Step by step instructions:

1. Like in lab1. Launch a VM running Ubuntu 20.01 with ansible and Jenkins.
   Here is the content of my Vagrant file. I used docker-compose to install Jenkins and used provision.sh to install ansible.

```
Vagrant.configure("2") do |config|
  config.vm.box = "ubuntu/focal64"
  config.vm.hostname = "sonarqube.box"
  config.vm.provision "docker"

  config.vm.provider "virtualbox" do |v|
    v.memory = 7792
    v.cpus = 2
  end

  config.vm.provision :docker_compose, yml: "/vagrant/docker-compose.yml", run: "always"

  config.vm.provision "shell" do |shell|
    shell.path = "provision.sh"
  end

  config.vm.network "forwarded_port", guest: 9000, host: 9000
  config.vm.network "forwarded_port", guest: 9092, host: 9092

  config.vm.network "forwarded_port", guest: 8080, host: 8080
  config.vm.network "forwarded_port", guest: 50000, host: 50000
  config.vm.network "public_network"
end
```

   I used public network here for convenience. The content in provision.sh is:

```
sysctl -w vm.max_map_count=262144
echo "vm.max_map_count=262144" >> /etc/sysctl.conf
sysctl -w fs.file-max=131072
echo "fs.file-max=131072" >> /etc/sysctl.conf
ulimit -n 65536
ulimit -u 4096

sudo apt-get update
sudo apt-get upgrade
sudo apt-get install wget unzip -y

sudo apt-get install openjdk-11-jdk -y
sudo apt-get install openjdk-11-jre -y

sudo apt-get update

sudo apt-get install -y python3-pip
sudo pip install ansible


sudo cp ./ansible.cfg /etc/ansible/ansible.cfg
sudo cp ./hosts /etc/ansible/hosts

sudo apt install net-tools

sudo sed -i 's/PasswordAuthentication no/PasswordAuthentication yes/g' /etc/ssh/sshd_config; sudo systemctl restart
sshd;
```

   This installs ansible as well as sshpass and jdk.

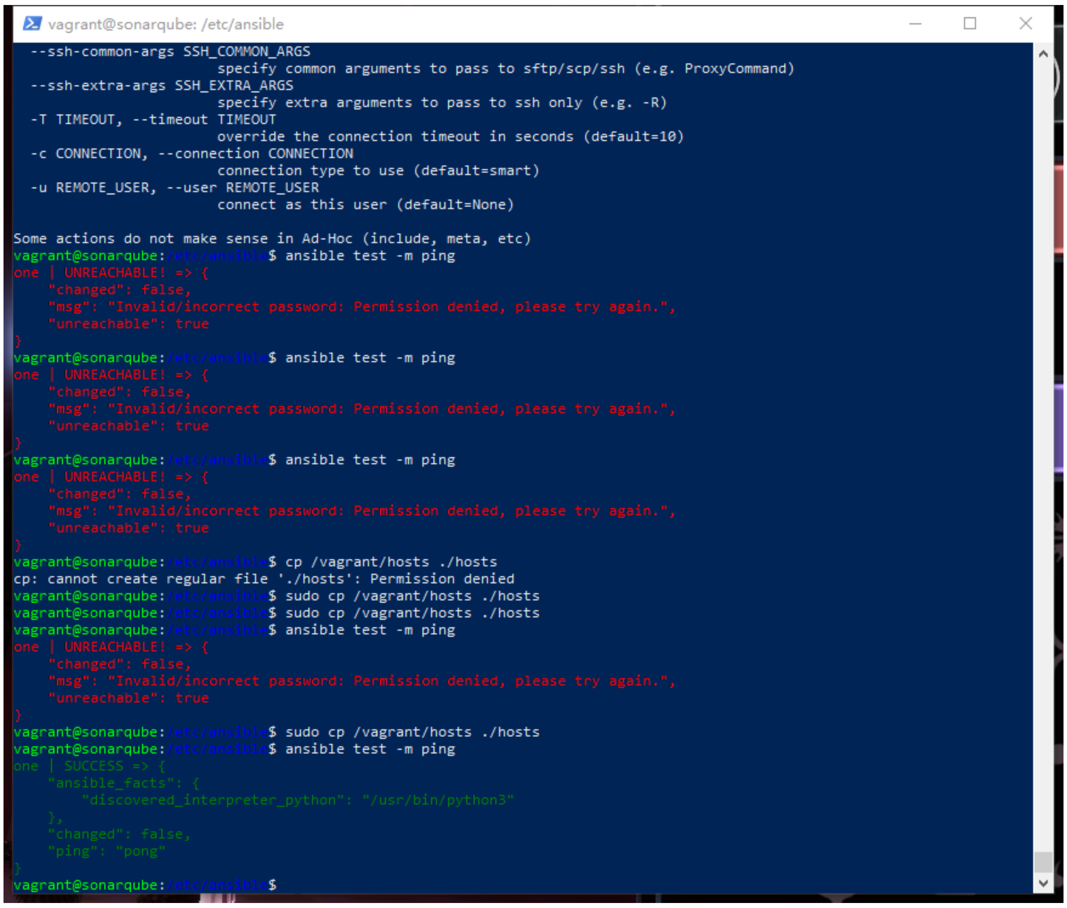
2. I then used vagrant to set up a second VM as the web-server. I only need to install java and set some ssh parameters. So the vagrant file and provision.sh is very simple:

```
Vagrant.configure("2") do |config|
  config.vm.box = "ubuntu/focal64"
  config.vm.hostname = "ansible.box"

  config.vm.provision "shell" do |shell|
    shell.path = "provision.sh"
  end

  config.vm.network "forwarded_port", guest: 8080, host: 8081, id: "pet"
  config.vm.network "forwarded_port", guest: 80, host: 8082, id: "nginx2"
  config.vm.network "public_network"
end
```

```
sudo apt-get update
sudo apt-get upgrade
sudo apt-get install wget unzip -y

sudo apt-get install openjdk-11-jdk -y
sudo apt-get install openjdk-11-jre -y

sudo sed -i 's/PasswordAuthentication no/PasswordAuthentication yes/g' /etc/ssh/sshd_config; sudo systemctl restart
sshd;
```

This launches a second VM with java.

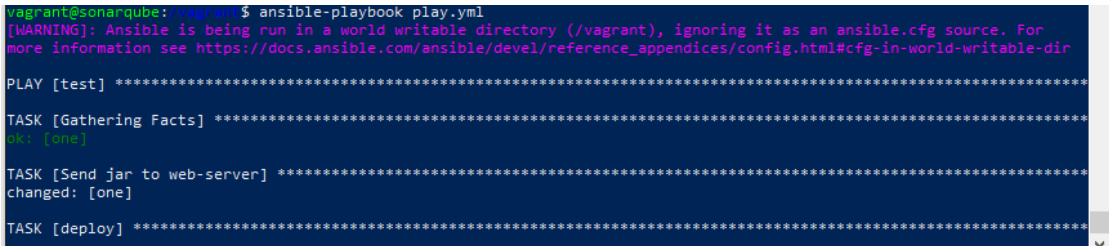
3. Then I used vagrant ssh to enter the first VM, where I edited the ansible.cfg and hosts in the ansible config directory. The modified version is here:
https://github.com/Dedsec-Xu/devops/blob/main/hw2/vagrant/ansible.cfg
https://github.com/Dedsec-Xu/devops/blob/main/hw2/vagrant/hosts
Because I used public_network for both VMs. I can easily setup the ipaddress in hosts file. Then I ping the webserver from the host VM to see if it works.



```
vagrant@sonarqube: /etc/ansible
  --ssh-common-args SSH_COMMON_ARGS
                        specify common arguments to pass to sftp/scp/ssh (e.g. ProxyCommand)
  --ssh-extra-args SSH_EXTRA_ARGS
                        specify extra arguments to pass to ssh only (e.g. -R)
  -T TIMEOUT, --timeout TIMEOUT
                        override the connection timeout in seconds (default=10)
  -c CONNECTION, --connection CONNECTION
                        connection type to use (default=smart)
  -u REMOTE_USER, --user REMOTE_USER
                        connect as this user (default=None)

Some actions do not make sense in Ad-Hoc (include, meta, etc)
vagrant@sonarqube:/etc/ansible$ ansible test -m ping
one | UNREACHABLE! => {
    "changed": false,
    "msg": "Invalid/incorrect password: Permission denied, please try again.",
    "unreachable": true
}
vagrant@sonarqube:/etc/ansible$ ansible test -m ping
one | UNREACHABLE! => {
    "changed": false,
    "msg": "Invalid/incorrect password: Permission denied, please try again.",
    "unreachable": true
}
vagrant@sonarqube:/etc/ansible$ ansible test -m ping
one | UNREACHABLE! => {
    "changed": false,
    "msg": "Invalid/incorrect password: Permission denied, please try again.",
    "unreachable": true
}
vagrant@sonarqube:/etc/ansible$ cp /vagrant/hosts ./hosts
cp: cannot create regular file './hosts': Permission denied
vagrant@sonarqube:/etc/ansible$ sudo cp /vagrant/hosts ./hosts
vagrant@sonarqube:/etc/ansible$ sudo cp /vagrant/hosts ./hosts
vagrant@sonarqube:/etc/ansible$ ansible test -m ping
one | UNREACHABLE! => {
    "changed": false,
    "msg": "Invalid/incorrect password: Permission denied, please try again.",
    "unreachable": true
}
vagrant@sonarqube:/etc/ansible$ sudo cp /vagrant/hosts ./hosts
vagrant@sonarqube:/etc/ansible$ ansible test -m ping
one | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
vagrant@sonarqube:/etc/ansible$
```

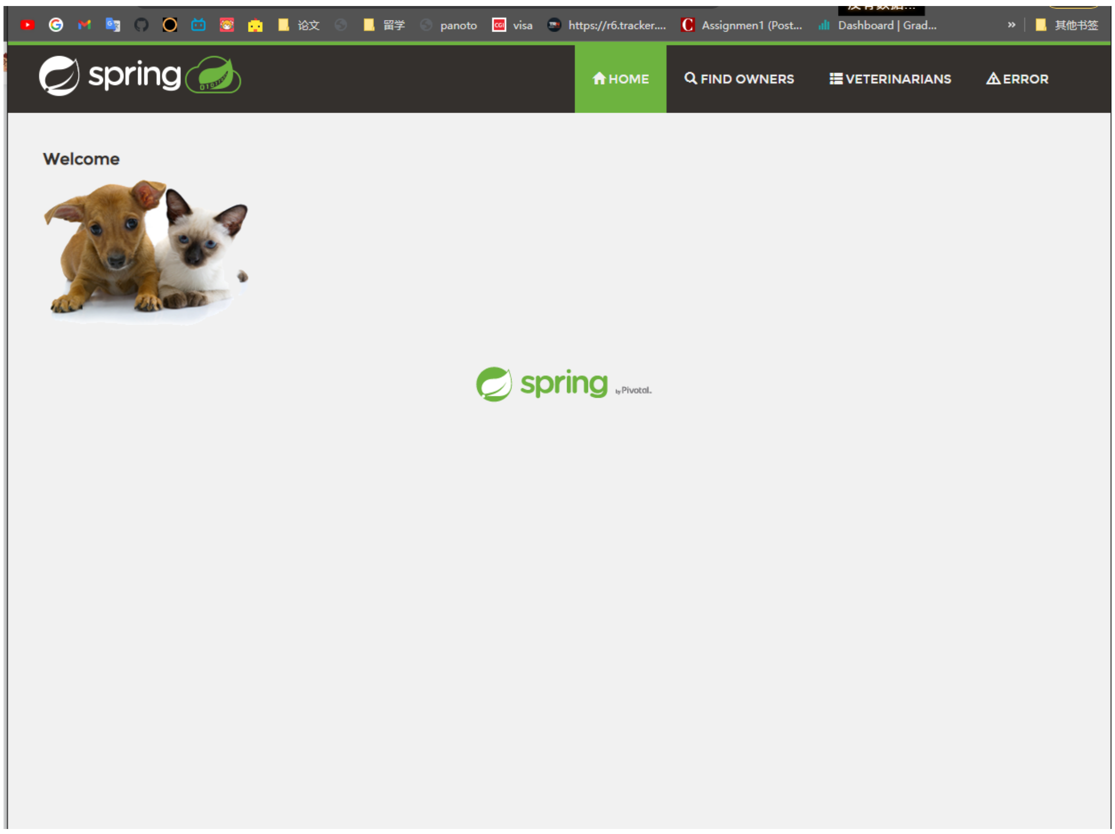
4. Then I wrote an ansible playbook yml file to send the jar to the webserver and run it there.

```yaml
---
- hosts: test
  remote_user: vagrant
  tasks:
    - name: Send jar to web-server
      copy:
       src: /vagrant/petclinic.jar
       dest: /vagrant
       mode: 0755
    - name: deploy
      shell: "nohup java -jar /vagrant/petclinic.jar"
```



```
vagrant@sonarqube:/vagrant$ ansible-playbook play.yml
[WARNING]: Ansible is being run in a world writable directory (/vagrant), ignoring it as an ansible.cfg source. For
more information see https://docs.ansible.com/ansible/devel/reference_appendices/config.html#cfg-in-world-writable-dir

PLAY [test] *********************************************************************************************************

TASK [Gathering Facts] **********************************************************************************************
ok: [one]

TASK [Send jar to web-server] ***************************************************************************************
changed: [one]

TASK [deploy] *******************************************************************************************************
```

After a while, pet-clinic is successfully running on the web-server VM. And I can open it on port 8081(Because what I set in Vagrant file)



5. I have automated most of these. You can run auto.bat, which can automatically setup both webserver and the host VM. And install java on both and setup ansible and ansible configuration.

Then you only need to run

```
ansible-playbook play.yml
```

in the host machine and it will automatically deploy the app to the webserver.