SWE 645: Homework Assignment 3

Full stack application development, containerization, and deploying on Kubernetes cluster with CI/CD Pipeline

Your next assignment is to develop full stack applications using React.js to implement the frontend of the Student Survey application, and FastAPI and SQLMOdel/SQLAlchemy to implement the backend REST APIs and persistence layer of the application. You can choose Amazon Relational Database Service (Amazon RDS)/MySQL or any other database of your choice. Your application implements CRUD operations to manage student survey data in a persistence storage. The application allows prospective students to fill out and submit a survey form to provide feedback about their campus visit. The submitted survey data gets stored in a persistence storage. It also allows users to view all surveys recorded to date. In addition, the application provides the capabilities to update and delete a specific survey.

Please containerize your applications using Docker technology and deploy it on the Kubernetes cluster using the CI/CD pipeline that you built for the last homework assignment. There should be a frontend Pod for the React application and a backend Pod for the REST API/persistence layer.

You can use Amazon RDS to provision and use a MySQL database for this homework. When using Amazon RDS, please make sure that you set up the database in Development/Sandbox mode to avoid any unexpected charges. https://aws.amazon.com/getting-started/hands-on/create-mysql-db/

You can use Postman https://www.postman.com/ to test the working of your containerized microservice(s) – the backend REST APIs before integrating them with the React application.

This homework can be done individually or in a group of maximum 4 students. Only one submission per group is required. Please make sure the submission documentation includes the names of all team members.

Please use the following for the student survey form data.

- First name, last name, street address, city, state, zip, telephone number, email, and date of survey, which are required fields.
- What they liked most about the campus. Options include students, location, campus, atmosphere, dorm rooms, and sports.
- How they became interested in university. Options include friends, television, Internet, and other things.

• The likelihood of him/her recommending this school to other prospective students. The options include Very Likely, Likely, Unlikely.

Submission

The submission for this assignment should be through the Canvas website. I expect a zipped package containing the source files, configuration files, such as Dockerfile, YAML manifests, Jenkinsfile, jar file, and any additional packages, scripts, or files that you used. I also require detailed documentation which contains installation and setup instructions, demonstration of the working code, including references of the tools you used so that the TA and I can replicate your steps and deploy and run the assignment if needed. Please provide a video recording demonstrating the working of every part of your application and make it a part of your submission. Also, provide the URL of your application deployed on Kubernetes in readme file as part of your HW submission on the class blackboard. Your application does not need to be live for grading.

NOTE: A late assignment carries a 10% late penalty for each week it is late. Assignments are NOT accepted after being 2 weeks late. Make sure your or your group's name is on every programming artifact, so we know who it belongs to. For every source file, please include comments at the top of the program describing what the program does. This only needs to be 1 or 2 sentences. Be sure to test access and functionality to your submission before the due date.

Grading:

The following areas will be used in the basic grading of these projects:

- Does system meet the functional requirements along with proper documentation and video recording: 85 points
- Does the assignment run without errors: 13 points
- Comments: 2 points

Instant Point Deductions:

I reserve the right to deduct points instantly for the following reasons:

- The source code/configuration files are not included in the package.
- The detailed documentation and recorded video are not included in the package.
- The program doesn't run due to errors in the code.
- I spend more than 5 minutes trying to debug the assignment.
- I can't figure out how to use the assignment, and instructions are left out.