DevOps Project Assignment: End-to-End CI/CD on AWS

🎯 Objective:

Provision infrastructure on AWS, configure Ubuntu Desktop with required software using Ansible, and deploy a Java web application using Jenkins CI/CD pipeline.

🧩 Task Breakdown:

◇ Part 1: Terraform – Infrastructure as Code

- Create a VPC with public subnet.
- Launch 2 EC2 instances:
  - jenkins-server: for Jenkins controller.
  - ubuntu-desktop: for deploying apps (target node).
- Attach appropriate security groups for:
  - SSH (22), HTTP (80), App (8080), Desktop access (3389 or VNC).
- Create an IAM Role for EC2 with necessary policies (e.g., EC2, S3 access).

◇ Part 2: Docker – Jenkins Agent Image

- Create a Dockerfile to build a Jenkins agent container with:
  - Java (8, 11, 17)
  - Python3
  - Maven
  - Ansible
  - Terraform
  - AWS CLI
- Ensure SSH is enabled for Jenkins master to connect.

◇ Part 3: Ansible – Configuration Management

- Set up dynamic inventory using AWS EC2 plugin.
- Create Ansible roles to install/uninstall:
  - Java
  - Tomcat 10
  - Python
  - Ubuntu desktop + Chrome Remote Desktop
- Use main.yaml playbook to apply/destroy roles based on variables.

◇ Part 4: Jenkins – CI/CD Pipeline

- Set up Jenkins pipelines:
  1. ubuntu-desktop-app.groovy:
     - Clones IaC repo
     - Runs Terraform (apply/destroy) with approval stages
     - Triggers Ansible playbooks to install/remove software
  2. java-app-deploy.groovy:
     - Clones Java app repo
     - Runs SonarQube analysis
     - Builds .war using Maven
     - Uploads to Nexus
     - SSHes into target EC2 and deploys to Tomcat
     - Updates pom.xml version and pushes it back to GitHub

🗀 Expected Deliverables:

- GitHub repo with:
  - /terraform/ folder (for AWS infra)
  - /ansible/ folder (with roles and playbooks)
  - /jenkinsfiles/ (Jenkins pipeline scripts)
  - /Dockerfile (for Jenkins agent)
- Sample output screenshots or logs showing successful:
  - Terraform apply/destroy
  - Ansible provisioning
  - Jenkins build & deployment

💡 Bonus:

- Add email approval in Jenkins stages (apply/destroy).
- Parameterize branch/environment via Jenkins input.
- Use Nexus + SonarQube hosted on AWS if comfortable.