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Software Engineer - Full Stack [Take Home Test]

Forethought

We believe that the true essence of software engineering extends far beyond algorithmic problem-solving. In crafting this take-home exercise, we've thoughtfully designed it to reflect the authentic challenges and experiences a software engineer would encounter in a day-to-day environment.

As practicing software engineers ourselves, we understand that no one can be an expert in every technology or framework. The reality of our profession is that we constantly navigate new territories, learn unfamiliar tools, and solve complex problems through research, experimentation, and collaboration. This exercise is designed to honor that reality.

We embrace the modern software development landscape where AI-powered tools like GitHub Copilot, ChatGPT, and Claude have become valuable allies in our development process. We strongly encourage you to leverage these tools, just as you would in your daily work. Your ability to effectively research, learn, implement & deliver solutions matters more to us than any pre-existing knowledge.

The exercise deliberately spans multiple areas of software development – from backend services to frontend interfaces, from real-time data handling to testing strategies & deployment This breadth isn't meant to overwhelm,but rather to give you the space to demonstrate your problem-solving approach and engineering mindset. We're interested in seeing how you make architectural decisions, handle trade-offs, and document your thinking process – rather than seeing the perfect solution.

When evaluating your submission, we'll focus on your engineering approach – how you structure your solution, the clarity of your code, the thoughtfulness of your documentation, and the reasoning behind your technical decisions. We care about seeing your authentic problem-solving process rather than a perfect implementation.

Take this opportunity to show us how you think, learn, and create as a software engineer. Document your journey, explain your choices, and don't hesitate to make pragmatic decisions about where to focus your efforts. We're looking forward to understanding your unique perspective and approach to software engineering through this exercise, we’re not looking for a perfect solution!

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Overview

Design and implement a full-stack application that monitors HTTP responses and displays them in real-time. This assignment tests your ability to work with APIs, handle periodic tasks, manage databases, and create real-time web applications.

Functional Requirements

Backend

1. Create a service that pings **httpbin.org/anything** endpoint every 5 minutes

2. Generate random JSON payload data for each request to send along with the request

3. Store the response data in a database of your choice

4. Broadcast new data to connected clients (web application in this case)

5. Create REST endpoints to fetch historical data

Frontend

1. Create a simple dashboard, responsive is a plus.
2. Display response data in a tabular format.
3. Implement real-time updates when new data is received.

Testing & CI Pipeline Requirements

1. Implement a CI pipeline using GitHub Actions, GitLab CI, or a similar

2. The pipeline should:

- Run a test suite
- Perform linting checks
- Generate test coverage reports

3. Focus testing on core functionality:
   - Choose and document what you consider core parts of the application
   - Write comprehensive tests for ONE of those core components.
4. Probable test categories:
   - Unit tests for critical business logic
   - Integration tests for key API endpoints
   - Basic end-to-end tests for critical user flows

Technical Specifications

Backend Requirements

- Use of Node.js (Express.js, Nest.js, or similar framework) is encouraged, otherwise Python based frameworks is okay.

- Choose any SQL or NoSQL database

- Proper error handling & logging is a huge plus

Frontend Requirements

- Use React or Next.js, if not VueJs or AngularJs is also okay.

- Implement proper state management

- Handling loading and error states is a huge plus

- Basic component tests is a huge plus

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Expected Deliverables

1. Source code in a Git repository

2. README.md with:

   - Setup instructions

   - Architecture overview

   - Choice of technologies and reasoning

   - Assumptions made

   - Future improvements

   - Testing strategy and core component identification

3. Database schema (if applicable)

4. Deployment of the solution is any Free platforms

Evaluation Criteria

- Proper execution of functional requirements

- Clarify & readability of code

- Thought process & decision-making process

Time Expectation

With the proper tooling, this entire task is supposed to take 4-8 if done right. Please use your best judgement to complete the task.

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Submission

- Share a GitHub/GitLab repository link to Asif Bin Hossain , Mizanur Radnan

- Ensure the repository is public or provide access to the above emails if private

Notes

- Focus on code quality & dao 0 architecture, rather than aiming for the perfect solution

- Some parts are intentionally kept vague for you to make appropriate assumptions, so don’t be scared to make assumptions on any parts of the system but be rational about it.

- Document any assumptions or shortcuts taken due to time constraints.

- Feel free to use any additional libraries that you think are necessary

- Include instructions for running the application locally

- Clearly document your reasoning for identifying core components and testing priorities

- Be smart & don’t be afraid to go outside of your comfort zone.

- If you have any questions or concerns, feel free to reach out to Asif Bin Hossain .

Good Luck, See you at the finish line!

BizScout Engineering team