DevOps Project

(Creating an Jenkins Pipeline in Docker for One-Click Deployment of a Webpage)

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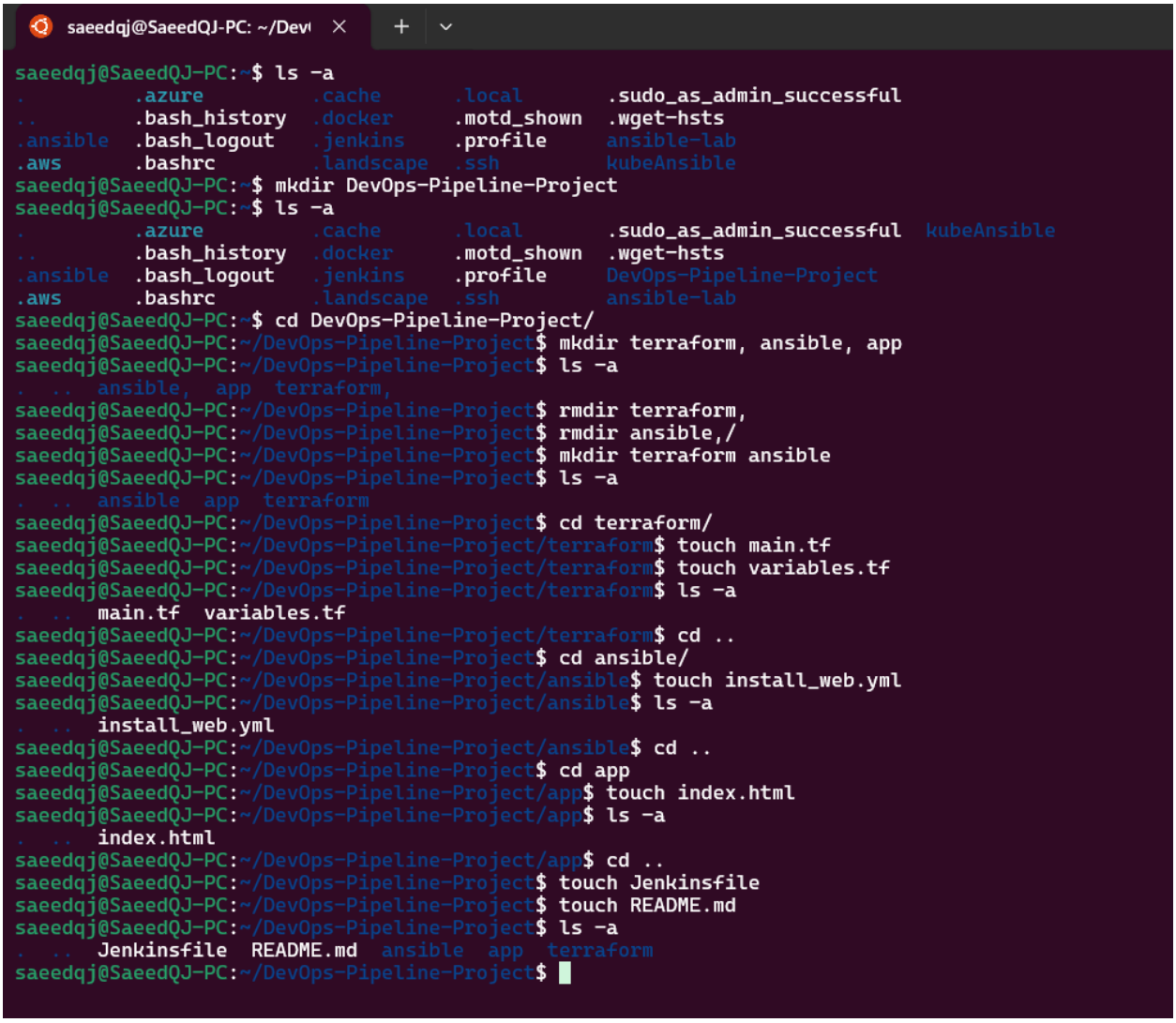
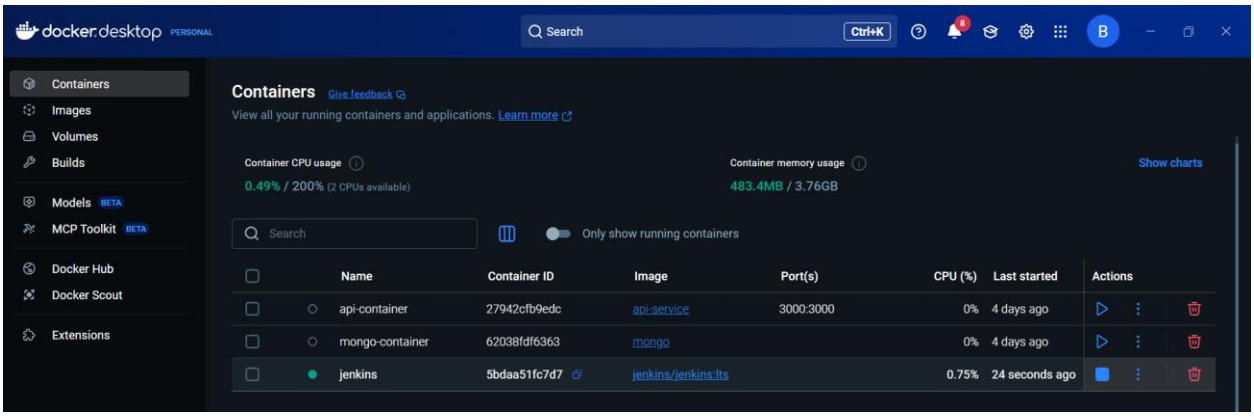
1. Creating the Complete Project Structure



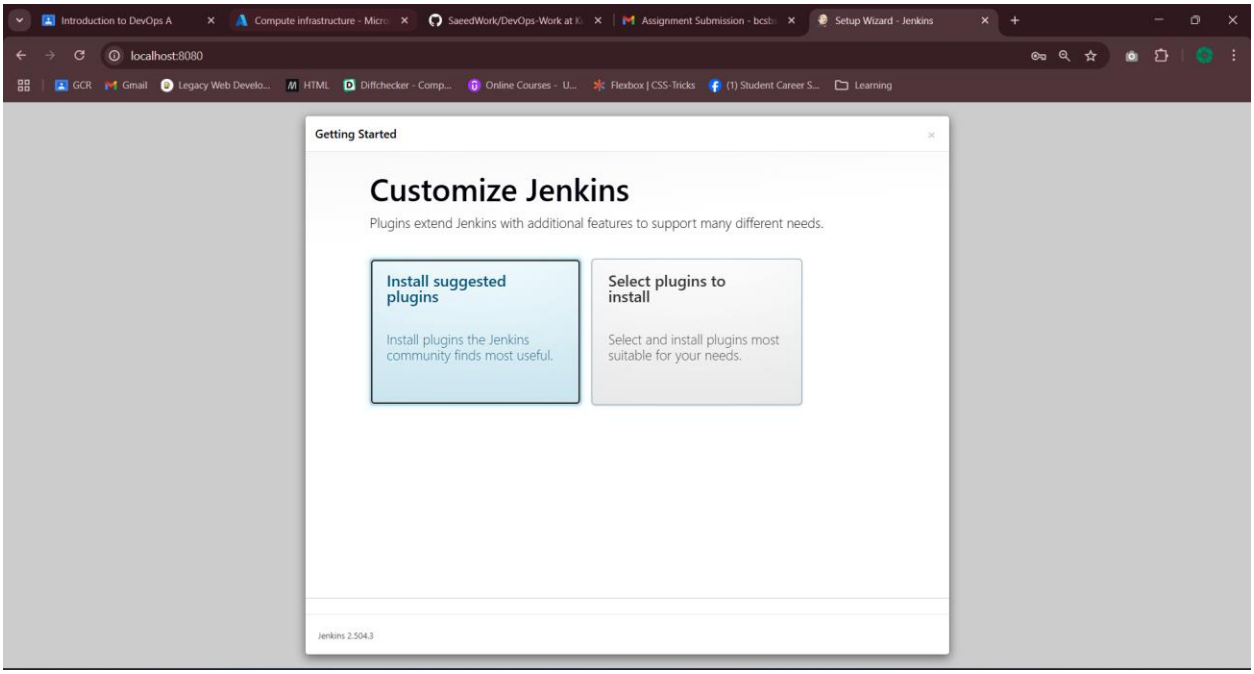
Note - We ran nano command and inserted some html template in the index.html file in the app folder. Wasn't really comfortable with nano so used VS code instead.

2. Running Jenkins in Docker

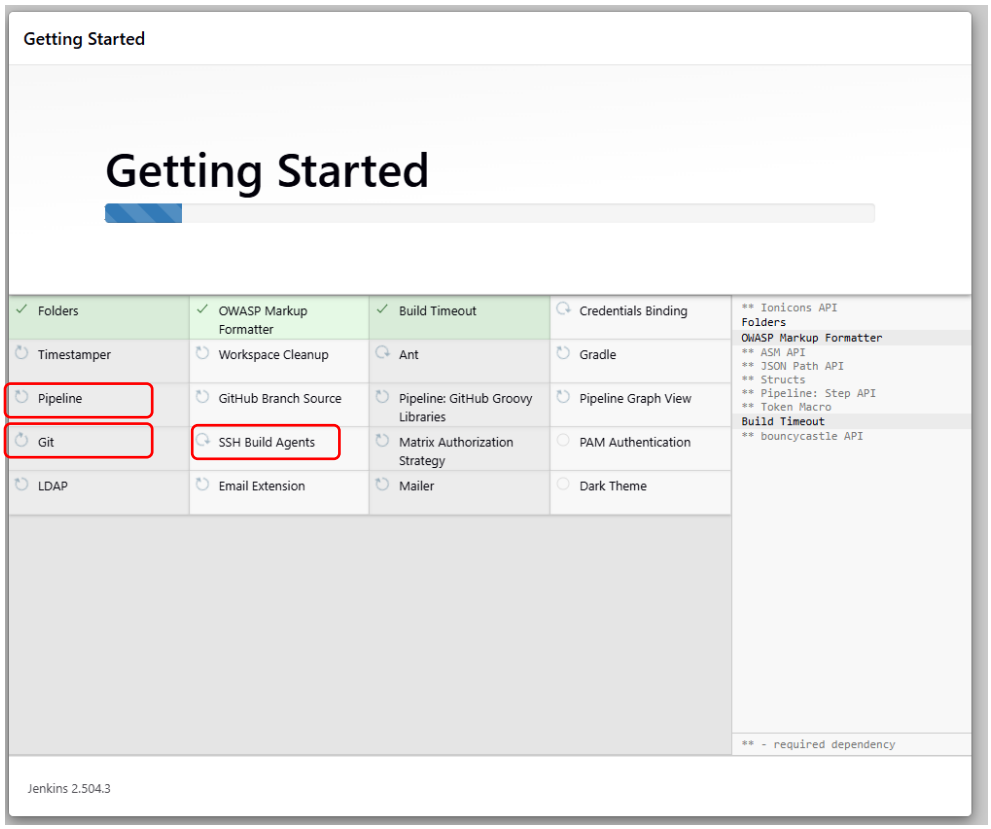
```
saeedqj@SaeedQJ-PC: ~
saeedqj@SaeedQJ-PC:~$ docker run -d \
  --name jenkins \
  -p 8080:8080 -p 50000:50000 \
  -v jenkins_home:/var/jenkins_home \
  -v /var/run/docker.sock:/var/run/docker.sock \
  -v $(which terraform):/usr/local/bin/terraform \
  -v $(which ansible-playbook):/usr/local/bin/ansible-playbook \
  -v $(pwd):/workspace \
  jenkins/jenkins:lts
Unable to find image 'jenkins/jenkins:lts' locally
lts: Pulling from jenkins/jenkins
0c01110621e0: Pull complete
2315362e4443: Pull complete
4185f63a4bf1: Pull complete
51c9d25ed578: Pull complete
10709260192c: Pull complete
474c0ab7c65d: Pull complete
62d5bb186774: Pull complete
f1c4b8ee4b6f: Pull complete
719a01689f92: Pull complete
1c8d8eef6986: Pull complete
e05a8359c72d: Pull complete
981fa0afce25: Pull complete
Digest: sha256:f4607803bd1ee4dc91b1695b07d3a04c77b4f575a507ff65375af888e1497662
Status: Downloaded newer image for jenkins/jenkins:lts
5bdaa51fc7d7f1813754a82c1bd0927c1256aa7cb49e7e6333bd307a7d4a80f3
saeedqj@SaeedQJ-PC:~$
```



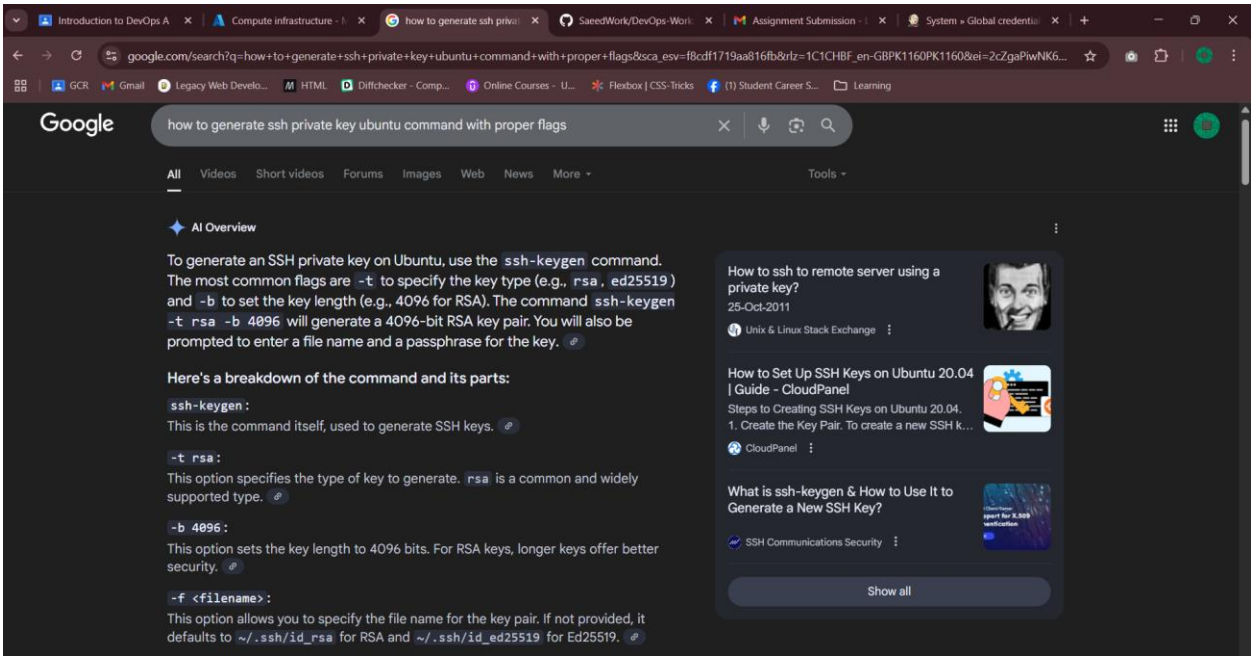
Jenkins is live on port 8080



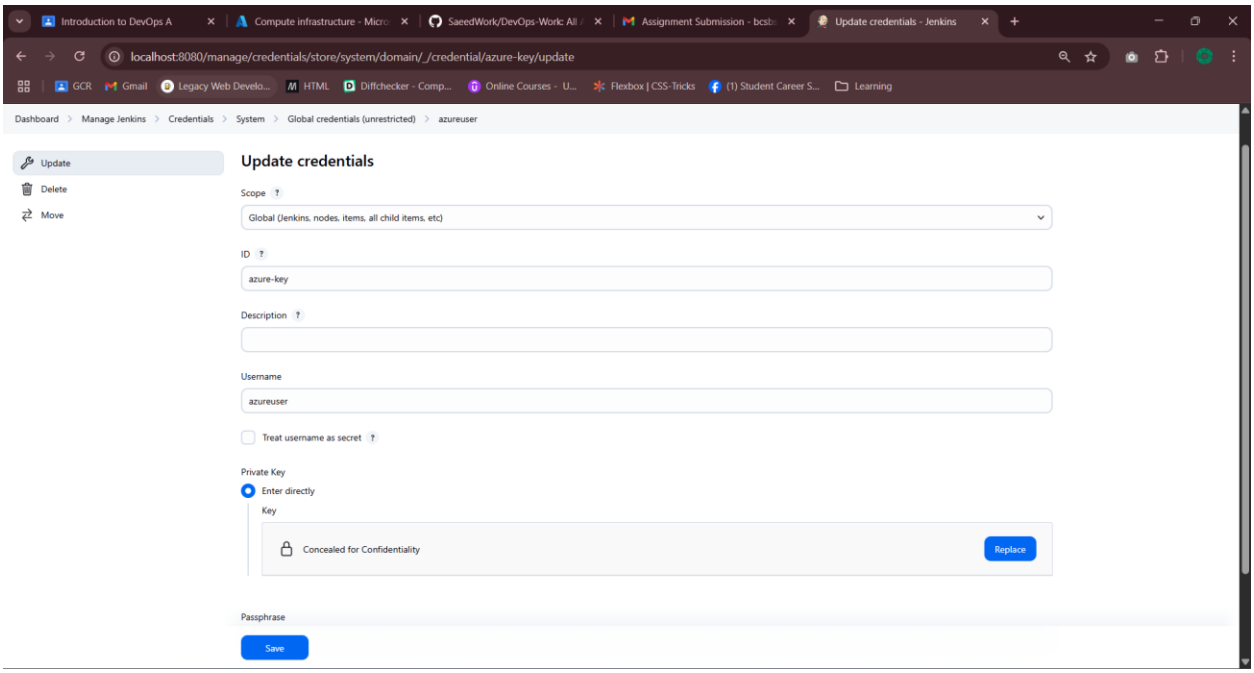
Installing the plugins – Git, Pipeline , SSH Agent



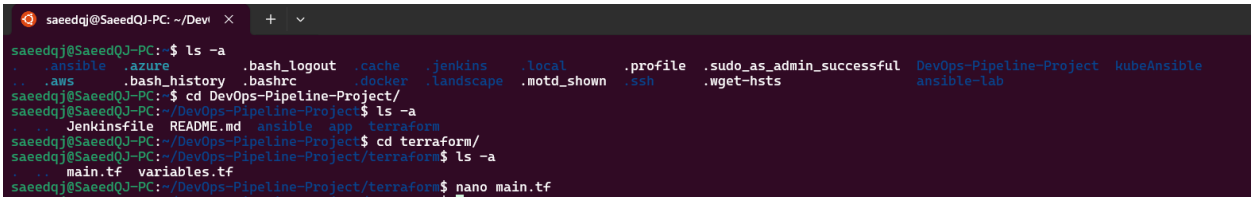
Creating & adding private key into Jenkins




```
saeedqj@SaeedQJ-PC:~$ ssh-keygen -t rsa -b 4096 -f ~/.ssh/azure_vm_key
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/saeedqj/.ssh/azure_vm_key
Your public key has been saved in /home/saeedqj/.ssh/azure_vm_key.pub
The key fingerprint is:
SHA256:D8xEtacABIr0NTXYIzovYVCh4PuQqb2bzkBS+FrzJq8 saeedqj@SaeedQJ-PC
The key's randomart image is:
+---[RSA 4096]----+
|...oo=*o...      |
|++o..o.=.  .     |
|oo+.. . + . .    |
| o+=   + . o     |
|.*= +   S .      |
|++o+ .   o       |
|+ o.+     .      |
| o *             |
| .Eo.            |
+----[SHA256]-----+
saeedqj@SaeedQJ-PC:~$ cat ~/.ssh/azure_vm_key
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAAABG5vbmUAAAAEbm9uZQAAAAAAAAABAAACFwAAAAdzc2gtcn
NhAAAAAwEAAQAAAgEA1PZinP818X7nRAqRq2oorpC4ESPcDZ/7xRI2F3z1C2Ib4n2VrezT
48yyHuz+a9UCHlRHFbl2ZUC4FvDsbUyMylKLGGUmjsS8NX2OGiFIPR1uOcOy74GIcpYF4T
```

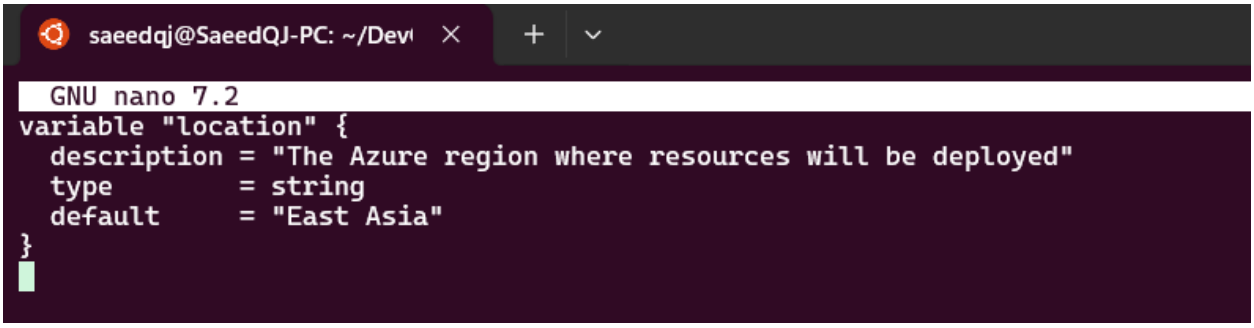


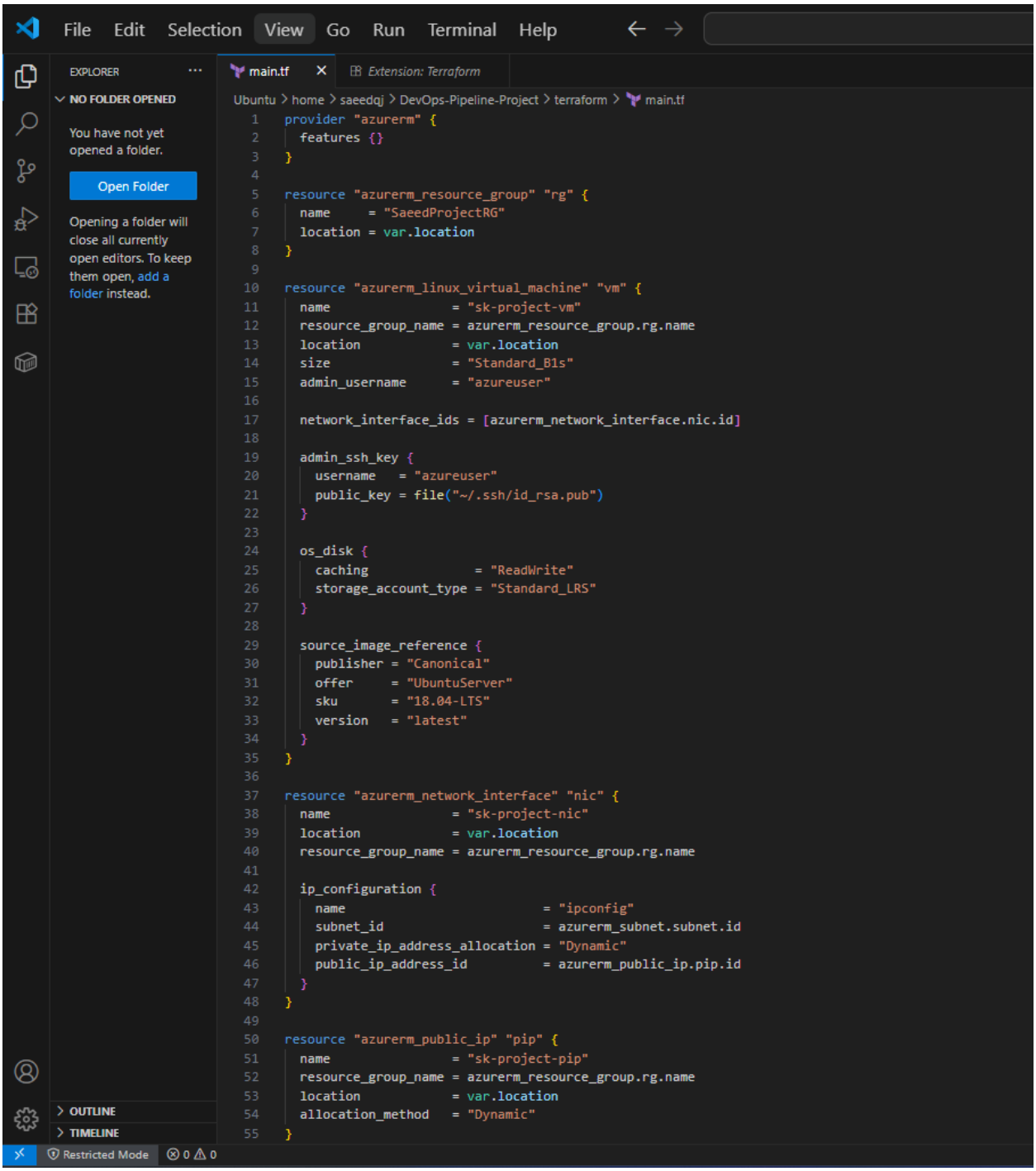
Updating main.tf file with terraform code.



Note - Wasn't really comfortable with nano for editing so used VS code instead.

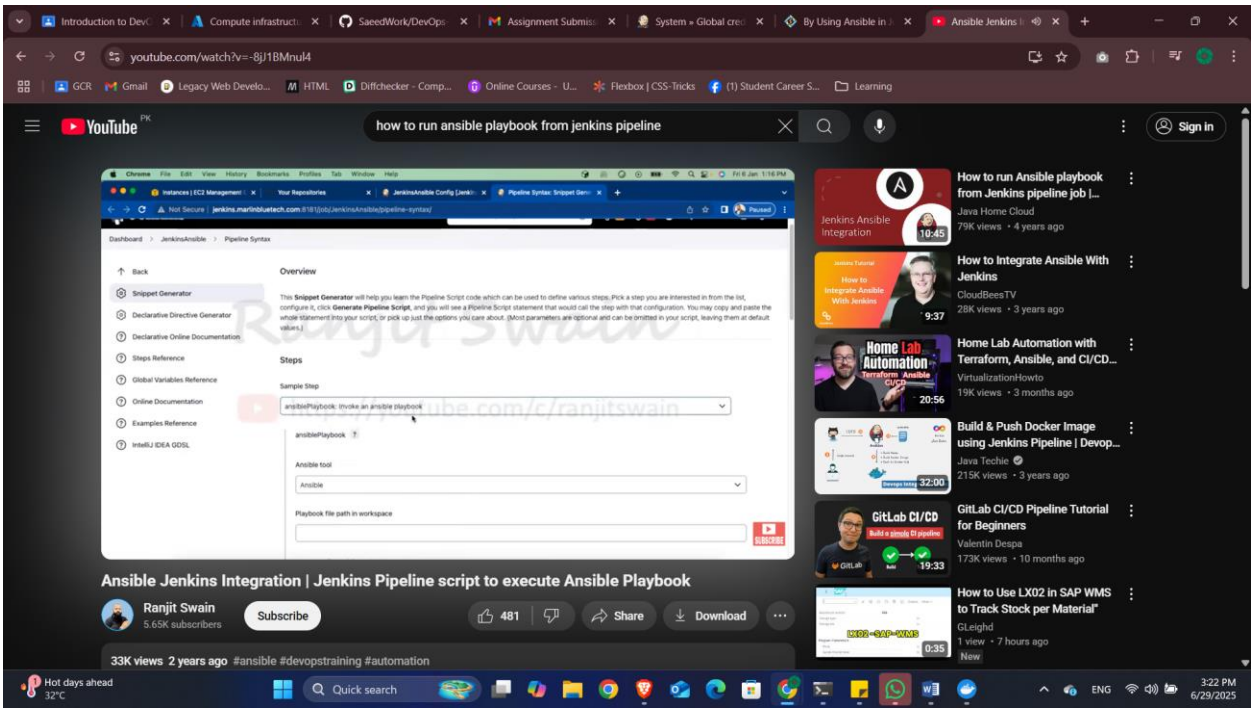
We set a Location Variable in variables.tf file and kept everything else in main.tf

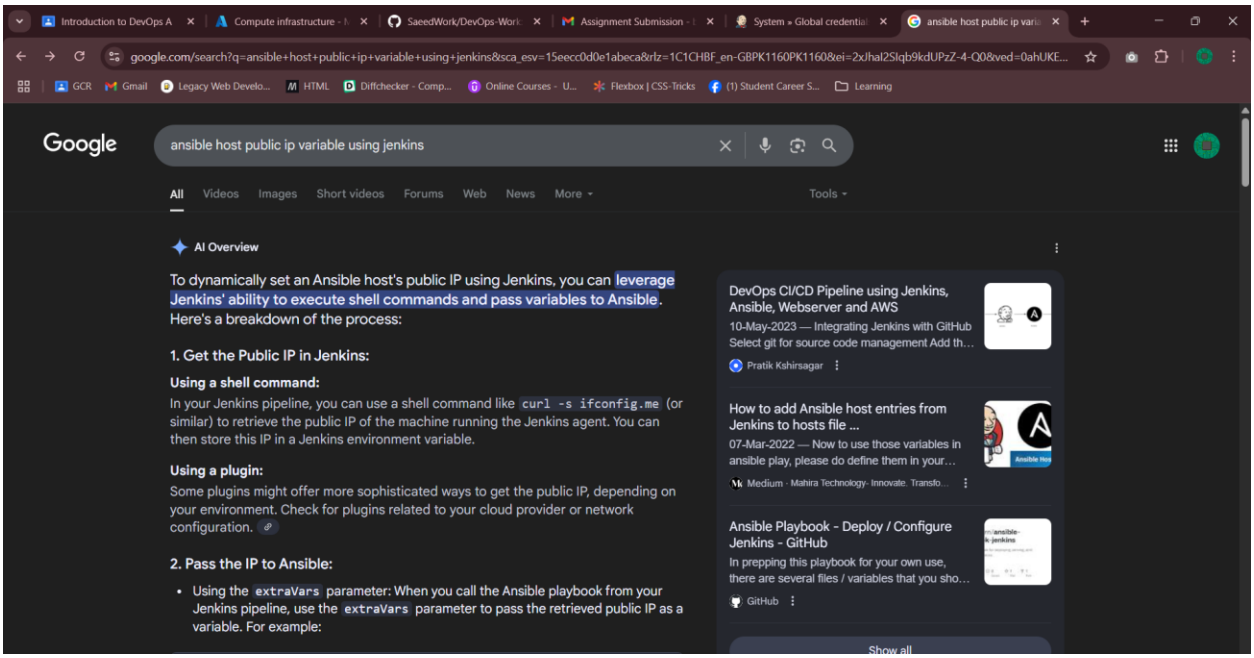



File Edit Selection View Go Run Terminal Help
EXPLORER
NO FOLDER OPENED
You have not yet opened a folder.
Open Folder
Opening a folder will close all currently open editors. To keep them open, add a folder instead.
OUTLINE
TIMELINE
main.tf
Extension: Terraform
Ubuntu > home > saeedqj > DevOps-Pipeline-Project > terraform > main.tf
provider "azurerm" {
features {}
}
resource "azurerm_resource_group" "rg" {
name = "SaeedProjectRG"
location = var.location
}
resource "azurerm_linux_virtual_machine" "vm" {
name = "sk-project-vm"
resource_group_name = azurerm_resource_group.rg.name
location = var.location
size = "Standard_B1s"
admin_username = "azureuser"
network_interface_ids = [azurerm_network_interface.nic.id]
admin_ssh_key {
username = "azureuser"
public_key = file("~/.ssh/id_rsa.pub")
}
os_disk {
caching = "ReadWrite"
storage_account_type = "Standard_LRS"
}
source_image_reference {
publisher = "Canonical"
offer = "UbuntuServer"
sku = "18.04-LTS"
version = "latest"
}
}
resource "azurerm_network_interface" "nic" {
name = "sk-project-nic"
location = var.location
resource_group_name = azurerm_resource_group.rg.name
ip_configuration {
name = "ipconfig"
subnet_id = azurerm_subnet.subnet.id
private_ip_address_allocation = "Dynamic"
public_ip_address_id = azurerm_public_ip.pip.id
}
}
resource "azurerm_public_ip" "pip" {
name = "sk-project-pip"
resource_group_name = azurerm_resource_group.rg.name
location = var.location
allocation_method = "Dynamic"
}
Restricted Mode
0 0

Now we set Ansible, but before that we need to create hosts.yml file and set all hosts in it.

(Was a bit confused that how will I put the host ip if the VM is not created.)





```
saeedqj@SaeedQJ-PC:~/DevOps-Pipeline-Project/terraform$ cd ..
saeedqj@SaeedQJ-PC:~/DevOps-Pipeline-Project$ cd ansible/
saeedqj@SaeedQJ-PC:~/DevOps-Pipeline-Project/ansible$ ls -a
.  ..  install_web.yml
saeedqj@SaeedQJ-PC:~/DevOps-Pipeline-Project/ansible$ touch hosts.yml
saeedqj@SaeedQJ-PC:~/DevOps-Pipeline-Project/ansible$ nano hosts.yml
saeedqj@SaeedQJ-PC:~/DevOps-Pipeline-Project/ansible$
```

saeedqj@SaeedQJ-PC: ~/Dev

```
  GNU nano 7.2
all:
  hosts:
    web:
      ansible_host: __PUBLIC_IP__
      ansible_user: azureuser
      ansible_ssh_private_key_file: ~/.ssh/azure_vm_key
```

Search

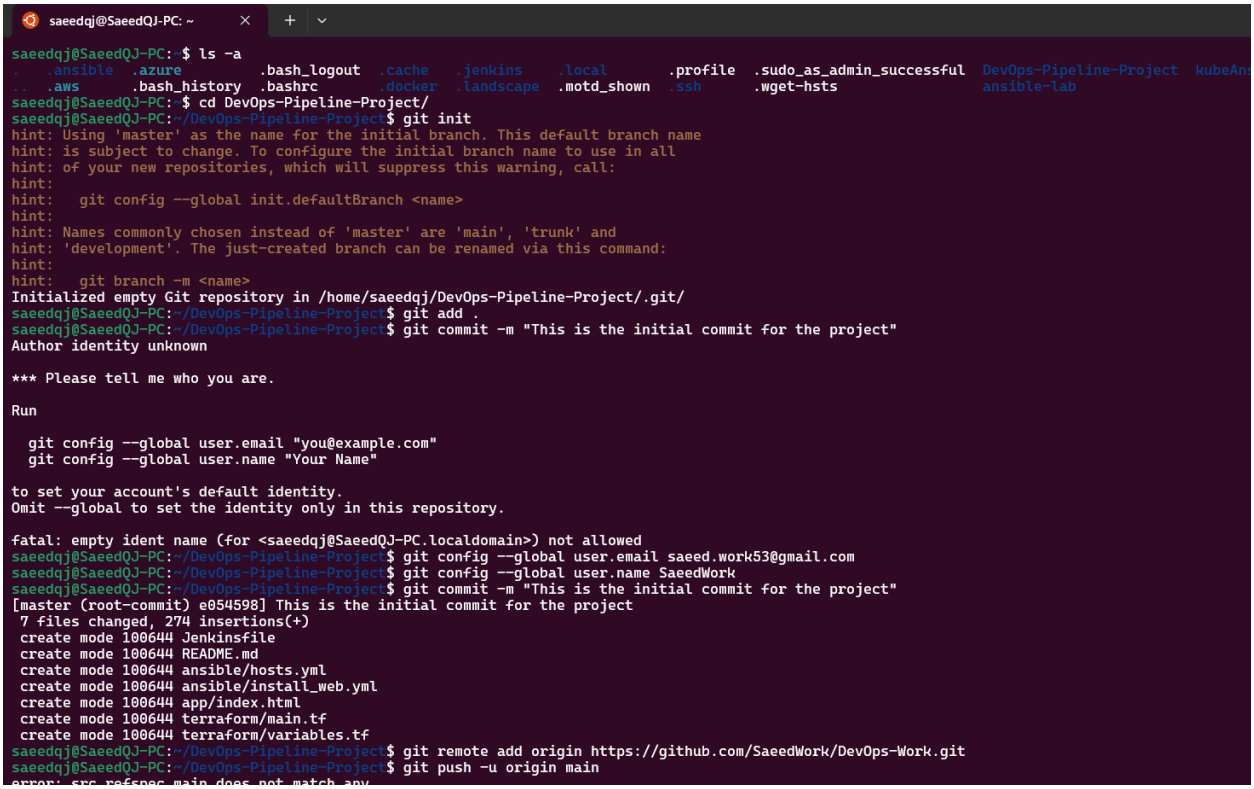
Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Man

Jenkinsfile ● | ! install_web.yml ×

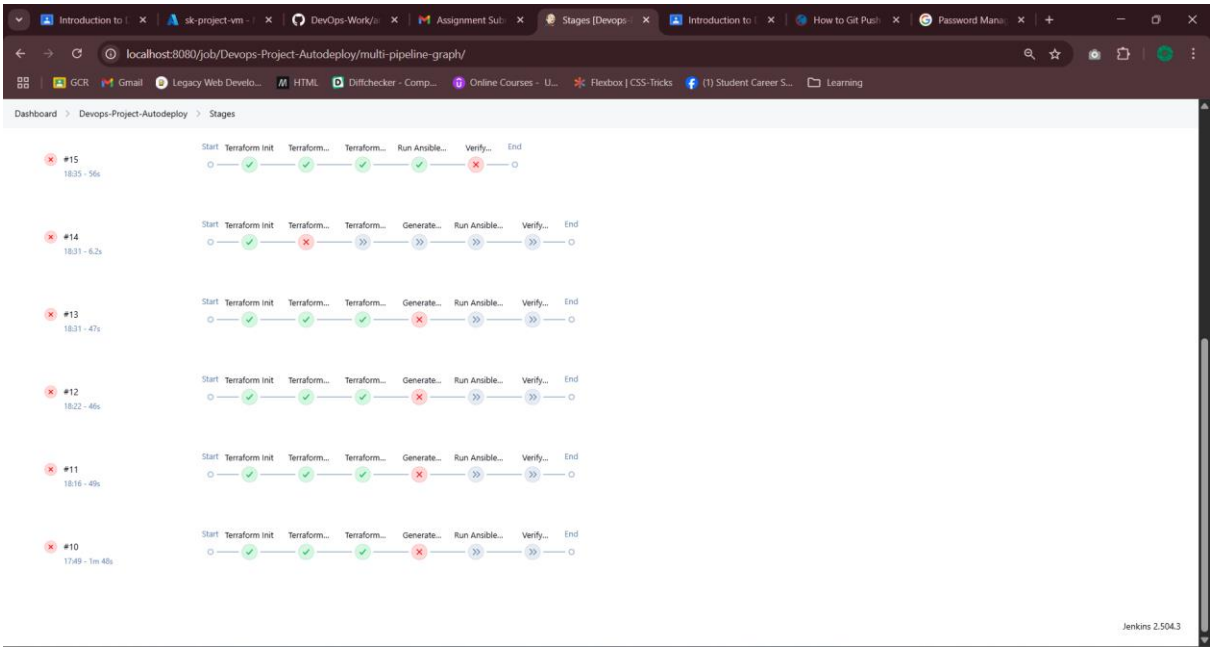
Ubuntu > home > saeedqj > DevOps-Pipeline-Project > ansible > ! install_web.yml

```yaml
---
- name: Install Apache and Deploy Web App
  hosts: all
  become: yes

  tasks:
    - name: Update apt cache
      apt:
        update_cache: yes
        cache_valid_time: 3600

    - name: Install Apache
      apt:
        name: apache2
        state: present

    - name: Create a directory in home
      file:
        path: /home/azureuser/devops_project
        state: directory
        owner: azureuser
        group: azureuser
        mode: '0755'

    - name: Deploy index.html
      copy:
        src: /workspace/app/index.html
        dest: /var/www/html/index.html
        owner: www-data
        group: www-data
        mode: '0644'

```

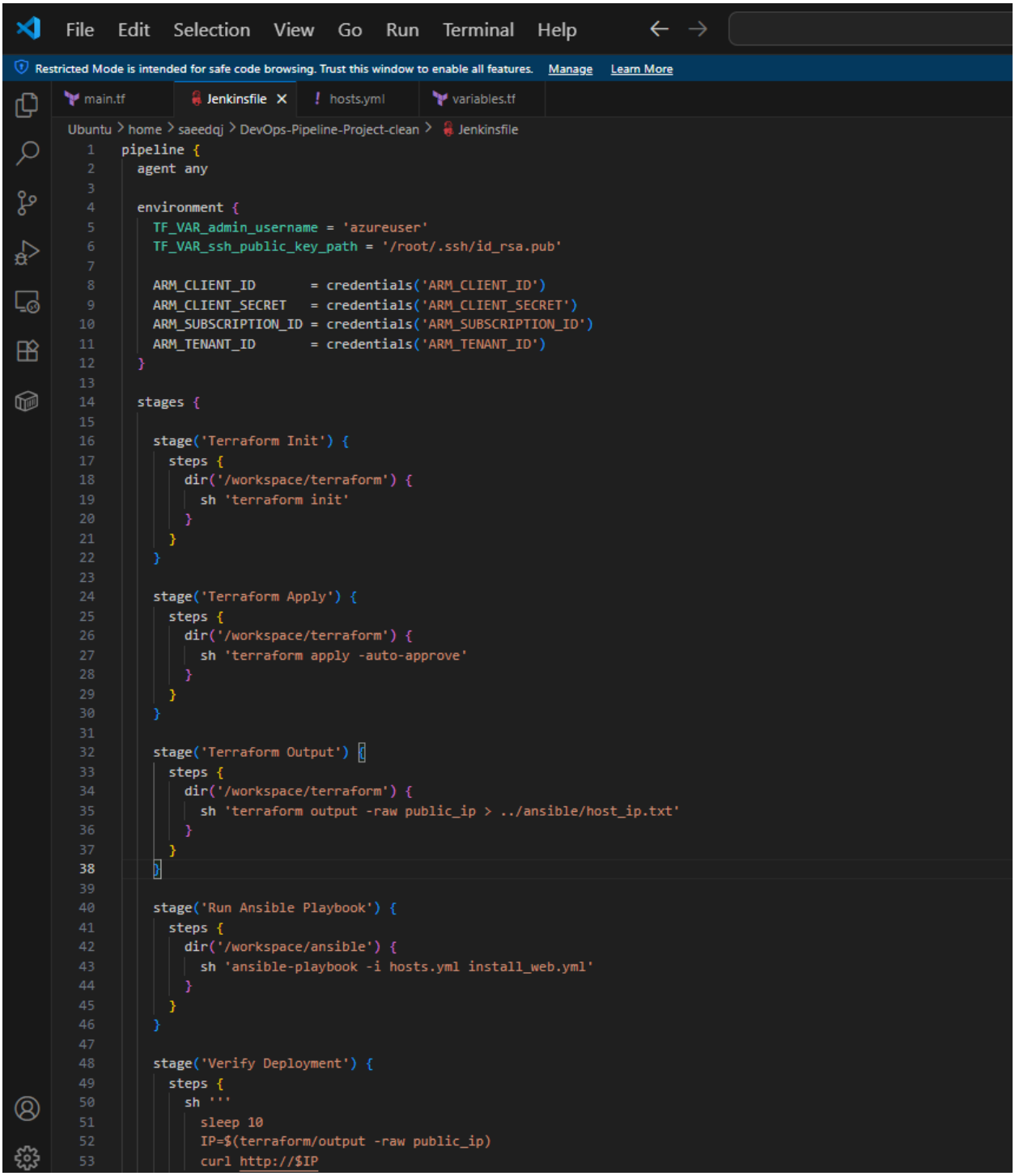
Now we push everything to github and create a pipeline in Jenkins for testing.



After a tiring and tedious process of troubleshooting for hours, we were able to run till ansible in Jenkins the last stage was not running



The Jenkins file looks something like this



File Edit Selection View Go Run Terminal Help

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main.tf | Jenkinsfile | hosts.yml | variables.tf

Ubuntu > home > saeedqj > DevOps-Pipeline-Project-clean > Jenkinsfile

```
pipeline {
  agent any

  environment {
    TF_VAR_admin_username = 'azureuser'
    TF_VAR_ssh_public_key_path = '/root/.ssh/id_rsa.pub'

    ARM_CLIENT_ID       = credentials('ARM_CLIENT_ID')
    ARM_CLIENT_SECRET   = credentials('ARM_CLIENT_SECRET')
    ARM_SUBSCRIPTION_ID = credentials('ARM_SUBSCRIPTION_ID')
    ARM_TENANT_ID       = credentials('ARM_TENANT_ID')
  }

  stages {

    stage('Terraform Init') {
      steps {
        dir('/workspace/terraform') {
          sh 'terraform init'
        }
      }
    }

    stage('Terraform Apply') {
      steps {
        dir('/workspace/terraform') {
          sh 'terraform apply -auto-approve'
        }
      }
    }

    stage('Terraform Output') {
      steps {
        dir('/workspace/terraform') {
          sh 'terraform output -raw public_ip > ../ansible/host_ip.txt'
        }
      }
    }

    stage('Run Ansible Playbook') {
      steps {
        dir('/workspace/ansible') {
          sh 'ansible-playbook -i hosts.yml install_web.yml'
        }
      }
    }

    stage('Verify Deployment') {
      steps {
        sh '''
          sleep 10
          IP=$(terraform/output -raw public_ip)
          curl http://$IP
```

And we added credentials that look like this

Credentials

T	P	Store ↓	Domain	ID	Name
		User: Saeedulkhair	(global)	azure-key	azureuser/******
		User: Saeedulkhair	(global)	ARM_CLIENT_ID	ARM_CLIENT_ID
		User: Saeedulkhair	(global)	ARM_CLIENT_SECRET	ARM_CLIENT_SECRET
		User: Saeedulkhair	(global)	ARM_SUBSCRIPTION_ID	ARM_SUBSCRIPTION_ID
		User: Saeedulkhair	(global)	ARM_TENANT_ID	ARM_TENANT_ID

The output looks like