COSC2759 Assignment 1 specifications

Deadline	Sunday 19.04.2020 (**11:59 pm** AEST)
% allocated to this assignment	20
To be submitted via	Canvas
To be attempted	Individually

Scenario

ACME corp. has developed a web application using NodeJS. Vue.js, and PostgreSQL, and are running this in their AWS cloud account. The source for the application is stored in GitHub, but they have been building and deploying this manually from Tom the lead developer's laptop. This approach has worked for a while, but last month Tom was sick with the flu, and this prevented an important deployment that their biggest customer was waiting for.

There have also been instances where bugs have been introduced into their public website which has caused and increase in the number of support calls from their customers, and the support and development teams have had to work overtime to manage the load and fix the issues.

These issues are causing a reduced morale with the teams, as well as impacting the revenue of ACME corp. They have reached out to you, as an expert in DevOps and Automation, to help resolve their issues around a single point of failure and help their teams focus on delivering new features rather than supporting old and broken ones.

To help resolve their issues, you have suggested setting up an automated build, or continuous integration, to help reduce the dependency on Tom and his laptop. And to add automated testing to reduce the number of defects that is missed during testing.

The application source code can be found here: **https://tinyurl.com/vdo79fr**

NOTE: Download the zipped archive from above url, unzip it. Those of who have never created a web application in the format provided as a part of this source code need to understand the directory structure, what each of the files are?, what are they doing? Look at the "test" folder, make sure you have a good understanding of the source code.

It will be crucial to completing the assignment tasks.

The Approach

To make this easier for ACME corp., which doesn't have extensive experience with DevOps, we will be using well known SaaS tools to help reduce the learning curve for their development team. You will follow best practice principles and make as much of your solution using code, this includes your CI build configuration and scaffolding scripts.

Tools to use:

- GitHub
- CircleCI
- Docker
- Docker Compose

Deliverable

ACME corp. expects a Zip file with all the code and documentation required to run the Continuous Integration build you are creating for them. This includes the files that define the CircleCI pipeline, any shell scripts, and Docker files you use. The goal is for ACME corp to be able to commit the files into their own GitHub repository and set up a CircleCI pipeline, and have it work with no modification to the files necessary.

You should also include the ".git" folder in your zip file so ACME corp can learn from your approach to branching.

PA-DI Tasks

It will be important that you document each of the elements in your solution and explain not only what it does, but the intent behind it, so the ACME corp. team can understand why you chose to approach it the way you did. [20%]
Please consider:

- Analysis of the problem (5%)
- Explain and Justify the solution (10%)
- Writing quality, layout and accuracy (5%)

To include in zip file:
Add a readme.md file into the root of your folder explaining all the elements you have chosen to include, what it does, and why you chose to include it.

Set up a private repository in GitHub and commit the application there to be built, tested, and packaged using CircleCI. [5%]

To include in zip file:
Provide a screenshot of your CircleCI pipeline having executed with the url visible in your browser

Things that needs to be added to your Continuous Integration build [25%]

- Unit testing (5%)
- Static Code Analysis / Lint (5%)
- Code Coverage Report (5%)
- Multiple failure scenarios (5%)
- Generating an artefact that can be deployed (5%)

To include in zip file:
Include the CircleCI configuration file
any scripts required for the pipeline to execute properly

Your pipeline needs to be able to support multiple branches and have CI builds trigger on all branches. [15%]

To include in zip file:
Include the CircleCI configuration file
any scripts required for the pipeline to execute properly

Artefacts should only be generated on the master branch [15%]

To include in zip file:
Include the CircleCI configuration file
any scripts required for the pipeline to execute properly

HD Tasks

If you can finish all above tasks, then you can start working on HD tasks.

No help or consultation will be provided for these tasks. You are welcome to ask general questions regarding the tasks, but this is a strictly self-research section →

f. Run integration testing as part of the pipeline [10%]

Execute automated test that validates that the application integrates properly with the PostgreSQL database backend by standing up a database in a docker container and running tests against it. Integration tests are written by Mocha, please read ReadMe file on the project. (5%)

If the tests fail, break the build and report back why it failed in the log.(5%)

To include in zip file:
Include the CircleCI configuration file
any scripts required for the pipeline to execute properly

g. Run end-to-end tests as part of the pipeline [10%]

End-to-end testing is a test that check if the flow of an application from start to finish is behaving as expected. The purpose of performing end-to-end testing is to find system dependencies and to ensure that the data integrity is maintained between various system components and systems. Please read ReadMe file on the project.

Execute automated tests that validate that the application functions as expected from the user interface. (5%)

If the tests fail, break the build and report back why it failed in the log. (5%)

To include in zip file:
Include the CircleCI configuration file
any scripts required for the pipeline to execute properly

Assessment criteria

You will be assessed on:

- Your ability to automate the build and packaging of the ACME web application
- Using YAML to define CircleCI build tasks
- Integrating unit testing into your pipeline and validate that they are successful
- How well you document your solution.
- How well you analyse the problem and justify your solution for each task.
- Does the provided Zip file contain everything required for ACME corp to be able to use the pipeline you have designed?
- Do you use branching and commit changes often?

PLAGIARISM

All assignments will be checked with plagiarism-detection software; any student found to have plagiarised would be subject to disciplinary action. Plagiarism includes:

- CONTRACT CHEATING: paying someone to do your work
- CONTRACT CHEATING: getting someone else to write the test or attend demo
- submitting work that is not your own or submitting text that is not your own
- copying work from/of previous/current semester students
- allowing others to copy your work via email, printouts, social media etc.
- posting assignment questions (in full or partial) on external technical forums
- sending or passing your work to your friends
- posting assignment questions on technical forums to get them solved

A disciplinary action can lead to

- a meeting with the disciplinary committee
- a score of zero for the assignment
- a permanent record of copying in your personal university records and/or
- expulsion from the university, in some severe cases

All plagiarism will be penalised. There are no exceptions and no excuses. You have been warned. For more details please read RMIT's page on Academic Integrity at https://www.rmit.edu.au/students/student-essentials/assessment-and-exams/academic-integrity

Submission Procedure

One single zipped archive (*only .zip file extensions allowed*) containing

- **readme.md** file:
  - things you have been asked to document in each of the tasks on pages 2,3 and 4
  - this file should also contain your full name, student id and any other relevant information.
- **Any other file that you may wish to submit**

Late submissions and Extension-related information

A penalty of 10% per day of the total marks for each assignment will apply for each day a submission is late, including both weekdays and the weekend. After 5 days, you will receive zero marks for that assignment.

Email your Head Tutor; Homy (amirhomayoon.ashrafzadeh@rmit.edu.au) for extension related queries.