**DevOps Assignment**

Steps followed for the assignment :-

1. Install Ubuntu (if using windows OS).
2. Install Java (11 or 17) using Ubuntu terminal.
3. Install Jenkins using Ubuntu terminal.
4. Create a git repository.
5. Push python files (calculator and tests) onto git.
6. Write a Docker file and create a docker image using ubuntu terminal.
7. Write a Jenkins file.
8. Push both Jenkins and Docker file on git.
9. Start Jenkins server
10. Create pipeline integrate with git as SCM
11. Add Webhooks
12. Cloud Formation Using SAM Template

**Installation Part**

**Ubuntu:-**

* In Windows Features turn on “Virtual Machine Platform” and “Windows Subsystem for Linux”.
* Install latest release of Ubuntu from Microsoft Store.
* Download WSL 2 Linux terminal.
* Launch Ubuntu and set credentials

**Jenkins:-**

* Install Java 17 or Java 11 from ubuntu terminal using given command  
   -> sudo apt install openjdk-17-jdk
* Now Install Debian packages for Jenkins using Ubuntu Terminal  
   -> wget -q -O - https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo apt-key add –   
   -> sudo sh -c 'echo deb https://pkg.jenkins.io/debian-stable binary/ > /etc/apt/sources.list.d/jenkins.list'
* Install Jenkins  
   -> sudo apt update  
   -> sudo apt install Jenkins

**Docker:-**

* Download Docker desktop and configure it for Ubuntu

**AWS SAM CLI:-**

* Download AWS CLI and configure it by using access key and secret key for the user
* Install SAM

**Files Creation**

**Python:-**

Create Python files and push them onto git repo

**Docker Image:-**

Now open ubuntu terminal inside the project folder and create a docker image (I created image named ‘devops\_image’) using command mentioned below  
 -> docker build -t devops\_image .

You can check whether output for created image using  
 -> docker run devops\_image

**Docker & Jenkins file:-**

Now create Docker and Jenkins file inside the same project folder using appropriate syntax and push them onto Git hub repo.

**Create Jenkins Pipeline**

* Start Jenkins Server
* Create new item as Pipeline
* Choose Git as SCM
* Enter correct Project URL and Git Repo
* Apply changes

**Adding Webhooks**

* Inside pipeline configure choose “GitHub hook trigger for GITScm polling” as Build Triggers.
* Now Add webhook inside setting of our project git repository.  
   For webhook we need a http URL for Jenkins localhost, for that
* Download **ngrok** application for your system.
* Open command prompt where ngrok is downloaded and execute given command which will expose our local host and give us a URL  
  -> ngrok http 8080
* Now add the URL in webhook settings of our Project in specifies format  
  <url>/github-webhook/

You have enabled webhook build trigger for your Pipeline.

**Cloud Formation**

* Create an task by executing the given command on the windows powershell in the project directory .

-> sam init

* Do require changes in the lamda handler function of app.py
* Build the task using given command

-> sam build

* Deploy your task by using

-> sam deploy –guided

Error of S3 bucket does not exist may arise, then create an S3 bucket manually and execute following commands:

->sam package --s3-bucket <bucket\_name> --output-template-file packaged.yaml

->sam deploy --template-file packaged.yaml --stack-name <your stack name> --capabilities CAPABILITY\_IAM

* Go to Cloud Formation in AWS Console and check if stack is created successfully or not.