SAVITIBAI PHULE PUNE UNIVERSITY
M.Sc.(Computer Science) Sem-III
Practical Examination (From 2024-2025)
SUBJECT: CS-613-MJP : Lab Course on CS-612-MJ (DevOps Fundamentals)
Time: 3 Hours Max. Marks: 35

Q.1) create a simple project using any programming language and perform some operation on the project using git.
Make your project as a git repository
add your file staging area and commit changes with a descriptive message. [15 M]

Q.2) create a simple Java project using Maven. adding dependencies, and Configuring the project's POM file and compile code using maven tool. [15 M]

Q.3) Viva. [5 M]

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Q.1) Docker and Containerization

Task 1: Dockerfile Creation and Build
● Create a Dockerfile to containerize a simple HTML web page.
● The Dockerfile should use an nginx base image and copy the HTML page to the default directory served by nginx.
● Build the Docker image and tag it appropriately.

Task 2: Running and Managing Containers
● Run the Docker container, mapping port 8080 on the host to the container's port 80.
● Confirm the web page is accessible through localhost:8080.
● Stop and remove the container after testing. [15 M]

Q.2) create a simple project And push on remote server (like github) using git. and perform some operation.
And displays a chronological history of commits. [15 M]

Q.3) Viva. [05 M]

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Q.1) Applying CI/CD Principles to Web Development Using Jenkins, Git, and Local HTTP Server (e.g., Apache or Nginx). [15 M]

Q.2) Create a simple project, push it to a remote repository on GitHub, and create a new branch. Merge this branch into the main branch and display a chronological history of commits. [15 M]

Q.3) Viva. [05 M]

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Q.1) Configure Maven to compile the code, run tests, and generate artifacts like JAR files. [15 M]

Q.2) Create a simple project and use Git commands to check the status, view log history, see differences between the working directory and the last commit, make a commit and display a chronological history of commits.

[15 M]

Q.3) Viva. [05 M]

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Q.1) Create a simple project, push it to a remote repository on BitBucket, and create a new branch. Merge this branch into the main branch and display a chronological history of commits.

[15 M]

Q.2) Create a simple project, push it to a remote repository on Github , and create a new branch. Merge this branch into the main branch and display a chronological history of commits.and Pull the changes on your local machine.

[15 M]

Q.3) Viva. [05 M]

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Q.1) Create a simple project, push it to a remote repository on GitLab, and create a new branch. Merge this branch into the main branch and display a chronological history of commits. Pull the changes on your local machine.

[15 M]

Q.2) Create CI using Webhook and deploy a project using Jenkins Execute shell.

[15 M]

Q.3) Viva. [05 M]

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Q.1) Create a new file on a separate branch, make some changes to this file, and then merge these changes into the main branch using bitBucket interface.

[15 M]

Q.2) Outline the process of setting up a CI/CD pipeline for a web application using Jenkins, Git, and a local HTTP server. Include the configuration of Jenkins, the webhook setup, and the execution of build and deployment steps.

[15 M]

Q.3) Viva. [05 M]

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Q.1) Implement Bitbucket Operations Using Git

- Task 1: Create a new repository on Bitbucket and clone it locally.
- Task 2: Create a file example.txt, add and commit it, and create a branch feature.
- Task 3: Push the feature branch to Bitbucket and create a pull request. Review and merge the pull request.

[15 M]

Q.2) Explain how to set up and manage dependencies in a Maven project. Describe the structure of a pom.xml file, adding dependencies, and how Maven handles build automation for tasks like compiling code, running tests, and generating JAR files.

[15 M]

Q.3) Viva. [05 M]

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Q.1) Install Docker on your system and create a simple "Hello, World!" application using HTML.
Create a Dockerfile to containerize the application, using an official web server image as the base. Build the Docker image, tag it, and run a container, making the application accessible on a local port (e.g., http://localhost:8080).

[15 M]

Q.2) Git and GitHub Repository Management.

Task 1: Repository Setup and Initial Commit

- Set up a local Git repository and create a file named project.md with a brief description of a hypothetical project.
- Initialize the repository, add project.md, commit the changes, and push to a GitHub repository.

Task 2: Branching and Merging

- Create a new branch called feature-branch and make additional changes to project.md.
- Commit the changes in the feature-branch, switch back to main, and merge feature-branch into main.
- Push the updated main branch to GitHub, ensuring the merge is reflected.

[15 M]

Q.3) Viva. [05 M]

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Q.1) Containerize a basic application and deploy it using Docker.

[15 M]

Q.2) Git and GitHub Repository Management
Objective: To manage repositories, branching, and merging in Git and GitHub.

Task 1: Repository Setup and Initial Commit

- Set up a local Git repository and create a file named project.md with a brief description of a hypothetical project.
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Q.1) Applying CI Principles to Web Development Using Jenkins, Git [15 M]

Q.2) Containerize a basic application and deploy it using Docker. [15 M]

Q.3) Viva. [05 M]

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Q.1) Bitbucket Repository and Branch Management

Task 1: Repository Setup and Branching

- Create a repository on Bitbucket and clone it locally.
- Create a branch development, add a new file, commit the changes, and push it to the development branch on Bitbucket.

Task 2: Pull Request and Code Review

- In Bitbucket, create a pull request to merge development into main.
- Assign a reviewer (or self-review) and comment on any changes before merging.

[15 M]

Q.2) Automated Deployment with Jenkins and GitHub

Task 1: Configuring Jenkins with GitHub

- Install and set up Jenkins.
- Integrate Jenkins with a GitHub repository, ensuring Jenkins triggers a build on every push.

Task 2: Creating a CI/CD Pipeline

- Create a Jenkins pipeline that clones your GitHub repository, builds a simple web application, and archives the build artifacts.
- Configure a post-build action to notify your GitHub repository of the build status.

Task 3: Adding Deployment Step

- Extend the pipeline to deploy the built application to a local web server (use shell commands for deployment).
- Set up a webhook in GitHub to trigger the Jenkins job automatically upon a code push.

[15 M]

Q.3) Viva. [05 M]

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Q.1) Bitbucket Repository Management

Task 1: Creating and Configuring a Bitbucket Repository

- Create a new repository on Bitbucket with a meaningful name and description.
- Clone the repository to your local machine and add a README.md file.
- Push the README.md file to the Bitbucket repository.

Task 2: Setting Up Access Controls

- Invite a collaborator to the repository with "Read" access only.
- Update the collaborator's access to "Write" and confirm they can push to the repository.
- Document the access control changes in a separate file and push it to the repository.

Task 3: Working with Branches

- Create a new branch named feature/update-readme.
- Make a minor update to the README.md file on this branch and push it.
- Create a pull request (PR) for merging this branch into the main branch and merge it after review.

[15 M]

Q.2) Applying CI/CD Principles to Web Development Using Jenkins, Git and Local HTTP Server (e.g., Apache or Nginx).

[15 M]

Q.3) Viva. [05 M]

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