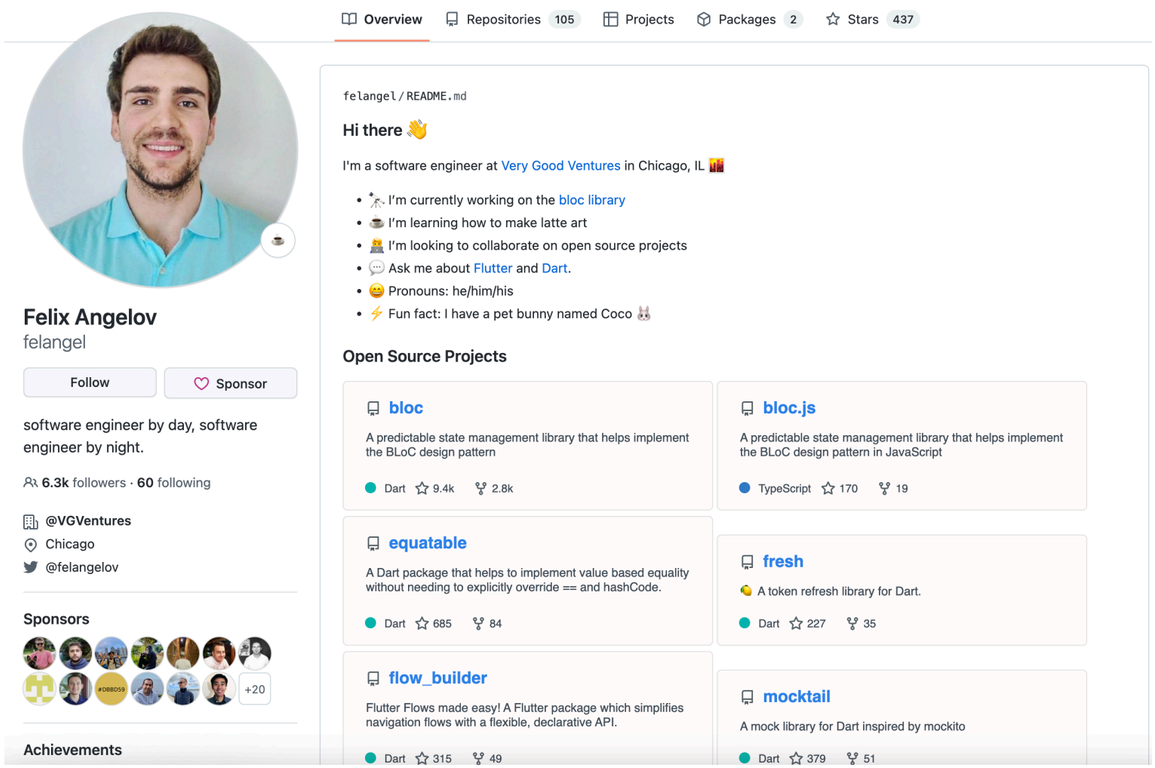
Meet Mason 🧱⛏️

Introduction to Templating & Custom Code Generation

Felix Angelov @ Very Good Ventures 🦄

About Me 🕶️🦄



VERY GOOD VENTURES

bloc

Story Time 👨‍🏫

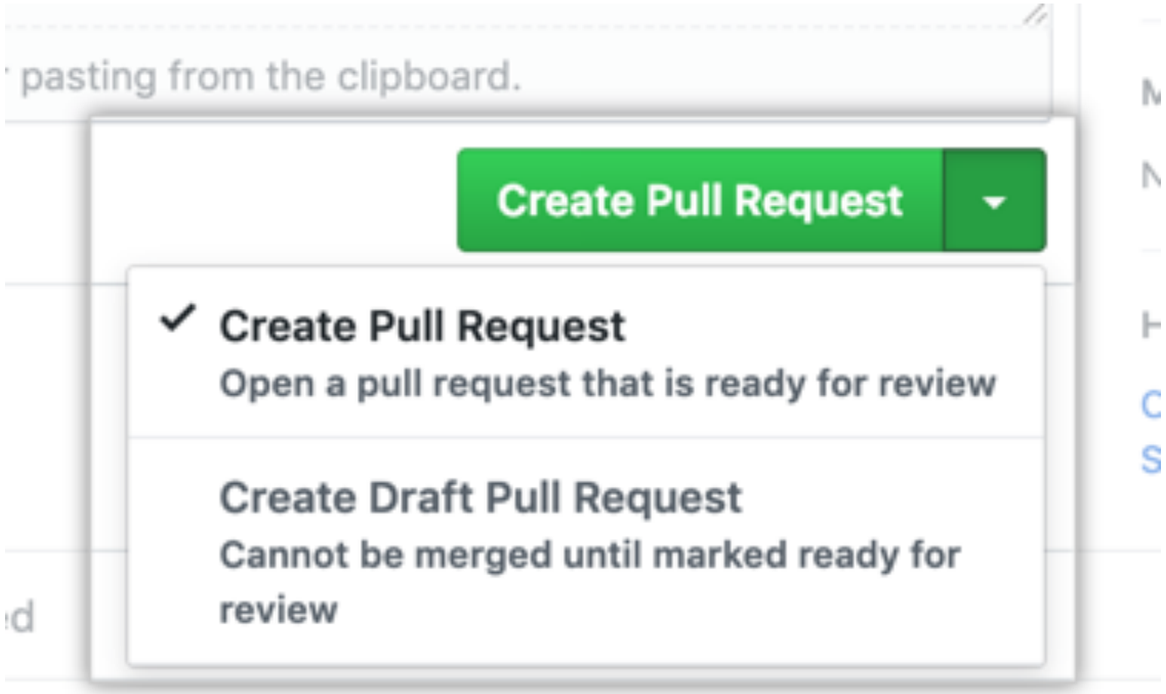
I joined a new team and picked up a new feature...

Story Time 👨‍🏫

So I did what any developer would do...

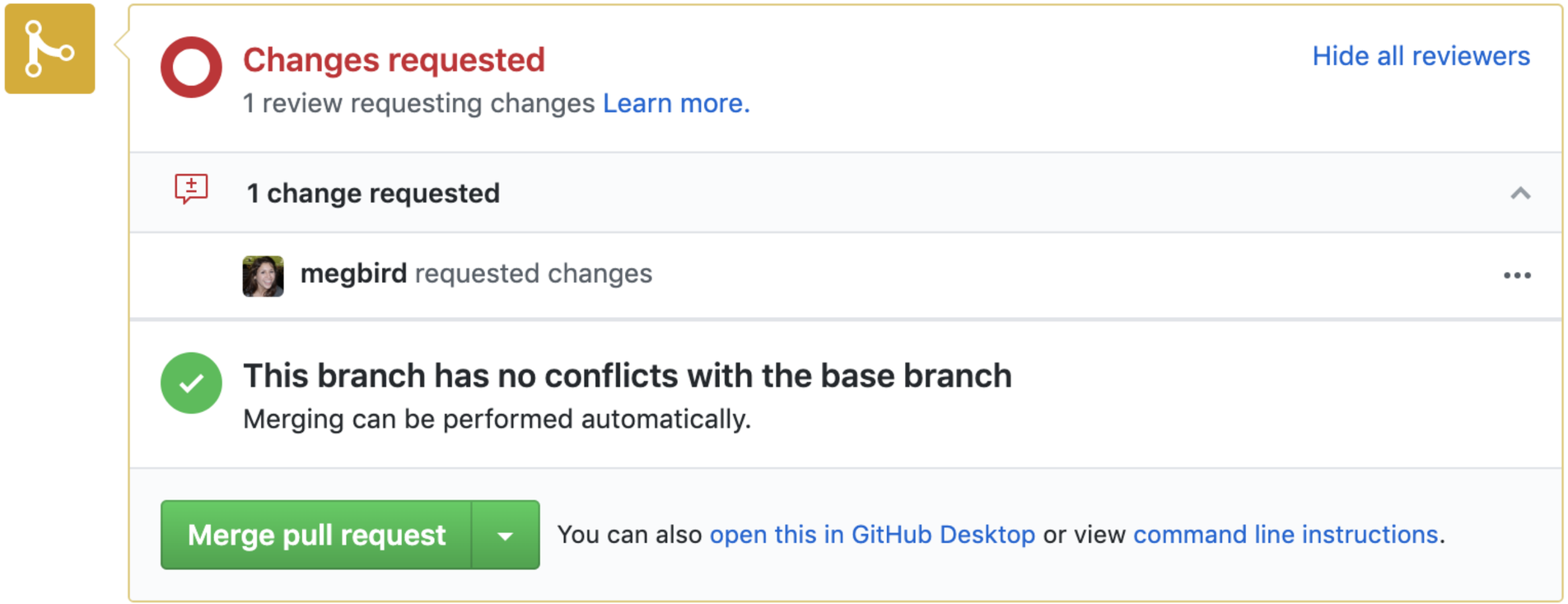
Story Time 👨‍🏫

And opened a pull request...



Story Time 👨‍🏫

🤦‍♂️ I copied a "legacy" feature! 😭



Story Time 👨‍🏫

- 🗒️ Back to square one...
- ⌛ Lots of wasted time...
- 😤 Both sides frustrated...

I wish we could... 💭

- Produce code in a way that is:
  - 🔁 Consistent
  - ⚡ Fast
  - 🧩 Customizable
  - 📦 Reusable

Some Possible Solutions...

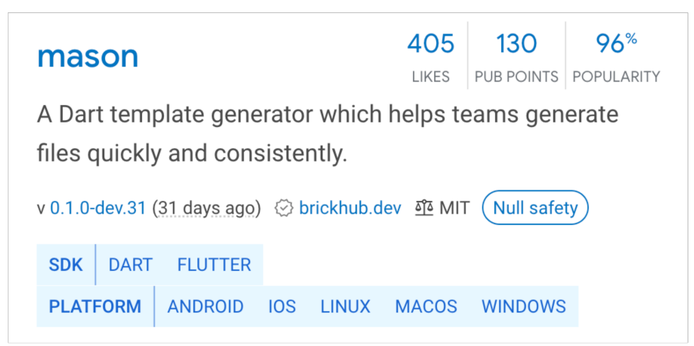
- 🧐 Copy + Paste
- 🧐 Gists
- 🧐 GitHub Templates
- 🧐 VSCode/IntelliJ Snippets
- 🧐 Custom Tooling (CLIs, IDE Extensions, etc.)

Idea 💡

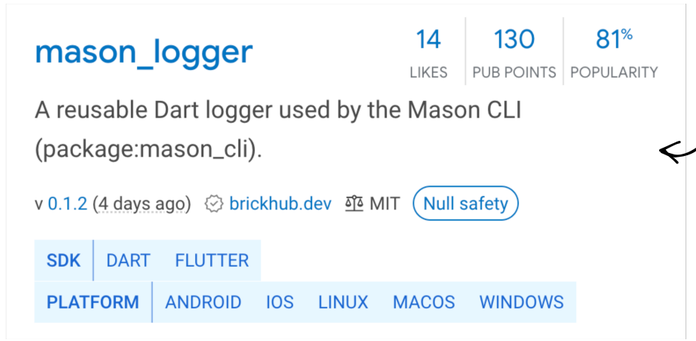

A TASK THAT TAKES
MORE THAN 5 MINUTES
PROGRAMMERS
CAN THIS BE AUTOMATED?
imgflip.com

Meet Mason 👋

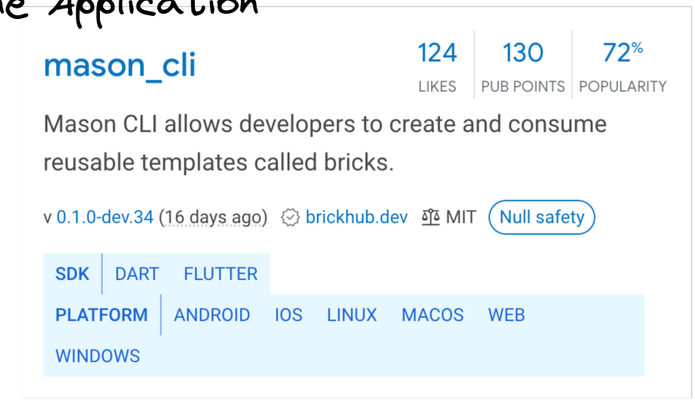
Core Templating Engine



Reusable Logger

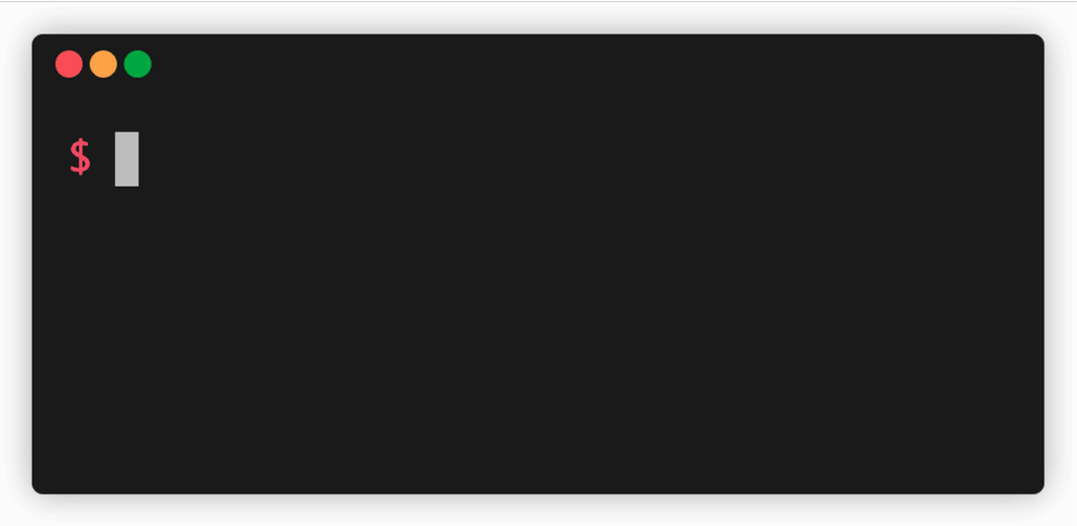


Command-line Application



API Client for managing remote bricks

Intro to Mason CLI 👨‍💻



- Create and consume reusable templates called bricks 🧱
- Powered by Dart and Mustache 🎯 🤓
- Inspired by Stagehand, Yeoman, and Cookiecutter ✨

Chapter 1: Getting Started 

- ☑️ Install Mason CLI
- ☑️ Initialize Mason in a Workspace
- ☑️ Install a brick
- ☑️ Use a brick

Installing Mason 📦

```
# 🎯 Activate from https://pub.dev
dart pub global activate mason_cli

# 🍺 Install from https://brew.sh
brew tap felangel/mason
brew install mason
```

Mason CLI Overview

```
$ mason
🧱  mason • lay the foundation!

Usage: mason <command> [arguments]

Global options:
-h, --help            Print this usage information.
    --version         Print the current version.

Available commands: ...
```

Chapter 1: Checkpoint 📕 🏁

- ✅ Install Mason CLI
- ☑️ Initialize Mason in a Workspace
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`$ mason init` 📂

Create a locally scoped workspace for working with bricks

- initializes mason in the current directory
  - generates a `mason.yaml`
- allows you to work with locally scoped bricks
- mason always uses nearest parent `mason.yaml`

$ mason init in action

```
$ mason init
✓ Initializing (47ms)
✓ Getting bricks (10ms)
✓ Generated 1 file(s):
  /me/mason_playground/mason.yaml (new)

Run "mason make hello" to use your first brick.
```

Anatomy of the `mason.yaml`

```yaml
# Register bricks which can be consumed via the Mason CLI.
# https://github.com/felangel/mason
bricks:
  # Sample Brick
  # Run `mason make hello` to try it out.
  hello: "0.1.0+1"
  # Bricks can also be imported via git url.
  # Uncomment the following lines to import
  # a brick from a remote git url.
  # widget:
  #   git:
  #     url: https://github.com/felangel/mason
  #     path: bricks/widget
```

Chapter 1: Checkpoint 📕 🏁

- ✅ Install Mason CLI
- ✅ Initialize Mason in a Workspace
- ☑️ Install a brick
- ☑️ Use a brick

`$ mason get` ☁️

Install all bricks registered in the nearest parent `mason.yaml`

- Think `dart pub get`
- Generated `mason-lock.json`
- Bricks are cached locally for offline use
  - add `.mason` to `.gitignore`

$ mason get in action

```
$ mason get
✓ Getting bricks (22ms)
```

```
├── .mason
├── mason-lock.json
└── mason.yaml
```

`$ mason list` 🗒️

List all installed bricks

- Use `mason ls` shorthand
- Outputs installed bricks
- Defaults to locally installed bricks
- Use `--global` or `-g` for globally installed bricks

$ mason list in action

```
$ mason list
/me/mason_playground
└── hello 0.1.0+1 -> registry.brickhub.dev
```

$ mason list in action

```
# Change to a directory outside the workspace
$ cd /me/dart_playground

# List available bricks
$ mason ls
/me/dart_playground
└── (empty)
```

Chapter 1: Checkpoint 📕 🏁

- ✅ Install Mason CLI
- ✅ Initialize Mason in a Workspace
- ✅ Install a brick
- ☑️ Use a brick

`$ mason make` 

Generate code from a brick

- looks up brick metadata
- prompts for any required variables
- generates code in the desired output directory

$ mason make in action

```
$ mason make hello
? What is your name? (Dash) Felix
✓ Made brick hello (52ms)
✓ Generated 1 file:
  /me/mason_playground/HELLO.md (new)
```

HELLO.md

Hello Felix! 👋

$ mason make: command-line args

```
$ mason make hello --name Felix
✓ Made brick hello (41ms)
✓ Generated 1 file:
  /me/mason_playground/HELLO.md (identical)
```

$ mason make: config file 

```
$ mason make hello -c config.json
✓ Made brick hello (41ms)
✓ Generated 1 file:
  /me/mason_playground/HELLO.md (identical)
```

config.json

```
{
  "name": "Felix"
}
```

$ mason make: output directory 🗂️

```
$ mason make hello --name Felix -o ./out
✓ Made brick hello (41ms)
✓ Generated 1 file:
  /me/mason_playground/out/HELLO.md (new)
```

$ mason make: conflicts !

```
$ mason make hello --name Dash
conflict /me/mason_playground/HELLO.md
Overwrite HELLO.md? (Yyna) y
✓ Made brick hello (32.5s)
✓ Generated 1 file:
  /me/mason_playground/HELLO.md (new)
```

BEFORE

Hello Felix! 👋

AFTER

Hello Dash! 👋

Conflict Resolution Strategies

By default, `mason` will prompt on each file conflict

Options:

- y - yes, overwrite (default)
- Y - yes, overwrite this and all others
- n - no, do not overwrite
- a - append to existing file

$ mason make: conflict resolution

```
# ❓ Always prompt when there is a file conflict (default)
$ mason make hello --name Dash --on-conflict prompt

# 🖍️ Always overwrite when there is a file conflict
$ mason make hello --name Dash --on-conflict overwrite

# ✌️ Always skip when there is a file conflict
$ mason make hello --name Dash --on-conflict skip

# ➕ Always append when there is a file conflict
$ mason make hello --name Dash --on-conflict append
```

Chapter 1 Complete 📕 🥳

- ✅ Install Mason CLI
- ✅ Initialize Mason in a Workspace
- ✅ Install a brick
- ✅ Use a brick

Chapter 1 Summary  

```
# 🎯 Activate from https://pub.dev
$ dart pub global activate mason_cli

# 📁 Initialize mason in the current workspace
$ mason init

# ☁️ Install all bricks defined in `mason.yaml`
$ mason get

# 🚧 Generate code from a brick
$ mason make hello
```

Chapter 2: Creating a Brick 

- ☑️ Generating a new brick
- ☑️ Anatomy of a brick
- ☑️ Brick template syntax
- ☑️ Hooks

`$ mason new` ⛏️

Create a new brick template

- creates a brick in the current directory
  - generates a `brick.yaml`
  - generates a `__brick__` directory
- includes `README`, `LICENSE`, and `CHANGELOG`

$ mason new in action

```
$ mason new example
✓ Created new brick: example (74ms)
✓ Generated 5 file(s):
  /me/mason_playground/example/brick.yaml (new)
  /me/mason_playground/example/README.md (new)
  /me/mason_playground/example/CHANGELOG.md (new)
  /me/mason_playground/example/LICENSE (new)
  /me/mason_playground/example/__brick__/HELLO.md (new)
```

Chapter 2: Checkpoint 📕 🏁

- ✅ Generating a new brick
- ☑️ Anatomy of a brick
- ☑️ Brick template syntax
- ☑️ Hooks

Anatomy of a Brick 

```
.
├── CHANGELOG.md
├── LICENSE
├── README.md
├── __brick__
└── brick.yaml
```

- **`__brick__`**
  - brick template
- **`brick.yaml`**
  - brick metadata (`pubspec.yaml`)

Anatomy of the `brick.yaml`

Defines the metadata for a specific brick

```yaml
name: example
description: An example brick
version: "0.1.0+1"

environment:
  mason: ">=0.1.0-dev <0.1.0"

vars:
  name:
    type: string
    description: Your name.
    default: Dash
    prompt: What is your name?
```

- can contain zero or more variables
- variable types include:
  - `string`, `number`, `boolean`, `enum`, `array`

Variable Type: `array`

```yaml
vars:
  flavors:
    type: array
    description: Supported flavors
    prompt: What flavors would you like to generate?
    defaults:
      - development
      - production
    values:
      - development
      - integration
      - staging
      - production
```

```
$ mason make example
? What flavors would you like to generate?
❯ ◉ development
  ○ integration
  ○ staging
  ◉ production
```

Variable Type: enum

```yaml
vars:
  license:
    type: enum
    default: MIT license
    prompt: "Choose a License:"
    values:
      - "Apache License 2.0"
      - 'BSD 3-Clause "New" or "Revised" license'
      - "GNU General Public License (GPL)"
      - "MIT license"
      - "Mozilla Public License 2.0"
```

```
$ mason make example
? Choose a License:
  ○  Apache License 2.0
  ○  BSD 3-Clause "New" or "Revised" license
  ○  GNU General Public License (GPL)
❯ ◉  MIT license
  ○  Mozilla Public License 2.0
```

Anatomy of the `__brick__`

`__brick__`

```
├── README.md
├── lib
|   └── {{name}}.dart
└── pubspec.yaml
```

output

```
├── README.md
├── lib
|   └── flutter_vikings_2022.dart
└── pubspec.yaml
```

vars

```
{
  "name": "flutter_vikings_2022"
}
```

Putting it Together 🧩

```
.
├── CHANGELOG.md
├── LICENSE
├── README.md
├── __brick__
│   └── HELLO.md
└── brick.yaml
```

__brick__/HELLO.md

```
Hello {{name}}! 👋
```

brick.yaml

```yaml
name: hello
description: An example brick
version: "0.1.0+1"

vars:
  name:
    type: string
    description: Your name.
    prompt: What is your name?
```

```
$ mason make hello
? What is your name? Vikings
```

HELLO.md

```
Hello Vikings! 👋
```

Chapter 2: Checkpoint 📕 🏁

- ✅ Generating a new brick
- ✅ Anatomy of a brick
- ☑️ Brick template syntax
- ☑️ Hooks

Template Syntax

- Powered by Mustache 🤓
  - `package:mustache_template`
  - https://mustache.github.io/mustache.5.html

Template Syntax: Conditionals

__brick__/pubspec.yaml

```
{{^publish}}
publish_to: none
{{/publish}}

dependencies:
  flutter:
    sdk: flutter

  {{#useGoogleFonts}}
  google_fonts: latest
  {{/useGoogleFonts}}
```

pubspec.yaml

```
publish_to: none

dependencies:
  flutter:
    sdk: flutter

  google_fonts: latest
```

vars

```
{
  "publish": false,
  "useGoogleFonts": true
}
```

Template Syntax: Loops

__brick__/README.md

```
{{#platforms}}
{{.}}
{{/platforms}}
```

README.md

```
iOS

Android

Web
```

vars

```
{
  "platforms": ["iOS", "Android", "Web"]
}
```

Template Syntax: Lambdas

__brick__/{{name.snakeCase()}}.dart

```
import 'package:flutter/widgets.dart';

class {{name.pascalCase()}} extends StatelessWidget {
  const {{name.pascalCase()}}({super.key});

  @override
  Widget build(BuildContext context) {
    return const SizedBox();
  }
}
```

viking_ship.dart

```
import 'package:flutter/widgets.dart';

class VikingShip extends StatelessWidget {
  const VikingShip({super.key});

  @override
  Widget build(BuildContext context) {
    return const SizedBox();
  }
}
```

vars

```
{ "name": "viking ship" }
```

Built-in Lambdas

Name	Example	Shorthand Syntax	Full Syntax
camelCase	helloWorld	{{variable.camelCase()}}	{{#camelCase}}{{variable}}{{/camelCase}}
constantCase	HELLO_WORLD	{{variable.constantCase()}}	{{#constantCase}}{{variable}}{{/constantCase}}
dotCase	hello.world	{{variable.dotCase()}}	{{#dotCase}}{{variable}}{{/dotCase}}
headerCase	Hello-World	{{variable.headerCase()}}	{{#headerCase}}{{variable}}{{/headerCase}}
lowerCase	hello world	{{variable.lowerCase()}}	{{#lowerCase}}{{variable}}{{/lowerCase}}
mustacheCase	{{ Hello World }}	{{variable.mustacheCase()}}	{{#mustacheCase}}{{variable}}{{/mustacheCase}}
pascalCase	HelloWorld	{{variable.pascalCase()}}	{{#pascalCase}}{{variable}}{{/pascalCase}}
paramCase	hello-world	{{variable.paramCase()}}	{{#paramCase}}{{variable}}{{/paramCase}}
pathCase	hello/world	{{variable.pathCase()}}	{{#pathCase}}{{variable}}{{/pathCase}}
sentenceCase	Hello world	{{variable.sentenceCase()}}	{{#sentenceCase}}{{variable}}{{/sentenceCase}}
snakeCase	hello_world	{{variable.snakeCase()}}	{{#snakeCase}}{{variable}}{{/snakeCase}}
titleCase	Hello World	{{variable.titleCase()}}	{{#titleCase}}{{variable}}{{/titleCase}}
upperCase	HELLO WORLD	{{variable.upperCase()}}	{{#upperCase}}{{variable}}{{/upperCase}}

Template Syntax: Partials

Nested Templates within other templates

```
__brick__
  ├── HELLO.md
  ├── {{~ footer.md }}
  └── {{~ header.md }}
```

{{~ header.md }}

```
# 🧱 {{name}}
```

{{~ footer.md }}

```
_made with 💖 by mason_
```

HELLO.md

```
{{> header.md }}

Hello {{name}}!

{{> footer.md }}
```

Chapter 2: Checkpoint 📕 🏁

- ✅ Generating a new brick
- ✅ Anatomy of a brick
- ✅ Brick template syntax
- ☑️ Hooks

Hooks 🪝

Custom code that executes before or after generation

```
$ mason new example --hooks
```

```
.
├── CHANGELOG.md
├── LICENSE
├── README.md
├── __brick__
│   └── HELLO.md
├── brick.yaml
└── hooks
    ├── .gitignore
    ├── post_gen.dart
    ├── pre_gen.dart
    └── pubspec.yaml
```

Hooks Example: pre_gen.dart

```dart
// pre_gen.dart
import 'dart:io';
import 'package:mason/mason.dart';

void run(HookContext context) {
  // Read vars.
  final name = context.vars['name'];

  // Use the `Logger` instance.
  context.logger.info('Hello $name!');

  // Update vars.
  context.vars['current_year'] = DateTime.now().year;
}
```

Hooks Example: post_gen.dart

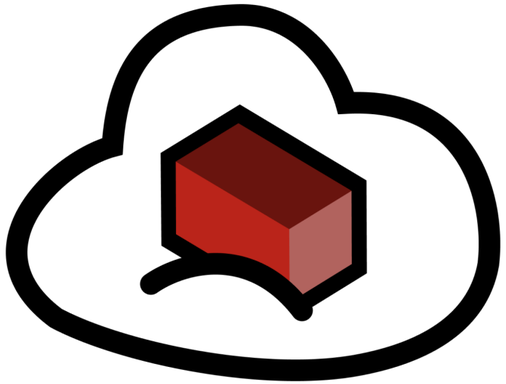
```dart
// post_gen.dart
import 'dart:io';
import 'package:mason/mason.dart';

Future<void> run(HookContext context) async {
  final progress = context.logger.progress('Installing packages');

  // Run `flutter packages get` after generation.
  await Process.run('flutter', ['packages', 'get']);

  progress.complete();
}
```

Chapter 2 Complete 📕 🥳

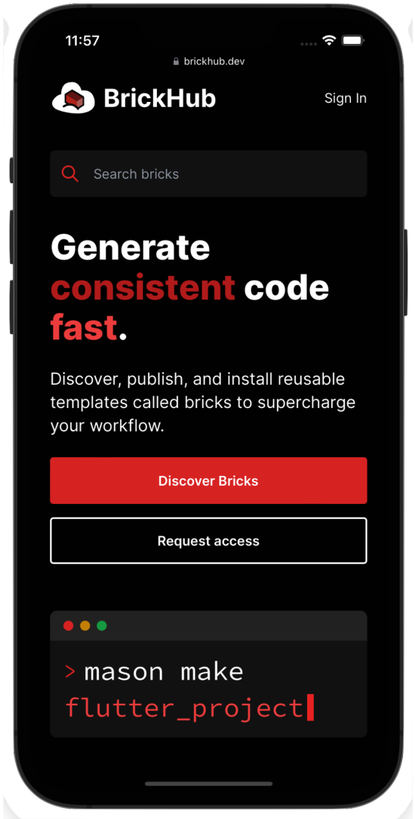
- ✅ Generating a new brick
- ✅ Anatomy of a brick
- ✅ Brick template syntax
- ✅ Hooks

Chapter 3: Brick Management 

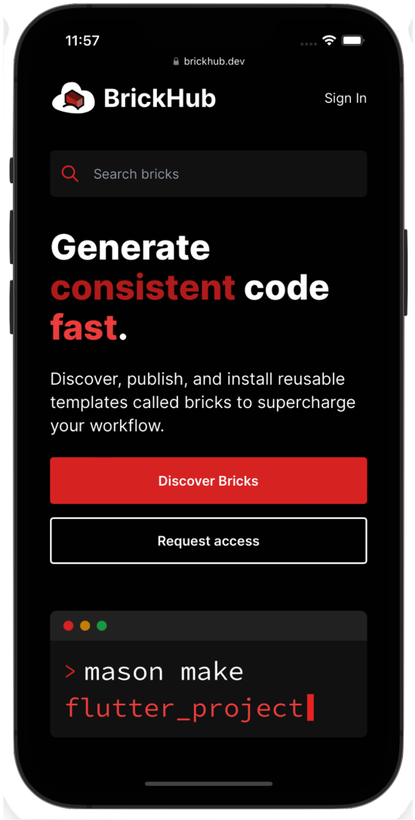
- ☑️ Intro to BrickHub
- ☑️ Publishing a brick
- ☑️ Adding / Removing bricks
- ☑️ IDE Integration



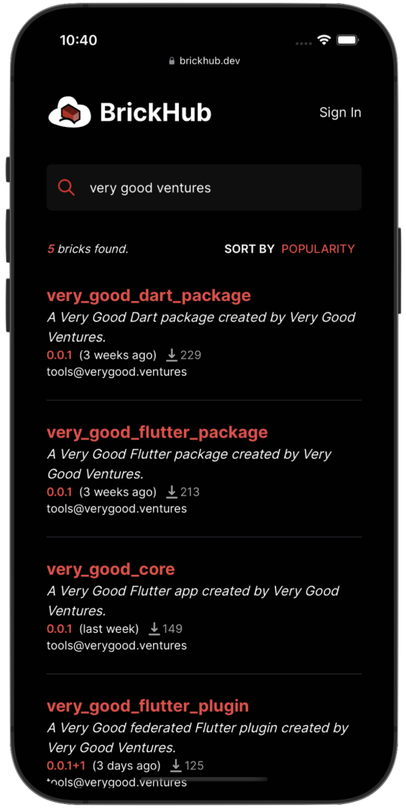
brickhub.dev


11:57
brickhub.dev
BrickHub
Sign In
Search bricks
Generate
consistent code
fast.
Discover, publish, and install reusable templates called bricks to supercharge your workflow.
Discover Bricks
Request access
> mason make
flutter_project

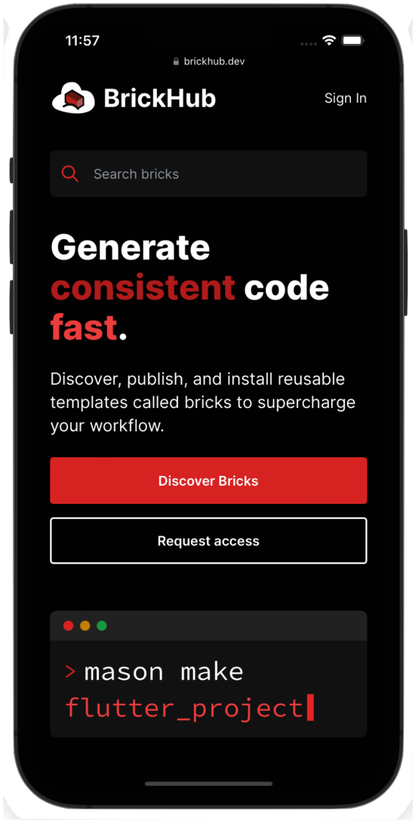
Install



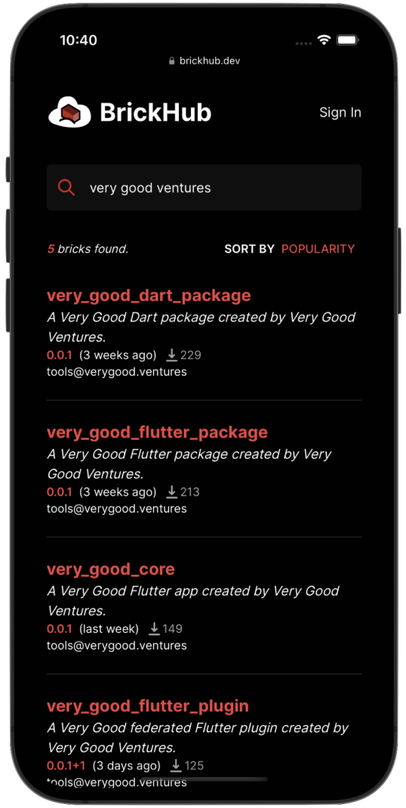
Install



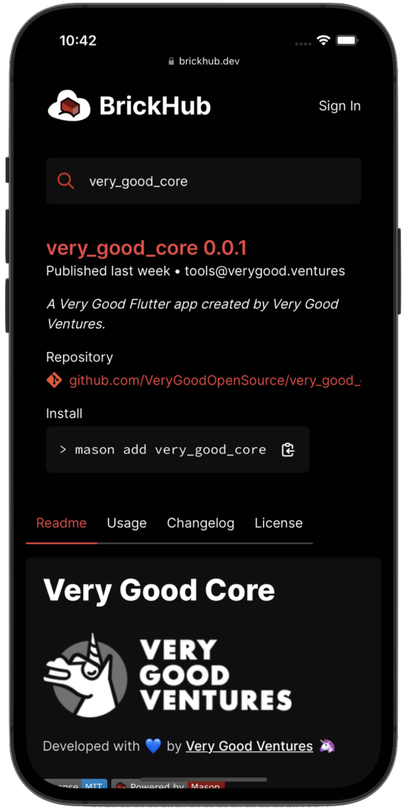
Discover



Install



Discover



✨ Publish ✨

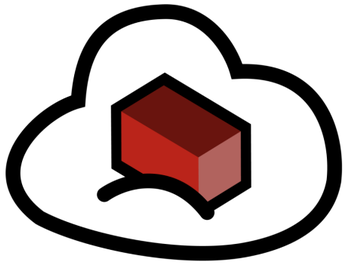
basic_flame_game
Creates a basic flutter application which displays a Flame Game.
0.1.0+1 (2 months ago) ↓ 258

flutterfire_starter
A template to have a quickstart with FlutterFire
0.1.0 (last month) ↓ 235

bloc
Generate a new Bloc in Dart. Built for the bloc state management library.
0.1.3+2 (last month) ↓ 685

model
A brick to create your model with properties and all the supporting methods, copyWith, to/from json, equatable and more!
0.3.7 (2 months ago) ↓ 6033

120+
bricks created



53,400+
brick downloads

feature_brick
A brick to create a feature using best practices and your state management of choice!
0.5.1 (2 weeks ago) ↓ 4400

amplify_starter
A highly opinionated AWS Amplify starter project with Authenticator, Amplify Datastore and bloc state management.
0.2.2 (3 weeks ago) ↓ 704

macosui_starter
A starter Flutter application for macOS that uses macos_ui
1.2.1+2 (last month) ↓ 828

github_actions_dart
A brick that simplifies generating Github actions for Dart/Flutter monorepos
0.0.11 (last month) ↓ 1304

Chapter 3: Checkpoint  🏁

- ✅ Intro to BrickHub
- ☑️ Publishing a brick
- ☑️ Adding / Removing bricks
- ☑️ IDE Integration

Signing Up ✍️

- 🙋 Request access at https://brickhub.dev
- 📪 Receive email invite
- ✍️ Sign up at https://brickhub.dev/signup
- 📧 Verify email

Logging In 🔐

Log into brickhub.dev

```
$ mason login
email: me@email.com
password: ******
✓ Logged into brickhub.dev (0.5s)
You are now logged in as <me@email.com>
```

Publishing a Brick 

Publish a brick to brickhub.dev

```
$ mason publish --directory ./my_brick
Do you want to publish my_brick 0.1.0+1? (y/N) y
✓ Bundled my_brick (0.1s)
✓ Published my_brick to brickhub.dev (0.1s)
```

Logging Out 🚪

Log out of brickhub.dev

```
$ mason logout
✓ Logged out of brickhub.dev (3ms)
```

Chapter 3: Checkpoint 📘 🏁

- ✅ Intro to BrickHub
- ✅ Publishing a brick
- ☑️ Adding / Removing bricks
- ☑️ IDE Integration

Adding Bricks to Workspace 🗃️

```
# Install example from path
$ mason add example --path ./example
```

mason.yaml

```yaml
bricks:
  example:
    path: ./example
```

Adding Bricks to Workspace 🗃️

```
# Install widget from git
$ mason add widget
  --git-url https://github.com/felangel/mason
  --git-path bricks/widget
```

mason.yaml

```yaml
bricks:
  widget:
    git:
      url: https://github.com/felangel/mason
      path: bricks/widget
```

Adding Bricks to Workspace 🗃️

```
# Install amplify_starter from https://brickhub.dev
$ mason add amplify_starter
```

mason.yaml

```yaml
bricks:
  amplify_starter: ^0.2.2
```

Let's List 'em 🗒️

```
$ mason ls
/me/mason_playground
├── amplify_starter 0.2.2 -> registry.brickhub.dev
├── example 0.1.0+1 -> /me/mason_playground/example
└── widget 0.1.0+1 -> https://github.com/felangel/mason

$ cd /me/dart_playground
$ mason ls
/me/dart_playground
└── (empty)
```

Adding Bricks Globally 🌎

Globally installed bricks can be used from anywhere on your machine

```
# Install example from path
$ mason add -g example --path ./example

# Install widget from git
$ mason add -g widget
  --git-url https://github.com/felangel/mason
  --git-path bricks/widget

# Install amplify_starter from https://brickhub.dev
$ mason add -g amplify_starter
```

Listing Global Bricks 🌎

```
$ cd /me/dart_playground

$ mason ls
/me/dart_playground
└── (empty)

$ mason ls -g
/me/.mason-cache/global
├── amplify_starter 0.2.2 -> registry.brickhub.dev
├── example 0.1.0+1 -> /me/mason_playground/example
└── widget 0.1.0+1 -> https://github.com/felangel/mason
```

Removing Bricks 🗑️

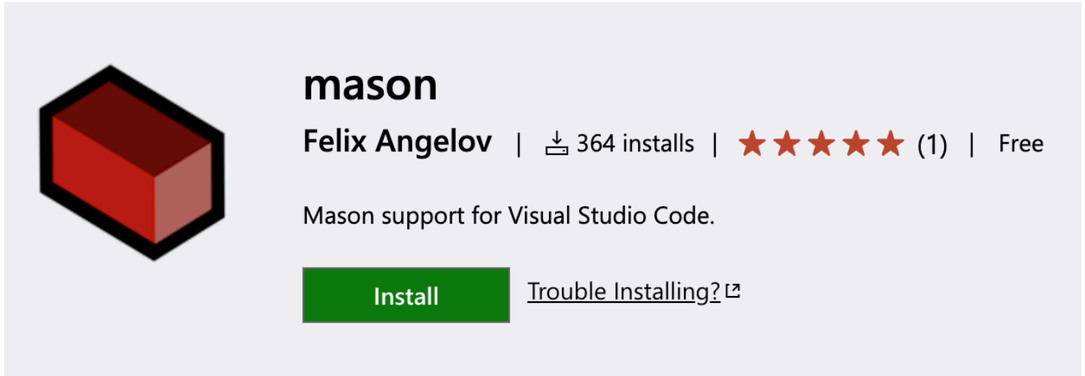
```
# Remove local brick
$ mason remove example
✓ Removed example (22ms)

# Remove global brick
$ mason remove -g widget
✓ Removed widget (21ms)
```

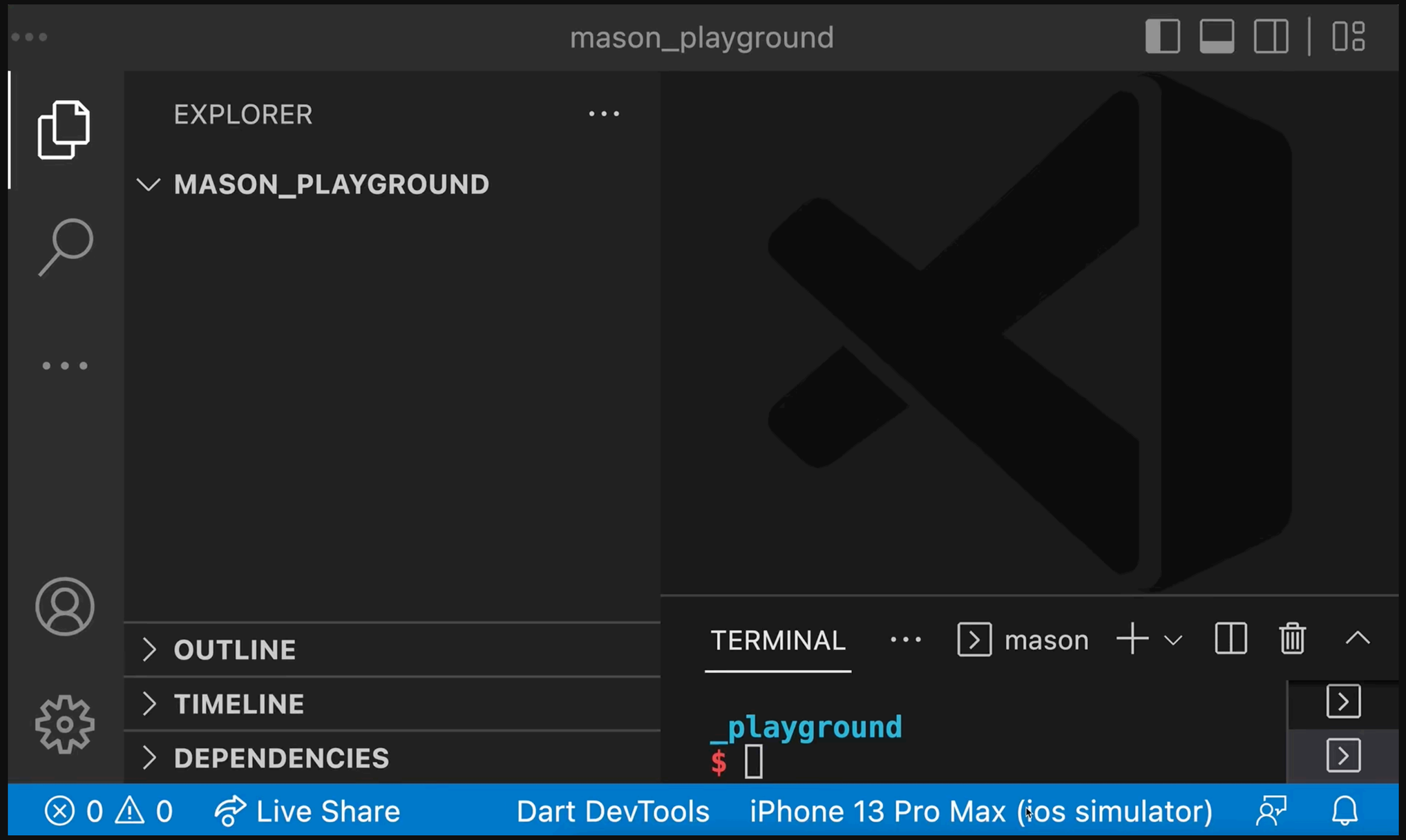
Chapter 3: Checkpoint 📘 🏁

- ✅ Intro to BrickHub
- ✅ Publishing a brick
- ✅ Adding / Removing bricks
- ☑️ IDE Integration

IDE Integration ⚡

- `mason init` command
- `mason add` and `mason remove` commands
- `mason make` via right-click
- `mason get` on save




mason_playground
EXPLORER
MASON_PLAYGROUND
OUTLINE
TIMELINE
DEPENDENCIES
TERMINAL
mason
_playground
$
0 0
Live Share
Dart DevTools
iPhone 13 Pro Max (ios simulator)

Chapter 3: Complete  

- ✅ Intro to BrickHub
- ✅ Publishing a brick
- ✅ Adding / Removing bricks
- ✅ IDE Integration

Now ⏳

When a new teammate joins and picks up a new feature...

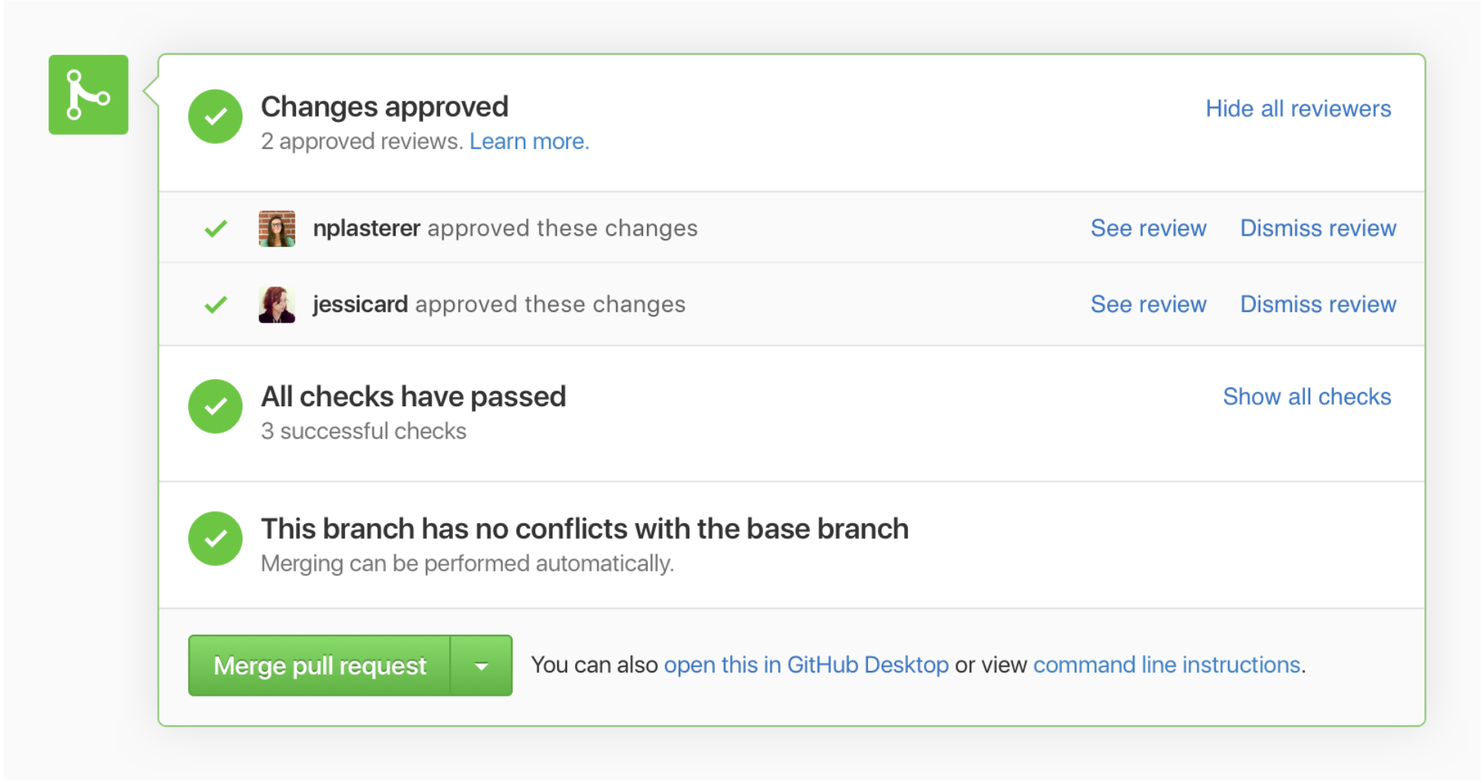
Now ⏳

Use mason to generate a new feature...

```
$ mason make feature_brick
? What is the feature name? login
✓ Made brick feature_brick (0.3s)
✓ Generated 8 file(s):
  /me/mason_playground/my_app/lib/login/widgets/login_body.dart (new)
  /me/mason_playground/my_app/lib/login/view/login_page.dart (new)
  /me/mason_playground/my_app/lib/login/bloc/login_event.dart (new)
  /me/mason_playground/my_app/lib/login/bloc/login_state.dart (new)
  /me/mason_playground/my_app/lib/login/widgets/widgets.dart (new)
  /me/mason_playground/my_app/lib/login/login.dart (new)
  /me/mason_playground/my_app/lib/login/bloc/bloc.dart (new)
  /me/mason_playground/my_app/lib/login/bloc/login_bloc.dart (new)
```

Now ⏳

And get that pull request merged efficiently 🎉



Let's Recap 

- Mason allows us to generate code:
  - ✅🔁 Consistently
  - ✅⚡ Fast
  - ✅🧩 Customizable
  - ✅📦 Reusable

Roadmap 

- Multiple Template Engine Support
- Template Extensions
- Multiple Publishers
- IntelliJ Plugin

Thank You!

Twitter @felangelov
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