

## 17-313: Foundations of Software Engineering

### Homework 1: Joining the team

Learning goals:

- Familiarize yourself with an existing software project
- Download, install and run an existing software project.
- Run an evaluation tool and collect metrics
- Evaluate the results of these metrics

Welcome to the team! To start your journey on this project, your first task is to become familiar with an existing piece of software. Eventually you will be adding new features, but the first step is to simply download, run, evaluate, and explore the current software product. The project we will be building on this semester is an open source document management system, the Mayan EDMS (<https://www.mayan-edms.com/>) system.

Your first step should be to read the documentation from Mayan EDMS, and review the contents of the repository. Note, there is documentation both for users, and for developers.

Your first task is to simply download and run the system. There are several ways to do this, but we strongly suggest that you build a Docker container. While you may install locally, that is almost always significantly more work than using Docker. The documentation for this is available here: (<https://docs.mayan-edms.com/topics/docker.html#building-the-image>)

HINT: to save yourself future work, we strongly suggest, instead of cloning from GitLab, you should clone from GitHub.

Once you build a docker image, you should run it and open your application in your browser. HINT: if you have trouble starting up your docker image, you might find it helpful to look over the upgrading section: <https://docs.mayan-edms.com/topics/docker.html#upgrading>)

Once you have Mayan EDMS up and running locally, proceed to evaluate it using the Google Lighthouse tool: <https://developers.google.com/web/tools/lighthouse/>). You can run Lighthouse as a stand alone application, or using the audit tab of google developer tools. After you run Lighthouse, it will give you a score for various dimensions: Performance, Accessibility, Best Practices, and SEO.

After looking over the metrics, pick one metric to improve. The Lighthouse reports will give you some suggestions as to how to accomplish this. The only requirements are that your change should affect the top level score, and that the change should involve a commit to the repo. HINT: Because of this, you might want to avoid trying to change the performance score.

Fork the Mayan GitHub repo, and commit your change to your fork. The commit message should include which score you were targeting, what the score was before the change, and what it was after.

After you have completed this task, we will ask you to reflect on the nature of metrics. To do this, you will answer the following questions about metrics, specifically in the context of Mayan EDMS. You should focus your answers for each of these questions on the one top level metric in Lighthouse that you chose to improve.

- What properties do we care about, and how do we measure them?
- What is being measured? Does it (to what degree) capture the thing you care about? What are its limitations?
- How should this metric be incorporated into process? Check in gate? Once a month? Etc.
- What are potentially negative side effects or incentives?

### Deliverables and Deadlines

There is one (1) deliverable and one (1) deadline for this homework.

*Individual Component – 100 points – due Tuesday, September 15th, 23:59*

Create and submit a single **PDF document** containing the following:

- A link to the commit where you improved one of the lighthouse scores.
- A prose description of which metric you chose to improve, why you chose that metrics, and how you went about improving it.
- You should then answer the following questions about the metric you chose:
  - What properties do we care about, and how do we measure it?
  - What is being measured? Does it (to what degree) capture the thing you care about? What are its limitations?
  - How should it be incorporated into process? Check in gate? Once a month? Etc.
  - What are potentially negative side effects or incentives?

Your reflection document should be under two pages (soft limit). Submit the result as PDF document via Gradescope.

### Grading

This homework is worth 100 points. Running the project, making the change, and committing it properly constitutes 50 points (50%), and the reflection document constitutes 50 points (50%).

To receive full credit for the group component, we expect:

- The correct use of tools and technology, including Docker, Git, GitHub, and Lighthouse.
- Answers to the questions that demonstrate understanding of the benefits and limitations of software metrics, specifically in the context of Mayan EDMS. This analysis should go beyond superficial statements, mere descriptions, and truisms, which ties specifically to the context of this assignment.