

# Tester avec Robot Framework

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APPUYER SUR LA BARRE D'ESPACE OU LES FLÈCHES POUR DÉMARRER

# Tour de table

- Expérience testeur
- Expérience avec Robot Framework
- Expérience dev
- Attente vis à vis de cette formation ?

# Qui suis-je ?

- Rémi PICARD
- Dev Scala Cobalt
- 4 ans chez Nickel
- 4 ans d'expérience avec Robot Framework 🤖
- Passionné par les technos Web, Data et DevOps
- 13 ans d'expérience dans l'IT 💡
- Joueur d'échecs ♟



# Découverte de Robot Framework

**Robot Framework => "Robot"**  
**RF / RBF / RBT**

# Plan

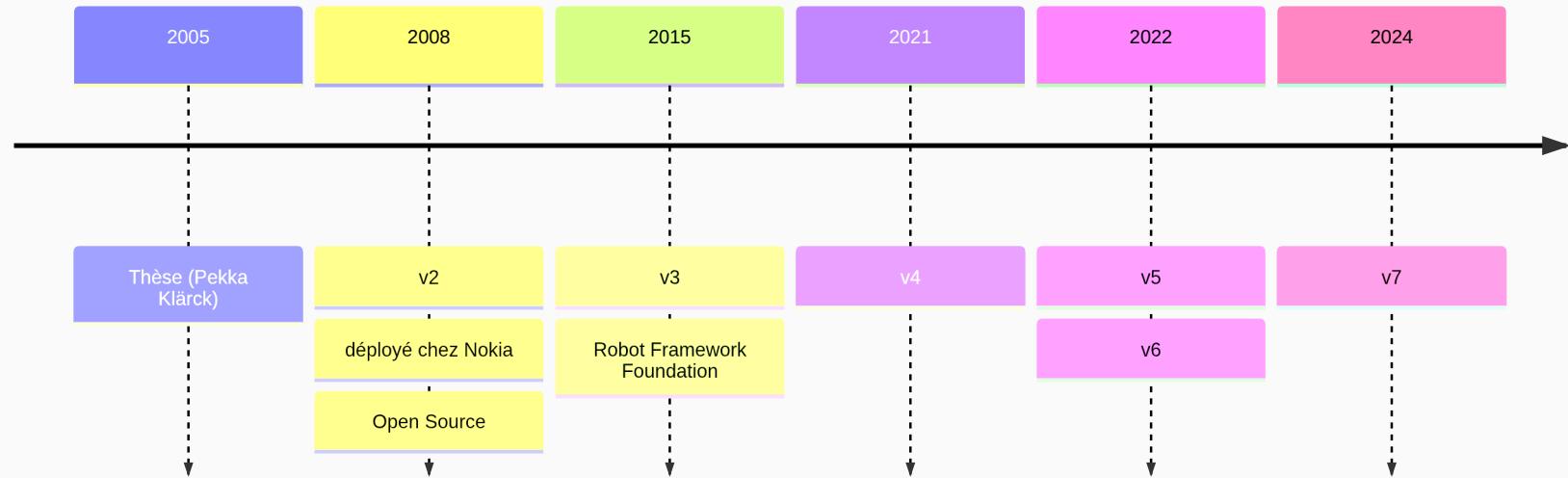
- Généralités
- Rappels Python
- Comprendre le fonctionnement de Robot
- Installer l'env de dev
- Apprendre le langage Robot
- Découvrir la ligne de commande `robot`
- Codelab Tests API
- Codelab Tests UI avec Playwright

# Présentation

- Outil d'automatisation
- Langage
- Open Source codé en Python
- Fonctionnalités clefs en main (assertions, rapport de tests...)
- Extensible via des librairies Robot Framework (HTTP, JSON, SQL, Kafka ...)
- Extensible via des librairies Python

# Histoire

## 20 ans déjà !

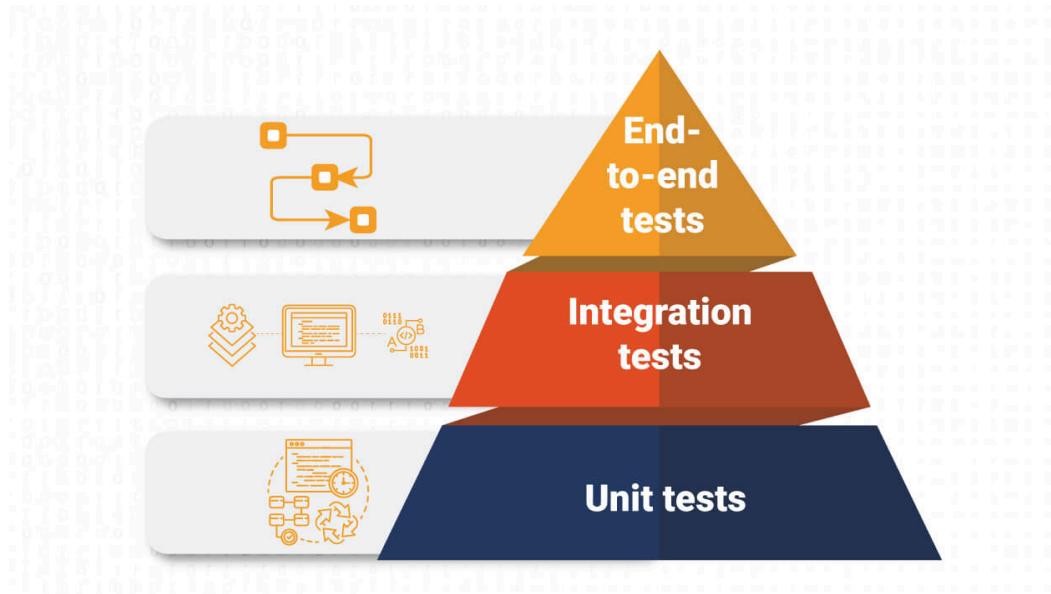


# Communauté

- Slack
- RoboCon / RBCN : conférence annuelle à Helsinki 
- [Documentation](#)

# Pyramide des tests

## Tests End-To-End

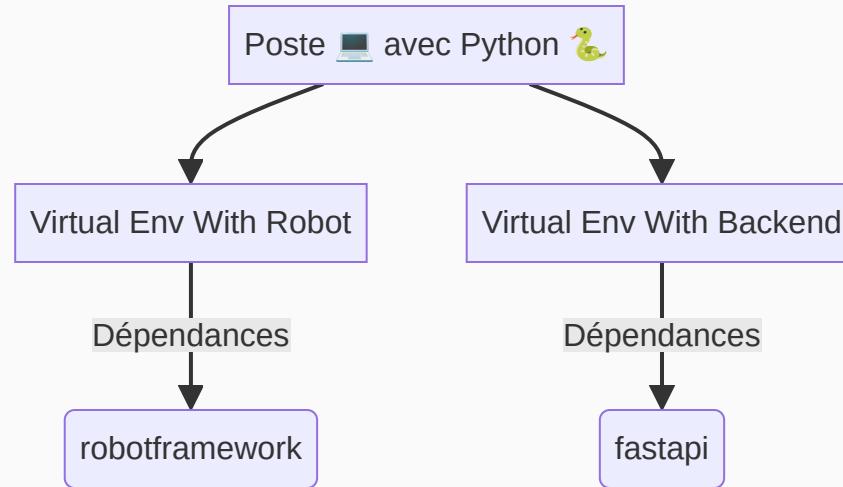


Source: <https://blog.takima.fr/saffranchir-de-la-pyramide-des-tests/>

**Env de dev** 

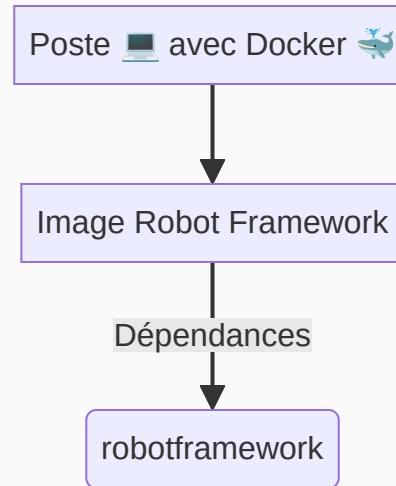
# Installation

## Python Virtual Environment



### Python Virtual Environment

# Installation Docker



# Installation PyCharm / VSCode

Set up your IDE

# Codelab



- [Installation env de dév](#)
- [Hello World](#)
- [Configuration IDE](#)

# Développer avec Python 🐍

## Rappels

# Types natifs

| Type     | Mot-clé  | Exemple                             |
|----------|----------|-------------------------------------|
| Entier   | int      | 42 , -17 , 0                        |
| Flottant | float    | 3.14 , 2.5e-3                       |
| Booléen  | bool     | True , False                        |
| Chaîne   | str      | "Hello" , 'World'                   |
| Tableau  | list     | ["Hello" , "World"]                 |
| Map      | dict     | {"key": "value" , "key2": "value2"} |
| Aucun    | NoneType | None                                |

[Documentation](#)

# Méthodes

```
1 def ma_fonction(arg1: int, arg2: str, default_arg="default", *args, **kwargs) -> int:
2     # ...
3     return 42
4
5 ma_fonction(42, "Quarante-deux")
6 ma_fonction(42, "Quarante-deux", "override default value")
7 ma_fonction(42, "Quarante-deux", "default", 1, 2, 3)
8 ma_fonction(42, "Quarante-deux", "default", robot="Nono", john="Doe")
9 ma_fonction(42, "Quarante-deux", "default", 1, 2, 3, robot="Nono", john="Doe")
```

# Développer avec Robot Framework

## Tests, Variables, Keyword, Python, Structure ...

# Tests

- fichier `*.robot`
- indentation comme en Python 
- ensemble de phrases 
- Section `*** Test Cases ***`
- Import librairies dans `*** Settings ***`

# Tests

## Déclaration

```
1 *** Settings ***
2 Library      String
3
4 *** Test Cases ***
5 Mon Premier Test
6     ${chaine}=  Generate Random String    10
7     Log      Hello ${chaine}
```

# Variables

- Même types qu'en Python 
- Syntaxe  `${...}` (comme en Bash)
- Création dans un Test ou Keyword
- Création en global dans la section  `*** Variables ***`
- Import des variables Python possible

# Variables

## Section Variables

```
1 *** Variables ***
2 ${nombre}      42
3 ${chaine}      Ma chaîne de caractères
4 @{tab}          1  2  3
5 &{map}          clef1=valeur1    clef2=valeur2
6
7 *** Test Cases ***
8 Teste Variables
9     Log    nombre=${nombre}
10    Log    chaine=${chaine}
11    Log    tab=${tab}
12    Log    map=${map}
```

## Variables

# Variables

## Déclaration

```
1 *** Test Cases ***
2 Creation Variable
3     ${ma_variable}    Set Variable    C3PO
4     Log    ma_variable=${ma_variable}
5
6     # Nouvelle syntaxe RF>=7.0
7     VAR    ${ma_variable}    C3PO
8     Log    ma_variable=${ma_variable}
```

# Variables

## Portée

- Local \${hi} = Set Variable Hello
- Test Set Test Variable \${HI} Hello
- Suite Set Suite Variable \${HI} Hello
- Global Set Global Variable \${HI} Hello
- 💡 Limiter au maximum la portée
- Nouvelle syntaxe (uniforme): VAR \${variable} scope=SUITE

# Variables

## Syntaxe VAR

It is recommended to use the VAR syntax introduced in Robot Framework 7.0 for creating variables in different scopes instead of the Set Global/Suite/Test/Local Variable keywords.

### BuiltIn

# Variables

## Import YAML

- option --variablefile / -V
- robot --variablefile conf/local.yaml tests/14-variablefile.robot

# Variables

## Option CLI

- option --variable / -v
- robot --variable env:LOCAL tests/14-variable.robot

# Variables

## Import Python

```
1 # resources/mes_variables_python.py  
2 variable_python = 42
```

```
1 *** Settings ***  
2 Variables      resources/mes_variables_python.py  
3  
4 *** Test Cases ***  
5 Utiliser Variable Python  
6     Log      variable_python=${variable_python}
```

# Variables

## ENV

- Syntaxe `%{VARIABLE_ENV=default_value}`

# Injection Python



## Evaluate

```
1 *** Test Cases ***
2 Teste Evaluate
3     ${nb}=    Evaluate    41 + 1
4     Log      nb=${nb}
5
6 Teste Evaluate Autre Syntaxe
7     ${nb}=    Set Variable   ${${41 + 1}}
8     Log      nb=${nb}
```

# Keyword Concept

- Ensemble de mots clés (séparés par 1 espace)
- Forme une phrase 
- Représente une **action** 
- Déclaré dans la section `*** Keywords ***`
- Robot Framework traduit les phrases en appels Python 

# Keyword

## Syntaxe Robot Framework

```
1 *** Keywords ***
2 Mon Premier Keyword
3     Log    Hello World
4
5 Mon Premier Keyword Avec Argument
6     [Arguments]    ${name}
7     Log    Hello ${name}
8
9 Mon Premier Keyword Avec Argument Et Return
10    [Arguments]   ${name}
11    Log    Hello ${name}
12    RETURN    42
```

# Keyword

## Arg dans Keyword

```
1  *** Keywords ***
2  Keyword Avec ${arg1} Intégré
3      Log    Hello ${arg1}
4
5  Keyword Avec ${arg1} Intégré Et Arguments
6      [Arguments]    ${name}
7      Log    Hello ${arg1}, ${name}
8
9  *** Test Cases ***
10 Appel Keywords
11     ${arg1}    Set Variable    Ma Variable
12     Keyword Avec ${arg1} Intégré
13     Keyword Avec ${arg1} Intégré Et Arguments    Arg2
```

# Keyword

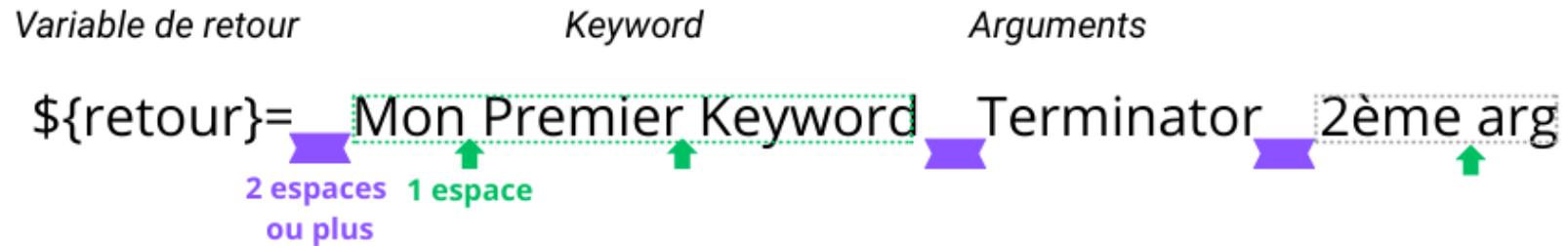
## List (args) / Dict (kwargs)

```
1 *** Keywords ***
2 Keyword Avec Args
3     [Arguments]    @{list}
4     FOR    ${i}    IN    @{list}
5         Log    i=${i}
6     END
7
8 Keyword Avec Kwargs
9     [Arguments]    &{map}
10    FOR    ${k}    ${v}    IN    &{map}
11        Log    key=${k}, value=${v}
12    END
13
14 *** Test Cases ***
15 Appel Keywords
16     # ${list}    Create List    1    2    3
17     VAR    @{list}    1    2    3
18     Keyword Avec Args    ${list}
19
20     # ${map}    Create Dictionary    cle1=valeur1    cle2=valeur2
21     VAR    &{map}    cle1=valeur1    cle2=valeur2
22     Keyword Avec Kwargs    &{map}
```

# Keyword

## Gestion des espaces

- **1 espace** entre chaque mot
- **2 espaces ou +** (ou **tabulation**) entre chaque argument



# Keyword

## Gestion des chaînes

- inutile de mettre des " ou des ' autour des chaînes de caractère

# Keyword Appel

```
1 *** Test Cases ***
2 Mon Premier Test
3     Mon Premier Keyword
4         Mon Premier Keyword Avec Argument      Nono le petit robot
5             ${retour}=    Mon Premier Keyword Avec Argument Et Return    Terminator
6
7 *** Keywords ***
8 Mon Deuxième Keyword
9     Mon Premier Keyword
```

# Keyword Syntaxe Python

```
1 # mon_keyword.py
2 # Mon Premier Keyword
3 def mon_premier_keyword():
4     print("Hello World")
5
6 # ${retour}=    Mon Premier Keyword Avec Argument Et Return    ${name}
7 def mon_premier_keyword_avec_argument_et_return(name) -> int:
8     print(name)
9     return 42
```

\*\*\* Settings \*\*\*

Library mon\_keyword.py

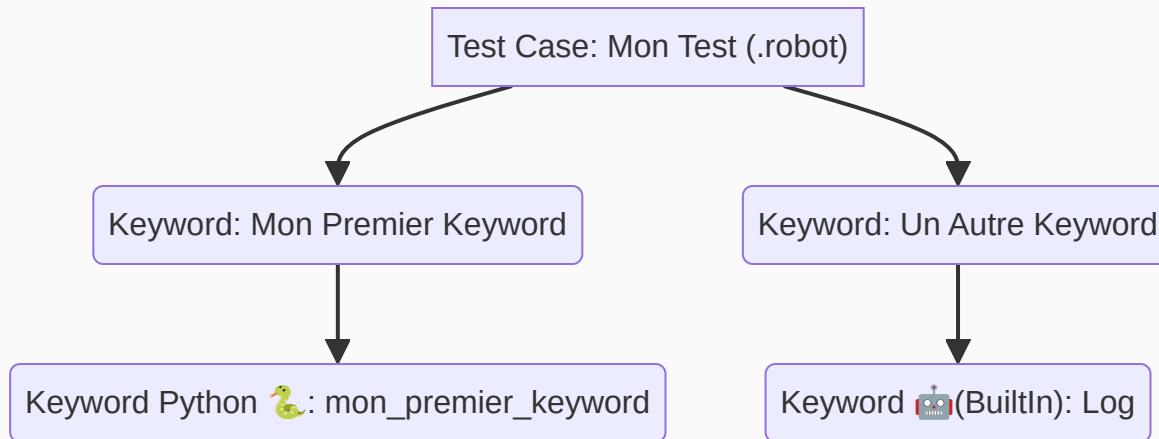
\*\*\* Test Cases \*\*\*

Mon Test

Mon Premier Keyword

\${retour}= Mon Premier Keyword Avec Argument Et Return R2D2

# Test → Keyword → Keyword



# Sections

- `*** Settings ***` : imports librairies / ressources / variables
- `*** Test Cases ***` : déclarations Tests
- `*** Keywords ***` : déclarations Keywords
- `*** Variables ***` : déclarations Variables

# Structures

- boucle FOR
- boucle WHILE
- condition IF / ELSE
- gestion erreur TRY / EXCEPT
- Control structures

# Ligne de commande robot

```
1  robot --help
2
3  # Lance tous les tests présents dans le dossier tests
4  robot tests
5
6  # Lance le test "Mon Test"
7  robot -t "Mon Test" tests
```

# Résultats

- `log.html` : détails par tests et keywords
  -  ERROR => automatiquement affiché (avec focus sur le keyword en erreur)
  -  SUCCESS
- `output.xml` / `xunit.xml` : sortie technique pour intégration continue / outils

# Résultats

## log.html

|   |  |
|---|--|
| - <b>SUITE</b> <b>Jinja</b>   | 00:00:00.021   |
| Full Name:  | Jinja  |
| Source:   | /Users/remi/wk/robot-worksheets/tests/file/jinja.robot       |
| Start / End / Elapsed:  | 20250902 11:17:57.075 / 20250902 11:17:57.096 / 00:00:00.021 |
| Status:   | 1 test total, 0 passed, 1 failed, 0 skipped                  |
| - <b>TEST</b> <b>Creer Fichier Avec Un Template</b>                                 | 00:00:00.001   |
| Full Name:  | Jinja.Creer Fichier Avec Un Template                         |
| Start / End / Elapsed:  | 20250902 11:17:57.094 / 20250902 11:17:57.095 / 00:00:00.001 |
| Status:   | <b>FAIL</b>  |
| Message:  | TypeError: write() argument must be str, not list            |
| + <b>KEYWORD</b> \${ligne1} = <b>Builtin.Create Dictionary</b> variable=Ligne 1     | 00:00:00.000   |
| + <b>KEYWORD</b> \${ligne2} = <b>Builtin.Create Dictionary</b> variable=Ligne 2     | 00:00:00.000   |
| + <b>KEYWORD</b> \${data} = <b>Builtin.Create List</b> \${ligne1} \${ligne2}        | 00:00:00.000   |
| - <b>KEYWORD</b> <b>Creer Fichier</b> data/mon_fichier.csv \${data}                 | 00:00:00.001   |
| Start / End / Elapsed:  | 20250902 11:17:57.095 / 20250902 11:17:57.096 / 00:00:00.001 |
| + <b>KEYWORD</b> \${content} = <b>file_helper.Charger Template</b> \${data}         | 00:00:00.000   |
| - <b>KEYWORD</b> \${fichier} = <b>OperatingSystem.Create File</b> \${path} \${data} | 00:00:00.000   |
| Documentation:  | Creates a file with the given content and encoding.          |
| Start / End / Elapsed:  | 20250902 11:17:57.095 / 20250902 11:17:57.095 / 00:00:00.000 |
| 11:17:57.095 <b>FAIL</b>  | TypeError: write() argument must be str, not list            |
| + <b>RETURN</b> \${fichier}   | 00:00:00.000   |

# Quizz

[Lien ou passer à la slide suivante](#)



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Sign in

# TP Keyword



Tester les syntaxes

- Keywords
- Tests
- Variables

# Requests Library

- Tests d'API
- Wrapper de la lib Python requests
- [Documentation](#)
- Manipulation JSON simple

# Requests Library

```
1 pip install robotframework-requests
```

# Requests Library

```
1 *** Settings ***
2 Library      RequestsLibrary
3
4 *** Test Cases ***
5 Quick Get Request Test
6     ${response}    GET    https://www.google.com
7
8 Quick Get Request With Parameters Test
9     ${response}    GET    https://www.google.com/search    params=query=ciao    expected_status=200
10
11 Quick Get A JSON Body Test
12     ${response}    GET    https://jsonplaceholder.typicode.com/posts/1
13     Should Be Equal As Strings    1    ${response.json()[id]}
14
15 Create Booking
16     ${booking_dates}    Create Dictionary    checkin=2022-12-31    checkout=2023-01-01
17     ${body}    Create Dictionary
18     ...    firstname=Hans
19     ...    lastname=Gruber
20     ...    totalprice=200
21     ...    depositpaid=false
22     ...    bookingdates=${booking_dates}
23     ${response}    POST    url=https://restful-booker.herokuapp.com/booking    json=${body}
24     ${id}    Set Variable    ${response.json()[bookingid]}
```



API Booker

# Browser Library

- Tests UI
- Wrapper de [Playwright](#)
- [Documentation](#)
- [Keywords](#)
- [Exemples / Comparaison](#)

# Browser Library

- Rapide 
- Fiable 
- Contrôle du navigateur 
- Remplaçant de [Selenium Library](#)

# Browser Library

```
1 # Installer Node https://nodejs.org/en/download/
2
3 pip install robotframework-browser
4
5 # Télécharge le navigateur
6 rfbrowser init
7
8 # Télécharge le navigateur Firefox
9 rfbrowser init firefox
```

# Browser Library

```
1 *** Settings ***
2 Library    Browser
3
4 *** Test Cases ***
5 Go To Playwright With Browser Library
6     # Opens a new browser instance. Use this keyword for quick experiments or debugging sessions.
7     Open Browser
8
9     New Page    https://playwright.dev/
10    Get Title   contains   Playwright
11    Take Screenshot
12
13    Click      a >> "Get started"
14    Get Element States  h1 >> "Installation"  contains  visible
15    Take Screenshot
```



# Browser Library

## Ralentir le navigateur

Ralentir Browser

```
# Remplacer `Open Browser` par `New Browser`  
New Browser    browser=firefox    headless=${False}    slowMo=1 second
```

# Sélecteurs

- CSS (type selector => `input` , `div` ...)
- CSS (id selector => `#todo-input` )
- CSS (class selector => `.todo-list` )
- [CSS Selector Reference](#)
- [CSS Selector Tester](#)
- XPATH (`//*[@id="todo-input"]` )
- [XPath Syntax](#)

# Selecteurs

## DevTools Elements

The screenshot shows the Chrome DevTools Elements tab open on a React application. The application displays the text "todos" in large red letters, followed by a green button with the placeholder "What needs to be done?". Below the button, there is a message: "Double-click to edit a todo", "Created by the TodoMVC Team", and "Part of TodoMVC".

The DevTools sidebar on the left lists "React" and "TypeScript + React" sections, along with a detailed description of React's core principles.

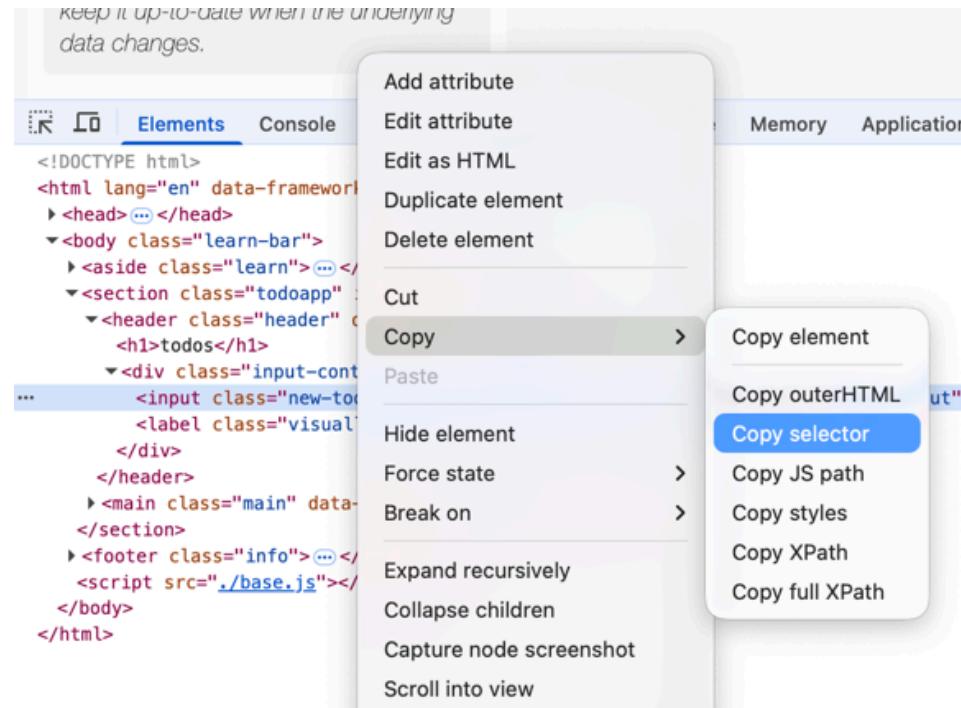
The main pane shows the DOM tree for the "learn-bar" component. The "Elements" tab is selected. The "Styles" panel on the right shows CSS rules from "element.style", "base.css:135", and "index.css:33".

```
<!DOCTYPE html>
<html lang="en" data-framework="react"> scroll
  <head> </head>
  ... <body class="learn-bar"> == $0
    <aside class="learn"> ...
    <section class="todoapp" id="root">
      <header class="header" data-testid="header">
        <h1>todos</h1>
        <div class="input-container">
          <input class="new-todo" id="todo-input" type="text" data-testid="text-input"
            placeholder="What needs to be done?" value>
          <label class="visually-hidden" for="todo-input">New Todo Input</label>
        </div>
```

| Styles  | Computed | Layout | Event Listeners | DOM Breakpoints |
|---|----------|--------|-----------------|-----------------|
| element.style {<br>}  |          |        |                 |                 |
| @media (min-width: 899px) {<br>.learn-bar {<br>padding-left: 300px;<br>width: auto;<br>}<br>} |          |        |                 | base.css:135    |
| body {<br>-webkit-font-smoothing: antialiased;  |          |        |                 | index.css:33    |

# Selecteurs

## DevTools Elements



# Selecteurs

## DevTools Console

- \$\$ ou document.querySelectorAll pour tester les sélecteurs

The screenshot shows the Chrome DevTools interface with the 'Console' tab selected. In the main pane, the TodoMVC application is displayed, featuring a header 'todos', a central input field with placeholder 'What needs to be done?', and footer text indicating it was created by the TodoMVC Team and is part of TodoMVC. On the left, a sidebar provides information about React, including its core principles: declarative code, efficiency, and flexibility. Below the sidebar, the DevTools navigation bar includes tabs for Elements, Console, Sources, Network, Performance, Memory, Application, and Privacy and security. The Console tab is active, showing the command '\$\$("input")' and its execution result: '[input#todo-input.new-todo]'. The result is expanded to show one element at index 0: '0: input#todo-input.new-todo length: 1 [[Prototype]]: Array(0)'. The bottom of the console shows a single '>' character.

```
> $$("input")
<- [input#todo-input.new-todo] i
  ▶ 0: input#todo-input.new-todo
    length: 1
  ▶ [[Prototype]]: Array(0)

>
```



TODO MVC

## **Bonnes pratiques et Industrialisation**

# Plan

- Organiser les tests et les ressources
- Utiliser les librairies standards de Robot Framework
- Découvrir les syntaxes avancées
- Ecrire des tests robustes
- Découvrir les outils autour de Robot Framework
- Mettre en place une intégration continue

# Organiser les tests et les ressources

## Structure standard d'un projet

- `tests/` : fichiers de tests (`.robot`) et suite de tests
- `resources/` : keywords partagés, variables et librairies maison (`.resource`, `.py`)

```
1 mon-projet/
2   └── tests/
3     ├── cas_de_test.robot
4     └── suite/
5       └── autre_cas_de_test.robot
6   └── resources/
7     └── keyword_commons.resource
8     └── ma_librarie.py
```

## RobotFramework - Project Structure

# Syntaxes avancées



# Test Template

```
1 *** Test Cases ***
2 Normal test case with embedded arguments
3     The result of 1 + 1 should be 2
4     The result of 1 + 2 should be 3
5
6 Template with embedded arguments
7 [Template]    The result of ${calculation} should be ${expected}
8     1 + 1    2
9     1 + 2    3
10
11 *** Keywords ***
12 The result of ${calculation} should be ${expected}
13     ${result} =    Evaluate    ${calculation}
14     Should Be Equal As Strings    ${result}    ${expected}
```

- Test Templates

# Test

## Before / After

- Test Setup
- Test Teardown
- Test setup and teardown

# Behavior Driven Development (BDD)

## Syntaxe Given-When-Then

```
1 *** Test Cases ***
2 Mon Test Bdd
3     Given Pré Requis
4     When Action
5     Then Verifications
6
7 *** Keywords ***
8 Pré Requis
9     Log    Pré Requis
10
11 Action
12     Log    Action
13
14 Verifications
15     Log    Verifications
```

BDD

## Test Execution Log

|   |                               |  |
|---|-------------------------------|--|
| - | <b>SUITE</b>                  | 09-Bdd   |
|   | <b>Full Name:</b>             | 09-Bdd   |
|   | <b>Source:</b>                | /Users/remi/wk/robot-examples/tests/09-bdd.robot             |
|   | <b>Start / End / Elapsed:</b> | 20250903 14:07:37.963 / 20250903 14:07:37.973 / 00:00:00.010 |
|   | <b>Status:</b>                | 1 test total, 1 passed, 0 failed, 0 skipped                  |
| - | <b>TEST</b>                   | Mon Test Bdd   |
|   | <b>Full Name:</b>             | 09-Bdd.Mon Test Bdd  |
|   | <b>Start / End / Elapsed:</b> | 20250903 14:07:37.973 / 20250903 14:07:37.974 / 00:00:00.001 |
|   | <b>Status:</b>                | PASS   |
| - | <b>KEYWORD</b>                | Given Pré Requis   |
|   | <b>Start / End / Elapsed:</b> | 20250903 14:07:37.973 / 20250903 14:07:37.973 / 00:00:00.000 |
| + | <b>KEYWORD</b>                | Builtin.Log Pré Requis                                       |
| - | <b>KEYWORD</b>                | When Action  |
|   | <b>Start / End / Elapsed:</b> | 20250903 14:07:37.973 / 20250903 14:07:37.973 / 00:00:00.000 |
| + | <b>KEYWORD</b>                | Builtin.Log Action   |
| - | <b>KEYWORD</b>                | Then Verifications   |
|   | <b>Start / End / Elapsed:</b> | 20250903 14:07:37.973 / 20250903 14:07:37.973 / 00:00:00.000 |
| + | <b>KEYWORD</b>                | Builtin.Log Verifications                                    |

# Utiliser les librairies standards



# Standard Library

- Inclus avec Robot Framework Core
- BuiltIn (importé automatiquement)
- String
- Collections
- DateTime
- [OperatingSystem](#)
- Screenshot
- Process
- XML
- [Standard Library](#)

# Standard Library Import

```
1 *** Settings ***
2 Library Collections
3 Library OperatingSystem
4 Library Process
5 Library String
```

# BuiltIn

```
1 *** Test Cases ***
2 Some Assertions
3     ${var}=    Set Variable    1.0
4     Should Not Be Equal    1    ${var}
5     Should Be Equal As Numbers    1    ${var}
6     Should Be Equal As Strings    1.0    ${var}
7     Should Be True    ${var} == 1.0
8     Should Not Be True    ${var} > 10
9
10    ${string}=   Set Variable   My String
11    Should Start With    ${string}    My
12    Length Should Be    ${string}    9
```

# Gestion des fichiers



# Fichier Template

- [Templates Ninja2](#)
- Création contenu de fichiers
- Couplé à `OperatingSystem`

# Fichier Template

- Template Jinja2 `templates/mon_template.csv.j2`

```
1  entete1;entete2
2  {%- for d in data %}
3  CONSTANTE;{{ d.variable }}
4  {%- endfor %}
```

- Utilisation dans Keyword Python

```
1  from jinja2 import Environment, FileSystemLoader
2
3  # Initialiser l'environnement avec un dossier de templates
4  env = Environment(loader=FileSystemLoader("templates"))
5  template = env.get_template("mon_template.csv.j2")
6
7
8  def charger_template(data):
9      contenu = template.render(data=data)
10     return contenu
```

# Fichier Template

- Utilisation dans Robot Framework

```
1  *** Settings ***
2  Library      OperatingSystem
3  Library      resources/file_helper.py
4
5  *** Test Cases ***
6  Creer Fichier Avec Un Template
7      ${ligne1}    Create Dictionary    variable=Ligne 1
8      ${ligne2}    Create Dictionary    variable=Ligne 2
9      ${data}      Create List        ${ligne1}    ${ligne2}
10     Creer Fichier   data/output/mon_fichier.csv   ${data}
11
12  *** Keywords ***
13  Creer Fichier
14      [Arguments]  ${path}    ${data}
15      ${contenu}   Charger Template   ${data}
16      ${fichier}   Create File     ${path}    ${contenu}
17      ${contenu}   Get File       ${path}
18      Log         ${contenu}
```

# Fichier Template

```
1  entete1;entete2  
2  CONSTANTE;Ligne 1  
3  CONSTANTE;Ligne 2
```

## TP Fichiers

- Créer et remplir un fichier
- Récupérer le fichier
- Déplacer le fichier
- Supprimer le fichier

## Autres Librairies / Outils



# Autres Librairies

- Requests Library
- Browser Library
- Database
- JSON
- Kafka
- DataDriver

## DataDriver

- JSON, CSV ou Excel => Données de tests
- `pip install robotframework-datariver`

# PaBot

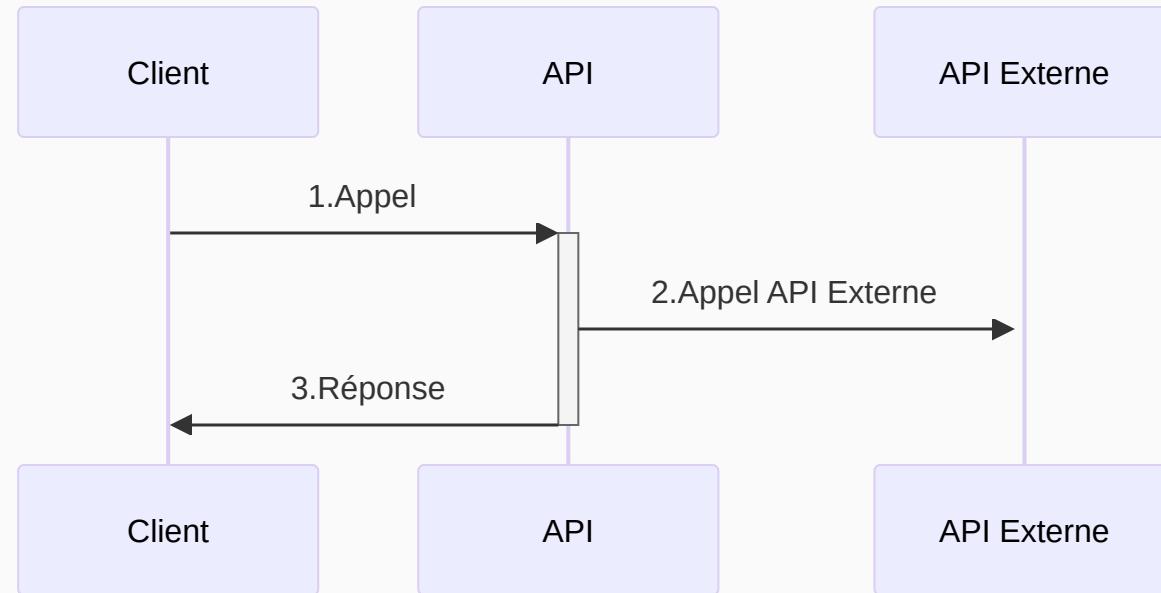
- Lancement des tests en parallèle 
-  Isolation des tests
- CLI `pabot` wrapper de `robot` (même options)
- `pip install robotframework-pabot`
- [PaBot](#)

# MockServer

- L'API à tester a besoin d'un service externe
- Le service externe n'est pas disponible sur l'env de test
- MockServer remplace le service externe
- MockServer configurable par API

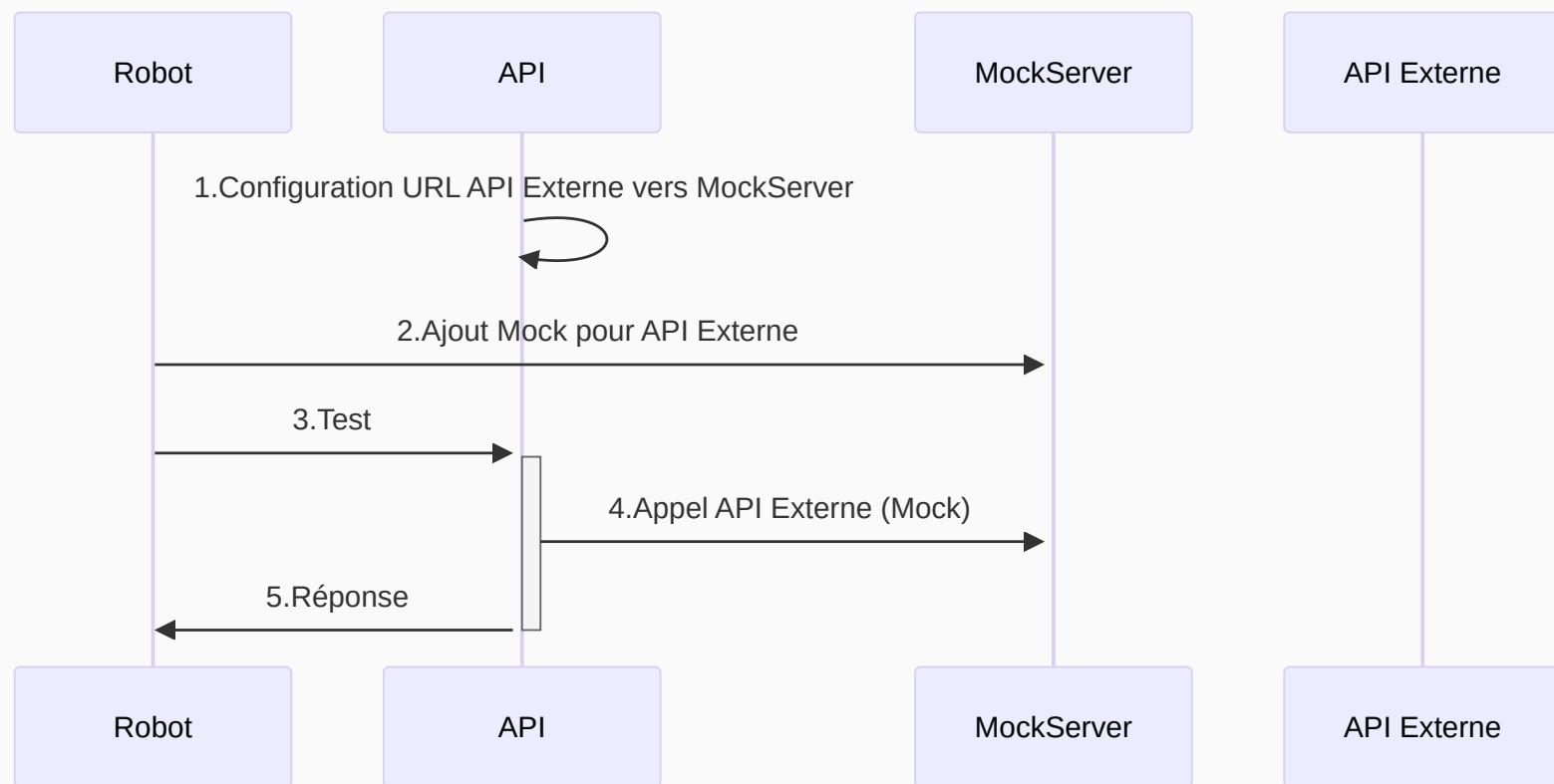
# MockServer

## API dépend de API Externe



# MockServer

## Flow de TEST



# Ligne de commande



# Ligne de commande `robot`

```
1 # Vérifie la syntaxe de tous les tests
2 robot --dryrun tests
3
4 # Ajoute le répertoire courant dans le PYTHON PATH
5 robot --pythonpath . tests
```

# PYTHON\_PATH

Sans --pythonpath :

```
1 *** Settings ***
2 Resource    ./resources/ma_lib.resource
3
4 *** Test Cases ***
5 Tester Ma Lib
6     Mon Keyword
```

Avec --pythonpath . ou -P . :

```
1 *** Settings ***
2 Resource    resources/ma_lib.resource
3
4 *** Test Cases ***
5 Tester Ma Lib
6     Mon Keyword
```

# Ligne de commande robocop

- robocop check (Linter)

```
1  tests/22-failed-test.robot:8:5 ERR13 Invalid IF syntax: IF must have closing END
2  |
3  6 |
4  7 | Test Lint En Erreur
5  8 |     IF
6  |     ^^ ERR13
7  9 |         Log  IF
8  |
```

# API Python

- Lancement `robot`
- Réflexion Tests / Keywords (métadonnées, hooks)
- Parsing des résultats en Python

# API Python

```
1 import robot
2
3 def run_tests():
4     robot.run("tests", outputdir="data", loglevel="TRACE")
```

# Pattern Visitor

```
1  from robot.running import TestSuiteBuilder
2  from robot.model import SuiteVisitor
3
4  class TagsOnTestCasesFinder(SuiteVisitor):
5      def __init__(self):
6          self.tests = list()
7
8      def visit_test(self, test):
9          self.tests.append(test.name)
10
11     def list_tests():
12         builder = TestSuiteBuilder()
13         testsuite = builder.build("tests/")
14         finder = TagsOnTestCasesFinder()
15         testsuite.visit(finder)
16         for test in sorted(finder.tests):
17             print(test)
18
19     if __name__ == "__main__":
20         list_tests()
```

# Listener

- Mécanisme d'envoi de notifications
- Inspection / Modification de données
- Lors de l'exécution d'un test
- Lors de l'exécution d'un keyword
- Lors de l'écriture des rapports
- `--listener`
- [Documentation Listener](#)

# Listener

## Exemple

```
1  """Listener that stops execution if a test fails."""
2  from robot.api import logger
3
4  ROBOT_LISTENER_API_VERSION = 2
5
6  def end_test(name, attrs):
7      if attrs["status"] == "FAIL":
8          logger.warn(f"Test '{name}' failed: {attrs['message']}")  
9          input("Press enter to continue.")
```

```
robot --listener resources/pause_listener.py tests/22-failed-test.robot
```

Bonnes pratiques



# Composition de Keywords

- Passer en argument un Keyword à un Keyword
- Equivalent à passer une lambda ou un callback à une méthode Python 
- Run Keyword
- Run Keyword If
- Wait Until Keyword Succeeds

# Logs

## Niveaux

- TRACE : niveau le plus fin (ex : détails requête HTTP)
- DEBUG : trace de debug
- INFO : par défaut
- WARN : avertissement erreur non bloquante
- ERROR : erreur bloquante (le test s'arrête)

# Logs

## Définir niveau

```
1 # Augmente le niveau de logs à TRACE
2 robot --loglevel TRACE . tests
3
4 # Augmente le niveau à TRACE mais affiche par défaut en INFO
5 robot -L TRACE:INFO . tests
```



The screenshot shows the Robot Framework REPORT window with the log level set to TRACE. It displays several log entries from a test run:

- Line 1: Documentation: Sends a PUT request.
- Line 2: Start / End / Elapsed: 20250920 10:51:10.302 / 20250920 10:51:10.856 / 00:00:00.554
- Line 3: 10:51:10.302 TRACE Arguments: [ 'https://restful-booker.herokuapp.com/booking/267' | json={'firstname': 'Rémi', 'lastname': 'PICARD', 'totalprice': '342', 'depositpaid': 'True', 'bookingdates': {'checkin': '2025-10-01', 'checkout': '2025-10-03'}, 'additionalneeds': 'Parking'} | expected\_status='200' | headers={'Cookie': 'token=e245623b1e81a5e'} ]
- Line 4: 10:51:10.303 DEBUG Starting new HTTPS connection (1): restful-booker.herokuapp.com:443
- Line 5: 10:51:10.854 DEBUG https://restful-booker.herokuapp.com:443 "PUT /booking/267 HTTP/1.1" 200 169
- Line 6: 10:51:10.855 INFO PUT Request : url=https://restful-booker.herokuapp.com/booking/267 path\_url=/booking/267 headers={'User-Agent': 'python-requests/2.32.5', 'Accept-Encoding': 'gzip, deflate', 'Accept': '\*/\*', 'Connection': 'keep-alive', 'Cookie': 'token=e245623b1e81a5e', 'Content-Length': 'application/json'} body=b'{"firstname": "R\u00e9mi", "lastname": "PICARD", "totalprice": "342", "depositpaid": "True", "bookingdates": {"checkin": "2025-10-01", "checkout": "2025-10-03"}, "additionneeds": "Parking"}'
- Line 7: 10:51:10.855 INFO PUT Response : url=https://restful-booker.herokuapp.com/booking/267 status=200, reason=OK headers={'Content-Length': '169', 'Content-Type': 'application/json; charset=utf-8', 'Date': 'Sat, 20 Sep 2025 08:51:10 GMT', 'Etag': 'W/"a9-Rj43xx2tcnbuNGybUeGx0gfKjZs"', 'Nel': 'nel', 'Response-headers': [{"Via": "1.1 heroku-20/1.1"}, {"max-age": "3600", "success\_fraction": "0.01", "failure\_fraction": "0.1"}, {"Report-To": [{"group": "heroku-nel", "endpoints": [{"url": "https://nel.herokuapp.com/reports?ts=1758358270"}]}], "max-age": "3600"}, {"Reporting-Endpoints": "heroku-nel", "Server": "Heroku", "Via": "1.1 heroku-20/1.1"}, {"By": "Express"}]} body={"firstname": "R\u00e9mi", "lastname": "PICARD", "totalprice": "342", "depositpaid": "true", "bookingdates": {"checkin": "2025-10-01", "checkout": "2025-10-03"}, "additionalneeds": "Parking"}
- Line 8: 10:51:10.855 TRACE Return: <Response [200]>
- Line 9: 10:51:10.856 INFO \${response} = <Response [200]>

# Logs

## Keyword Python

```
1  from robot.api import logger
2
3  def log_from_python():
4      logger.info("Hello From Python Keyword")
```

## Correlation ID

- Remplir Header X-Request-ID
- Pousser logs Robot dans Grafana
- Suivre logs des tests et applicatifs

## Nommage / Découpage

- Rester générique
- Factoriser
- Donner des noms métier si possible

## Documenter

- Bon nommage peut être suffisant
- Documenter les passages importants (non triviaux)

# Structures avancées

- Tuple
- class
- dataclass (immutable)
- list-comprehension

# Tuple

```
1 *** Test Cases ***
2 Teste Les Tuples
3     ${robots}=    Get Robots
4     Log    ${robots}
5     ${robots_type}=    Evaluate    type(${robots})
6     Log    ${robots_type}
7     Log    ${robots[0]}
8     Log    ${robots[1]}
9
10 *** Keywords ***
11 Get Robots
12     ${robots}=    Evaluate    ("R2D2", "C3PO")
13     RETURN    ${robots}
```

# Dataclass

```
1 @dataclass
2 class ImmutableRobot:
3     name: str
4     color: str
5
6 # ${r2d2}=    Build Immutable Robot  R2D2  Bleue
7 # Log  ${r2d2.color}
8 def build_immutable_robot(name: str, color: str):
9     return ImmutableRobot(name, color)
```

# List Comprehension

```
1 *** Settings ***
2 Library      resources/robot_helper.py
3
4
5 *** Test Cases ***
6 Teste List Comprehension
7     ${c3po}=    Build Immutable Robot    C3PO    Jaune
8     ${r2d2}=    Build Immutable Robot    R2D2    Bleue
9
10    ${robots}=   Create List    ${c3po}    ${r2d2}
11
12    # Utilisez $robots (pas ${robots}) dans les expressions Python
13    ${robots_jaunes}=   Evaluate    [r for r in $robots if r.color == "Jaune"]
```

# Lire la documentation

- Guide
- Keyword

## Catenate

### Arguments

\* items

### Documentation

Catenates the given items together and returns the resulted string.

By default, items are catenated with spaces, but if the first item contains the string SEPARATOR=<sep>, the separator <sep> is used instead. Items are converted into strings when necessary.

### Examples:

|            |          |               |       |       |
|------------|----------|---------------|-------|-------|
| \${str1} = | Catenate | Hello         | world |       |
| \${str2} = | Catenate | SEPARATOR=--- | Hello | world |
| \${str3} = | Catenate | SEPARATOR=    | Hello | world |

=>

```
 ${str1} = 'Hello world'  
 ${str2} = 'Hello---world'  
 ${str3} = 'Helloworld'
```

# Formatteurs de code

- Robocop : Robot 
- Black : Python 
- Pre Commit (avant chaque commit Git)
- Vérification sur l'intégration continue

# Terminal interactif

- fzf (fuzzy finder)
- Pattern Visitor

# Terminal interactif



# Gérer l'asynchronisme

- Pas de `Sleep` (attente fixe fragile et qui ralentit les tests)
- Utiliser boucle d'attente `Wait Until Keyword Succeeds`
- Utiliser `[Timeout]` sur Keyword / Test
- [Documentation Timeout](#)
- Utiliser les bons outils ( `Playwright` attend par design)

```
1  *** Test Cases ***
2  Attendre Creation Fichier
3      Démarrer Batch
4          Wait Until Keyword Succeeds    2x    1s    File Should Exist    path=output.txt
5          ${fichier}    Get File    path=output.txt
6          # ... Assertion sur le fichier
7
8  *** Keywords ***
9  Démarrer Batch
10     Log    Start Batch
```

## - SUITE 12-Wait Until

**Full Name:** 12-Wait Until  
**Source:** /Users/remi/wk/robot-examples/tests/12-wait\_until.robot  
**Start / End / Elapsed:** 20250903 15:22:56.685 / 20250903 15:22:57.701 / 00:00:01.016  
**Status:** 1 test total, 0 passed, 1 failed, 0 skipped

## - TEST Attendre Creation Fichier

**Full Name:** 12-Wait Until.Attendre Creation Fichier  
**Start / End / Elapsed:** 20250903 15:22:56.694 / 20250903 15:22:57.700 / 00:00:01.006  
**Status:** FAIL  
**Message:** Keyword 'File Should Exist' failed after retrying 2 times. The last error was: No keyword with name 'File Should Exist' found.

### + KEYWORD Démarrer Batch

**KEYWORD** BuiltIn.Wait Until Keyword Succeeds 2x 1s File Should Exist path=output.txt  
**Documentation:** Runs the specified keyword and retries if it fails.  
**Start / End / Elapsed:** 20250903 15:22:56.695 / 20250903 15:22:57.700 / 00:00:01.005

### - KEYWORD File Should Exist path=output.txt

**Start / End / Elapsed:** 20250903 15:22:56.695 / 20250903 15:22:56.695 / 00:00:00.000  
15:22:56.695 FAIL No keyword with name 'File Should Exist' found.

### - KEYWORD File Should Exist path=output.txt

**Start / End / Elapsed:** 20250903 15:22:57.698 / 20250903 15:22:57.698 / 00:00:00.000  
15:22:57.699 FAIL No keyword with name 'File Should Exist' found.  
15:22:57.699 FAIL Keyword 'File Should Exist' failed after retrying 2 times. The last error was: No keyword with name 'File Should Exist' found.

### + KEYWORD \${fichier} = Get File path=output.txt

# Gérer les erreurs

- Tenter des retry avec `Wait Until Keyword Succeeds`
- Gérer les erreurs avec `TRY/EXCEPT`
- `Fail` un test si nécessaire
- `Log` (`WARN` / `ERROR`)

**Rendre plus lisible le rapport HTML**

# Suite

- Chaque fichier robot est une suite
- Les dossiers contenant les fichiers robot sont des suites
- Stats par suite

## Tag

- Les tests peuvent être taggués
- Options CLI `--include` / `--exclude` pour filtrer
- Stats par tag

# Log

- Ne pas TROP logger
- Loguer du HTML (tableau) `Log html=${True}`

# Remove Keywords

```
1 # WUKS = Wait Until Keyword Succeeds  
2 robot --removekeywords PASSED --removekeywords WUKS tests/17-remove_keywords.robot
```

# Remove Keywords

## - SUITE 17-Remove Keywords

Full Name: 17-Remove Keywords  
Source: /Users/remi/wk/robot-examples/tests/17-remove\_keywords.robot  
Start / End / Elapsed: 20250904 14:23:46.452 / 20250904 14:23:47.466 / 00:00:01.014  
Status: 2 tests total, 1 passed, 1 failed, 0 skipped

## - TEST Test OK

Full Name: 17-Remove Keywords.Test Ok  
Start / End / Elapsed: 20250904 14:23:46.461 / 20250904 14:23:46.462 / 00:00:00.001  
Status: PASS  
- KEYWORD All Is Ok  
Start / End / Elapsed: 20250904 14:23:46.461 / 20250904 14:23:46.461 / 00:00:00.000  
Message: Content removed using the --remove-keywords option.

## - TEST Remove Wait Until

Full Name: 17-Remove Keywords.Remove Wait Until  
Start / End / Elapsed: 20250904 14:23:46.461 / 20250904 14:23:47.466 / 00:00:01.005  
Status: FAIL  
Message: Keyword 'File Should Exist' failed after retrying 2 times. The last error was: File '/Users/remi/wk/robot-examples/output.txt' does not exist.

## - KEYWORD BuiltIn.Wait Until Keyword Succeeds 2x 1s File Should Exist path=output.txt

Documentation: Runs the specified keyword and retries if it fails.  
Start / End / Elapsed: 20250904 14:23:46.462 / 20250904 14:23:47.466 / 00:00:01.004  
Message: 1 failing item removed using the --remove-keywords option.

## - KEYWORD OperatingSystem.File Should Exist path=output.txt

Documentation: Fails unless the given path points to an existing file.  
Start / End / Elapsed: 20250904 14:23:47.464 / 20250904 14:23:47.465 / 00:00:00.001  
14:23:47.465 FAIL File '/Users/remi/wk/robot-examples/output.txt' does not exist.  
14:23:47.465 FAIL Keyword 'File Should Exist' failed after retrying 2 times. The last error was: File '/Users/remi/wk/robot-examples/output.txt' does not exist.

# Flatten Keywords

```
1  robot --flattenkeywords ITERATION tests/18-flatten_keywords.robot
```

# Flatten Keywords

- **SUITE** 18-Flatten Keywords

**Full Name:** 18-Flatten Keywords  
**Source:** /Users/remi/wk/robot-examples/tests/18-flatten\_keywords.robot  
**Start / End / Elapsed:** 20250904 14:32:21.416 / 20250904 14:32:21.428 / 00:00:00.012  
**Status:** 1 test total, 1 passed, 0 failed, 0 skipped

- **TEST** Flatten Keywords

**Full Name:** 18-Flatten Keywords.Flatten Keywords  
**Start / End / Elapsed:** 20250904 14:32:21.427 / 20250904 14:32:21.428 / 00:00:00.001  
**Status:** PASS

- **FOR** \${index} IN RANGE 5

**Start / End / Elapsed:** 20250904 14:32:21.427 / 20250904 14:32:21.428 / 00:00:00.001

- **ITERATION**

**Start / End / Elapsed:** 20250904 14:32:21.427 / 20250904 14:32:21.427 / 00:00:00.000  
**Message:** Content flattened.  
14:32:21.427 INFO 0

+ **ITERATION**  
+ **ITERATION**  
+ **ITERATION**  
+ **ITERATION**

# rebot

- Filtre les rapports de sortie

# Structure GROUP

```
1 *** Test Cases ***
2 Mon Test Avec Groupes
3     GROUP      Groupement de 2 Keywords
4         Premier Keyword
5         Deuxieme Keyword
6     END
7     Troisieme Keyword
8     Quatrieme Keyword
9
10    *** Keywords ***
11    Premier Keyword
12        Log      Keyword1
13
14    Deuxieme Keyword
15        Log      Keyword2
16
17    Troisieme Keyword
18        Log      Keyword3
19
20    Quatrieme Keyword
21        GROUP      Groupe dans un Keyword
22            Log      Keyword4
23            Log      Keyword4bis
24        END
```

# GROUP

|   |  |
|---|--|
| - <b>SUITE</b> <b>Group</b>                     | 00:00:00.011   |
| Full Name:                                      | Group  |
| Source:   | /Users/remi/wk/robot-worksheets/tests/group.robot            |
| Start / End / Elapsed:                          | 20250902 16:46:13.226 / 20250902 16:46:13.237 / 00:00:00.011 |
| Status:   | 1 test total, 1 passed, 0 failed, 0 skipped                  |
| - <b>TEST</b> <b>Mon Test Avec Groupes</b>      | 00:00:00.001   |
| Full Name:                                      | Group.Mon Test Avec Groupes                                  |
| Start / End / Elapsed:                          | 20250902 16:46:13.235 / 20250902 16:46:13.236 / 00:00:00.001 |
| Status:   | <b>PASS</b>  |
| - <b>GROUP</b> <b>Groupement de 2 Keywords</b>  | 00:00:00.001   |
| Start / End / Elapsed:                          | 20250902 16:46:13.235 / 20250902 16:46:13.236 / 00:00:00.001 |
| + <b>KEYWORD</b> <b>Premier Keyword</b>         | 00:00:00.000   |
| + <b>KEYWORD</b> <b>Deuxieme Keyword</b>        | 00:00:00.000   |
| + <b>KEYWORD</b> <b>Troisieme Keyword</b>       | 00:00:00.000   |
| - <b>KEYWORD</b> <b>Quatrieme Keyword</b>       | 00:00:00.000   |
| Start / End / Elapsed:                          | 20250902 16:46:13.236 / 20250902 16:46:13.236 / 00:00:00.000 |
| - <b>GROUP</b> <b>Groupe dans un Keyword</b>    | 00:00:00.000   |
| Start / End / Elapsed:                          | 20250902 16:46:13.236 / 20250902 16:46:13.236 / 00:00:00.000 |
| + <b>KEYWORD</b> <b>Builtin.Log Keyword4</b>    | 00:00:00.000   |
| + <b>KEYWORD</b> <b>Builtin.Log Keyword4bis</b> | 00:00:00.000   |

Intégration continue 🐛



- Utiliser ou Builder une image Docker
- Docker Images for Robot Framework

# Github Actions

The screenshot shows a GitHub Actions test report for a repository named "remi-picard / robot-examples". The "Actions" tab is selected in the navigation bar. The report details a "Robot Framework Tests" run triggered by a push to the "master" branch. The "JUnit Test Report" section is expanded, showing 29 tests run, 25 passed, 0 skipped, and 4 failed. The "Annotations" section lists three failed steps:

- 12-Wait Until.Attendre Creation Fichier**: Keyword 'File Should Exist' failed after retrying 2 times. The last error message is: "Variable '\${env}' not found."
- 14-Variablefile.Mes Variables**: Variable '\${env}' not found.
- 15-Variable Env.Chargement Variable Env**: Environment variable '%{ENV}' not found.

## CI Systems / GitHub Actions

# Intégration continue

- A chaque push
- Installer env python
- OU charger image Docker (évite de réinstaller les dépendances)
- Exécuter dry-run
- 💡 Ne pas lancer les tests

# Tests quotidiens

- Chaque nuit
- Installer env python
- OU charger image Docker (évite de réinstaller les dépendances)
- Lancer les tests
- Publier les rapports HTML
- Effectuer un diff avec jours passés
- Notifier équipe

# Tests quotidiens

## Lancement via CI

-  Standard
-  Ouvertures de flux (https, bases, sftp...)
-  Publier les reports
-  https

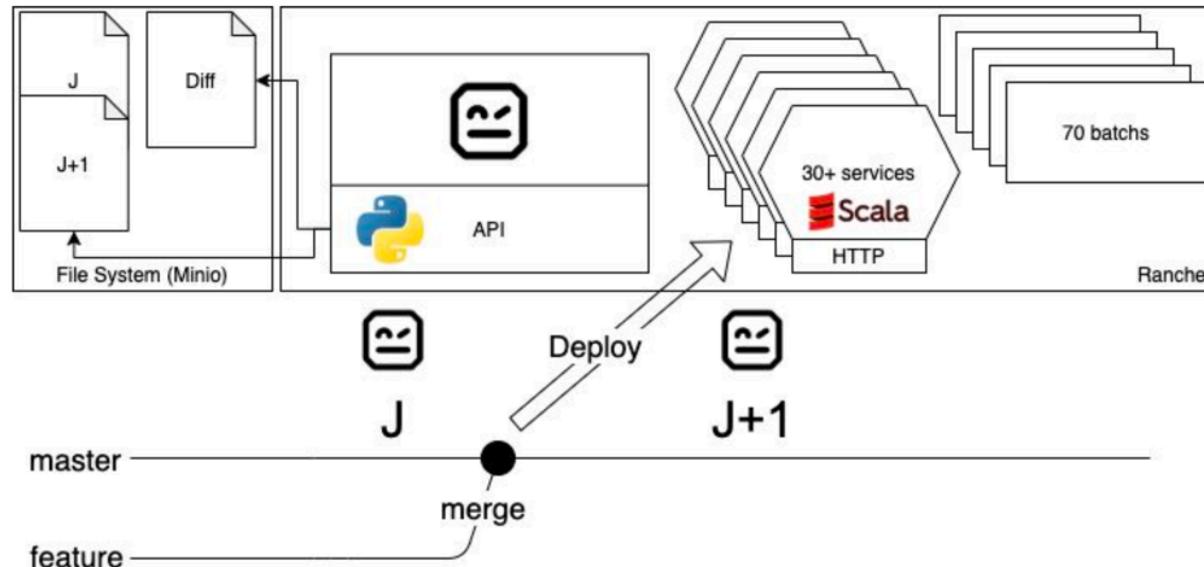
# Tests quotidiens

## Outils de Reporting

- [Allure](#)
- [Report Portal](#)
- [Grafana](#)
- [Robot Framework Metrics](#)
- [Robot Framework Dashboard](#)

# Tests quotidiens

## Lancement via K8S / API



# Tests quotidiens

## Lancement via K8S / API

-  File System Commun (input / output des apps, + report)
-  Lancement unitaire
-  http

# Tests quotidiens

## Robotdiff

| Suite / Test   | 01/02 | 02/02 | 03/02 |
|--|-------|-------|-------|
|  | 2     | 1     | 2     |
|  | 1 min | 3 min | 2 min |
| Account / Onboard A New Client                       | PASS  | PASS  | PASS  |
| Error / Always Failed Test                           | FAIL  | FAIL  | FAIL  |
| Error / Unstable Test                                | FAIL  | PASS  | FAIL  |
| Transfer / Transfer Amount Cannot Be Negative        | PASS  | PASS  | PASS  |
| Transfer / Transfer Amount Cannot Be Zero            | PASS  | PASS  | PASS  |
| Transfer / Transfer Money Between Two Clients        | PASS  | PASS  | PASS  |
| Transfer / Transfer Money From Unprovisioned Account | PASS  | PASS  | PASS  |
| Transfer / Transfer Money To Unknown Account         | PASS  | PASS  | PASS  |

Robotdiff

# Tests quotidiens

## Notifications (GChat / Slack)

- Notifier SI erreurs en + par rapport à la veille



**cobalt-robot-news** APPLI 8 h 30  
10 tests en erreur en + depuis hier !  
23 erreurs sur 99 au total  
[Robot Diff](#) | [Last Report](#)



3 réponses Dernière réponse il y a 3 jours



RBF Application Hier 08:30  
131 tests en erreur en + depuis hier !  
153 erreurs sur 175 au total  
≡ [Robot Diff](#)  
≡ [Last Report](#)  
 1 2

# Autres Usages



## Usage Testeur

- Création de jeu données
- Tests semi-maniuels

Collaborer



# Toolkit

## Partager une partie du code

- Keywords
- Helpers

# Portail Documentaire

- `libdoc` : documentation Keywords
- `libtoc` : Sidebar Keywords
- `testdoc` : documentation tests

# libdoc + libtoc

## minibank ↗

Search X  
Keywords (3) +

Create Account  
Get Account  
Transfer Money

Library scope: GLOBAL

### Introduction

HTTP calls to MiniBank API

### Keywords

#### Create Account

##### Arguments

initialBalance = \${100}

##### Documentation

Create an account

#### Get Account

##### Arguments

iban

##### Documentation

Get account by iban

## utils ↗

Search X  
Keywords (3) +

Generate Iban  
Get Bank Code  
Has Valid Bank Code

Library scope: GLOBAL

### Introduction

Documentation for library utils.

### Keywords

#### Generate Iban

##### Arguments

country

#### Get Bank Code

##### Arguments

iban

#### Has Valid Bank Code

##### Arguments

iban

Generated by [Libdoc](#) on 2023-02-10T16:27:26+00:00.

## Account & Error & Transfer

Generated  
20230315 10:37:19 UTC+01:00  
3 seconds ago

- TEST SUITE: Account & Error & Transfer
  - Full Name: Account & Error & Transfer
  - Number of Tests: 8
- + TEST SUITE: Account
- + TEST SUITE: Error
- TEST SUITE: Transfer
  - Full Name: Account & Error & Transfer.Transfer
  - Source: /Users/rpicard/wk/robotframework/rbl/robot/transfer.robot
  - Number of Tests: 5
- TEST CASE: Transfer Money
  - Full Name: Account & Error & Transfer.Transfer.Transfer Money
  - KEYWORD: \${iban1} = Create Account 100000
  - KEYWORD: \${iban2} = Create Account 0
  - KEYWORD: Transfer Money \${iban1}, \${iban2}, 1000
  - KEYWORD: \${resp} = Get Account \${iban1}
  - KEYWORD: Should Be Equal As Strings \${resp["balance"]}, 99000
  - KEYWORD: \${resp} = Get Account \${iban2}
  - KEYWORD: Should Be Equal As Strings \${resp["balance"]}, 1000
- + TEST CASE: Transfer Money To Unknown Account
- + TEST CASE: Transfer Money From Unprovisioned Account
- + TEST CASE: Transfer Amount Cannot Be Zero
- + TEST CASE: Transfer Amount Cannot Be Negative

# Robotic Process Automation (RPA)

Robotic Process Automation (RPA) is similar to test automation on the technical level, but the mentality is different on the business and results side. In RPA, it is pretty standard that you are not running on a machine you control entirely, so your robot needs to be "self-sufficient" and isolated. Also, instead of finding and documenting places where robot execution fails or succeeds, **the aim is always to succeed and get the result of the process**.

- \*\*\* Test Cases \*\*\* => \*\*\* Tasks \*\*\*
- Librairies RPA (Desktop, Cloud, Scrapping...)



Jeu RPA

IA



IA

## Avantages

- Apprendre
- Prototyper
- Résoudre problématique spécifique

## Avertissements

- Prendre du recul
- Perte de contrôle
- Empreinte écologique

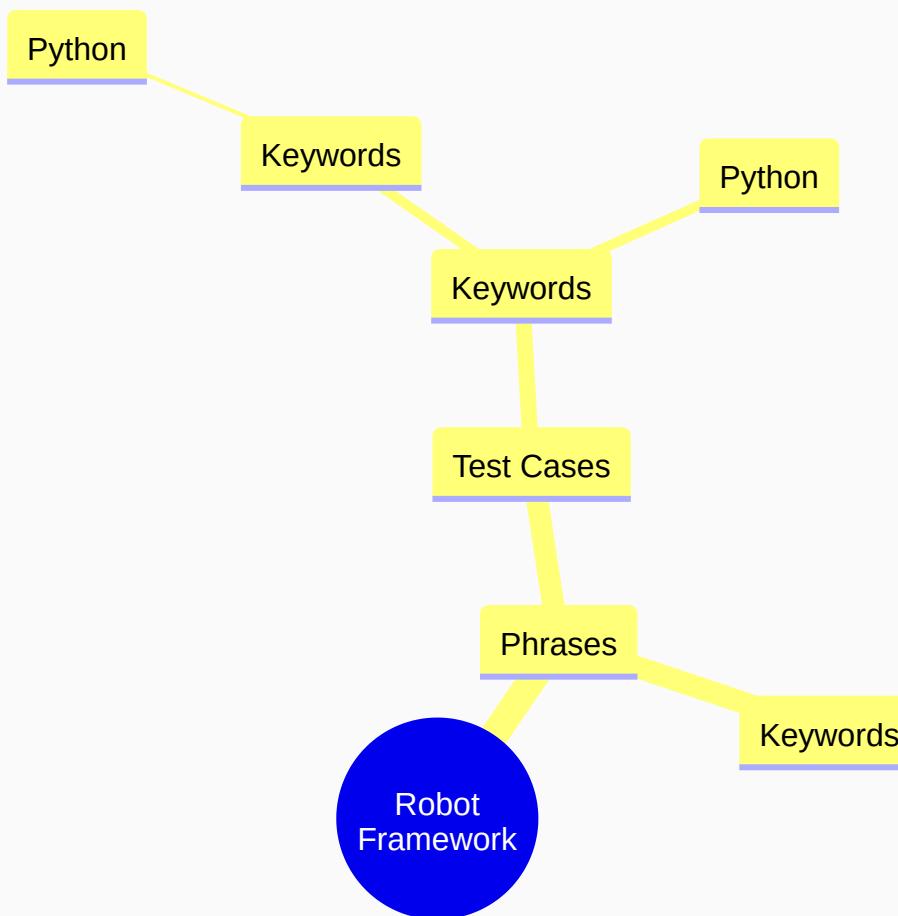
# Démo Génération de code

- Claude AI (Web)
- Gemini (CLI)

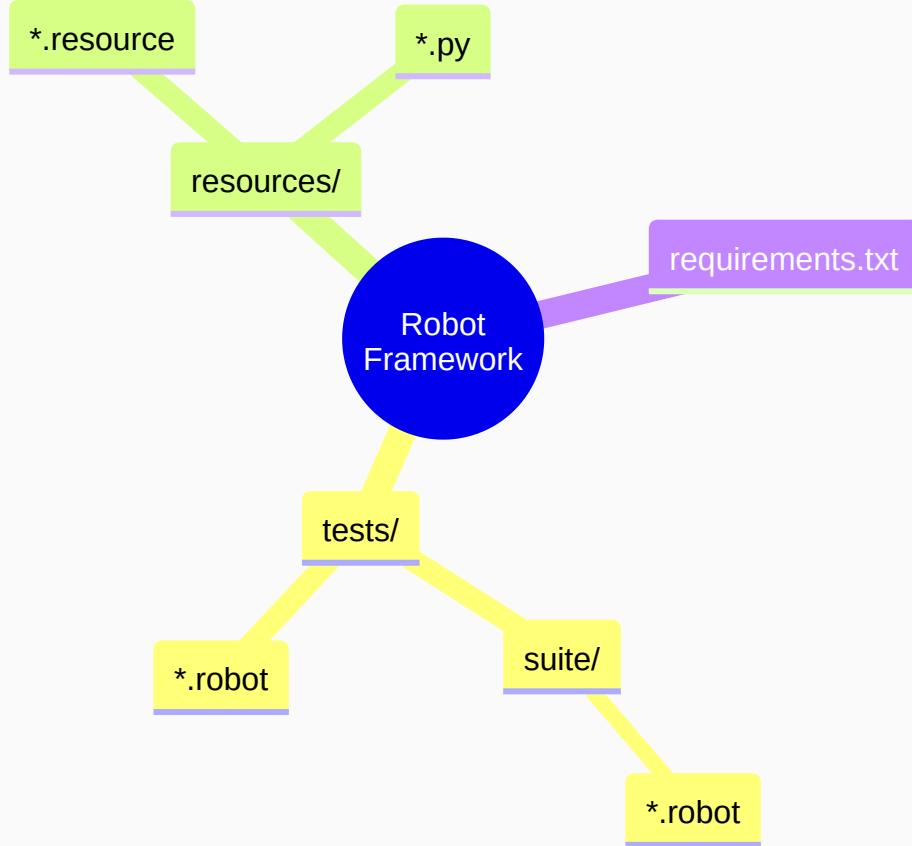
Récap



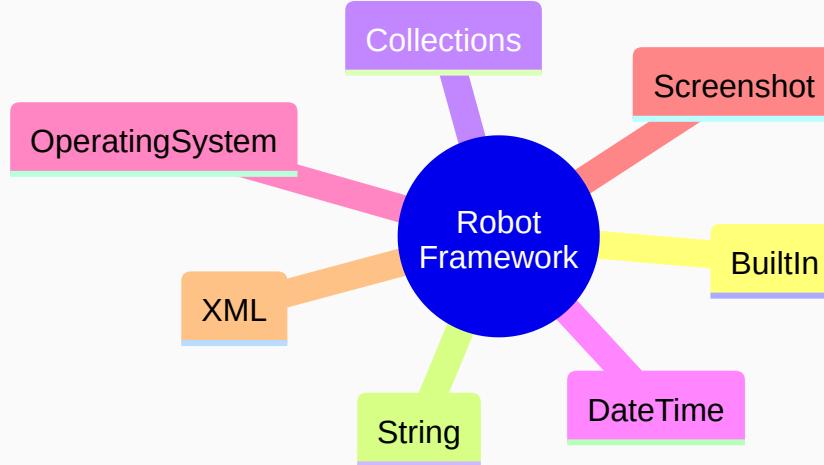
# Keywords / Phrases



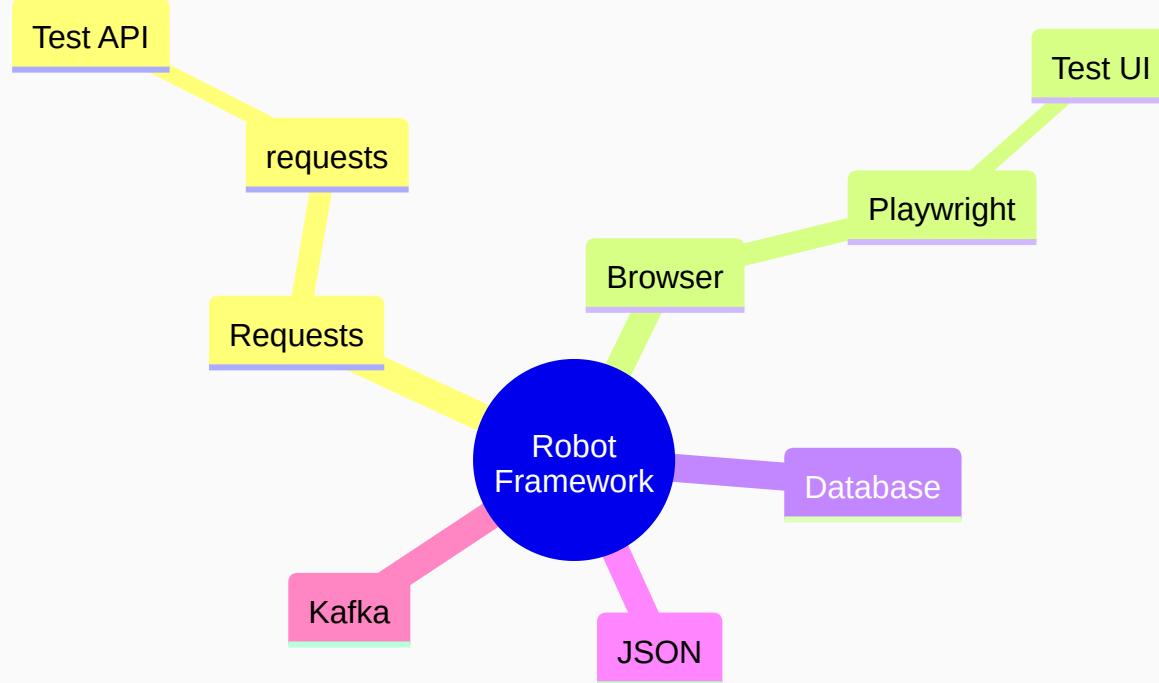
# Structure projet



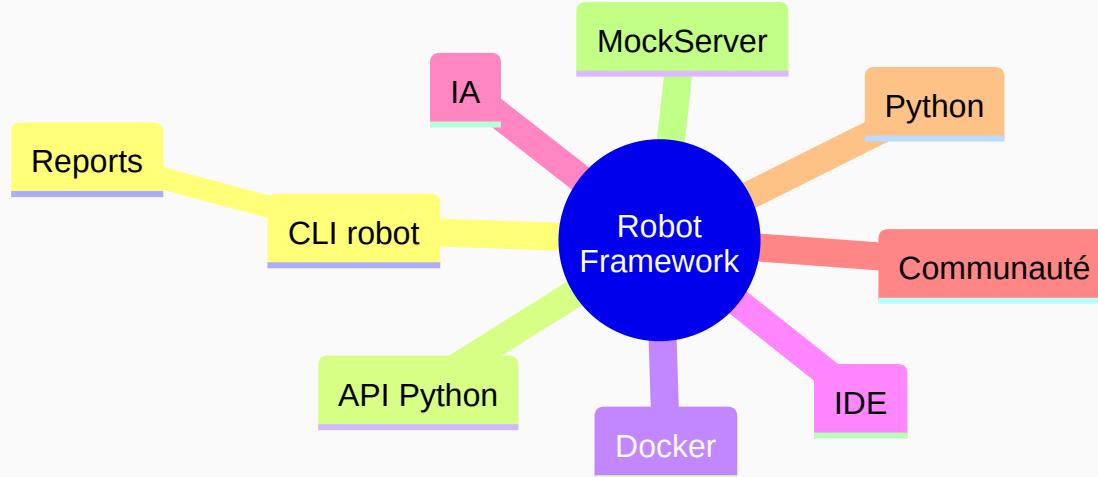
# Librairies Core



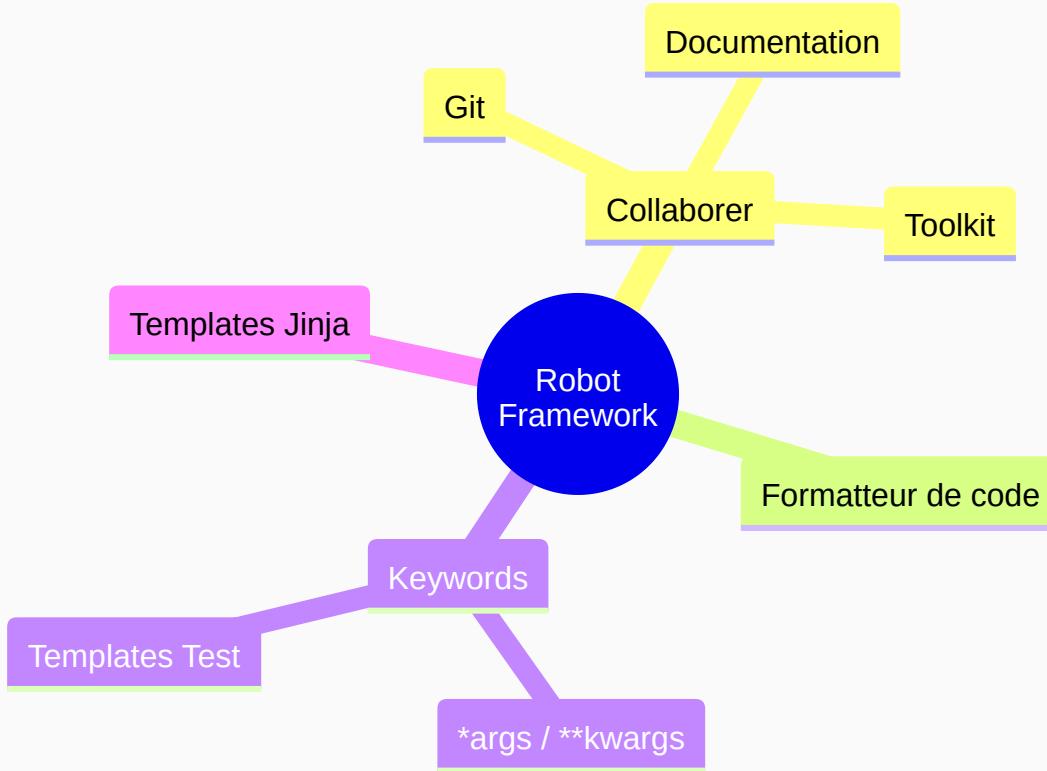
# Librairies



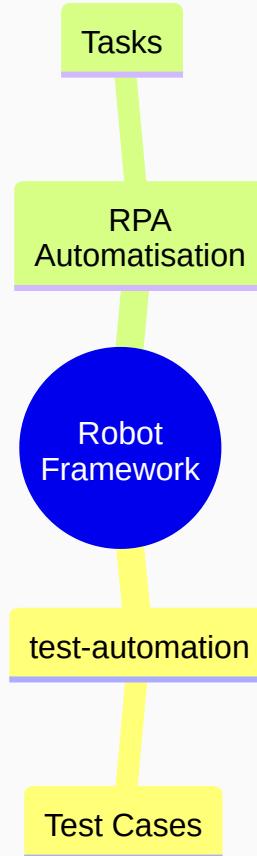
# Ecosystème



# Bonnes pratiques



# test-automation VS RPA



Rétro



## Questions & Réponses

- Merci pour votre attention. 🙏
- Bonne chance pour l'automatisation de vos tests !
- Amusez-vous bien !