Assignment

Hello All,

Please go through all listed instructions and guidance carefully for successful assignment completion.

Your assignment will be of 20 marks.

I have created 5 assignment questions from which you are expected to solve any one as per your choice.

Out of 5, Three assignments are group based and Two assignment are for an individual. Here, if anyone wants to execute group bases assignment individually they can do it, however assignment 4 & 5 are restricted to be done individually.

I have created goggle sheet in which you are supposed to provide your preference for assignment implementation. https://docs.google.com/spreadsheets/d/107ISxO7PARqkActYF0jMX4n2BnHG6n8nOsKFJ07QY0w/edit?usp=sharing

Please find the assignment details and instructions:

Assignment details:

1) Assignment 1,2, and 3 are expected to be performed in group (Not more than 5 people also it is fine with me if anyone wants to execute/perform this individually).

2) Assignment 4 & 5 is strictly expected to be performed individually.

Instructions:

1) Submission of assignment 1,2, & 3 is expected as below

Lab performed can be submitted either via screen recording (mp4) or with step by step screenshot (the video or screenshot must contain your BITS_ID or your name to authenticate)

If you are opting for screen recording, the recorded video should be uploaded to below drive https://drive.google.com/drive/folders/1G_1fy3bGYzuHY9NooCZwLiyh2Umi0WNT?usp=sharing (upload to the drive is restricted to BITS email ids)

For assignment 2 and 3 the group must share selenium test scripts and jenkinsfile respectively.

Note: If you attain to screen recording then kindly just upload video file to drive and other supporting documents should be uploaded here (Elearn portal)

elearn portal submission is mandatory to evaluate and provide the grades.

2) Submission of assignment 4 and 5:

The submission report must include the name and bits id of an individual

There will be plagiarism check so make sure not to copy paste from internet

The report content should be more than 4 pages (Word document)

Assignment Questions:

Assignment 1

The objective of this assignment is to have hands on experience of Git Workflow. You are required to create or fork a repo on Git and use Git bash on the desktop for completing the tasks. You are required to create one manager role for the repository and others as collaborators. The manager will act as a reviewer and decision maker.

Checklist of the tasks that are required to be performed:

Add team members as collaborators and assign them appropriate rights (if you are performing individual then create one dummy account for the task)

Create a branch(development/production/feature)

Edit files or create new files followed by commit

Clone the repo and Create pull-request

While collaborating your work, showcase how conflicts are resolved

Create tag such as open issue, or feature-added

Do a force push/commit and then later reset the changes

Stage "development branch to production branch"

Showcase how features are released in versions (merging production to master branch)

Also, state importance of Readme and gitignore files and their usage while working in a distributed environment.

Bonus point: If Pull Requests are linked with e-mail to the manager who finally approves the changes.

Assignment 2

Selenium is most commonly used frameworks for browser automation and Testing Team's use this tool extensively in DevOps pipelines. This assignment is designed to focus & perform GUI Automation testing using Selenium. You can select any website of your choice which requires you to login and then search through various lists.

You need to showcase following tasks:

Navigate to the website

Login to the portal (login form can be on the different window, or as a dropdown, or as a pop-up)

Showcase interaction with the Dynamic and Static elements

Extract web elements such as table or list

Usage of locator types, whether to use CSS selector or Xpath

How above variation effects performance of the testing

Usage of Dynamic Xpath or tags vs Static Xpath

Need of thread.sleep() functionality, in case of loading page or waiting for search results

Can same selenium test work in different browsers (chrome or IE)

Exception handling in case webpage doesn't load properly as expected

Bonus point: Measure the performance in terms of time investment for Manual Vs Automated Testing

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Assignment 3

Jenkins is a popular open source tool to perform continuous integration and build automation. Create a repo using git & Setup Jenkins. Create one administrator user and manage their roles.

You are required to perform following tasks:

Setup Master-slave Architecture

Create a Jenkins Pipeline (Describe steps, nodes and various stages included in the pipeline)

Showcase Build, Test and Deploy stages

Handle possible failures while executing pipeline

Create one additional branch and handle pull requests

Make some changes in the source code and integrate

 Create Staging & Production Environment

Deploy changes to Staging Environment

Deploy changes to Production Environment

List the importance and benefits of CI\CD

Bonus Point: Usage of plugins such as AWS or Azure for above tasks is advised

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Assignment 4 – Case Study

Consider you are part of a healthcare management system, working on a product development in analytics domain (provides day to day analysis of the entire system). The product is expected to generate business reports using AI for the stakeholders. The product should serve features such as, Data Loading, Data Cleaning, Data Pre-processing and Artificial Intelligence for Report Generation, Report Exporting in PDF/Word and integration with a mailing system.

During an investment round, received a big investment for the product to scale and deliver the product. Product must be converted as SaaS solution and made available for about 100 stakeholders each generating 1 lakh reports on monthly basis. To satisfy the request, it requires load balancing, parallel and distributed execution and error free as these reports contain great value to the stakeholder's company and timely generation. How this product development delivery can be accelerated with the help of DevOps?

Assignment 5 – Case Study

A parking lot or car park is a dedicated cleared area that is intended for parking vehicles. In most countries where cars are a major mode of transportation, parking lots are a feature of every city and suburban area. Shopping malls, sports stadiums, mega Temples, and similar venues often feature parking lots over large areas.

System Requirements:

We will focus on the following set of requirements while designing the parking lot:

The parking lot should have multiple floors where customers can park their cars.

The parking lot should have multiple entry and exit points.

Customers can collect a parking ticket from the entry points and can pay the parking fee at the exit points on their way out.

Customers can pay the tickets at the automated exit panel or to the parking attendant.

Customers can pay via both cash and credit cards.

Customers should also be able to pay the parking fee at the customer's info portal on each floor. If the customer has paid at the info portal, they don't have to pay at the exit.

The system should not allow more vehicles than the maximum capacity of the parking lot. If the parking is full, the system should be able to show a message at the entrance panel and on the parking display board on the ground floor.

Each parking floor will have many parking spots. The system should support multiple types of parking spots such as Compact, Large, Handicapped, Motorcycle, etc.

The Parking lot should have some parking spots specified for electric cars. These spots should have an electric panel through which customers can pay and charge their vehicles.

The system should support parking for different types of vehicles like car, truck, van, motorcycle, etc.

Each parking floor should have a display board showing any free parking spot for each spot type.

The system should support a per-hour parking fee model. For example, customers have to pay ₹40 for the first hour, ₹30 for the second and third hours, and ₹25for all the remaining hours.

13. The product is expected to use AI for automatically finding the available parking spot.

Do the Following:

A. Draw a component-based architecture diagram for the above description.

B. How this product development delivery can be accelerated with the help of DevOps?