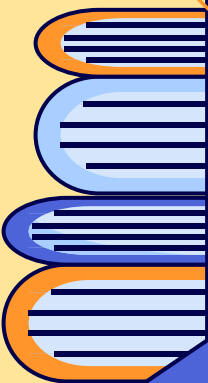
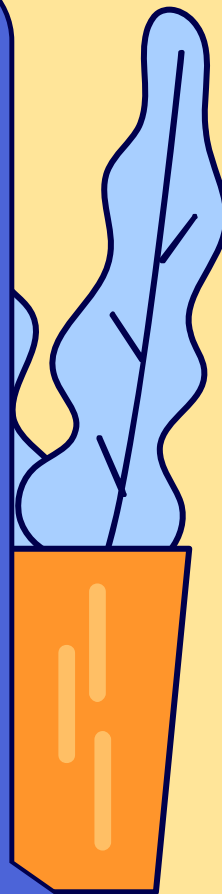


CONTINUOUS INTEGRATION

In Web Application Development
with Vanilla TypeScript



PROGRAMMING INTERACTIVE APPLICATIONS



OUR TEAM



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INTRODUCTION TO CI

Brief explanation about the
CI (Continuous Integration)

02

CI TOOLS

Tools that use
Continuous Integration

03

GITHUB ACTIONS

04

BIBLIOGRAPHY

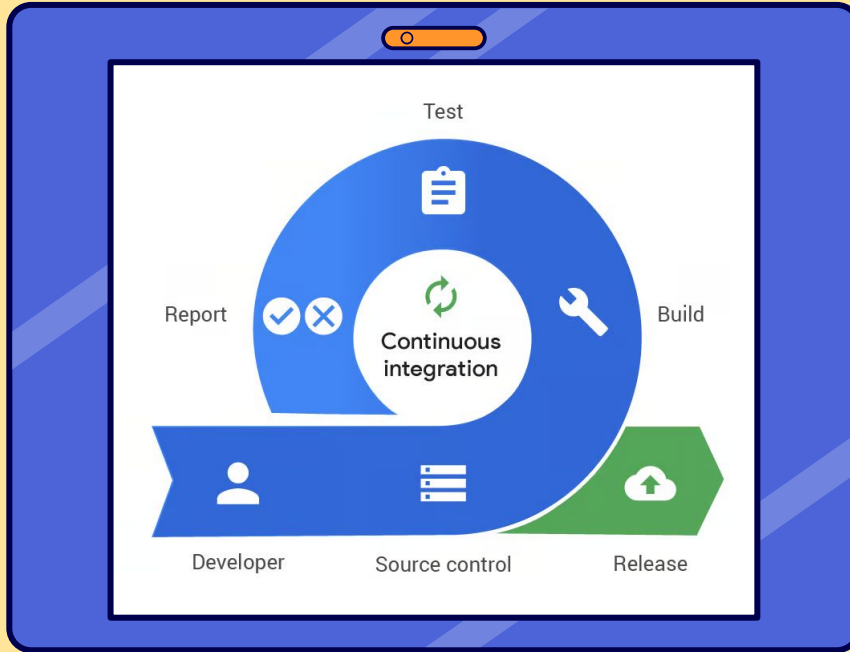
Resources used during
the presentation

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01

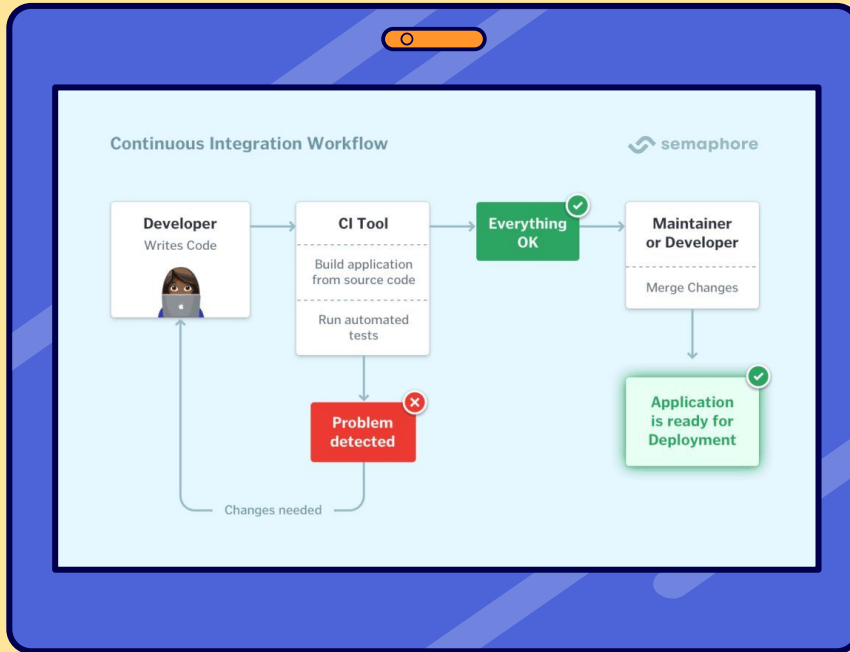
INTRODUCTION TO CI

What is Continuous Integration (CI)?



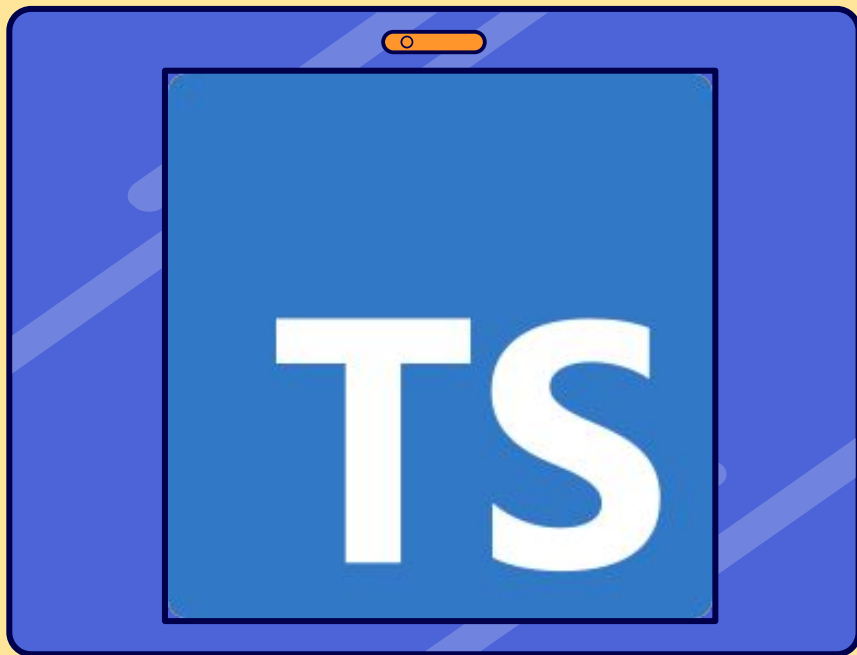
- Improve software quality & accelerate delivery
- Enable simultaneous work in a project
- Automatic processes that validate code stability through:
 - Compilation
 - Testing
 - Etc.

Benefits of using CI?



- Early detection of errors
- Reduction of integration time
- Greater transparency and confidence in the code
- Automation of repetitive tasks

CI with Vanilla TS projects



- Code is transpiled (TypeScript → JavaScript).
- Style rules defined by linters (ESLint or TSLint).
- Unit tests executed using tools (Jest or Vitest)
- Code ready to be deployed to production (GitHub Pages or Vercel).





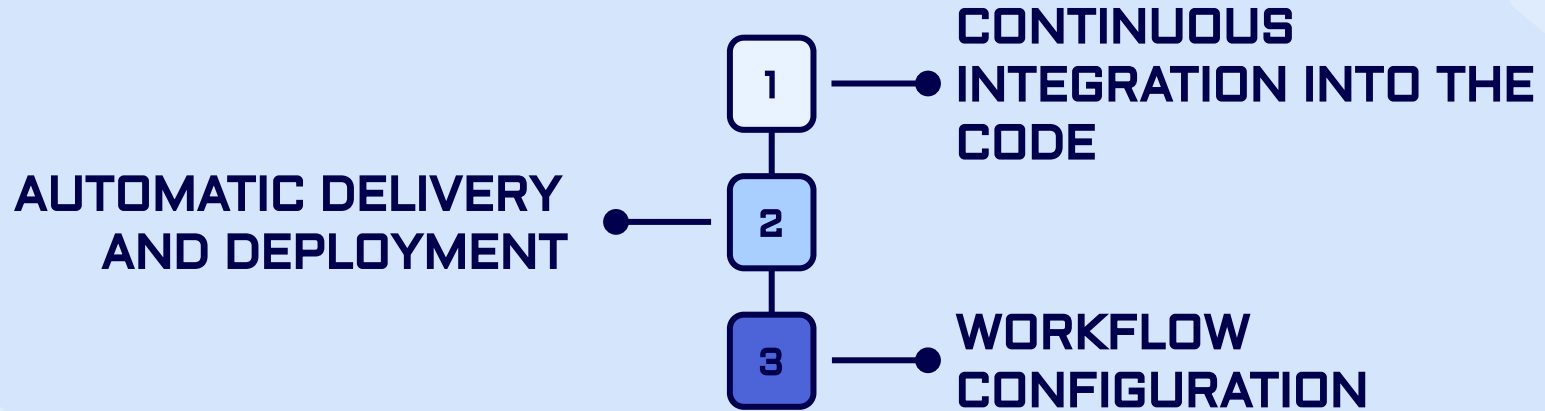
02

CI TOOLS

WHAT IS GITLAB-CI?



WHAT IT IS USED FOR



WHAT LANGUAGES CAN USE THIS TOOL?



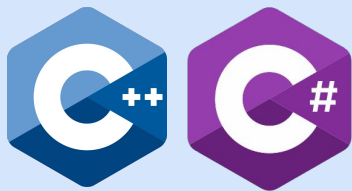
PYTHON



JAVA



JAVASCRIPT/NODE JS



C/C++/C#

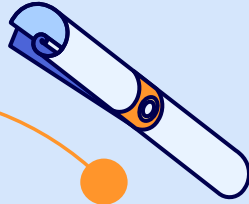


RUBY



TYPESCRIPT

GETTING STARTED WITH GITLAB-CI



CREATE THE CONFIGURATION FILE



`.gitlab-ci.yml`

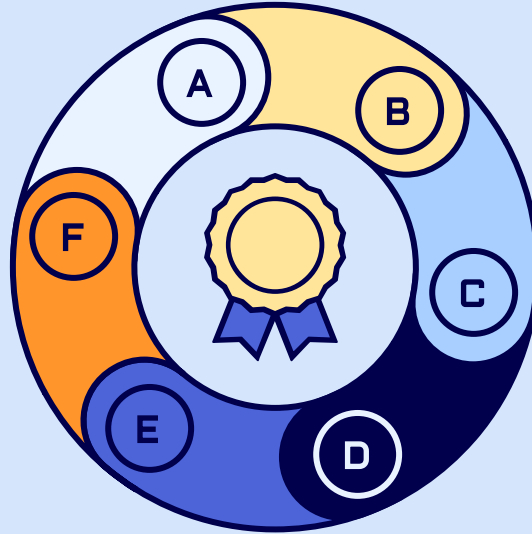
SELECT THE GITHUB REPOSITORY

→ We import or create the repository in
gitlab-ci

<https://gitlab.com/frannelfran>

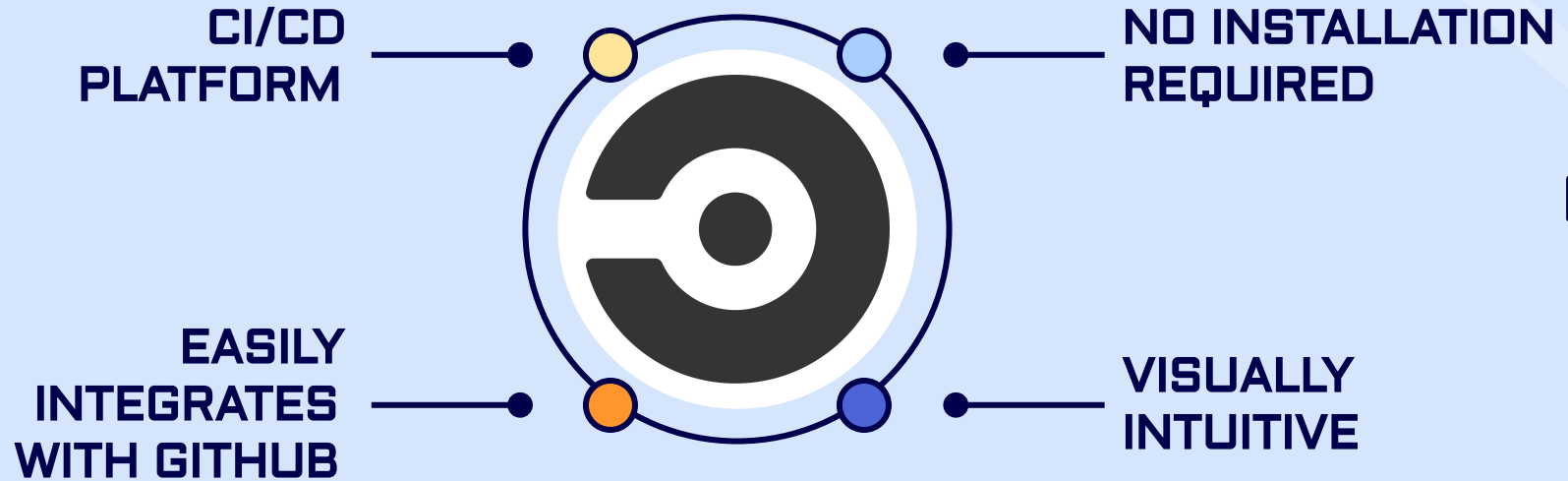
ADVANTAGES AND DISADVANTAGES

- NATIVE INTEGRATION WITH GITLAB
- CUSTOM PIPELINE CONFIGURATION
- TRANSPARENCY AND TRACEABILITY OF THE PROCESS

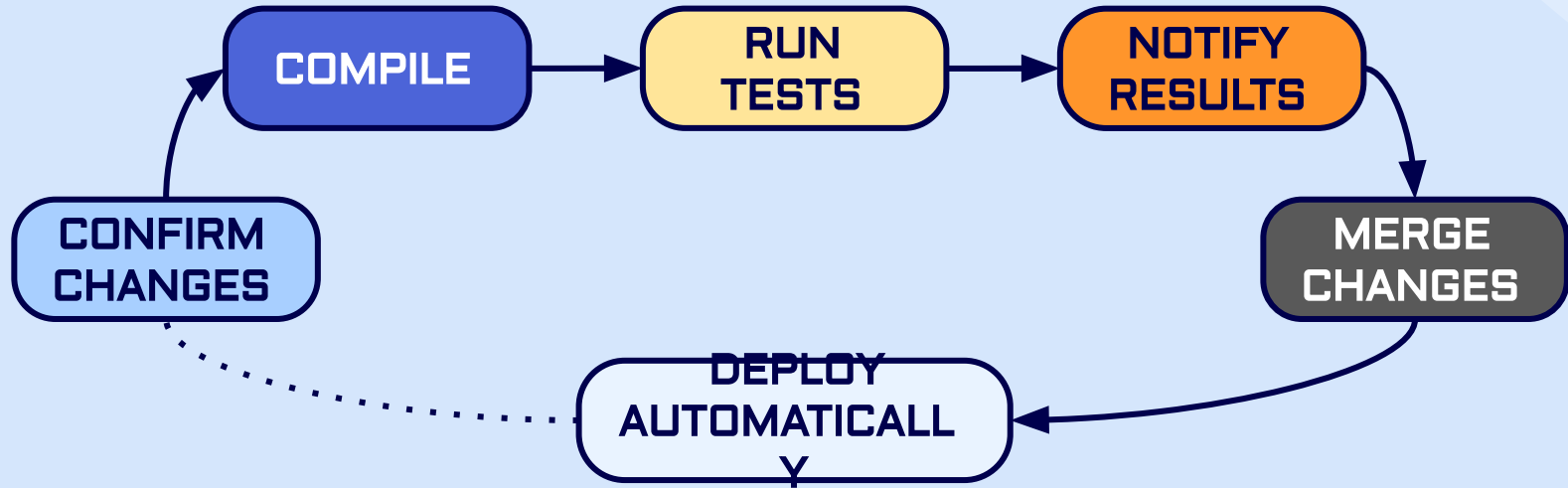


- DEPENDENCE ON THE PLATFORM
- STEEP LEARNING CURVE
- MAJOR MAINTENANCE DEMANDS

WHAT IS CIRCLECI?



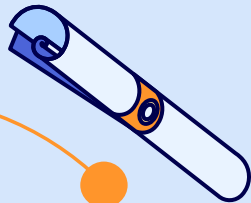
FULL SOFTWARE DEVELOPMENT LIFECYCLE



LANGUAGES & EXECUTION ENVIRONMENTS



GETTING STARTED WITH CIRCLECI



CREATE THE CONFIGURATION FILE



`.circleci/config.yml`

YAML format

SELECT THE GITHUB REPOSITORY

→ Every push starts a workflow now

DON'T FORGET!

Link your GitHub account in
Account Integrations



GitHub

Build and deploy your GitHub repositories.



Connected to **naileacg**

Disconnect

Can't find an organization? [Check permissions and update access to the ones you want on GitHub](#)

Not a GitHub organization admin? [Learn how to request access](#)

but, wait...

THERE'S A PROBLEM

How do we integrate CircleCI
into our PAI practices?





SOLUTION



1

● Fork the repository to your GitHub account

2

● Follow [this tutorial](#) to create a project in CircleCI

RESULTS

→ Auto-generated configuration file

→ New branch created for CircleCI setup

→ Triggers defined

i We'll commit `config.yml` to a **new .circleci directory** on a **new branch** called **circleci-project-setup**.

🔗 Pipeline name
build-and-test

</> Code
🔄 2024-2025-pai-p09-function-rendering-naileacg

📄 Config File
We'll commit `config.yml` to a new **.circleci directory** in
🔄 2024-2025-pai-p09-function-rendering-naileacg / 🌐 circleci-project-setup

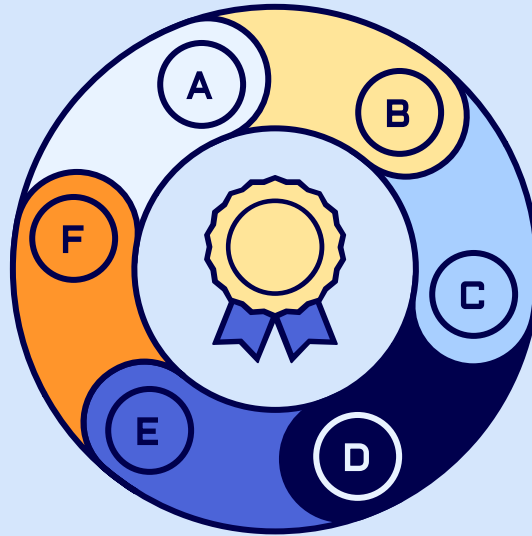
```
> .circleci/config.yml
```

⚡ Triggers

🔄 All pushes on 2024-2025-pai-p09-function-rendering-naileacg

ADVANTAGES AND DISADVANTAGES

- VERY INTUITIVE & CLEAR VISUALIZATION
- GOOD PERFORMANCE
- CUSTOM ENVIRONMENTS
- WELL-DOCUMENTED



YAML SYNTAX
CAN BE
TRICKY

LIMITED FREE
USAGE

PRIVATE REPO
LIMITATIONS

What is Jenkins?

**CI/CD OPEN
CODE TOOL**

**WIDELY USED IN
SOFTWARE
DEVELOPMENT**

**NOT LINKED TO
ANY
PLATFORM**

**INTEGRATED
WITH PLUGINS**



WHAT IT IS USED FOR

INTEGRATED WITH
ALMOST ANY
DEVELOPMENT TOOL:
REPOSITORIES, CLOUD
SERVICES, ETC.



MANAGE COMPLEX
PIPELINES TO ADAPT THE
TEAM'S WORKFLOWS

WORKFLOW
CONFIGURATION

WHAT LANGUAGES CAN USE THIS TOOL?



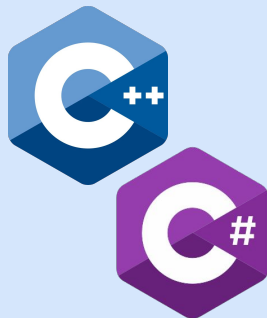
PYTHON



JAVA/KOTLIN



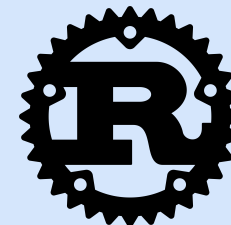
JAVASCRIPT/NODE JS



C/C++/C#

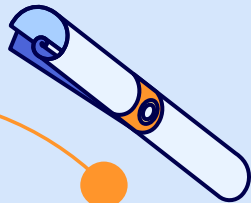


RUBY



RUST

GETTING STARTED WITH JENKINS



TRADITIONAL WAY



Create jobs via
graphic interface

MODERN WAY



Using pipelines in Jenkinsfile

TOOLS OVERVIEW

	Hosting	Repositories	Complexity
GitLab CI/CD	Cloud & Self-hosted	GitLab	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>
CircleCI	Cloud	GitHub / Bitbucket	<input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>
Jenkins	Self-Hosted	Not linked to any	<input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>

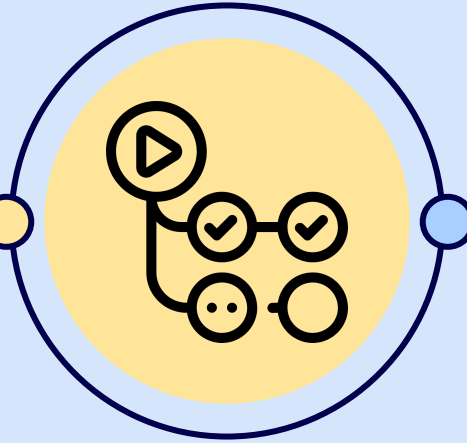
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03

GITHUB ACTIONS

WHAT ARE GITHUB ACTIONS?

**AUTOMATE
WORKFLOWS**



**DESIGNED
MAINLY FOR
CI/CDC**

WHAT DOES THAT MEAN?

For example, you can have a script run automatically every time

01



**A BRANCH IS
PUSHED**

02



**A PULL
REQUEST IS
CREATED**

03



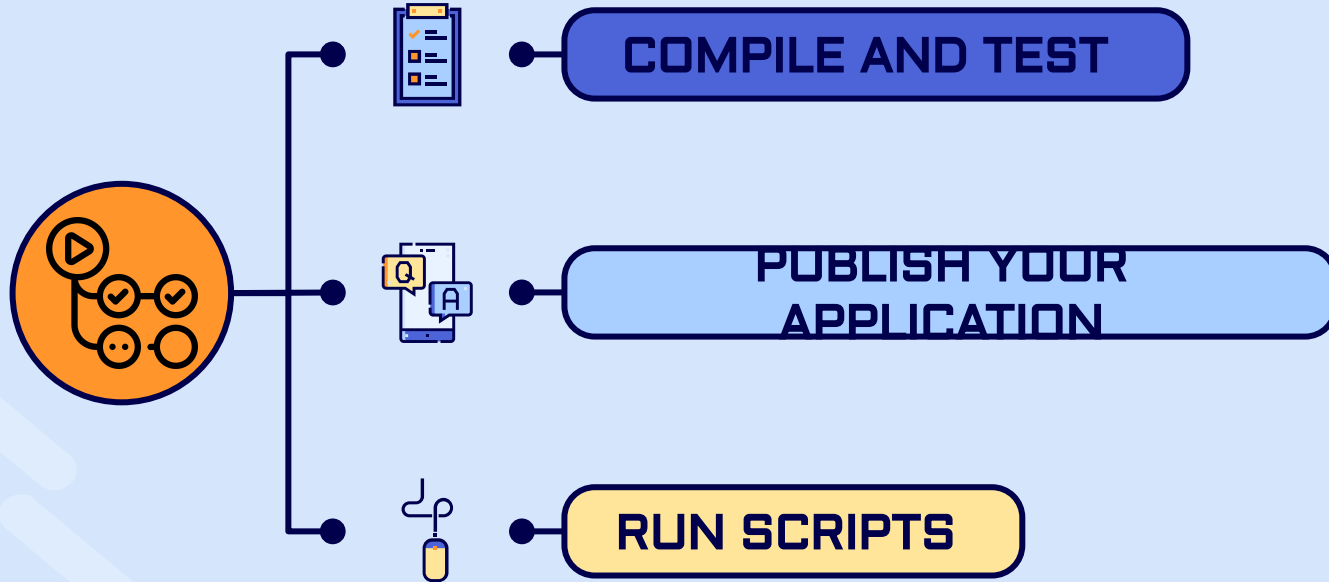
**A RELEASE IS
PUBLISHED**

04



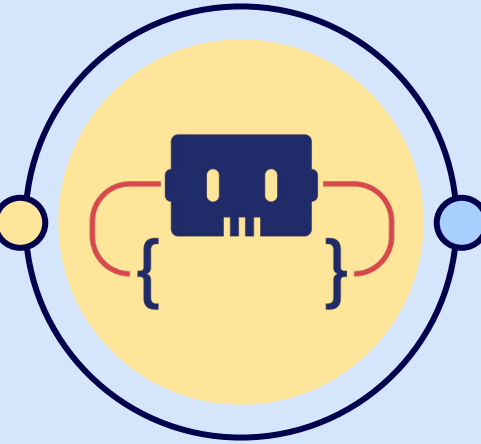
**OR EVEN AT
SPECIFIC
TIMES**

WHAT YOU CAN DO WITH GITHUB ACTIONS?



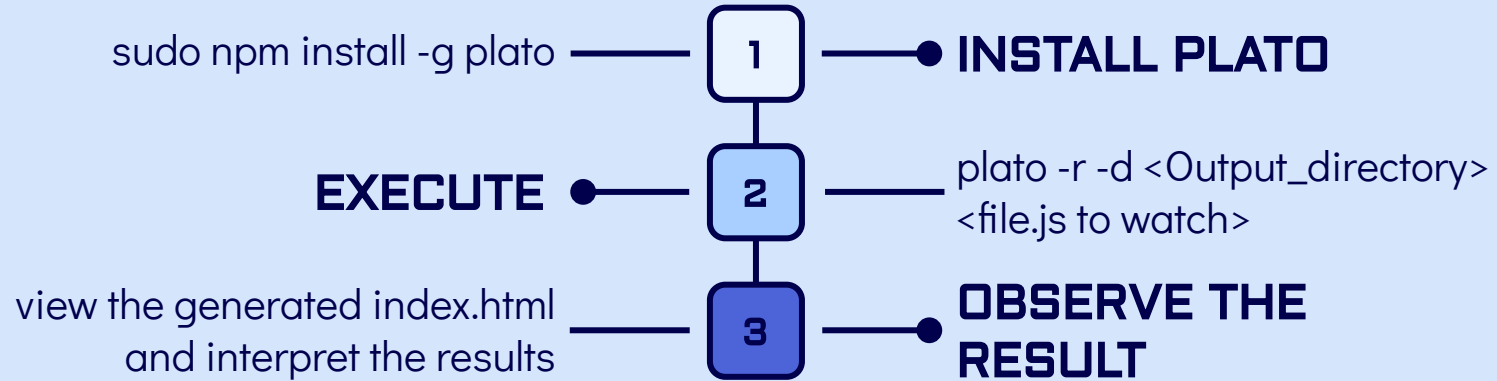
WHAT ARE CODE SMELLS?

**INDICATORS
OF DESIGN
PROBLEMS**



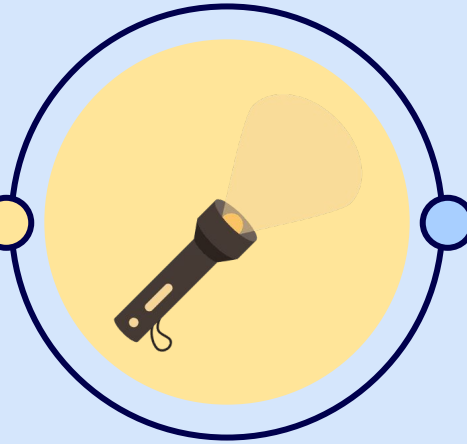
**THEY ARE NOT
MISTAKES**

HOW TO USE IT?



WHAT IS LINTER?

**STATIC
ANALYSIS
TOOL**



**DETECT
ERROR,
INCONSISTE
NCIES AND
MORE...**

WHAT PROBLEMS CAN BE POINTED OUT

01

**SYNTAX
ERRORS**

02

**INAPPROPRIATE
USE OF CONTROL
STRUCTURES**

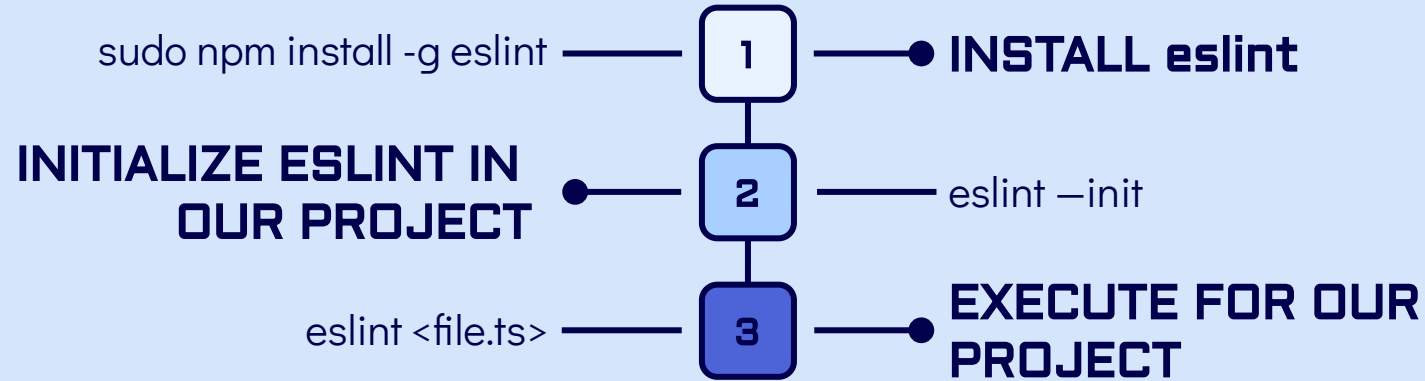
03

**INCORRECT
NAME
VARIABLES**

04

**FORMATTING
AND STYLE
ISSUES**

HOW TO USE IT?



TESTING AND COVERAGE

**AUTOMATED
TEST
EXECUTION**



**MEASURE
CODE
COVERAGE**

HOW TO USE IT?

`npm install --save-dev jest
ts-jest @types/jest`

1

● **INSTALL JEST**

CONFIGURE TESTING

2

With `jest.config.ts` file and the
actual test files

`npm test -- --coverage`

3

● **EXECUTE TESTS**

**OBSERVE THE
RESULT**

4

view the generated `index.html`
and interpret the results

WHAT ARE GITHUB PAGES?

STATIC SITE
HOSTING
SERVICE
STRAIGHT
FROM A
REPOSITORY
ON GITHUB

GitHub Pages

RUNS THE
FILES
THROUGH A
BUILD
PROCESS, AND
PUBLISHES A
WEBSITE

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04

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<https://circleci.com/docs/create-project/>

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<https://github.com/features/actions>



THANKS!

Do you have any **questions?**

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- raul.gonzalez.33@ull.edu.es

