**Reading Guide**

*S6 Software Engineering*

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## Version

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**Introduction**

This is the reading guide of my portfolio. This guide has been created to provide you with a succinct overview of the portfolio's contents and the obtained learning outcomes throughout the semester.

Within this guide, you will discover an outline of the skills and knowledge acquired and the most illustrative documents to showcase my progress.

I hope this guide will provide you with valuable insight into the process of learning and development during Semester 6.

**Sprints**

# Sprint 1

During the first sprint, I have worked on setting up several documents, specifically the Architecture Document, Analysis Document, DevOps Document, Research Plan. I have also set up the Git repository, including the backend and frontend projects. The Git repository also has a working CI pipeline which for now, just builds the project. I have also created diagrams detailing the databases setup and backend architecture.

# Sprint 2

This sprint I started with implementing the rest of the microservices in the backend. I implemented Music Service, the service which handles everything related to the content on the platform and User Service, the service which handles everything related to users such as CRUD for users and communities. I set everything up so every microservice registers on a Eureka Discovery server. I implemented an API gateway which redirects every request to its specific microservice. I then dockerized every microservice and build it into an image. I added a docker-compose file in the root project and orchestrated the microservices into containers and specified in which order they should start. After this, I deployed an Ubuntu VM instance with MariaDB installed on GCP. I created the music database containing 3 tables: songs, playlists and albums. I configured the server to allow TCP connections from any IP addresses and configured the privileges of the SQL user ‘root’. After this, I created a Mongo cluster on Mongo Cloud Atlas and created a database users with an users collection and a database communities with a community collection. I modified the connection properties in the backend system and then created a Google Kubernetes Engine cluster. I then created a deployment.yaml file in Music Service and User Service containing the definition for the Kubernetes deployments and services and deployed the two microservices. I tested the endpoints such as */api/songs* or */api/songs/create* or */api/users*. I finally configured these deployments to automatically scale depending on the CPU usage.

# Sprint 3

This sprint I decided to focus more on the quality of my software and my research on domain-driven design. I believe this is an essential type of sprint because testing and refactoring boost the quality of your software and by conducting the research on domain-driven design, I can better understand if my design choices were the right ones and what I should change. I started the sprint by writing a testing strategy document for testing the backend, I continued by implementing uploading an mp3 file and a picture via endpoints in the music service. These files are stored in Google Cloud Storage. After, I updated my pipeline to run tests and build and push docker images on every Git push. After, I started creating frontend pages for signup, login, and home page. I implemented basic login and register functionality and I implemented a verify email functionality, basically meaning you cannot login until verifying your email. Then, I started creating unit tests and integration tests. I tested every entity, controller, and service. Finally, I spent the last week of my sprint conducting an interview with a domain expert, a UX developer that could give me insight on the User domain of my application and reading documentation and literature on DDD. I ended the sprint by creating a research document and planning my next sprint.

**Learning Outcomes**

# Future-Oriented Organization

* **Group Project**
  + Project Plan (Testing Strategy, Project Assignment, Goals chapters)
* **Individual**
  + Analysis Document
  + Sprint Goals + Achievements
  + Testing strategy document(test setups)

I feel this work demonstrates that I can develop enterprise software, that I can apply a software development process that complies with professional industry standards. I can clearly define functional and non-functional requirements and document in a transferable way. I would rank myself as Proficient on the learning outcome. I can improve my writing skills and my skill to clearly define requirements.

# Investigate Problem-Solving

* **Group Project**
  + Investigate Problem Solving (Goal chapter)
  + GitHub Issue examples
  + Research Report (chapters 2 and 7)
* **Individual**
  + Research report
  + Backlog screenshot

I feel this work shows that I apply critical thinking in my work, identifying tasks that require further investigation using a well-known methodology, analyzing problems from multiple viewpoints, choosing suitable solutions, and justifying and presenting my work professionally through understandable, repeatable, and validated investigations. I would rank myself as Proficient on this Learning Outcome because I successfully used the DOT framework methods and strategies to create my individual research report and contributed to my group one.

# Personal Leadership

* **Group Project**
  + Group Feed Pulse feedback
  + Peer Feed Pulse feedback
* **Individual**
  + Graduation Preparation Short Report
  + CV

I feel this work proves that I seek out roles that align with my ambitions by reflecting on my current skills and determining the necessary development to pursue my desired career through setting personal and technical goals, planning the required activities to achieve them, and incorporating tasks such as finding relevant minors or graduation assignments into my overall plan. I would rank myself as Beginner or Proficient on this Learning Outcome, because I improved my self-reflecting skills and added the CV in this delivery.

# Targeted Interaction

* **Group Project**
  + Project Plan (Communication chapter)
  + Confidentiality Agreement
  + Sprint 1 Delivery Presentation
  + Sprint 2 Delivery Presentation
  + Sprint 3 Delivery Presentation
* **Individual**
  + Sprint 2 Delivery Presentation

I feel this work demonstrates that I work with my team to establish a professional, agile software development process that considers stakeholders and other relevant viewpoints, while actively sharing my technical knowledge to improve solutions, and maintaining a professional attitude in all communication. I would rank myself as Advanced in this Learning Outcome because I believe my presentation skills are up to par and my communication with the stakeholders and my team is frequent and good. I would like to improve my presentation skills by talking slower, so points get across more efficiently.

# Scalable Architectures

* **Group Project**
  + Architecture Document (C1, C2 Diagrams and Motivation for Technologies)
  + Event Storming
* **Individual**
  + Architecture Document
  + API Gateway
  + RabbitMQ Listener
  + Eureka Microservices

I feel this work proves that I investigate and implement scalable enterprise architectures that support relevant quality attributes, consisting of independently running parts that communicate asynchronously using messaging, utilizing performance indicators for monitoring and validation of automatic scaling under realistic loads, choosing appropriate technologies and utilizing analysis and design techniques such as Event Storming, and communicating my architectural choices using industry standards to stakeholders and team members, ensuring support from the development process and platform. I would rank myself as Beginner on this learning outcome because I believe I have a beginner’s insight of scalable enterprise architectures and design techniques, having designed a suitable architecture for both the group and individual projects.

# Development and Operations (DevOps)

* **Group Project**
  + VPS CD Pipeline
* **Individual**
  + DevOps Document
  + CI Pipeline Screenshot

I feel this work shows that I define a software development process that supports stakeholders' needs, especially when changes occur, by creating defined environments for development and utilizing 'Infrastructure as code' principles, ensuring independent deployability of application parts through the use of containers, implementing automatic testing and measurement for quality assurance, and automating the entire process using CI/CD principles. I would rank myself as Beginner or Proficient due to the fact that I managed to create a CD pipeline that deploys to a GCP VM for my group project and successfully set up a reverse proxy that directs traffic from my client’s private VPS to this VM.

# Cloud Services

* **Group Project**
  + Hacked SQL Instance Evidence
  + GCP VM (deployment environment)
  + SQL Instance GCP
* **Individual**
  + DevOps Document – Database Deployment and Kubernetes
  + GCP Bucket code snippet

I feel this work shows that I understand the purpose of cloud platform providers and develop applications utilizing scalable cloud services such as databases, container management, logging & monitoring, storage, authorization, and autoscaling, ensuring non-functional requirements are met. Additionally, I evaluate the impact of using cloud services as an alternative solution for parts of the application by considering the amount of resources needed, the most suitable cloud platform provider, and the associated budget based on cost estimation. I would rank myself at a Beginner level for this outcome. I have managed to deploy my application on Google Kubernetes Engine and create a VM instance with a MariaDB server, a MongoDB Cloud cluster and successfully connected them to the microservices. To reach a Proficient level, I would like to become even more familiar with the Cloud configurations, options, and resources, especially Cloud Storage as it is needed for my project.

# Security by Design

* **Group Project**
  + Security Diagram
* **Individual**
  + Analysis Document – Misuse Cases Chapter
  + Security Configuration
  + API Gateway Auth filter

I feel this work demonstrates that I investigate common security risks, use best practices to prevent them in software development, and implement techniques like authentication and authorization while also designing for and testing steps to mitigate breaches. I would like to rank myself as proficient because I successfully implemented authentication and authorization using JWT with OAuth2 resource server. I also added an AuthFilter in the API Gateway so only secure requests go through. I have also configured Spring Security to allow role-based access to endpoints.

# Distributed Data

* **Group Project**
  + Persistence layer diagram
  + Ethical Requirements Document
  + Database Evidence
* **Individual**

I feel this work shows that I apply best practices to translate requirements into data requirements, investigate suitable solutions for real-time and persistent data storage, apply legal and ethical considerations, and incorporate distributed data development steps into your software development process. I would rank myself as Beginner on this learning outcome and the work I’ve done for my group project proves that. To improve I would like to play the Tarot Cards of Tech for my individual project and gain a better understanding of legal and ethical considerations.

**Conclusion**

In conclusion, this reading guide serves as an overview of the learning outcomes achieved throughout the semester and provides valuable insights into my progress. By reflecting on the topics covered and the skills developed, I can gain a deeper understanding of my strengths and weaknesses. I will use this guide as a tool to identify areas for improvement during the semester and set goals for future development. With this knowledge, I can continue to grow and advance in my studies and future career.