METAL
MANAGEMENT
SOLUTIONS

Full Stack Software Engineering Technical Assessment

January, 2024

Thank you for your interest in joining our team at MMS. This document outlines the technical assessment process designed to evaluate your skills and expertise as a Full Stack Software Engineer. Our assessment aims to provide a comprehensive understanding of your technical abilities, problem-solving skills, and creative thinking. At MMS, we value innovation, collaboration, and the continuous pursuit of excellence. As you embark on this assessment, we encourage you to showcase not just your technical competencies but also your unique approach to software development. This is an opportunity for us to learn about you as a professional and for you to get a glimpse of our technological aspirations and the challenging, yet rewarding, projects that await you.

Please be advised that the completed assessment should be submitted within one week from the date of receipt. Please collaborate with us if this timeline does not suit your schedule, we can accommodate you accordingly. We kindly request that all parts of the assessment, including your portfolio and the solutions to the development tasks, be returned to us by the end of this period. This timeline is designed to allow adequate time for a thorough completion of the tasks while enabling our team to proceed promptly with the evaluation process. Should you face any unforeseen challenges or require an extension for any reasons, please feel free to reach out to us.

In the following sections, you will find detailed instructions regarding the submission of your work portfolio, an overview of the development task, our evaluation criteria, and specific task details. We look forward to your participation and are excited to see the unique insights and skills you can bring to our team.

If you have any questions, please reach out to us to clarify.

1. Portfolio of work

As part of our technical assessment process, we kindly request that you provide a portfolio of your previous work. Along with descriptions of your projects, we would greatly appreciate it if you could include links to any relevant repositories on GitHub or GitLab. This portfolio should showcase the range of projects you have worked on, highlighting your technical skills, problem-solving abilities, and creativity. Examples of repositories, design documents, architecture plans, and case studies or summaries of completed projects are particularly valuable. In cases where confidentiality constraints or NDAs limit your ability to share certain works and you would like to share such works as part of your portfolio, please provide a descriptive overview focusing on your role and the technologies used, ensuring no sensitive information is disclosed.

2. Assessment Overview

In order to gain a better understanding of the level of your skill set as well as identifying your strengths, MMS would like you to demonstrate your skills by completing a development task. Take this as an opportunity to be creative and showcase your skills.

The outcome of this assessment will require the submission of the following:

- The repository of the “To Do” application in section 4.1
- The solution to the algorithm question posed in section 4.2

Upon completion of the assessment, we request that you email your solutions directly to us. Please include in your email detailed links to the relevant GitHub or GitLab repositories containing your work. The email with your submission should be sent to ivan@metalmanagementsolutions.com and please include careers@metalmanagementsolutions.com.

The successful completion of this task will entail a demonstration, either online or in person, of the two outcomes listed above.

3. Evaluation criteria

When evaluating the solutions, the MMS team will consider;

- the codebase of your proposed solution with regards to the structure of the solution (how organised is the code and is it simple to understand),
- whether the code is tested,
- how well it solved the problem,
- how you were able to interpret the task and work remotely

Please take note of the following:

- For applications where you are expected to demonstrate backend knowledge, please refrain from using services such as Firebase and the like. These services are not part of the MMS tech stack and unfortunately are not suited to our use cases.

4. Tasks Overview

Please create a “To-Do” application which can either be fully front end rendered, or backend rendered. The application should retain state and be easy to navigate.

4.1. Application

Create a “To Do” application with an architecture of your choice. It is advisable to use frameworks and languages that you are familiar with so that you can put your best foot forward. In house, we use Flask for our backend, and Angular for our front end, although we are happy to review the application in your preferred language and frameworks.

The design of the application should include the following components:

- Management of application state.
- Easy navigation between pages.

For the “To Do” application, take the following into consideration:

- A clean, user-friendly interface for listing, adding, editing, and deleting tasks.
- Ability to add new to-do items with a title and optional description.
- Edit and delete functionality for each to-do item.
- Persistent storage of to-do items (can use local storage, or integrate a simple backend or API).

Please use your initiative in designing and implementing the application.

4.2 Algorithm

Using a language of your choice, solve the following problem.

Problem Statement:

You are given an array of size `n`, which contains only integers. The array is not necessarily sorted. Write an algorithm to find the majority element in the array, if it exists. A majority element is defined as an element that appears more than `n/2` times in the array. If no such element exists, your algorithm should indicate this.

Example:

- Input: `[3, 3, 4, 2, 4, 4, 2, 4, 4]`
  - Output: `4`

- Input: `[3, 3, 4, 2, 4, 2, 2]`
    - Output: `No majority element`

Constraints:

- The array's size, `n`, is at least 1.
- The elements of the array are integers.

Consider various edge cases and showcase your thinking.