SWE - Full Stack(Senior) Take Home Exercise

Note:
1. The purpose of this assessment is to evaluate your ability to break down a complex problem into smaller, manageable components, make informed decisions regarding design and engineering, and successfully achieve the desired outcomes.
2. The assessment consists of a core objective that should take approximately 4-5 hours to complete. In addition to the core objective, we have provided a set of optional tasks that you may choose to work on.
3. It is important to strike a balance between completing the core objective and attempting to tackle the additional tasks. Prioritize the core objective and allocate your time wisely.
4. Upon submitting your assessment, we will contact you to schedule a follow-up session where we will discuss your submission in greater detail and ask further questions.
5. Our evaluation will primarily focus on the quality of your solution in addressing the core objective. Completing all the additional expectations is not necessary to receive a positive assessment.
6. However, if you decide to go the extra mile and complete all the tasks, we are keen to gain insights into your thought process behind the technical decisions you made along the way. Remember, the emphasis is on the quality of your work rather than the quantity of tasks completed.
7. As this role is for a senior position, it is crucial that you demonstrate the ability to extrapolate from your solutions to design for scale and articulate the technical architecture and decision-making process behind your work.

Problem:

For this take-home assessment, you will be tasked with creating an application that facilitates real-time collaboration on a document among multiple users. The application should ensure that any changes made to the document by a user are instantly reflected and visible to all other users who are currently accessing the document. To accomplish this, you will need to develop a system that efficiently transmits updates across different browsers in real-time.

The core objectives of this assessment can be summarized as follows:

- Enable users to log in to the application and create a new document.
- Provide the document creator with the functionality to add other users as collaborators on the document.
- Ensure that all collaborating users can view live changes made to the document by any other user in real-time.
- Implement a mechanism to persist the document content in a database, allowing users to access and work on the document at a later time.

Below, you will find more details and the additional objectives specific to each expected technical module within the aforementioned core objectives:

Authentication:

- Implement authentication mechanism to ensure that only registered users can access the application.
- Additional:
  - User Session management
  - The application shall require users to register for an account before accessing its features.

Authorization:

- By default, you can implement a model without any roles i.e., one user creates a document and invites other users to collaborate. Everyone has the ability to do all the actions.
- Additional: Implement an owner-collaborator model:
  - Owner: The user who creates the collaborative document will be designated as the owner. The owner will have full access to the document and will be responsible for managing collaborators.

- ○ Collaborator: Users invited by the owner to work on the document will be designated as collaborators. Collaborators will have permissions to modify the document based on the owner's settings(view, edit and delete operations)

Data Storage:

- Implement a simple database to store user information, including usernames and passwords.
- Store the document content and its corresponding permissions in the database.
- Additional:
  - ○ Implement best practices to store user credentials and ensure that proper security measures are in place to protect user data.

Collaboration:

- The application should support collaborative plain text editing.
- Additional:
  - ○ Support rich text editing.
  - ○ Support adding "shapes" or other objects in the document and work on it collaboratively.

Output:

1. Please create a github repo and respond with its link to shankar@floma.co
2. Please give us clear instructions in the README to run the project.
   a. This includes all the dependency installations and the execution commands.
   b. For the database part, you could choose any self-contained solutions. Otherwise, it would be really helpful to see the instructions to set this up and give the proper connection settings while running the code.
   c. (Plus) : If you could rather package it all up and give us a docker run command, that would be perfect. But do not worry if you don't have the time to do this.
3. Please keep the email subject line as "SWE FS(Senior) - (Your Full Name)"