

## CSE 4283 / 6283 – Software Testing and Quality Assurance

### Assignment-3, 100 Points

#### **Objective**

Develop testing and deployment plans that enable continuous deployment of an existing software system that is extended for web access. Create automated acceptance tests (end-to-end testing) and integration (regression) tests.

#### **Scenario**

You have been asked to create a web interface for the application you created for Assignment-2. The VP of engineering at your firm also wants to ensure that you can continuously deploy new features, bug fixes, and changes to the application. He also wants to ensure the quality of the overall system by adopting a quality assurance and test plan.

You will augment the existing application and make it accessible via a web interface and document a deployment pipeline for the system using various tools and cloud infrastructure.

#### **Requirements**

**Web Interface** - Add a web interface to the app you created for Assignment-2 and assume that it will be accessible via a Cloud Platform, for example, the Google Cloud Platform (e.g., container engine [vm], Google App Engine, etc.) or something similar.

**Deployment Pipeline** – Develop/document a deployment pipeline that will leverage continuous integration and delivery tools (can make your GitHub project public).

Steps for pushing to production environment:

1. Source control
2. Continuous Integration
3. Static analysis (e.g., code / style linter, static bug checker [e.g., SpotBugs]).
4. Automated unit tests
5. Automated end-to-end tests (at least one per functionality)
6. Automated deploy to staging environment
7. Manual push to production
8. Connect 3rd Party Code Coverage tool —> <https://coveralls.io/>, others for coverage reporting

## Assignment

**Project Report (submitted to Canvas as a \*PDF\* File):** Write a report documenting your plan. Your report should consist of the following content:

- **(10 pts) Report should be Professionally Organized / Presented** (content should not solely be a list of bullets that delimit the required content - write in prose / paragraph form). NO ORDER SPECIFIED – Include Name, NetID, and Github username, and link to your Github repository on first page of report [4 pts for including appropriate items on the first page, 6 pts for organization].
- **(20 pts) Discuss your Deployment Pipeline.** Explain each step, tools that should be used, and benefits provided by the tool [15 pts]. What challenges might be encountered at each step (e.g., setup of the tool, any additional implementation/coding required, etc.) [5 pts]?
- **(10 pts) Detailed setup and execution instructions** for your web application (put as a separate SECTION in the report).
- **(10 pts) Test Cases for Manual Testing:** Use Test Case Specification to specify 2 tests that should be performed during the manual testing phase [5 pts for each test].
- **(10 pts) Discuss automated unit testing** (using unit testing tool) you performed.
- **(20 pts) Tool Description** - briefly describe tools that should be used in the process (purpose, functionality provided, ease of use, setup, and do you recommend others beyond your team/organization to use it? Please note that you have already identified these tools earlier during the “discussion of your Deployment Pipeline.”) [15 pts, 3 pts each]. How does the tool integrate with the rest of the pipeline [5 pts]?
- **(10 pts) Cloud Platform Usage:** What Cloud Platform do you recommend to use [2 pts]? Brief discussion of challenges [4 pts], and benefits [4 pts] using this Cloud Platform.
- **(10 pts) Code Coverage Report:** Run a code coverage tool on your application and include a screenshot of the output from code coverage tool. Turn off any ignored lines or disabled functions from coverage analysis (i.e., coverage should indicate actual lines covered by tests and not ignored lines).

## **Notes & Resources**

- Tools you may consider
  - Continuous Integration
    - CircleCI, TravisCI, Bamboo\*, Jenkins\*, Team City, others
  - End-to-End Testing / Acceptance Testing / Web Interface Testing
    - [PhantomJS | Nightwatch] —> Selenium, Fitnesse, others
  - Backends/Hosting
    - Google App Engine, Google Kubernetes Engine, Google Compute Engine, etc.
  - Code coverage reporting
    - <https://coveralls.io/>, or others for coverage reporting

**Turn-in the report to Canvas. Include the link to your Github repository on the first page.**