Research Tools

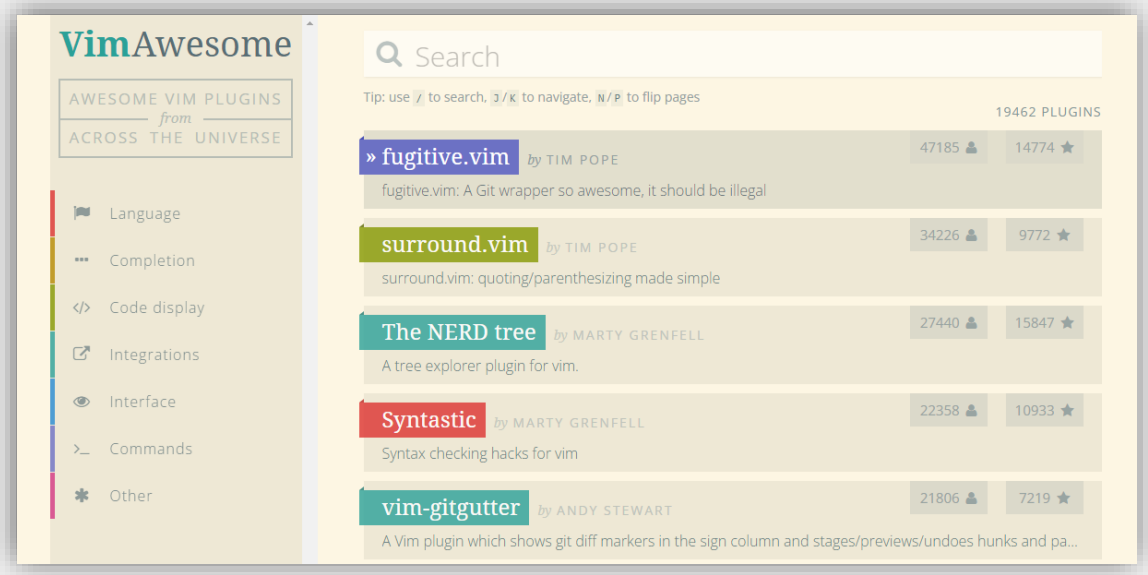
Liangwang Ruan

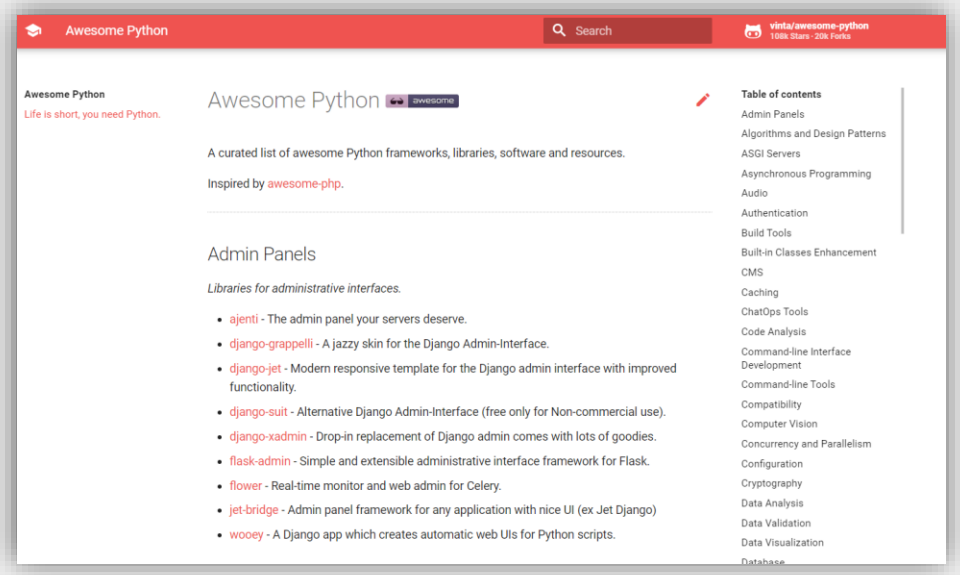
2021.12.1

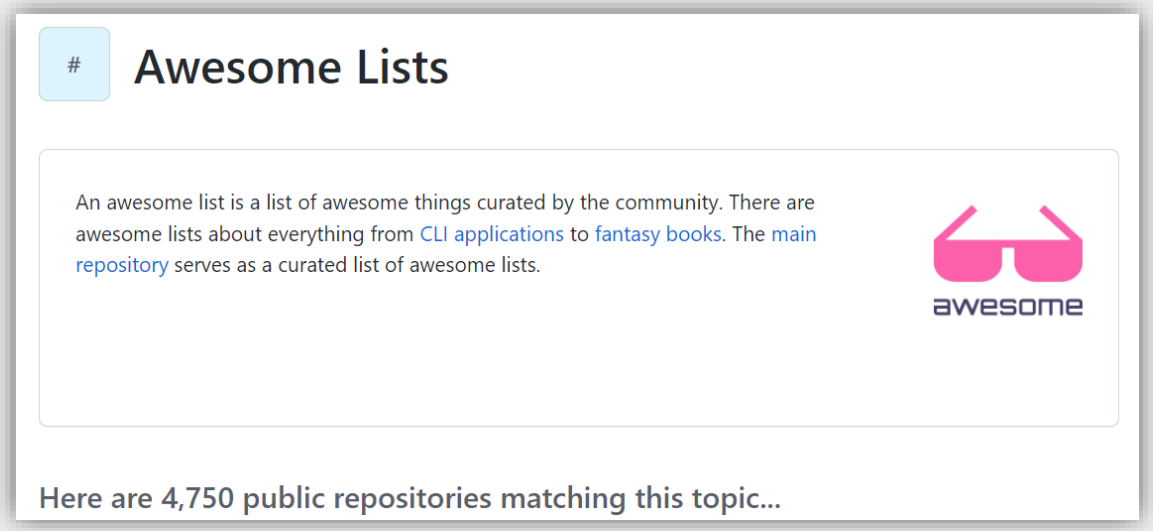
Documentation

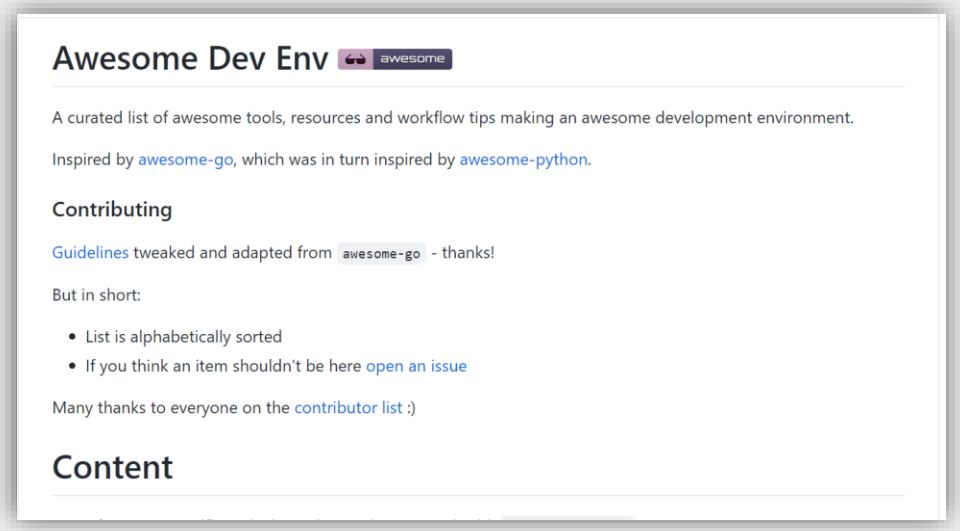
Personal Website

Awesome everything









Documentation

Why documentation is important?

- Take note for meetings
- Help to make your idea clear
- Trace project progress
- Explain your idea to others
- ...

Why not use Word?

- Only Windows and local
- Hard to adjust format
- No code/texmath support

May Contain:

- Text
- Code
- Equation
- Image
- Video
- Table
- Links

Think before code!

Markdown

What's Markdown?

- Light-weighted, portable, rendered to HTML
- Support codeblock, equation, image, weblink…
- Source text for ****everything****: websites, notes, books...

> Use `Paste Image` vscode extension to insert image from clipboard

Shortcomings

- No detailed formatting like font, space, image size…
- No cross reference
- No universal standard

= AsciiDoc

Asciidoctor

A *fast* text processor & publishing toolchain for converting AsciiDoc to HTML5, DocBook & more.

Download gem from RubyGems

Checkout source from GitHub

```
= Hello, AsciiDoc!
Doc Writer <doc@example.com>

An introduction to
http://asciidoc.org[AsciiDoc].

== First Section

* item 1
* item 2

[source,ruby]
puts "Hello, World!"
```

Asciidoctor is a fast, open source, Ruby-based text processor for parsing AsciiDoc® into a document model and converting it to output formats such as HTML 5, DocBook 5, manual pages, PDF, EPUB 3, and other formats.

Asciidoctor also has an ecosystem of extensions, converters, build plugins, and tools to help you author and publish content written in AsciiDoc. You can find the documentation for these projects at https://docs.asciidoctor.org.

In addition to running on Ruby, Asciidoctor can be executed on a JVM using AsciidoctorJ or in any JavaScript environment using Asciidoctor.js.

Key documentation

- Asciidoctor Documentation
- AsciiDoc Language Documentation
- AsciiDoc Syntax Quick Reference

> *Use AsciiDoc for document markup. Really. It's actually **readable** by humans, easier to parse and way more flexible than XML.*
>
> — *Linus Torvalds*

Asciidoctor Project

The Asciidoctor project is an effort to bring a comprehensive and accessible publishing toolchain, centered around the AsciiDoc syntax, to a growing range of ecosystems, including Ruby, JavaScript and the JVM.

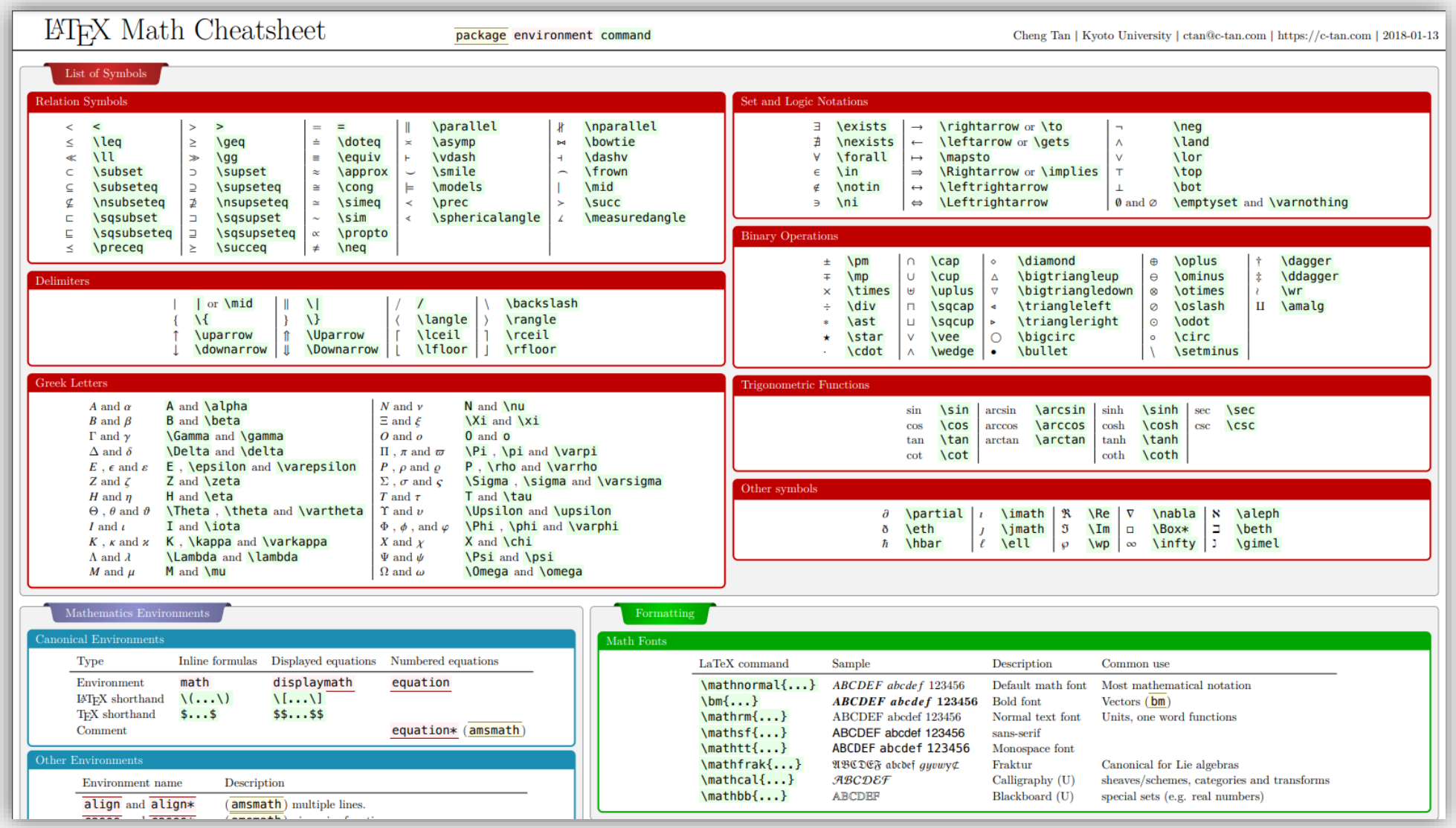
In addition to an AsciiDoc processor and a collection of stylesheets, the project provides

\subsection{\LaTeX}

```
\usepackage{xcolor}
\begin{itemize}
  \item The standard of papers, theses, books
  \item Millions of templates
  \item Flexible and customizable
\end{itemize}

\textbf{Tips}: Use \textcolor{red}{snippets} to speed up
 \href{https://castel.dev/post/lecture-notes-1/}{Vim+LaTeX}
\textbf{Tips}: Use Overleaf for cooperation
```

Cheat sheet is useful



LaTeX Math Cheatsheet

package environment command

Cheng Tan | Kyoto University | ctan@c-tan.com | https://c-tan.com | 2018-01-13

List of Symbols

Relation Symbols

$<$	`<`	$>$	`>`	$=$	`=`	$\parallel$	`\parallel`	$\nparallel$	`\nparallel`
$\leq$	`\leq`	$\geq$	`\geq`	$\doteq$	`\doteq`	$\asymp$	`\asymp`	$\bowtie$	`\bowtie`
$\ll$	`\ll`	$\gg$	`\gg`	$\equiv$	`\equiv`	$\vdash$	`\vdash`	$\dashv$	`\dashv`
$\subset$	`\subset`	$\supset$	`\supset`	$\approx$	`\approx`	$\smile$	`\smile`	$\frown$	`\frown`
$\subseteq$	`\subseteq`	$\supseteq$	`\supseteq`	$\cong$	`\cong`	$\models$	`\models`	$\mid$	`\mid`
$\nsubseteq$	`\nsubseteq`	$\nsupseteq$	`\nsupseteq`	$\simeq$	`\simeq`	$\prec$	`\prec`	$\succ$	`\succ`
$\sqsubset$	`\sqsubset`	$\sqsupset$	`\sqsupset`	$\sim$	`\sim`	$\sphericalangle$	`\sphericalangle`	$\measuredangle$	`\measuredangle`
$\sqsubseteq$	`\sqsubseteq`	$\sqsupseteq$	`\sqsupseteq`	$\propto$	`\propto`				
$\preceq$	`\preceq`	$\succeq$	`\succeq`	$\neq$	`\neq`				

Set and Logic Notations

$\exists$	`\exists`	$\rightarrow$	`\rightarrow` or `\to`	$\neg$	`\neg`
$\nexists$	`\nexists`	$\leftarrow$	`\leftarrow` or `\gets`	$\land$	`\land`
$\forall$	`\forall`	$\mapsto$	`\mapsto`	$\lor$	`\lor`
$\in$	`\in`	$\Rightarrow$	`\Rightarrow` or `\implies`	$\top$	`\top`
$\notin$	`\notin`	$\leftrightarrow$	`\leftrightarrow`	$\bot$	`\bot`
$\ni$	`\ni`	$\Leftrightarrow$	`\Leftrightarrow`	$\emptyset$ and $\varnothing$	`\emptyset` and `\varnothing`

Delimiters

$\|$	`|` or `\mid`	$\|\|$	`\\|`	$/$	`/`	$\backslash$	`\backslash`
$\{$	`\{`	$\}$	`\}`	$\langle$	`\langle`	$\rangle$	`\rangle`
$\uparrow$	`\uparrow`	$\Uparrow$	`\Uparrow`	$\lceil$	`\lceil`	$\rceil$	`\rceil`
$\downarrow$	`\downarrow`	$\Downarrow$	`\Downarrow`	$\lfloor$	`\lfloor`	$\rfloor$	`\rfloor`

Binary Operations

$\pm$	`\pm`	$\cap$	`\cap`	$\diamond$	`\diamond`	$\oplus$	`\oplus`	$\dagger$	`\dagger`
$\mp$	`\mp`	$\cup$	`\cup`	$\triangle$	`\bigtriangleup`	$\ominus$	`\ominus`	$\ddagger$	`\ddagger`
$\times$	`\times`	$\uplus$	`\uplus`	$\triangledown$	`\bigtriangledown`	$\otimes$	`\otimes`	$\wr$	`\wr`
$\div$	`\div`	$\sqcap$	`\sqcap`	$\triangleleft$	`\triangleleft`	$\oslash$	`\oslash`	$\amalg$	`\amalg`
$\ast$	`\ast`	$\sqcup$	`\sqcup`	$\triangleright$	`\triangleright`	$\odot$	`\odot`		
$\star$	`\star`	$\vee$	`\vee`	$\bigcirc$	`\bigcirc`	$\circ$	`\circ`		
$\cdot$	`\cdot`	$\wedge$	`\wedge`	$\bullet$	`\bullet`	$\setminus$	`\setminus`		

Greek Letters

A and α	`A` and `\alpha`	N and ν	`N` and `\nu`
B and β	`B` and `\beta`	Ξ and ξ	`\Xi` and `\xi`
Γ and γ	`\Gamma` and `\gamma`	O and o	`O` and `o`
Δ and δ	`\Delta` and `\delta`	Π , π and ϖ	`\Pi` , `\pi` and `\varpi`
E , ϵ and ε	`E` , `\epsilon` and `\varepsilon`	P , ρ and ϱ	`P` , `\rho` and `\varrho`
Z and ζ	`Z` and `\zeta`	Σ , σ and ς	`\Sigma` , `\sigma` and `\varsigma`
H and η	`H` and `\eta`	T and τ	`T` and `\tau`
Θ , θ and ϑ	`\Theta` , `\theta` and `\vartheta`	Υ and υ	`\Upsilon` and `\upsilon`
I and ι	`I` and `\iota`	Φ , ϕ , and φ	`\Phi` , `\phi` and `\varphi`
K , κ and $\varkappa$	`K` , `\kappa` and `\varkappa`	X and χ	`X` and `\chi`
Λ and λ	`\Lambda` and `\lambda`	Ψ and ψ	`\Psi` and `\psi`
M and μ	`M` and `\mu`	Ω and ω	`\Omega` and `\omega`

Trigonometric Functions

sin	`\sin`	arcsin	`\arcsin`	sinh	`\sinh`	sec	`\sec`
cos	`\cos`	arccos	`\arccos`	cosh	`\cosh`	csc	`\csc`
tan	`\tan`	arctan	`\arctan`	tanh	`\tanh`		
cot	`\cot`			coth	`\coth`		

Other symbols

∂	`\partial`	$\imath$	`\imath`	$\Re$	`\Re`	∇	`\nabla`	$\aleph$	`\aleph`
$\eth$	`\eth`	$\jmath$	`\jmath`	$\Im$	`\Im`	$\Box$	`\Box*`	$\beth$	`\beth`
$\hbar$	`\hbar`	ℓ	`\ell`	$\wp$	`\wp`	∞	`\infty`	$\gimel$	`\gimel`

Mathematics Environments

Canonical Environments

Type	Inline formulas	Displayed equations	Numbered equations
Environment	`math`	`displaymath`	`equation`
LaTeX shorthand	`\(...\)`	`\[...\]`	
TeX shorthand	`$...$`	`$$...$$`	
Comment			`equation*` (`amsmath`)

Other Environments

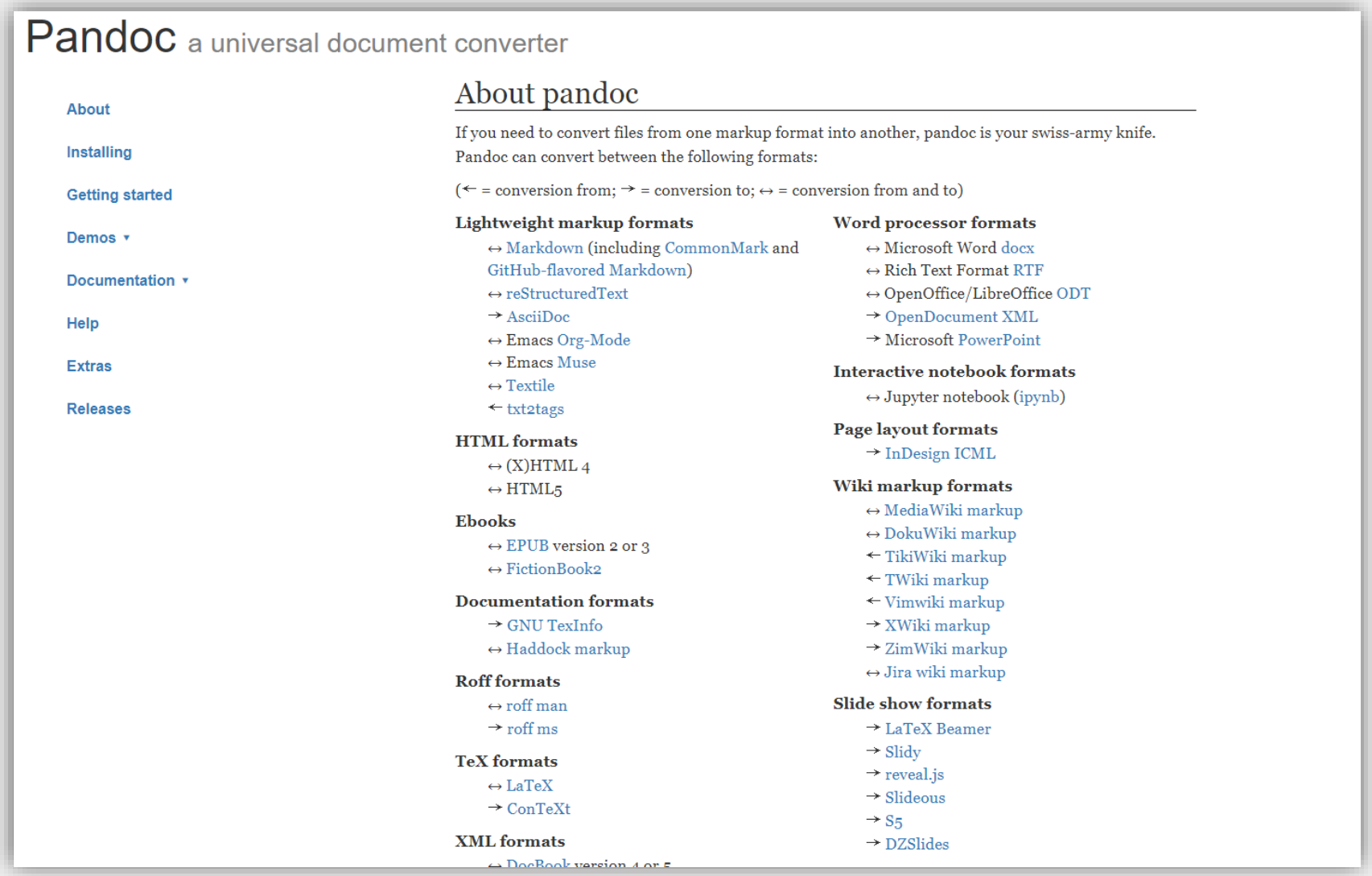
Environment name	Description
`align` and `align*`	(`amsmath`) multiple lines.

Formatting

Math Fonts

LaTeX command	Sample	Description	Common use
`\mathnormal{...}`	*ABCDEF abcdef* 123456	Default math font	Most mathematical notation
`\bm{...}`	***ABCDEF abcdef* 123456**	Bold font	Vectors (`bm`)
`\mathrm{...}`	ABCDEF abcdef 123456	Normal text font	Units, one word functions
`\mathsf{...}`	ABCDEF abcdef 123456	sans-serif	
`\mathtt{...}`	ABCDEF abcdef 123456	Monospace font	
`\mathfrak{...}`	$\mathfrak{ABCDEF}$ $\mathfrak{abcdef}$ $\mathfrak{gyvwyz}$	Fraktur	Canonical for Lie algebras
`\mathcal{...}`	$\mathcal{ABCDEF}$	Calligraphy (U)	sheaves/schemes, categories and transforms
`\mathbb{...}`	$\mathbb{ABCDEF}$	Blackboard (U)	special sets (e.g. real numbers)

Pandoc



Pandoc a universal document converter

About
Installing
Getting started
Demos ▾
Documentation ▾
Help
Extras
Releases

About pandoc

If you need to convert files from one markup format into another, pandoc is your swiss-army knife. Pandoc can convert between the following formats:

(← = conversion from; → = conversion to; ↔ = conversion from and to)

Lightweight markup formats
- ↔ Markdown (including CommonMark and GitHub-flavored Markdown)
- ↔ reStructuredText
- → AsciiDoc
- ↔ Emacs Org-Mode
- ↔ Emacs Muse
- ↔ Textile
- ← txt2tags

HTML formats
- ↔ (X)HTML 4
- ↔ HTML5

Ebooks
- ↔ EPUB version 2 or 3
- ↔ FictionBook2

Documentation formats
- → GNU TexInfo
- ↔ Haddock markup

Roff formats
- ↔ roff man
- → roff ms

TeX formats
- ↔ LaTeX
- → ConTeXt

XML formats
- ↔ DocBook version 4 or 5

Word processor formats
- ↔ Microsoft Word docx
- ↔ Rich Text Format RTF
- ↔ OpenOffice/LibreOffice ODT
- → OpenDocument XML
- → Microsoft PowerPoint

Interactive notebook formats
- ↔ Jupyter notebook (ipynb)

Page layout formats
- → InDesign ICML

Wiki markup formats
- ↔ MediaWiki markup
- ↔ DokuWiki markup
- ← TikiWiki markup
- ← TWiki markup
- ← Vimwiki markup
- → XWiki markup
- → ZimWiki markup
- ↔ Jira wiki markup

Slide show formats
- → LaTeX Beamer
- → Slidy
- → reveal.js
- → Slideous
- → S5
- → DZSlides

Pandoc

Markdown to:

- **PDF**: pandoc --pdf-engine=xelatex --template=tmp.latex xxx.md -o xxx.pdf
- **LaTeX**: pandoc --pdf-engine=xelatex --template=tmp.latex xxx.md -o xxx.tex
- **HTML**: pandoc xxx.md --toc --o xxx.html --katex
- **Docx**: pandoc xxx.md --reference-doc ref.docx --o xxx.docx
- **Slides**: pandoc xxx.md --o xxx.html –t revealjs

LaTeX to:

- **Markdown**: pandoc xxx.tex --o xxx.md
- **Docx**: pandoc xxx.tex --o xxx.docx --bibliography=ref.bib

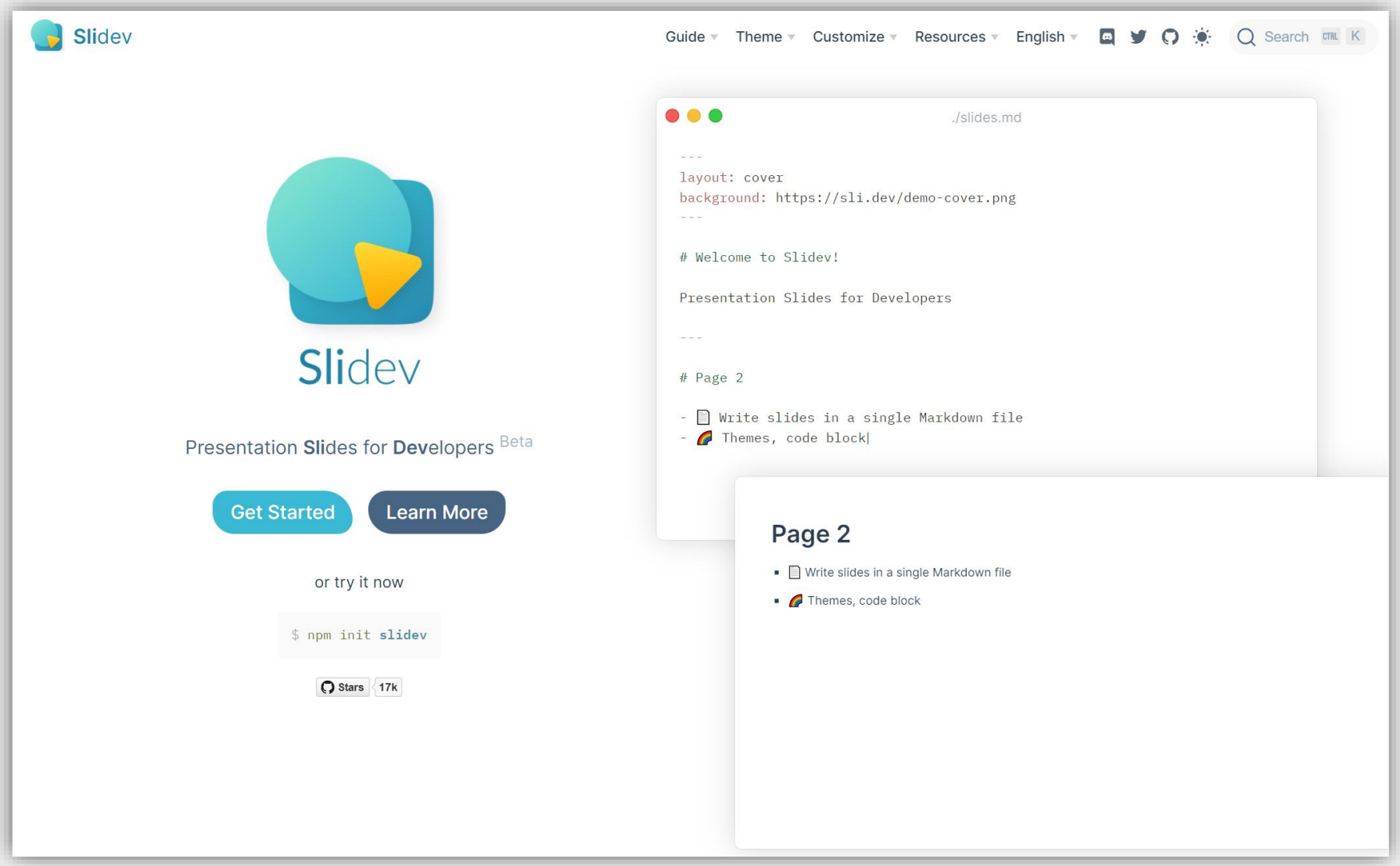
Write LaTeX in Markdown

```
---
header-includes:
  - \usepackage{graphicx}
---

# Test LaTeX

\begin{figure}[htb]
\centering
\includegraphics[width=0.48\linewidth]{1-2d.png}
\hfill
\includegraphics[width=0.48\linewidth]{1-3d.png}
\end{figure}
```

Slidev


Slidev
Guide
Theme
Customize
Resources
English
Search
CTRL K
Slidev
Presentation Slides for Developers Beta
Get Started
Learn More
or try it now
$ npm init slidev
Stars 17k
./slides.md
---
layout: cover
background: https://sli.dev/demo-cover.png

Welcome to Slidev!
Presentation Slides for Developers

Page 2
- Write slides in a single Markdown file
- Themes, code block
Page 2
Write slides in a single Markdown file
Themes, code block

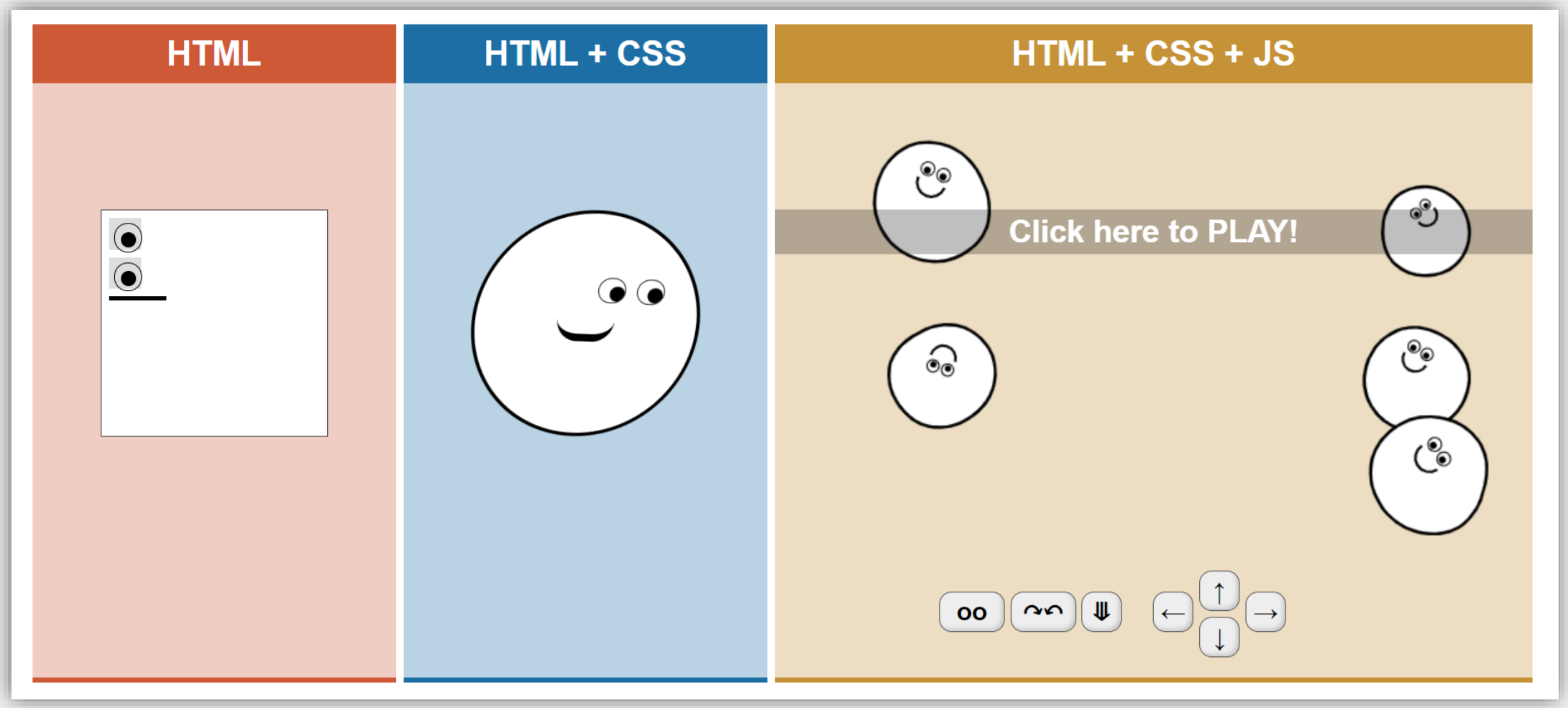
Online Tools

- Overleaf
- Notion
- Grammarly
- Google/Tencent Docs

Documentation

Personal Website

Frontend Basic



From https://html-css-js.com/

Frontend Basic

HTML

```
<!DOCTYPE html>
<html>
<head>
<title>HTML CSS JS</title>
</head>
<body>
<h1 id="Hello">World</h1>
<p>blablabla</p>
</body>
</html>
```

CSS

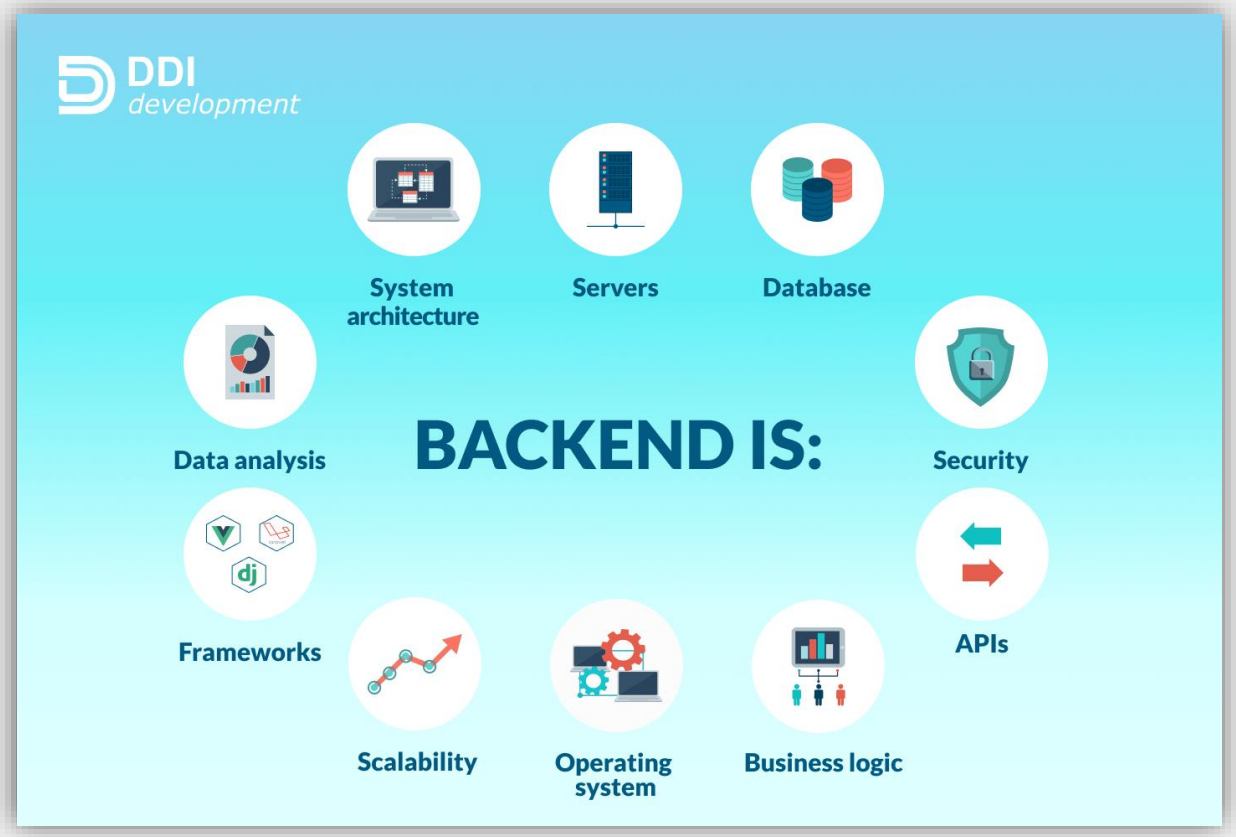
```
/* CSS styles */
h1 {
  font-family: Impact, sans-serif;
  color: #CE5937;
  }
```

Javascript

```
// JavaScript
document.getElementById('Hello').innerText +=
" Editors";
```

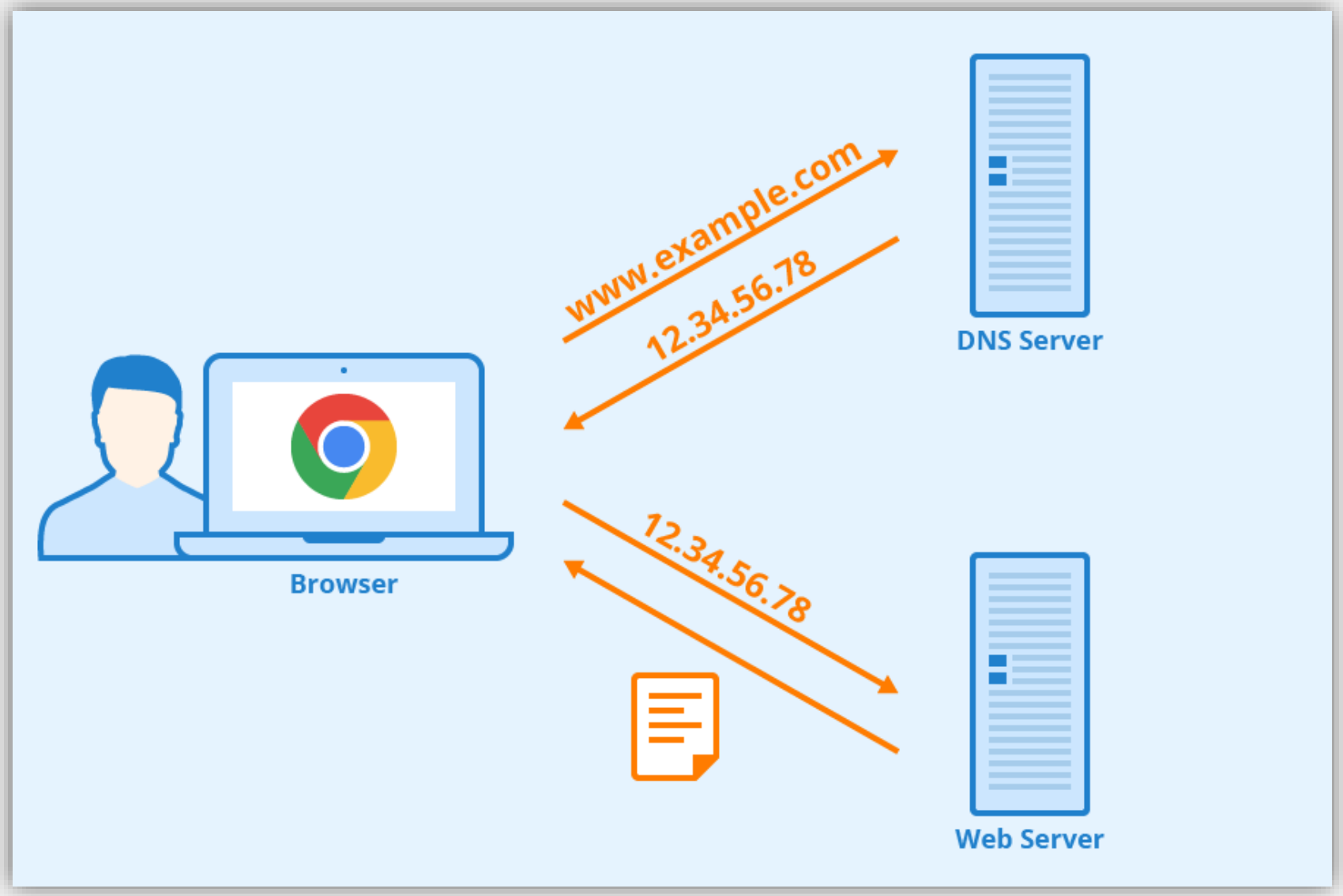
Backend Basic

- A (group of) server(s)
- Deal with requests
- Access database
- Run logic on server-side
- …



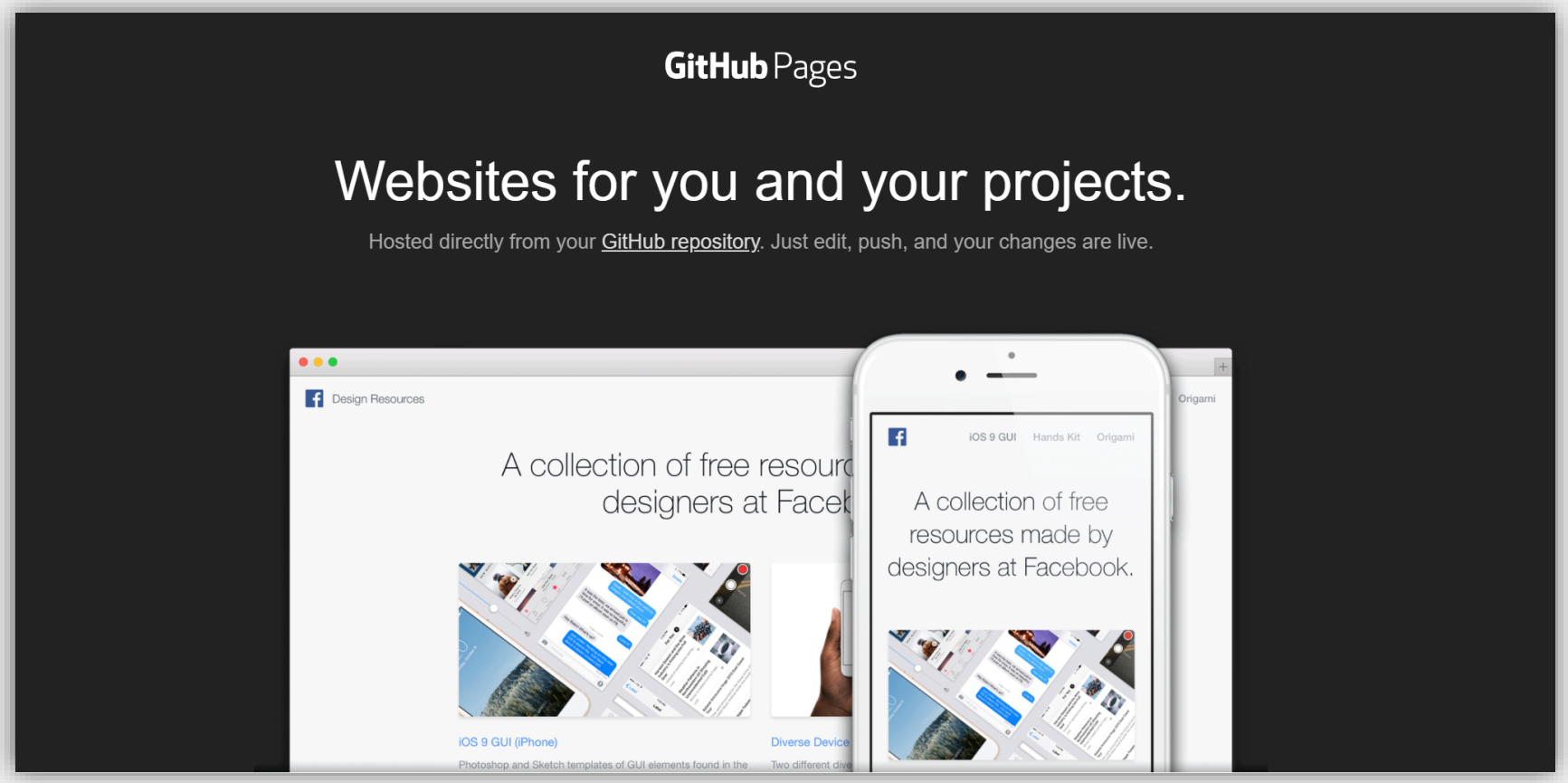
Everything you can’t see

DNS

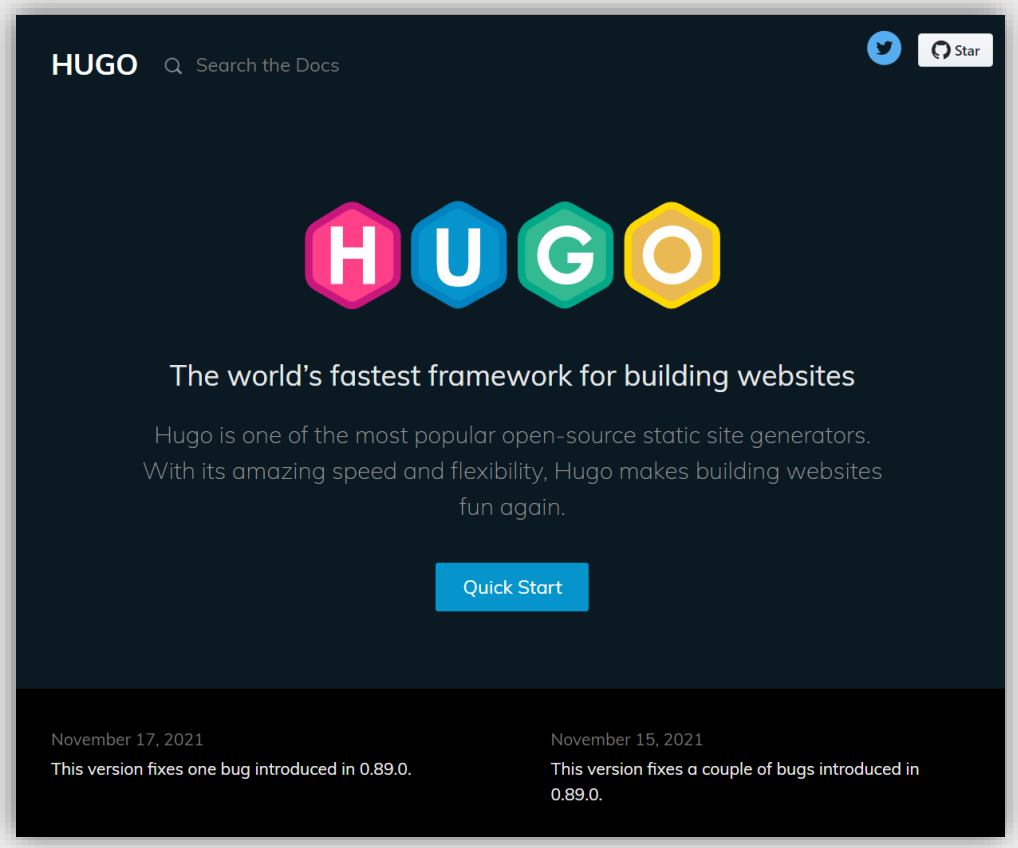

www.example.com
12.34.56.78
DNS Server
Browser
12.34.56.78
Web Server

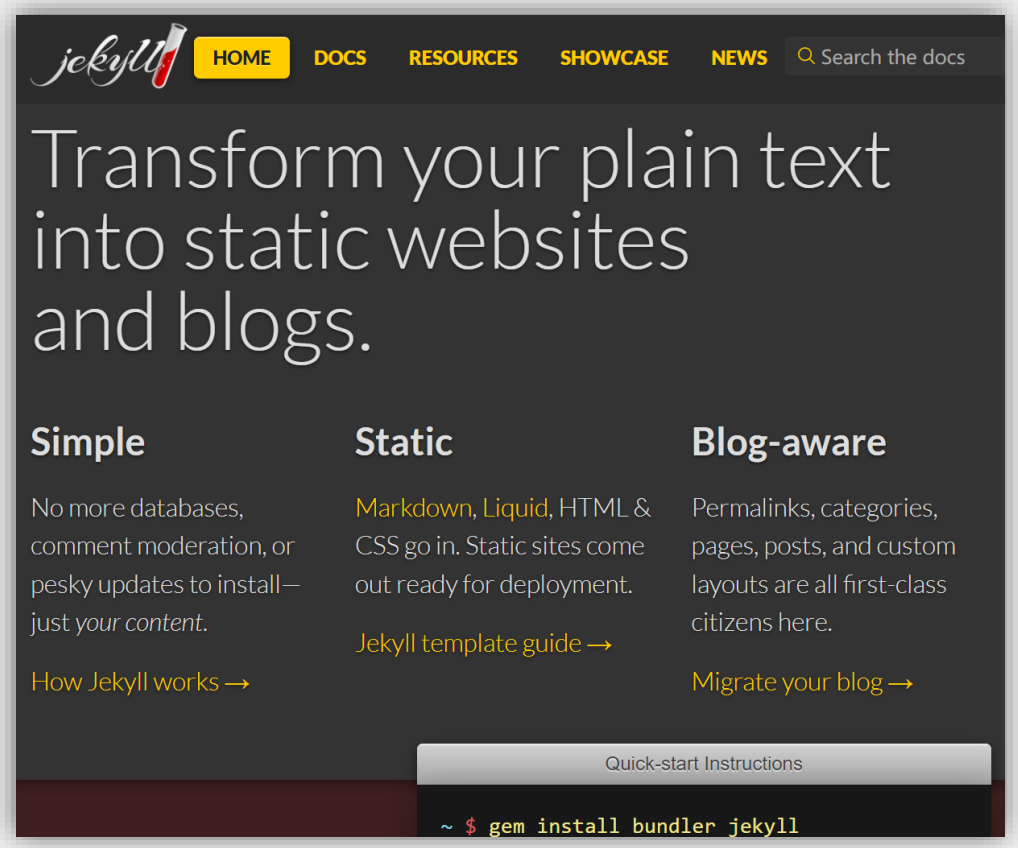
Github Pages

Free static site hosting service



Static Site Generator





Github Action

```yaml
name: github pages

on:
  push:
    branches:
      - master  # Set a branch to deploy

jobs:
  deploy:
    runs-on: ubuntu-18.04
    steps:
      - uses: actions/checkout@v2
        with:
          submodules: true  # Fetch Hugo themes (true OR recursive)
          fetch-depth: 0    # Fetch all history for .GitInfo and .Lastmod

      - name: Setup Hugo
        uses: peaceiris/actions-hugo@v2
        with:
          hugo-version: '0.82.1'
          extended: true

      - name: Build
        run: hugo --minify

      - name: Deploy
        uses: peaceiris/actions-gh-pages@v3
        with:
          github_token: ${{ secrets.GITHUB_TOKEN }}
          # publish_dir: ./docs
          publish_branch: gh-pages
          cname: lwruan.com
```

Google Search Console

Thanks for Listening