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[Demo Site](#) | [Repo](#)

## Description:

Cod.le builds on the FakeStackOverflow (FSO) platform, offering a **gamified learning environment** that includes: **authentication, a daily coding challenge with a fully functional IDE and live code execution, solution publishing, and admin-level management.**

Users can engage with the community to complete daily problems in a built-in editor, receive real-time execution feedback from our Docker-based code runner, and browse accepted solutions from the community.

Users who are admins can manage problems, test sets, and scheduling through a portal for designated admins.

## Tech Stack and Design:

**BACKEND:** new schemas and routes support problem scheduling, test-set updates, submissions, real-time result streaming, and solution publishing.

**FRONTEND:** Daily Problem page with a built-in IDE, solution browsing, user score display, and an Admin page for creating and editing problems and test sets.

**AUTHENTICATION:** Auth0, syncing new users into MongoDB and enabling admin-only access.

**CODE-RUNNER:** offloaded to an isolated Python/Docker service on an EC2 VM, where a load balancer distributes submissions across containers that scale automatically and safely contain crashes or timeouts.

**CI/CD** relied on GitHub, schema validation, Docker diagnostics, and integration testing across sprints.

## Future Work:

Future improvements to Cod.le include expanding the platform to **support multiple programming languages**, and adding a **leaderboard** that ranks users by their accumulated coding scores across all accepted submissions.

The screenshot shows the 'Problem Manager' interface. On the left, there are fields for 'Name' (Two Sum), 'Description' (Given an array of integers nums and an integer target, return indices of the two numbers such that they add up to target.), 'Starter' (def two\_sum(nums, target):), 'Language' (Python), 'Timeout for Test Set (ms)' (5000), 'Difficulty' (easy), and 'Main Function' (two\_sum). On the right, there is a 'Select Date' dropdown (12/02/2025) and a 'Schedule Selected Problem For Date' button. Below that is a 'Select Problem For Date' dropdown (Two Sum - easy). At the bottom right, there are 'Save Changes' and 'Delete' buttons, along with an 'Activate' button and a 'Go to Set' link.

View of the Admin Only page. Allows the admin to create/delete/modify a problem and test sets, as well as schedule a certain problem for a certain day.

The screenshot shows the 'Climb Stairs' challenge page. It includes a 'Description' section with the problem statement and examples. Below the description is an IDE with a code editor showing a Python solution for the 'Climb Stairs' problem. The code is: 

```
def climb_stairs(n):
    if n <= 2:
        return n
    prev2 = 1
    prev1 = 2
    for i in range(3, n + 1):
        current = prev1 + prev2
        prev2 = prev1
        prev1 = current
    return prev1
```

 The output shows 'Success' and 'Message: All tests passed!'. To the right, there is a 'Solutions' section showing two submissions: one by 'reactlearner' with a runtime of 0.5 ms and one by 'dockerbeginner' with a runtime of 1.2 ms.

View of the daily coding challenge, complete with an IDE (with auto-formatting), and a solutions page

The screenshot shows a console log with multiple lines of debug and info messages. It includes messages like 'Received heartbeat pulse', 'Sent heartbeat pulse', 'Received submission with id: 692de3078dfaf02c557b1e687', 'Received submission from the web server with submission\_id: 692de3078dfaf02c557b1e687', 'Sent submission\_id inputs: [[2], [3], [1], [4], [5]]', 'Sent submission results for submission\_id 692de3078dfaf02c557b1e687 back to load balancer', and 'Published result for job 692de3078dfaf02c557b1e687 to web server'.

Code-runner console log outputs