

# Software Design and Engineering

## Lab Document

<b>High Level Purpose Statement:</b>	I want to implement Docker into my capstone project in order to containerize a database that stores account credentials.
<b>Experimental Design:</b>	Due to the pre-existing structure, the only tasks that I foresee are: <ol style="list-style-type: none"><li>1) Creating a Dockerfile to initialize and configure a container for the database</li><li>2) Creating a Docker-Compose file to set up the database, build the game, and connect the game to the database</li></ol>
<b>Resources Available:</b>	<b>Docker Documentation</b> <a href="https://docs.docker.com/">https://docs.docker.com/</a>  <b>YouTube</b> <a href="https://www.youtube.com/watch?v=X2hpxp3Kq6A">https://www.youtube.com/watch?v=X2hpxp3Kq6A</a> <a href="https://www.youtube.com/watch?v=pGYAg7TMmp0">https://www.youtube.com/watch?v=pGYAg7TMmp0</a>  If I get stuck, I will reach out to my uncle and ask him for some help.
<b>Time Estimate:</b>	I estimate these tasks (on top of solidifying some understanding) to take between 4-12 hours.
<b>Experiment Notes:</b>	<b>Dockerfile</b> <i>Dockerfiles</i> are essentially the blueprint for creating containers. The goal is to specify configurations that will run the same way on any computer by packaging code, dependencies, and runtime environment into a self-contained unit.  <b>docker-compose</b> A <i>docker-compose</i> file is used to coordinate multiple services that need to work together, such as my game and the credentials database. Instead of having to install and configure a database, along with dealing with the headaches of permissions and connections, the <i>docker-compose</i> file defines how these services should be built, connected, and run together in a single environment.
<b>Results:</b>	<b>Dockerfile</b> My Dockerfile creates a container for my game and uses OpenJDK 17 as the base image. It copies my JAR file into the container and exposes port 5555 for the game (server-client connections).  <b>docker-compose</b> My docker-compose file sets up two services: one for my MariaDB database (called <i>mariadb</i> ), and one for my game (called <i>app</i> ).  The <i>mariadb</i> service creates a database called "pixelmate_login" and a user "player" with password "letsplaychess2025". It also exposes port 3306 to allow database connections. It executes my

	<p>"init.sql" file, which initializes the database schema for account creations and logins.</p> <p>The <i>app</i> service is built with my Dockerfile. It connects to the database and exposes port 5555.</p>
<b>Consequences for the Future:</b>	<p>I am loving Docker. I had some really bad luck with it earlier in the semester, but after doing more research and gaining a low-level understanding of how it works, I feel much more confident about using it. I plan on using it for all of my future projects.</p>