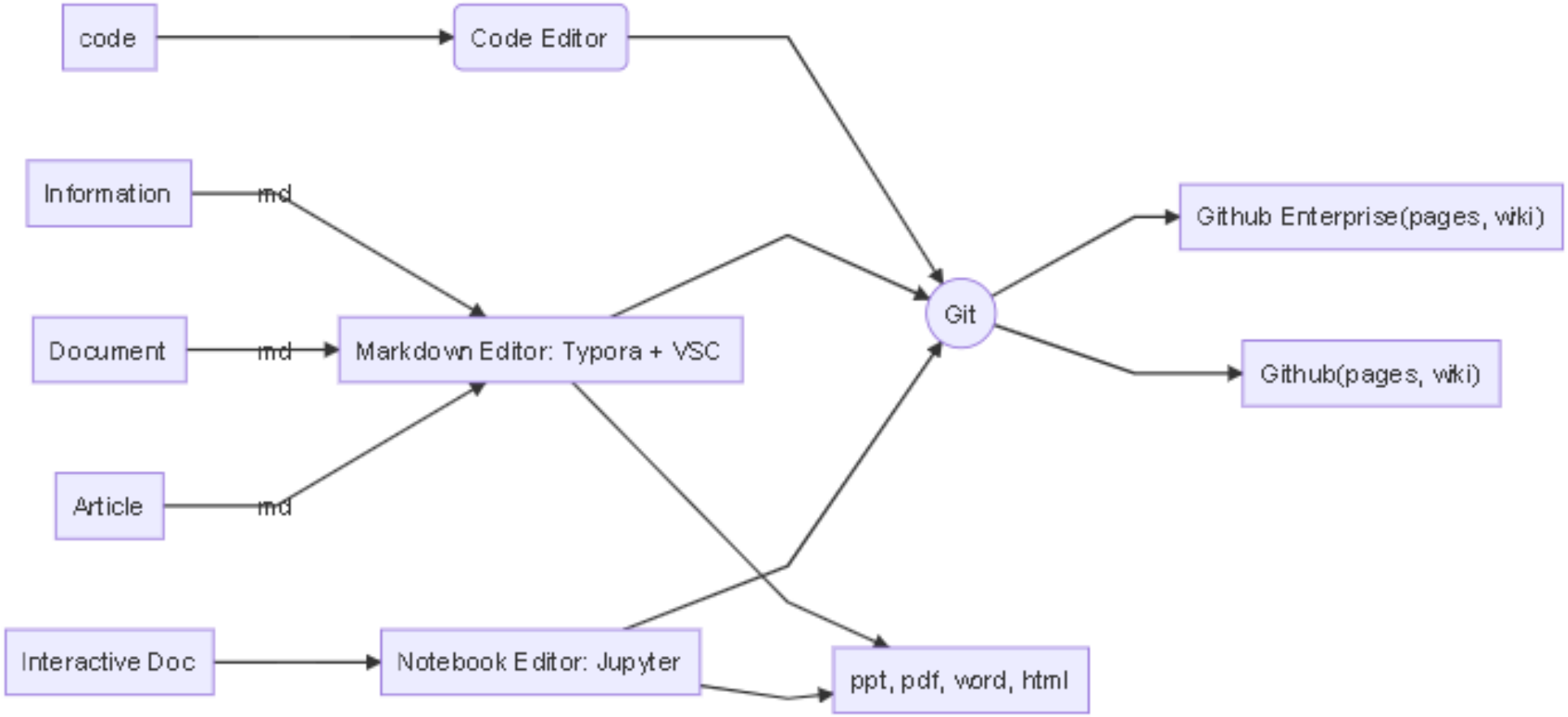
Michael

June, 2020

Agenda

- Basic
  - Workflow
  - Use Markdown
  - Write Documents in Typora
  - Share Documents With GitHub
- Advance
  - Write Slides in Visual Studio Code with Marp
  - Write Interactive Codes in Jupyter Notebook
  - Convert Markdown to Jupyter Notebook
  - Publish Documents with GitHub Pages

Workflow



All tools are free.

Principles

- Most documents are written by Markdown.
- All history versions of documents are stored by Git and GitHub.

Use Markdown

Markdown is a lightweight markup language with plain-text-formatting syntax, created in 2004.

- Fast: Without Rich Format
- Easy: Learn it in 5 minutes.
  tutorial: https://guides.github.com/features/mastering-markdown/

```
# Header 1

This is an R Markdown document. Markdown is a
simple formatting syntax for authoring webpages.

Use an asterisk mark to provide emphasis, such
as *italics* or **bold**.

Create lists with a dash:

- Item 1
- Item 2
- Item 3

```
Use back ticks to
create a block of code
```

Embed LaTex or MathML equations,
$\frac{1}{n} \sum_{i=1}^{n} x_{i}$

Or even footnotes, citations, and a
bibliography. [^1]

[^1]: Markdown is great.
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1. Markdown is great. ↩

Show Mathematics using Tex/LaTeX syntax

All markdown tools supports rendering normal mathematics using Tex/LaTeX syntax.

$$
\begin{aligned}
y = y(x,t) &= Ae^{i\theta} \\
&= A(\cos\theta + i\sin\theta) \\
&= A(\cos(kx - \omega t) + i\sin(kx - \omega t)) \\
&= A\cos(kx - \omega t) + iA\sin(kx - \omega t) \\
&= A\cos\left(\frac{2\pi}{\lambda}x - \frac{2\pi v}{\lambda}t\right) + iA\sin\left(\frac{2\pi}{\lambda}x - \frac{2\pi v}{\lambda}t\right) \\
&= A\cos\frac{2\pi}{\lambda}(x - vt) + iA\sin\frac{2\pi}{\lambda}(x - vt)
\end{aligned}
$$

Here are the codes behind the mathematics.

```
\begin{align*}
y = y(x,t) &= A e^{i\theta} \\
&= A (\cos \theta + i \sin \theta) \\
&= A (\cos(kx - \omega t) + i \sin(kx - \omega t)) \\
&= A\cos(kx - \omega t) + i A\sin(kx - \omega t)  \\
&= A\cos \Big(\frac{2\pi}{\lambda}x - \frac{2\pi v}{\lambda} t \Big) + i A\sin \Big(\frac{2\pi}{\lambda}x - \frac{2\pi v}{\lambda} t \Big)  \\
&= A\cos \frac{2\pi}{\lambda} (x - v t) + i A\sin \frac{2\pi}{\lambda} (x - v t)
\end{align*}
```

Show Diagrams using Mermaid

Mermaid is a tool to geneate diagrams and flowcharts from text in a similar manner as markdown.

Mermaid was nominated and won the JS Open Source Awards (2019) in the category "The most exciting use of technology"!!!

> The worflow diagram was done by Mermaid.
> Though Mermaid is still much simpler than other commercial tools(like visio), it is faster to create and modify diagrams via codes.

Code

Load sample diagram :

Flow Chart | Sequence Diagram | Class Diagram | State Diagram | Gantt Chart | Pie Chart | ER Diagram

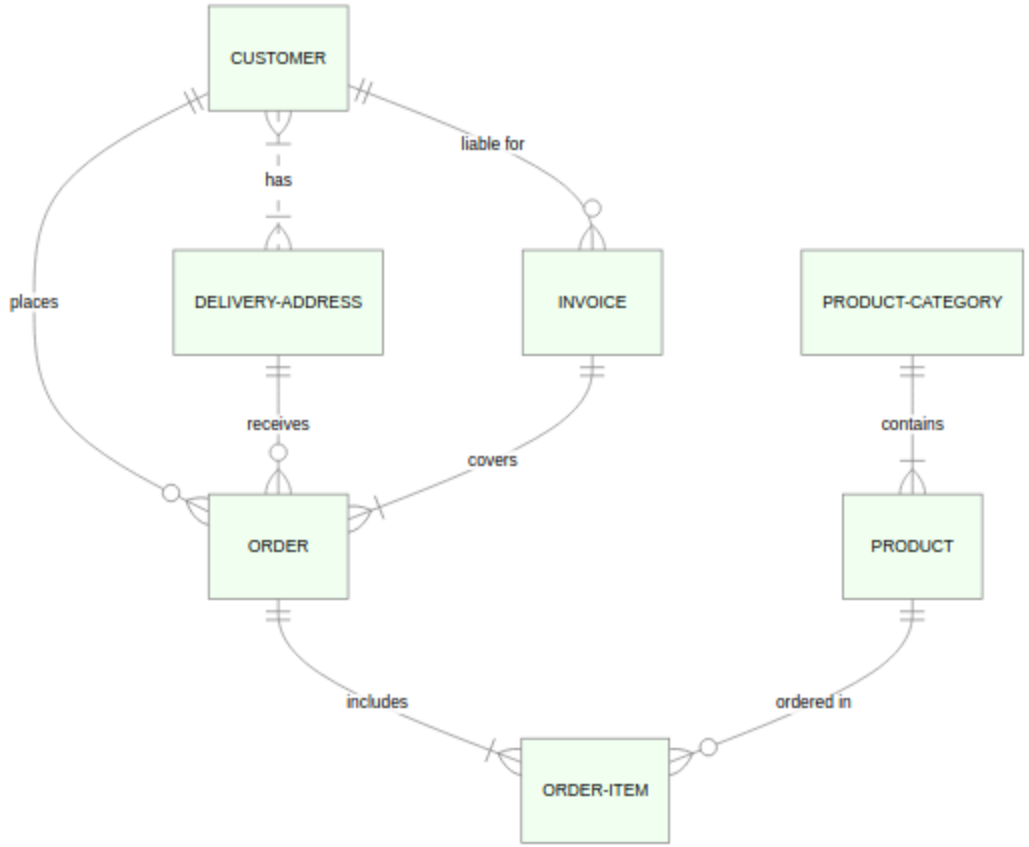
```
erDiagram
        CUSTOMER }|..|{ DELIVERY-ADDRESS : has
        CUSTOMER ||--o{ ORDER : places
        CUSTOMER ||--o{ INVOICE : "liable for"
        DELIVERY-ADDRESS ||--o{ ORDER : receives
        INVOICE ||--|{ ORDER : covers
        ORDER ||--|{ ORDER-ITEM : includes
        PRODUCT-CATEGORY ||--|{ PRODUCT : contains
        PRODUCT ||--o{ ORDER-ITEM : "ordered in"

```

Mermaid Configuration

```
{
  "theme": "default"
}
```

Preview



see more examples

Write Documents in Typora

Typora is a markdown editor. It gives you a seamless experience as both a reader and a writer.

- Distractions Free
- Seamless Live Preview
- What You See Is What You Mean

> Typora is commercial software (not open source), but is free during beta.

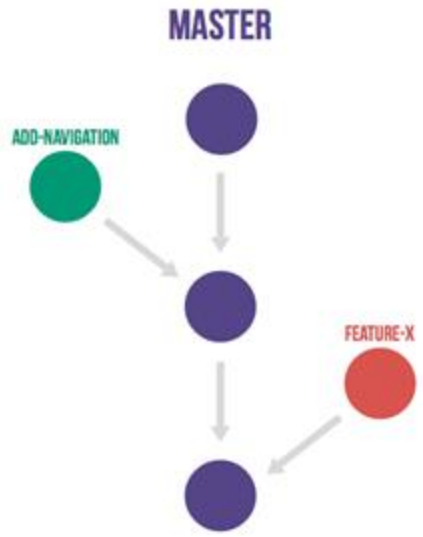
Easy to locate the chapter in Outline.

git_github_splunk.md - Typora

File Edit Paragraph Format View Themes Help

Files **Outline**

4. Git Workflow



Git workflow is mainly used by app development. We will use GitHub flow as the standard workflow.

> There are other popular workflows for git, for example, Git flow and Gitlab flow. See also Git Workflow.

4.1 Principle

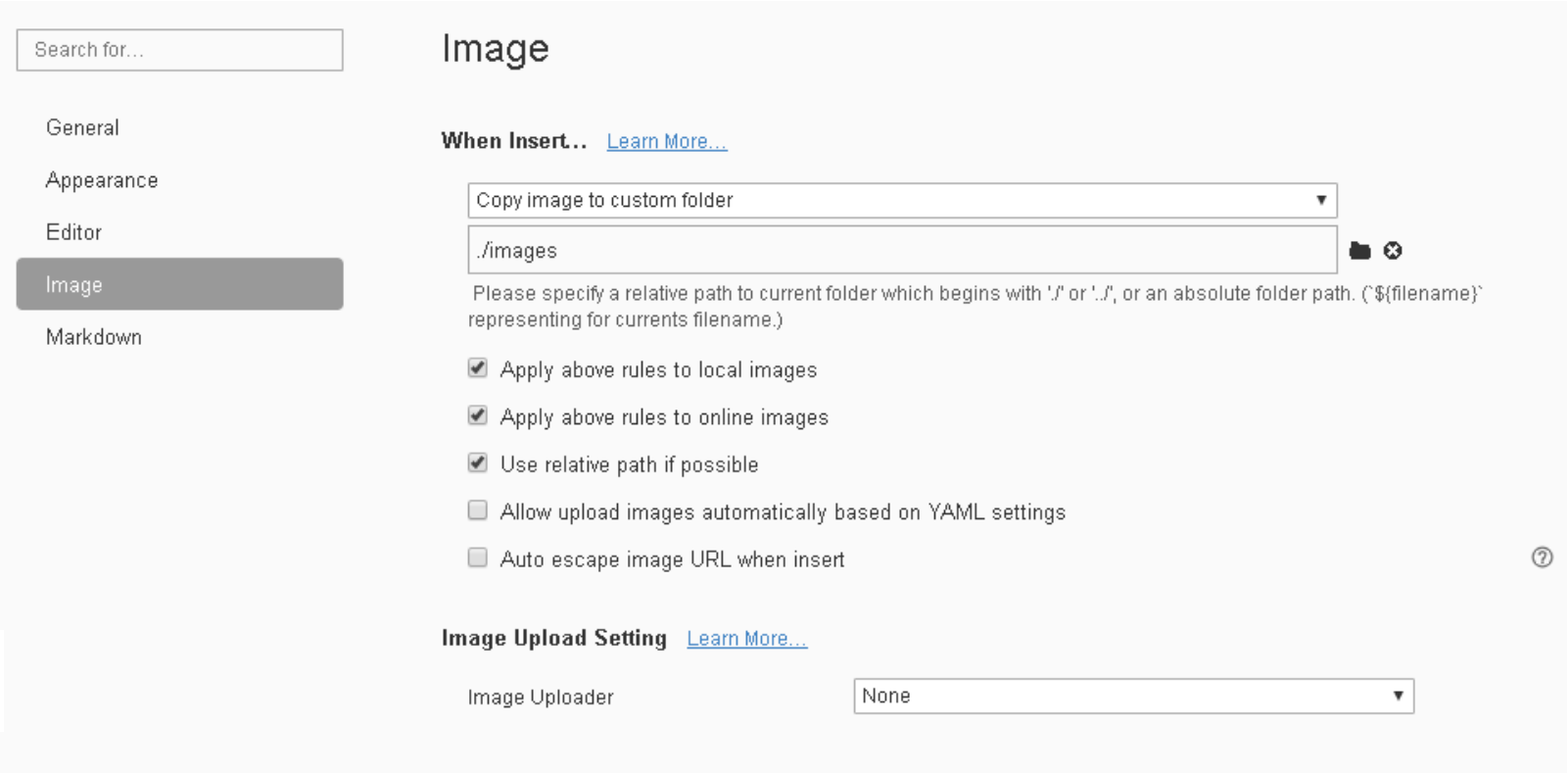
GitHub flow only has one long-term branch: *master*, so the principles are simple.

- Anything in the *master*branch is deployable

Esay to Insert Image

- insert images via capturing screen
- copy images from web pages

Don't need to download or upload, it only takes less than 3 seconds to add an image in the document.



Share Documents With GitHub

There are 3 actions.

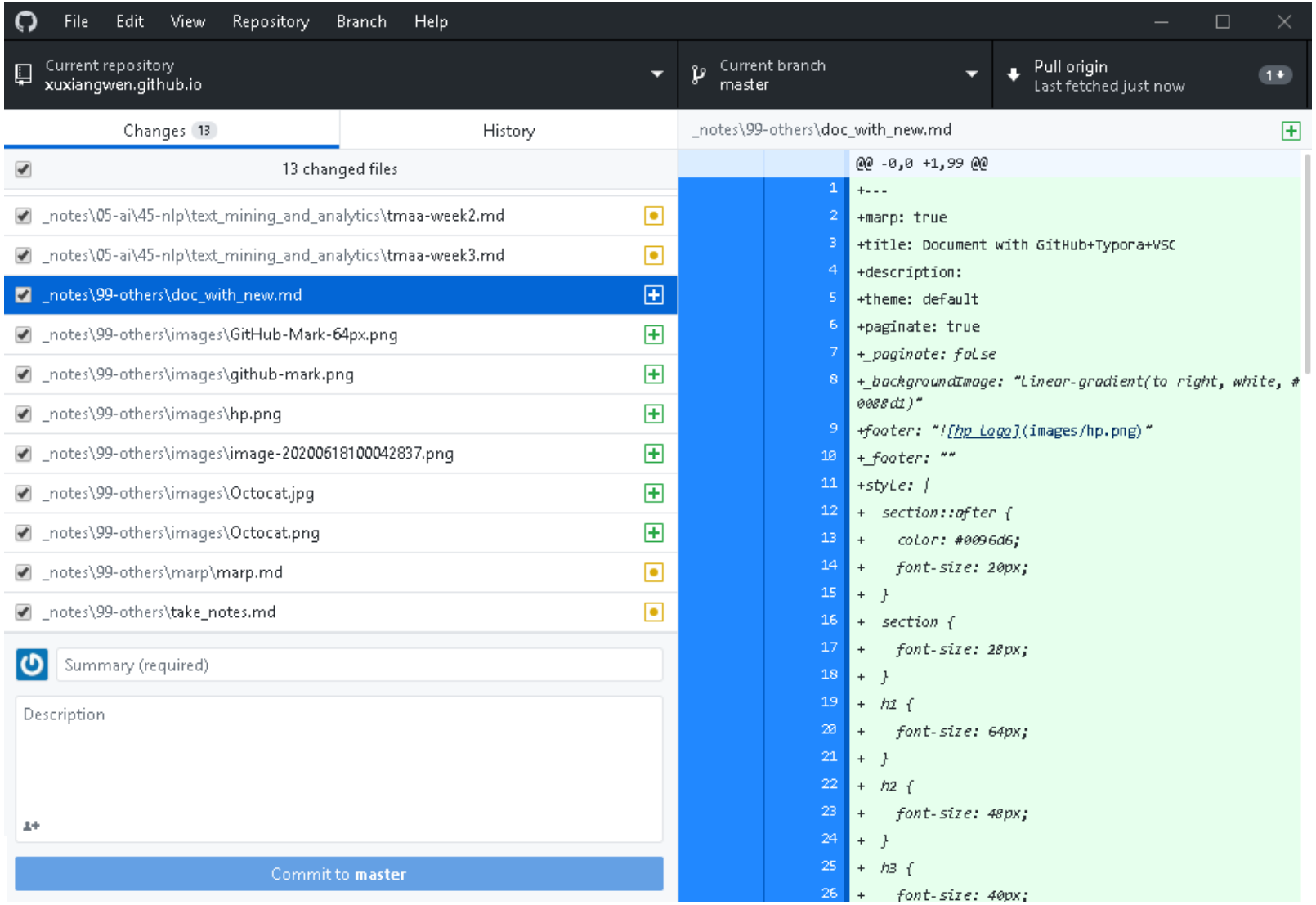
1. Commit the changes with description.
2. Push to GitHub

   Share the changes to others.
3. Pull from GitHub

   Get updates from others.

> Suggest to use GitHub Desktop.

GitHub Desktop monitors the documents automatically. It is pretty easy to commit, push and pull changes on GitHub Desktop.



Write Slides in Visual Studio Code with Marp

Marp for VS Code is a tool to create slide deck written in Marp Markdown on VS Code.

- Install Marp for VS Code in VS Code.
- Tutorial: https://marpit.marp.app/markdown

> This PPT itself was done by Marp for VS Code.

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![image-20200618104135017](images/image-20200618104135017.png)

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# Write Interactive Codes in Jupyter Notebook

The [Jupyter Notebook](https://jupyter.org/) is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text.

- Jupyter supports over 40 programming languages, including Python, R, Julia, and Scala.

- Install [Jupyter Notebook](https://jupyter.org/install)

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![height:600px](images/image-20200618104558515.png)

[sample link](https://nbviewer.jupyter.org/github/odewahn/ipynb-examples/blob/master/SymPy%20Examples.ipynb)

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# Convert Markdown to Jupyter Notebook

[notedown](http://github.com/aaren/notedown) is a simple tool to create [IPython notebooks](http://www.ipython.org/notebook) from markdown (and r-markdown).

~~~~
# Install
sudo  pip3 install notedown
# Convert
notedown tutorial.md > tutorial.ipynb
~~~~

---
```

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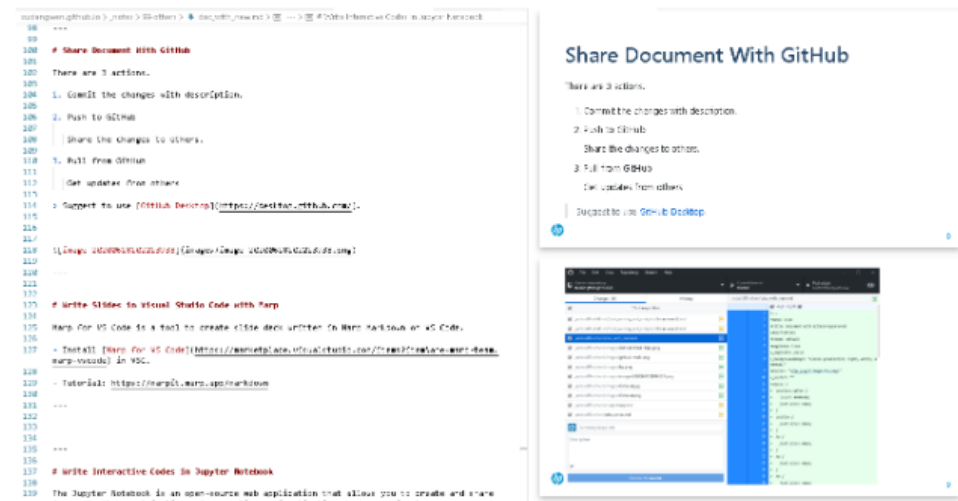

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- Install Jupyter Notebook

SymPy: Open Source Symbolic Mathematics

This notebook uses the SymPy package to perform symbolic manipulations, and combined with numpy and matplotlib, also displays numerical visualizations of symbolically constructed expressions.

We first load sympy printing extensions, as well as all of sympy:

In [1]:
```
from IPython.display import display

from sympy.interactive import printing
printing.init_printing()

from __future__ import division
import sympy as sym
from sympy import *
x, y, z = symbols("x y z")
k, m, n = symbols("k m n", integer=True)
f, g, h = map(Function, 'fgh')
```

Elementary operations

In [2]:
```
Rational(3,2)*pi + exp(I*x) / (x**2 + y)
```

Out[2]:
$$\frac{3\pi}{2} + \frac{e^{ix}}{x^2 + y}$$

In [3]:
```
exp(I*x).subs(x,pi).evalf()
```

Out[3]:
$$-1.0$$

sample link

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# Convert
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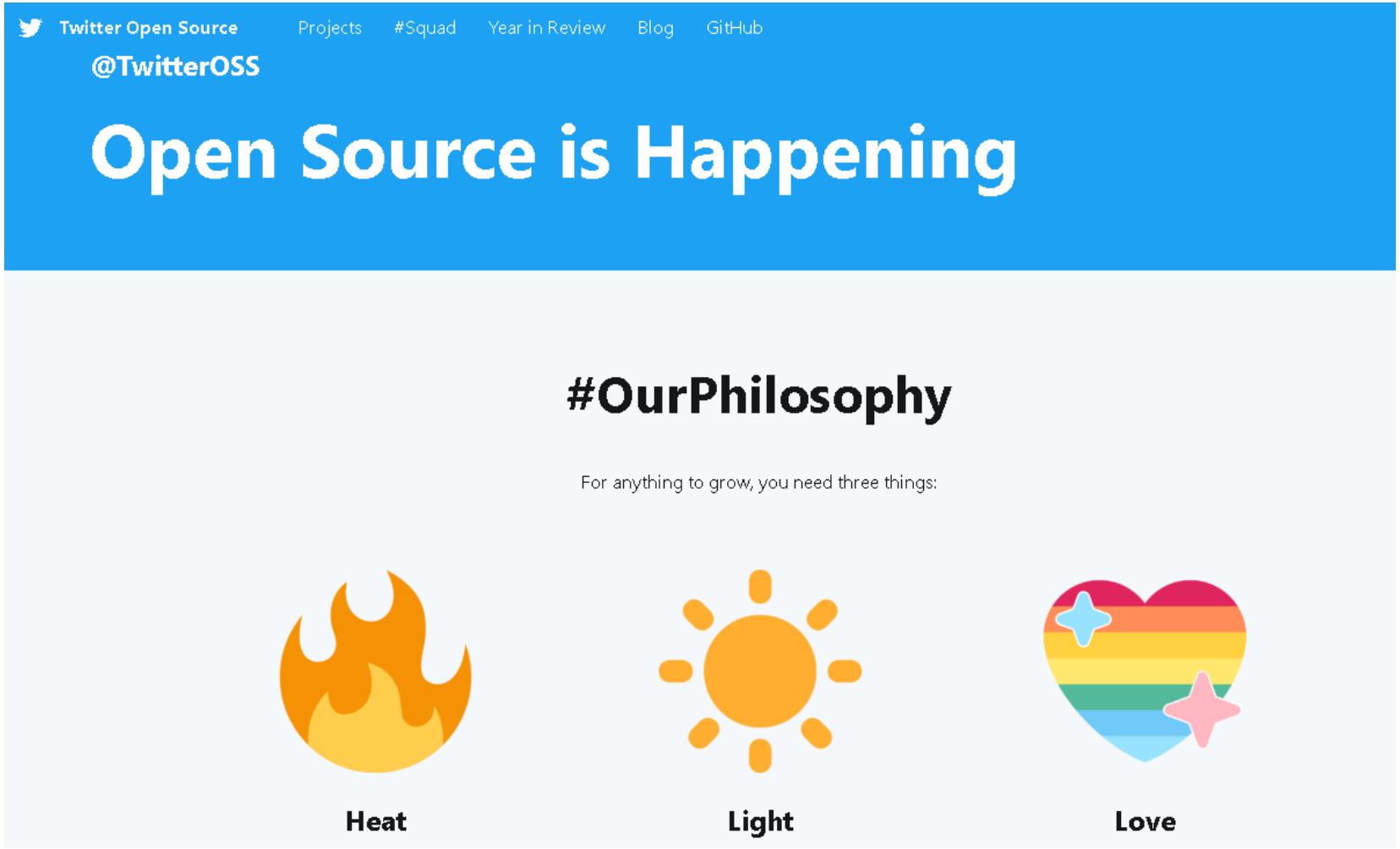
```

Publish Documents with GitHub Pages

use GitHub Pages to host a website about yourself, your organization, or your project directly from a GitHub repository.

Example: Twitter GitHub



see more examples

Thank You 😄