1. Download And Install Vagrant from below link https://developer.hashicorp.com/vagrant/install?product_intent=vagrant
2. It will take 15 to 20 minutes
3. Make vagrant named folder in document directory in your personal user directory
4. Now run terminal (CMD) in the same directory
5. Run command : vagrant init
6. It will make vagrantfile name file in the directory
7.

Now paste below code to vagrantfile using notepad or vscode

```
Vagrant.configure("2") do |config|


  # Define the Ubuntu VM named 'web'
  config.vm.define "ubuntu" do |vm|
    vm.vm.box = "ubuntu/bionic64"
    vm.vm.network "private_network", ip: "192.168.33.10"
    vm.vm.hostname = "ubuntu"
  end

  # Define the Ubuntu VM named 'spider'
  config.vm.define "ubuntu2" do |vm|
    vm.vm.box = "ubuntu/bionic64"
    vm.vm.network "private_network", ip: "192.168.33.11"
    vm.vm.hostname = "ubuntu2"
  end

  # Define the CentOS VM
  config.vm.define "centos" do |vm|
    vm.vm.box = "centos/7"
    vm.vm.network "private_network", ip: "192.168.33.20"
    vm.vm.hostname = "centos"
  end
end
```

8. Note: you must be need to installed VirtualBox before
9. Now run terminal (CMD) same directory
10. Run command: **vagrant up**

11. Now it will install 2 ubuntu OS and 1 CentOS, it takes 20 min minimum (depends on your internet)

12. now after installation run command: **vagrant ssh ubuntu** (your main device name) , same as for **ubuntu2** and **centos** in different terminals but in same directory

13. now it will go to at the both OS

14. now run command : sudo -i to get the superuser access in both OS

15. Now run command for add IP of remaining both OS to the operating OS

16. Run command for ubuntu: nano /etc/hosts

17. make the changes add IP of remaining both OS, do as same for Ubuntu2 and CentOS (instead of nano use **vi**)

18. operation to control vi : type **i** for insert ARROW buttons for up down press ***ESC*** and then type **:qw** for save and quit

19. now run command : **ssh keygen** to main OS (ubuntu) and you get public key to cd /.ssh directory **rsa.pub** file name

20. now copy the public key to remaining OS (ubuntu2, centos) and paste to same directory in the **authorized_keys** named file, authorized_keys have already it's own but you need to paste to down, Don't disturb already own key just paste down to the key

21. now run command : **ssh -i authorized_keys ubuntu2** in the main OS

Note : if it can’t boot to ubuntu2 than I recommend you to re run the **vagrant up**

22. Now run your **script.sh** give below

```
#!/bin/bash

# Variables
vms=("ubuntu2" "centos")

# Loop over VMs
for vm in "${vms[@]}"; do
    # Determine OS and install web server
    ssh -o StrictHostKeyChecking=no "$vm" '
        if grep -q "Ubuntu" /etc/os-release; then
            sudo apt update
            sudo apt install -y apache2
            echo "Apache 2 installed successfully on Ubuntu."
        elif grep -q "CentOS" /etc/os-release; then
            sudo yum check-update
            sudo yum install -y httpd
            echo "httpd (Apache) installed successfully on CentOS."
        else
            echo "Error: Unsupported OS."
            exit 1
        fi
    '
done
```

23. DONE