COMSATS UNIVERSITY, ISLAMABAD
Department of Computer Science
Assignment - 3, Fall 2025

[CLO4]: Apply DevOps pipeline automation techniques for code deployment

Course: CSC483 – Topics in Computer Science II (DevOps) **Class: BCS-7/ BDS-7**
Instructor: Qasim Malik **Total Marks: 10**

Part-I: [CLO4] Writing automated test cases using Selenium [4]

Selenium is an open-source project providing a range of tools and libraries aimed at supporting browser automation. There are lots of use cases that Selenium offers ranging from automated web scraping to automated web testing. In this part of the assignment, you are required to use Selenium to write at least 10 automated test cases to test your web application. Since building a web application is out of the scope of this course, it can be any simple web application with the only requirement being that it uses some Database Server for storing application's data. To write your test cases, you are free to use any programming language that supports Selenium's integration. Though Selenium supports several browsers, you are required to write test cases for Chrome browser. Since we are going to integrate those test cases in Jenkins pipeline, running on AWS EC2, you must use headless Chrome in your test cases.

Part-II: [CLO4] Creation of an automation pipeline with test stage [4+2]

Jenkins is an open-source automation server that helps automate various stages of the software development lifecycle, including building, testing, and deploying applications. It plays a key role in enabling Continuous Integration and Continuous Delivery (CI/CD). In this task, you will use Jenkins, running on an AWS EC2 instance, to automate the testing phase of software development. You are required to store your automated test case code in a GitHub repository. Next, you will enhance your existing Jenkins pipeline by adding a test stage, extending your pipeline script to fetch the code from GitHub and execute tests in a containerized environment using Docker. If you're using Java for writing test cases, you may use the pre-built Docker image available at:

https://hub.docker.com/r/markhobson/maven-chrome/

which includes Chrome, Maven, JDK, and ChromeDriver. Alternatively, you can build a similar image by writing your own Dockerfile

Upon completion of this assignment, you will be able to:

- Write automated test cases using Selenium
- Create an automation pipeline in Jenkins for test phase
- Configure and apply Jenkins pipeline for running automated test cases in a containerized way

What to submit

This is an individual assignment. Please fill out the following Google form to provide Deployment URL alongwoth the GitHub URLs for both the application code and test code:

https://forms.gle/4fnuUPhXptQnDPUK6

Here's the link of the response sheet for the above google form to view your responses:

https://docs.google.com/spreadsheets/d/1ApEzenqAEc-dKEmFZSd4bUfSknAA3100JpLKWcl4Ks0

You are required to submit a well-organized report that describes your application and outlines all the steps undertaken in both parts, supplemented with appropriate screenshots. Please ensure the Jenkins pipeline script is included.

Additionally, please add me as a collaborator to your GitHub repository containing application code so that I can trigger your Jenkins pipeline and verify its functionality. The pipeline should be configured to email the test results back to the collaborator who made the push.

Evaluation Criteria

Criteria	**Marks**
A minimum of 10 test cases implemented using Selenium	4
Jenkins pipeline is triggered by a GitHub push, executes the test stage, and emails test results to the collaborator who made the push	4
Report with screenshots and steps	2