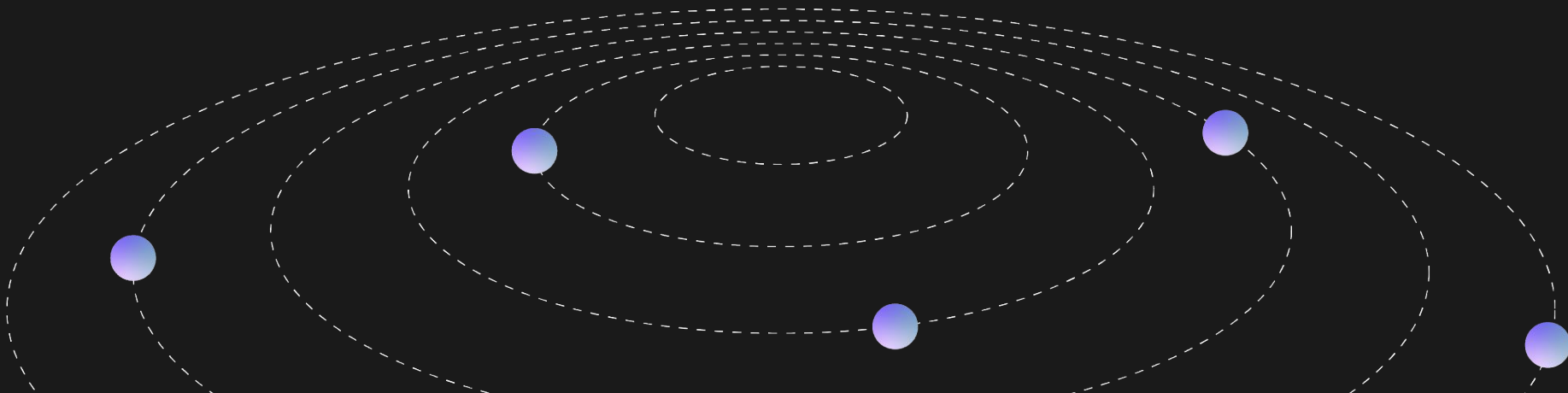


# Future of CI/CD

Testing.next







Low code / no code testing

# Test generation

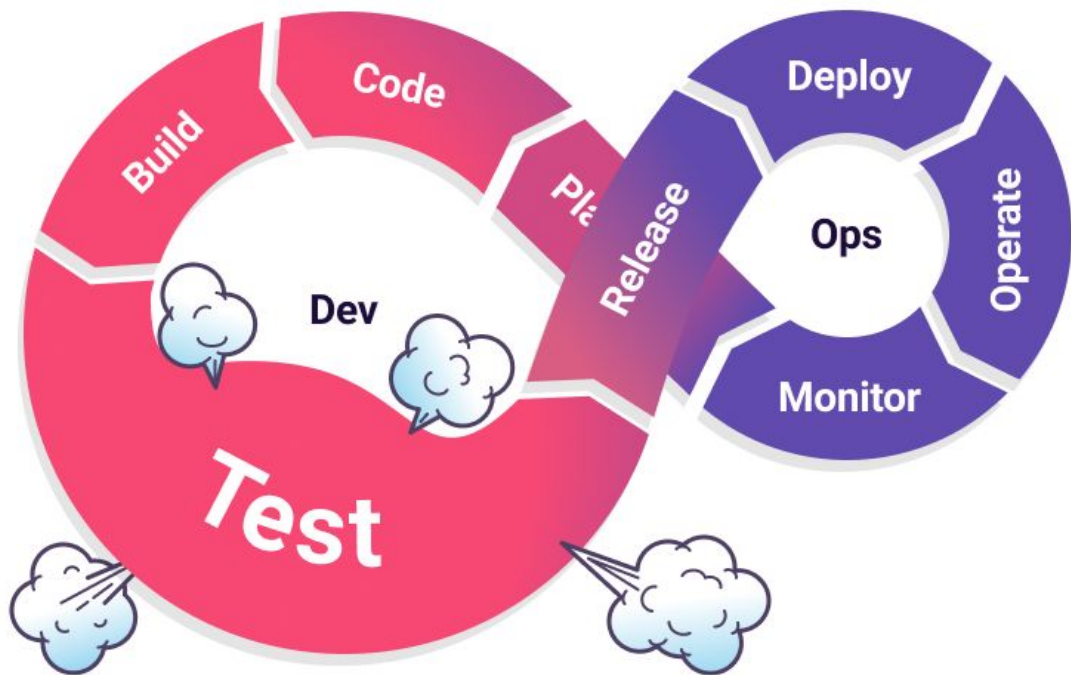
TDD + AI

# Static code analysis + AI





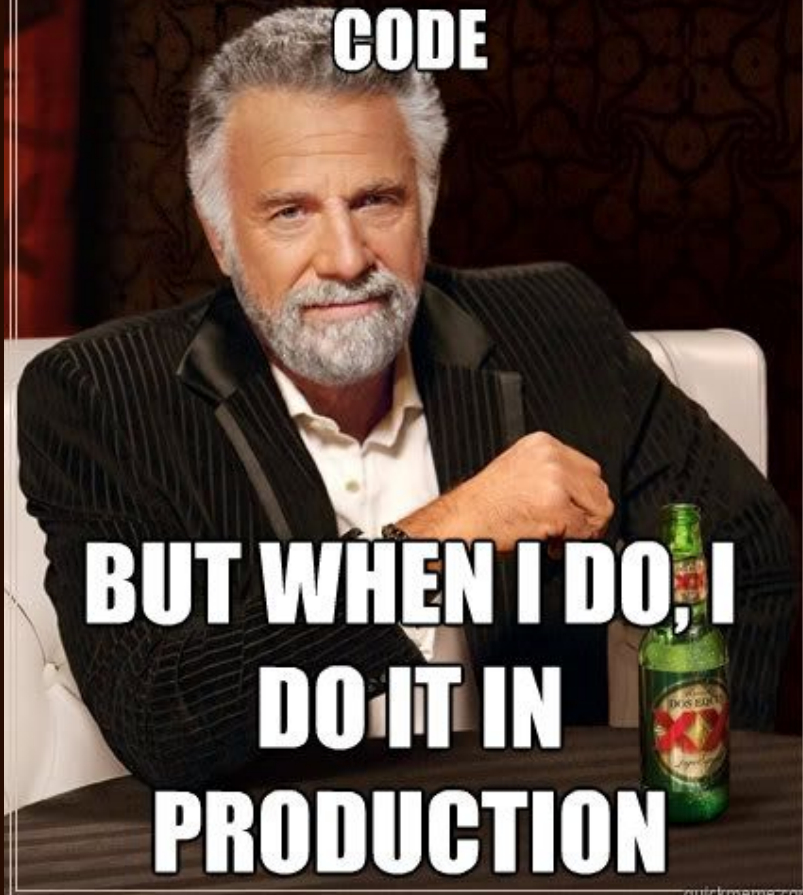




**Spread testing  
everywhere**

Testing is in architecture

**I DON'T ALWAYS TEST MY  
CODE**



**BUT WHEN I DO, I  
DO IT IN  
PRODUCTION**



DO NOT REMOVE THIS TAG

**PANDUAN PENYALAMAN**

1. HALAK  
2. AM PUSUTAR  
3. SQUEEZE PRESSER  
4. SWEEP BALAYER

**INSTRUCTIONS**

1. AIM  
2. PULL  
3. SQUEEZE  
4. SWEEP

1. HALAK  
2. AM PUSUTAR  
3. SQUEEZE PRESSER  
4. SWEEP BALAYER

STRIKE FIRST

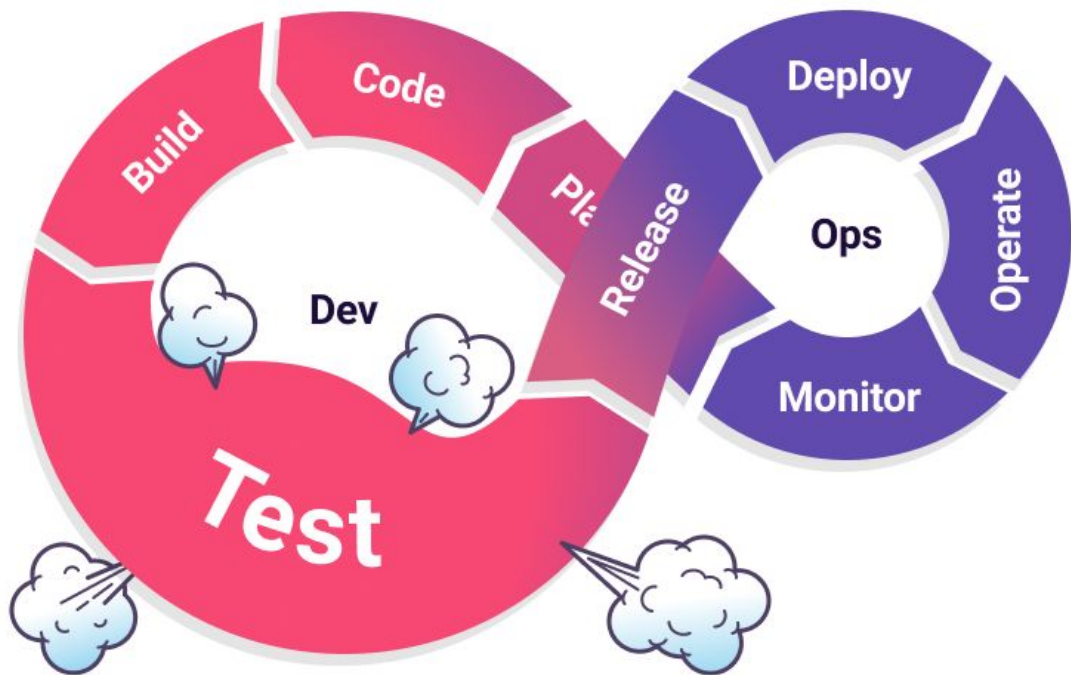


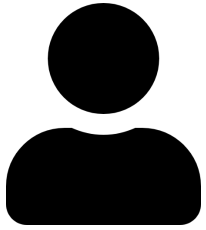
Eliminate risk → manage risk

Quality  
↑  
Testing

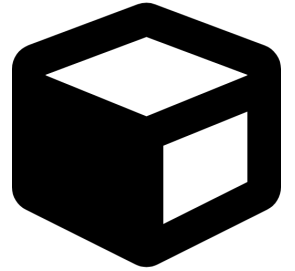
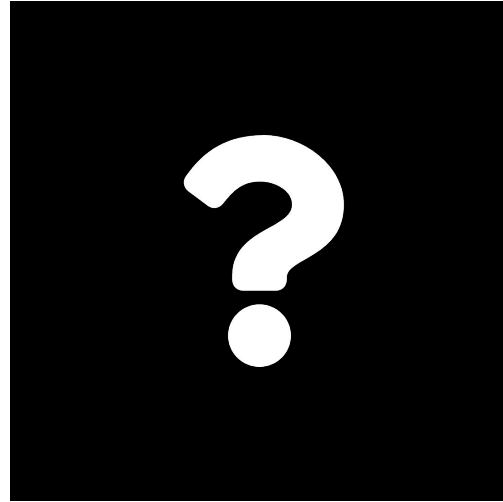








dev



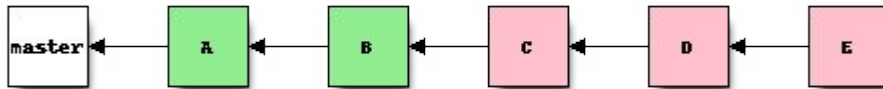
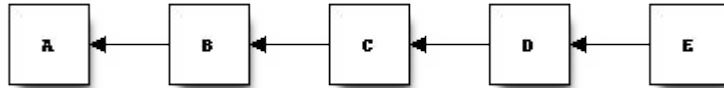
# Sharding / parallelization

- ▶ Problem
  - ▶ Tests take too long to run
- ▶ Run tests in parallel to reduce turn-around time
  - ▶ Static → Adaptive
  - ▶ Amdahl's law
  - ▶ \$\$\$



# Merge queue

- ▶ Problem
  - ▶ Pre-merge testing is adding too much workload & slowing things down
- ▶ Intelligently merge incoming changes





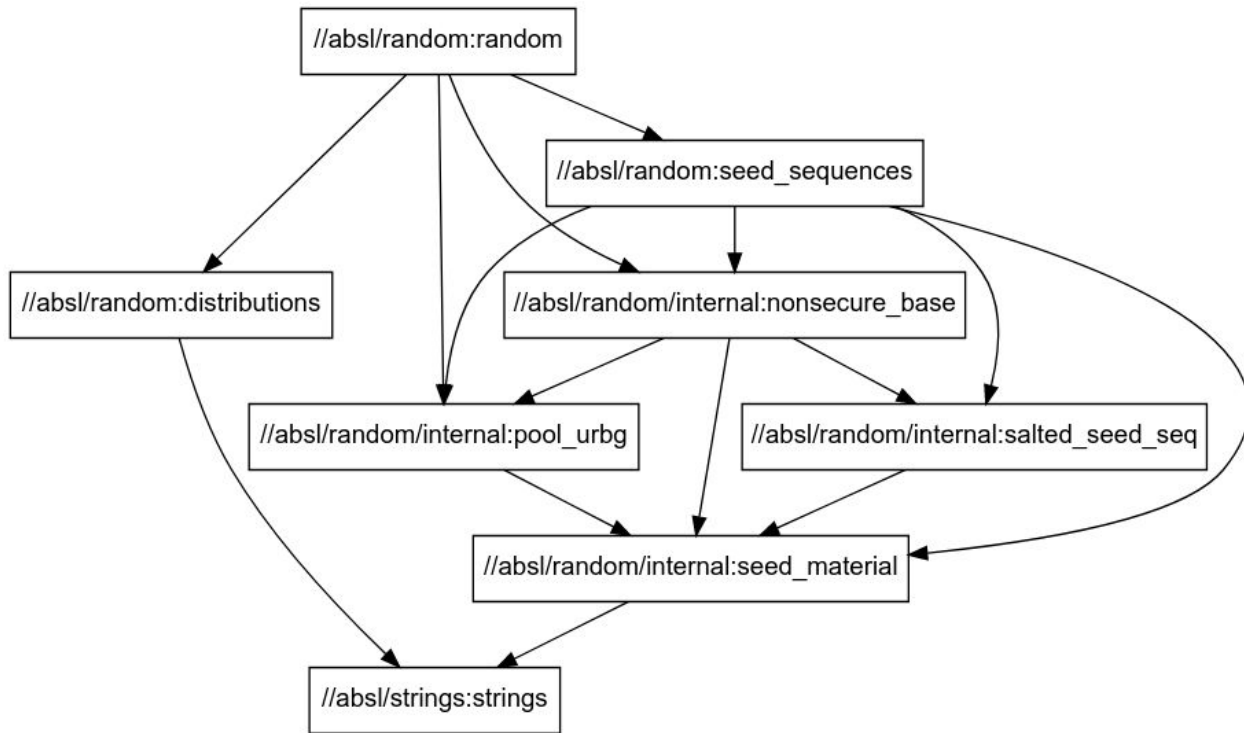
# Matrix sparsening

$O(MN) \rightarrow O(M+N)$

$$\begin{bmatrix} X & X & X & \cdot & \cdot & \cdot & \cdot \\ X & X & \cdot & X & X & \cdot & \cdot \\ X & \cdot & X & \cdot & X & \cdot & \cdot \\ \cdot & X & \cdot & X & \cdot & X & \cdot \\ \cdot & X & X & \cdot & X & X & X \\ \cdot & \cdot & \cdot & X & X & X & \cdot \\ \cdot & \cdot & \cdot & \cdot & X & \cdot & X \end{bmatrix}$$



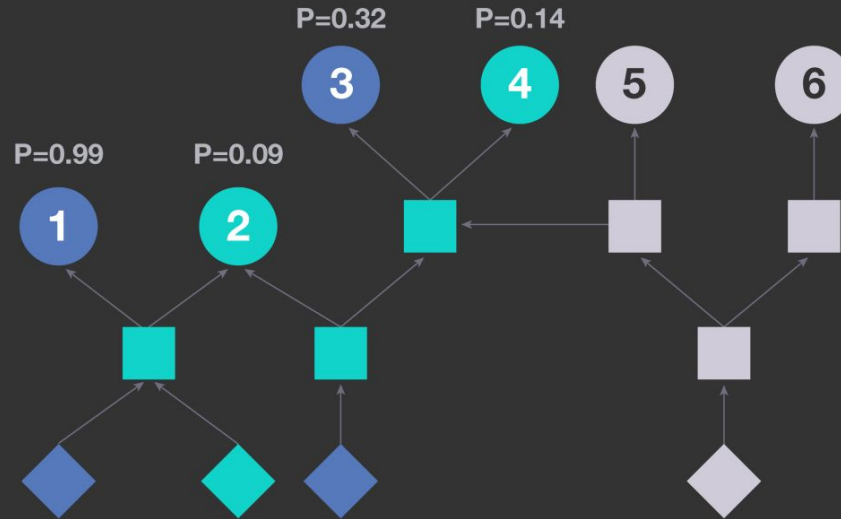
# Incremental building & testing



# Intelligent test selection

- ▶ Known failing tests
- ▶ Flaky tests
- ▶ Impact analysis
- ▶ Smoke tests
- ▶ Adaptive rotation

# Predictive test selection





# Triaging with AI



# Observability in testing

# AI assisted analysis





# Escalating flakiness

The screenshot shows a GitHub CI test failure page. At the top, there are navigation links for 'All builds', 'Your builds', and 'Flaky tests'. The breadcrumb trail is 'Flaky tests / TopSearchComponentTest / test\_renders\_top\_past\_week'. The main title is 'Test renders top past week' with a status of 'Unresolved'. Below the title are tabs for 'Summary', 'Stacktrace', 'Failures' (with a count of 2,753), 'Executions', and 'Related tests' (with a count of 1). The 'Summary' tab is active, showing four key metrics: 'IMPACT SCORE' of 1,033 (with 2,753 builds, 142 developers, and 37 deploys affected), 'FIRST SEEN' 19 days ago and 'LAST SEEN' 4 days ago, 'CATEGORY' 'Time-based' (described as failing when run at a certain time), and 'GITHUB ISSUE' #163537. Below the metrics is a 'RERUN COMMAND' section with a 'BETA' badge and the command: `bin/rails test test/components/search/top_search_component_test.rb:21`. The 'FAILURE' section shows the test name 'TopSearchComponentTest#test\_renders\_top\_past\_week' and the error message: 'Minitest::Assertion: expected to find visible css "[data-test-selector=selected-text]" with text /Top:\s+Past week/ but there were no match'. The 'OWNERSHIP' section lists three users: @monalisa (last to modify the test file), @jnraine (last to modify the test case), and @monalisa (last to modify the source file). The page ends with the GitHub logo.

CI All builds Your builds Flaky tests

Flaky tests / TopSearchComponentTest / test\_renders\_top\_past\_week

## Test renders top past week Unresolved

Summary Stacktrace Failures 2,753 Executions Related tests 1

IMPACT SCORE

# 1,033

👤 2753 builds 👤 142 developers 🚀 37 deploys

FIRST SEEN

19 days ago

LAST SEEN

4 days ago

CATEGORY

### Time-based

This test fails when run at a certain time.

GITHUB ISSUE

🕒 #163537

RERUN COMMAND BETA

```
bin/rails test test/components/search/top_search_component_test.rb:21
```

FAILURE

```
TopSearchComponentTest#test_renders_top_past_week
```

Minitest::Assertion:  
expected to find visible css "[data-test-selector=selected-text]" with text /Top:\s+Past week/ but there were no match

OWNERSHIP

@monalisa: You were the last person to modify the test file before it became flaky. (bbae2c)

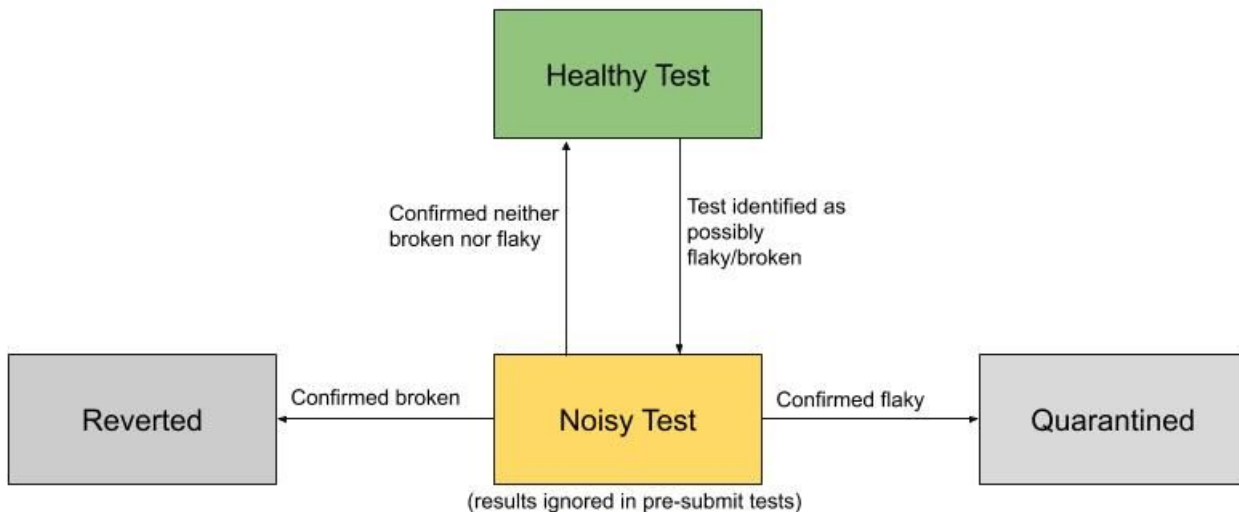
@jnraine: You were the last person to modify the test case before it became flaky. (2d6bae)

@monalisa: You were the last person to modify the source file before it became flaky. (a2e472)

github/search: service that owns this test.

# Escalating flakiness

- ▶ Sophisticated automated triage system (Dropbox)
  - ▶ Combination of bisect, multiple reruns, etc



# Future of CI/CD

- More sophisticated blackbox
- So many opportunities for AI
- System between you & your CI

# That's where I'm spending time -- let's talk!

Workspace: rocketair

DATA

- Test Sessions
- Builds

INSIGHTS

- Trends
- Unhealthy Tests BETA

ACTIONS

- Predictive Test Selection
- Simulate
- Observe
- Analyze
- Time Savings
- Test Notifications

## Test Session

[View in Jenkins](#)

⊗ 808 ⊗ 12 ⊙ 0

⌚ 48.2 min

⊗ Test session #123456 recorded today

Build 7a35428cd41d669c96a33dbc26a0a049

Branch main

Flavors browser chrome100 os macos12.3.1

Issues 4 Test Results

ISSUE	FIRST SEEN
<b>Mismatch in expected and actual ID and name in RepoServiceTest</b> <span>NEW</span> <b>detail</b> com.rocketcar.gemini.service.RepoServiceTest > Traceback (most recent call last): File "C:\Users\runneradmin\virtualenvs\cli-YK164YDY\lib\site-packages\responses\_init_.py"	Now
<b>Unexpected optimization result in ServiceTest</b> <span>ONGOING</span> > <b>repositoryPrioritization</b> com.rocketcar.gemini.service.RepoServiceTest (2 more) > Traceback (most recent call last): File "C:\Users\runneradmin\virtualenvs\cli-YK164YDY\lib\site-packages\responses\_init_.py"	1 day ago
<b>Application context loading failure due to unsatisfied dependency in 'provideS3Endpoint' method</b> <span>ONGOING</span> <b>runRepoE2E</b> com.rocketcar.gemini.e2e.RepoE2ETest > Traceback (most recent call last): File "C:\Users\runneradmin\virtualenvs\cli-YK164YDY\lib\site-packages\responses\_init_.py"	5 days ago
<b>NullPointerException error due to null Request in Service</b> <span>ONGOING</span> <b>repositoryPrioritization</b> com.rocketcar.gemini.service.RepoServiceTest > Traceback (most recent call last): File "C:\Users\runneradmin\virtualenvs\cli-YK164YDY\lib\site-packages\responses\_init_.py"	5 days ago



Thank you!

[launchableinc.com](https://launchableinc.com).