Assignment 3: Dockerized PHP Web App with Secure Authentication

Course: Web-Based Systems
Number: SENG 513
Semester: Fall 2023
Due Date: Week of March 5th
Instructor: Steve Sutcliffe <steve dot sutcliffe at ucalgary dot ca>
Version: 1.0.0
Weight: 10%

Objective:

To develop a secure web application using Docker with PHP and MySQL, demonstrating skills in containerization, web development, and database management.

Group Size:

You can do this assignment individually or in groups of a maximum of 4. Your group members must be in the same tutorial as you to give the demonstration.

Part 1: Docker Setup

1. Create or Update the necessary Dockerfiles:
    1.1. Students must update the Dockerfiles presented in class lectures to the latest versions of PHP and MySQL. Alternatively, you may build your own Dockerfiles from scratch.
2. Revise the docker-compose.yml file:
    2.1. Remove any hardcoded passwords and discover a way to provide the docker-compose.yml with access to that password information. This means you should not need to manually enter your passwords for MySQL when starting your docker-compose file.
    2.2. Ensure there is proper linking between the PHP and the MySQL containers.
3. MySQL Initialization:
    3.1. Include any setup/deployment scripts necessary for constructing the MySQL tables and administrative accounts.

Part 2: Web Application Development

1. Authentication Page: Develop a PHP-based web application with user registration functionality, secure login capability and session management.
2. Database Integration: Use MySQL to store user credentials and implement secure password storage.
3. Symfony [Bonus]: Additional marks for using the Symfony framework for application development.

Part 3: Administrator Interface

1. Admin Page: Create an administrator interface to view registered accounts and delete user accounts

Part 4: Demonstration

In your tutorial, each group (or individual if the assignment was done individually) will demonstrate the working application and explain their decisions and implementations.

1. Demonstration:
   1.1. Launch a fresh docker install with no pre-built images or containers.
   1.2. Show they are using the most recent versions of MySQL and PHP through the command line by connecting to the appropriate docker container and executing the appropriate command.
   1.3. Display the users and passwords in the database through the command console.
   1.4. Show the MySQL tables are built and initialized.
   1.5. Show a new user can register, sign in, visit a secured page and not be able to access the Admin page.

2. Explain:
   2.1. Explain how they handled the password issue in the docker-compose file.
   2.2. Explain how they secured the application, particularly handling the passwords in the PHP app.

D2L/GitLab Submission

Please follow these guidelines for submitting your application to D2L:

1. Create and use the University of Calgary's Gitlab repository online; name the repository seng513-202401-assignment3.
2. Commit your work frequently. Only commits made before the deadline will be considered for grading.
3. Grant access to both TAs and your Instructor by adding them as members on your repository.
4. Once done, submit a single *.txt file to D2L containing a link to your repository with a list of your group members (each person will need to make a submission on D2L). The file should be called seng513-assignment3.txt.

Grading [45 Points]

Functionality of the Web App [14 Points]

[2 pts] Launch a fresh Docker install with no pre-built images or containers.
[2 pts] Show using the most recent versions of MySQL and PHP.
[2 pts] Display users and passwords in the database.
[2 pts] Demonstrate MySQL tables are built and initialized on creation.
[2 pts] Secure page/Admin page inaccessible to users not logged in, Admin not accessible to new users
[2 pts] New user registration, login and secure access page functionality
[2 pts] Admin page functionality, including confirmed account deletion.

Security Practices [10 Points]

[5 pts] Secure handling of passwords in the PHP app.
[5 pts] Address password issues in the docker-compose file.

Effective Use of Docker [10 Points]

[5 pts] Proper use of Docker for setting up PHP and MySQL services.
[5 pts] Demonstrating understanding and optimization of Docker configuration.

Explanation and Understanding [6 Points]

[3 pts] Quality of explanation about handling passwords in the application.
[3 pts] Quality of explanation about Docker configuration and optimization.

Achievement Points [Up to 5 Points]

Achievement points play a crucial role in securing full marks for this assignment. These points are designed to challenge your understanding and application of the course material, pushing you beyond the foundational requirements. To successfully earn these points, you will need to engage in independent research and demonstrate a higher level of mastery.

These tasks are deliberately more complex and may not have straightforward solutions. They are intended to stimulate critical thinking, creativity, and a deeper exploration of the subject matter. The answers we are looking for here go beyond the basics; we aim to see how you can apply your knowledge innovatively and effectively in less conventional scenarios.

Remember, the journey to these points is as valuable as the points themselves. This is an opportunity for you to excel and showcase the breadth and depth of your understanding.

Advanced security implementations.
Innovative features or functionalities.
Exceptional optimized use of Docker.

Symfony Bonus Points [Up to 5 points]

Full implementation of requirements using Symfony 5+.

Penalties

As part of our commitment to academic integrity and adherence to intellectual property laws, it is crucial that all submitted work strictly respects copyright laws and guidelines. This includes, but is not limited to, the use of copyrighted materials, code, images, or any other content without proper authorization or attribution.

Please be aware that any instance of copyright infringement will be taken very seriously. The following penalties apply:

Immediate Deduction: If any part of your submitted work is found to violate copyright rules, a significant deduction will be applied to your assignment grade. This deduction can range from a partial to a full loss of marks, depending on the severity of the infringement.

Retroactive Application: Importantly, this penalty can be applied at any point during the course, including during the final grade calculation. If it is discovered post-submission – even after initial grading – that your

assignment contains copyrighted material used inappropriately, a retroactive deduction will be applied to your grade.

Severe Cases: In severe cases or in instances of repeated infringement, further disciplinary action may be taken in accordance with university policies, which could include failure in the course or referral to a disciplinary committee.

Responsibility and Vigilance: You must ensure that all materials used in your assignments are properly licensed or fall under fair use provisions and are correctly attributed. Please seek guidance before submission if you are unsure about using any material.

Honesty and Integrity: We encourage honesty and integrity in all academic endeavours. This policy is in place to uphold these values and to ensure a fair and legitimate educational environment for all students.

Additional Penalty: Use of !important [-5]

The use of `!important` is generally discouraged in the industry and demonstrates a lack of knowledge in structuring quality CSS. Using `!important` in this assignment will result in the deduction of marks.

Late Assignments

Assignments must be demonstrated to the TAs during your scheduled tutorial sessions. If you need to submit an assignment late, you must arrange this directly with your TA, subject to their availability. Late assignments will be graded on a simplified scale: they will receive either a passing grade of D+ (50%) or a failing grade of F (0).

In cases of special circumstances, such as illness or personal emergencies, accommodations may be made regarding submission deadlines. These will be considered on a case-by-case basis. Students facing such circumstances are encouraged to contact me as soon as possible to discuss potential adjustments.