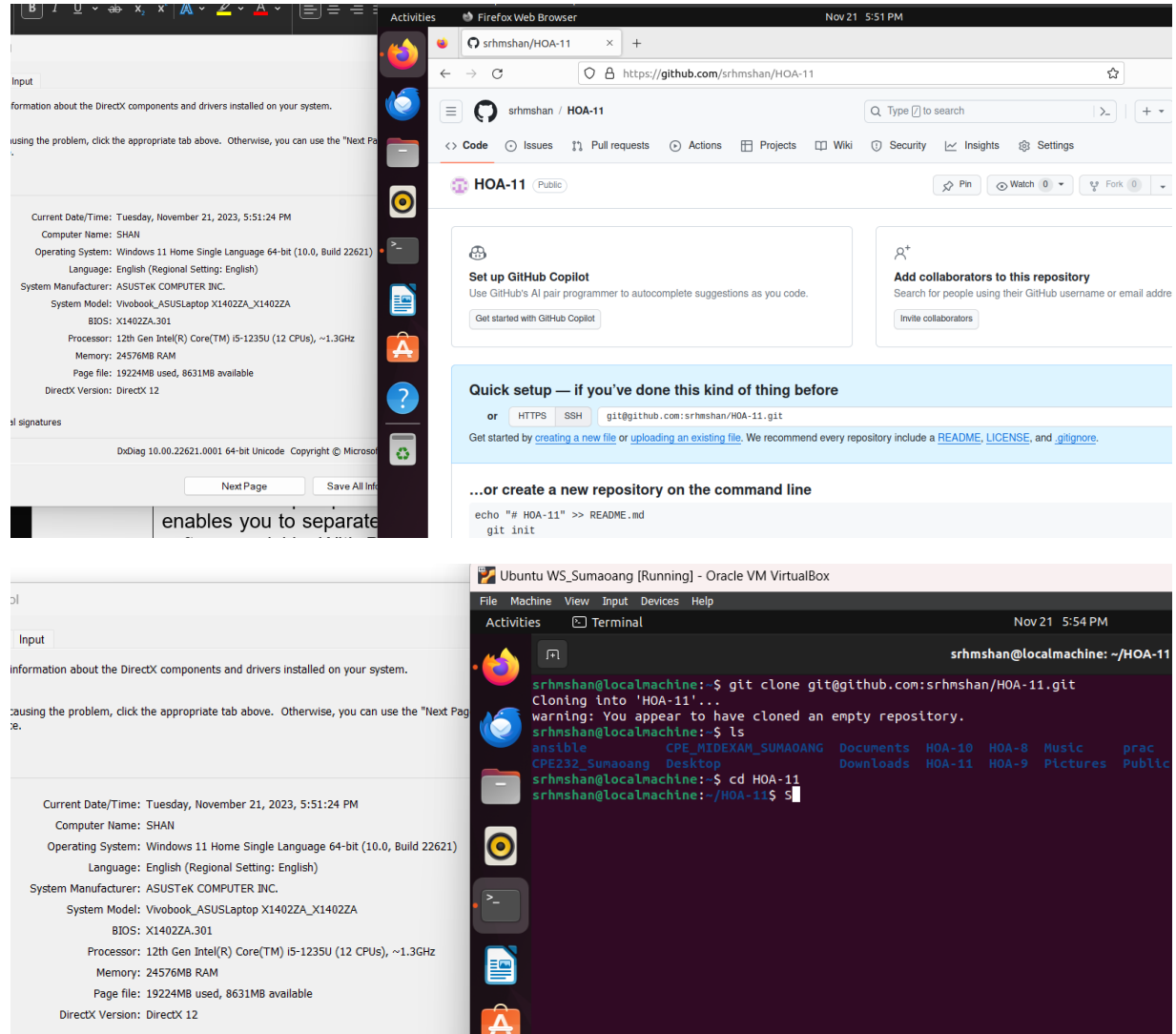


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<b>Course/Section: CPE 232-CPE31S5</b>	<b>Date Submitted: December 7, 2023</b>
<b>Instructor: Engr. Roman Richard</b>	<b>Semester and SY: 1<sup>st</sup> Sem SY 23-24</b>
<b>Activity 11: Containerization</b>	
<b>1. Objectives</b>	
Create a Dockerfile and form a workflow using Ansible as Infrastructure as Code (IaC) to enable Continuous Delivery process	
<b>2. Discussion</b>	
<p>Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production.</p> <p>Source: <a href="https://docs.docker.com/get-started/overview/">https://docs.docker.com/get-started/overview/</a></p> <p>You may also check the difference between containers and virtual machines. Click the link given below.</p> <p>Source: <a href="https://docs.microsoft.com/en-us/virtualization/windowscontainers/about/containers-vs-vm">https://docs.microsoft.com/en-us/virtualization/windowscontainers/about/containers-vs-vm</a></p>	
<b>3. Tasks</b>	
<ol style="list-style-type: none"> <li>1. Create a new repository for this activity.</li> <li>2. Install Docker and enable the docker socket.</li> <li>3. Add to Docker group to your current user.</li> <li>4. Create a Dockerfile to install web and DB server.</li> <li>5. Install and build the Dockerfile using Ansible.</li> <li>6. Add, commit and push it to your repository.</li> </ol>	

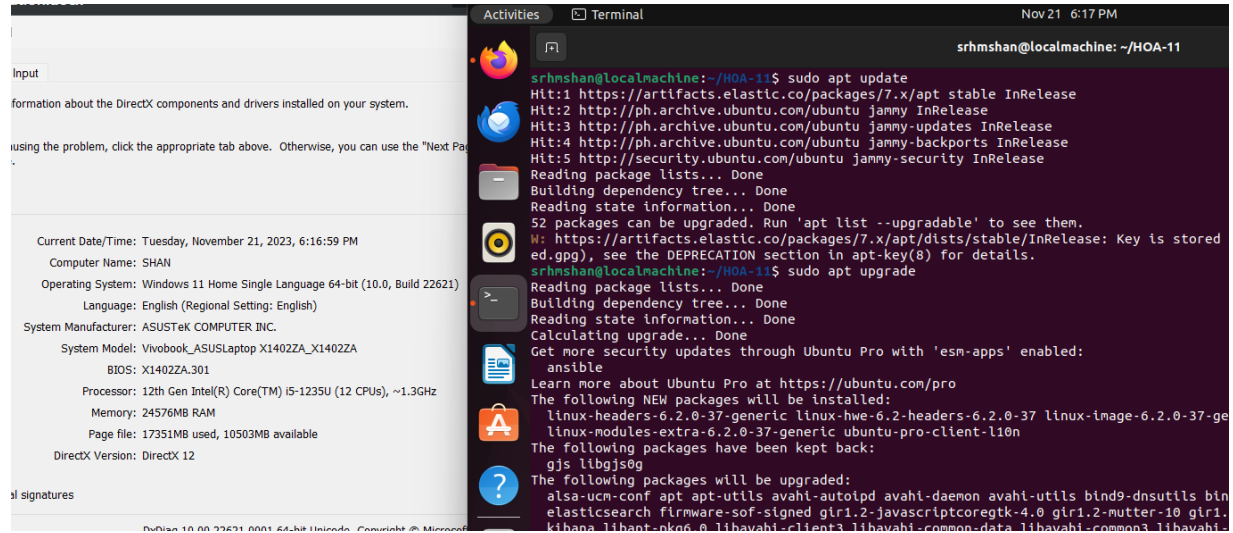
## 4. Output (screenshots and explanations)

### 1. Create a new repository for this activity.

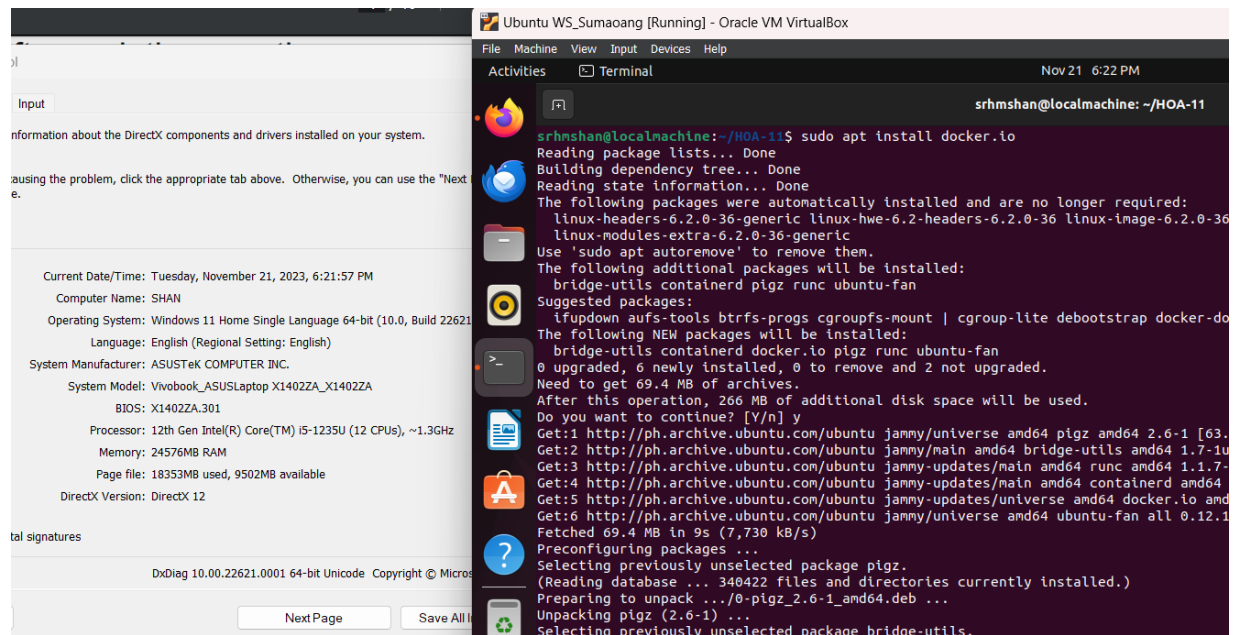


Using **git clone**, I copied and pasted the repository's link from GitHub to my local machine. I then changed my directory to HOA-11.

## 2. Install Docker and enable the docker socket.



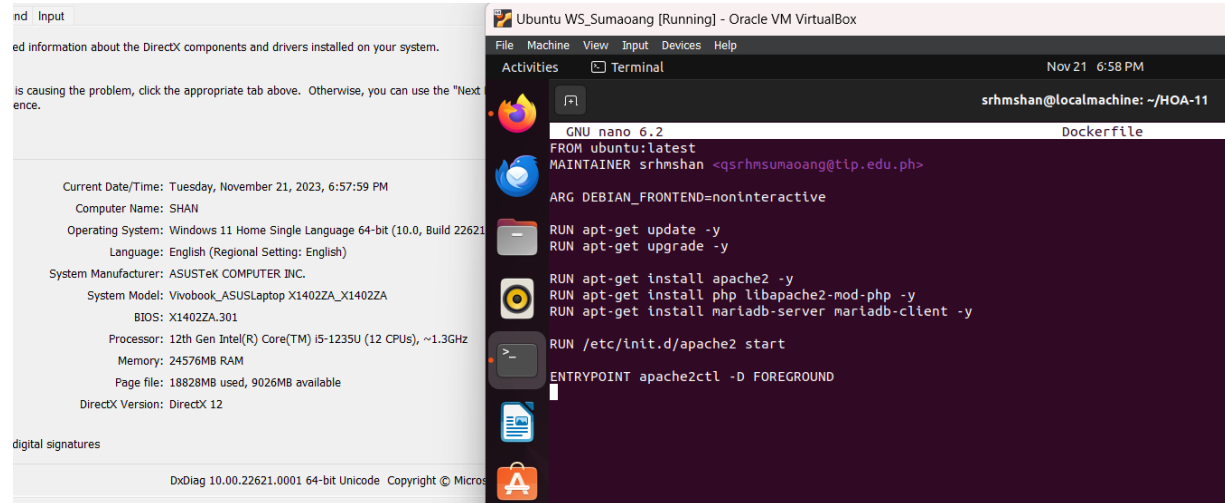
Before you start installing Docker, run the following commands: **sudo apt update** and **sudo apt upgrade**. This ensures that your system is fully updated.



After updating, execute the command **sudo apt install docker.io** to install Docker on your local machine.

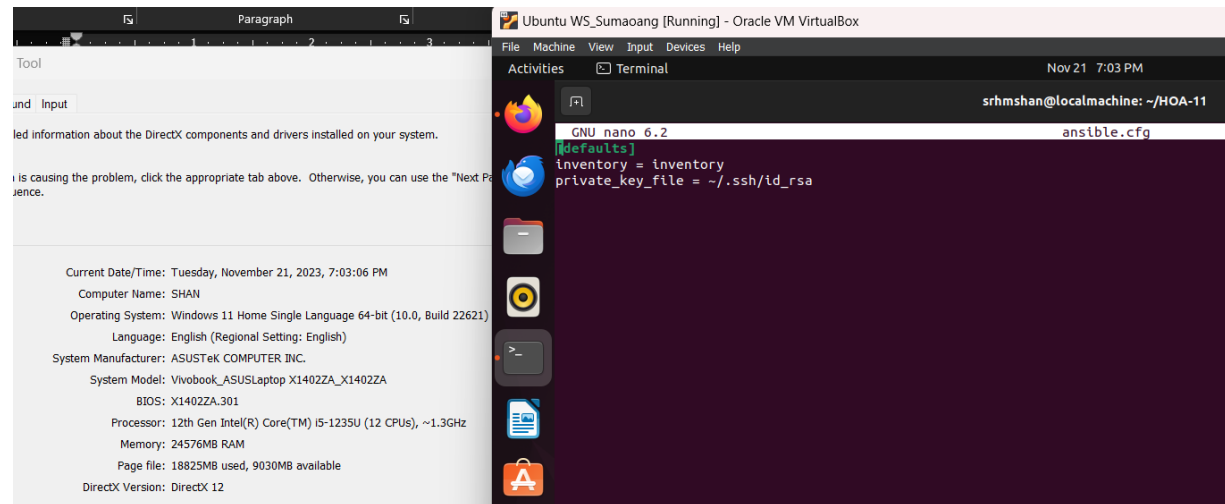


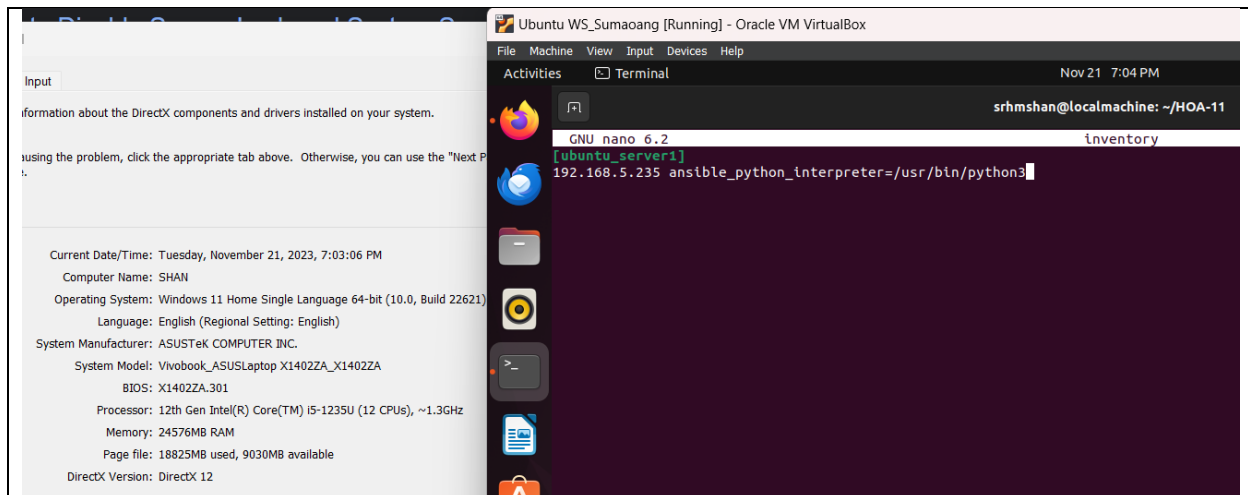
#### 4. Create a Dockerfile to install web and DB server.



Use the command **sudo usermod -aG docker <USER>** to include the current user in the group. Once the user is added, restart the Docker process with the command **sudo systemctl restart docker**.

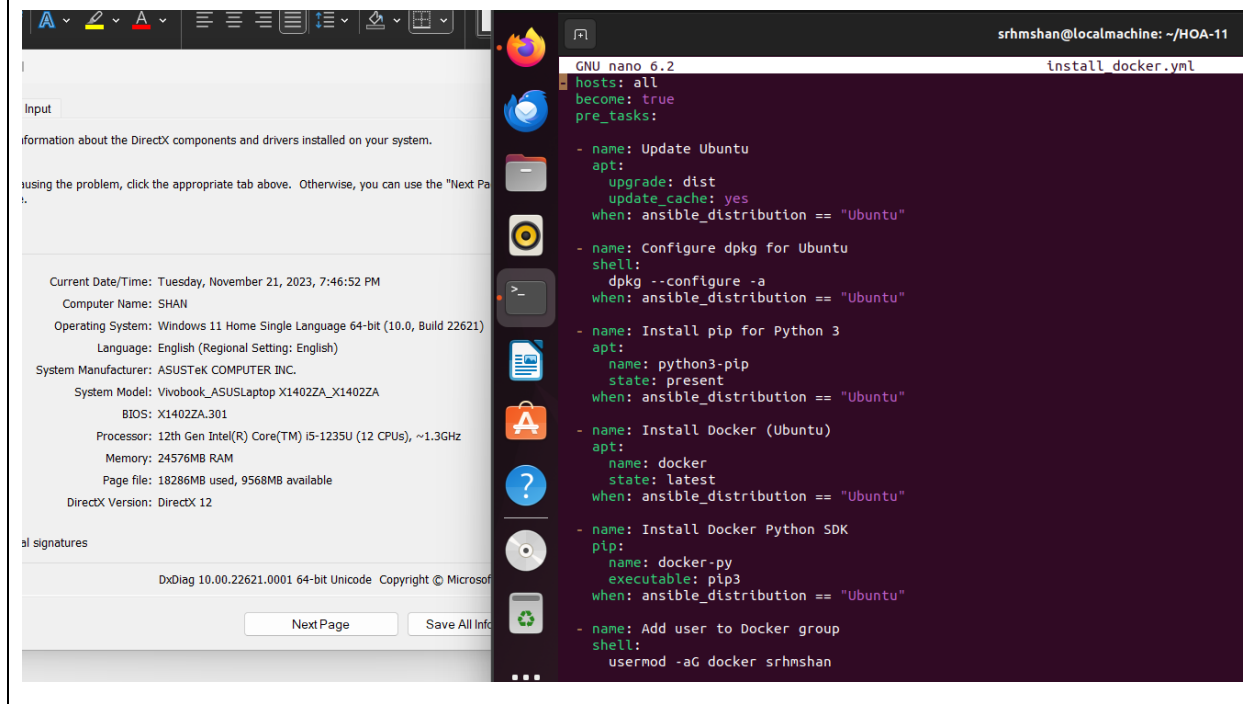
#### 5. Install and build the Dockerfile using Ansible.

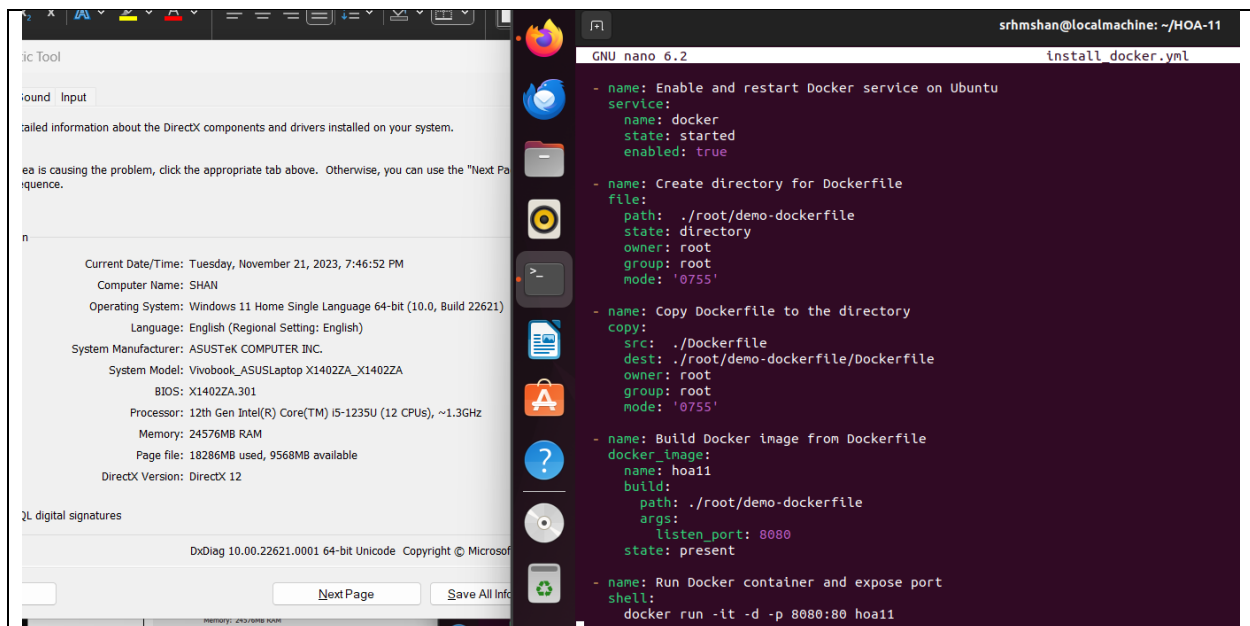




Here, I created my ansible.cfg and inventory files.

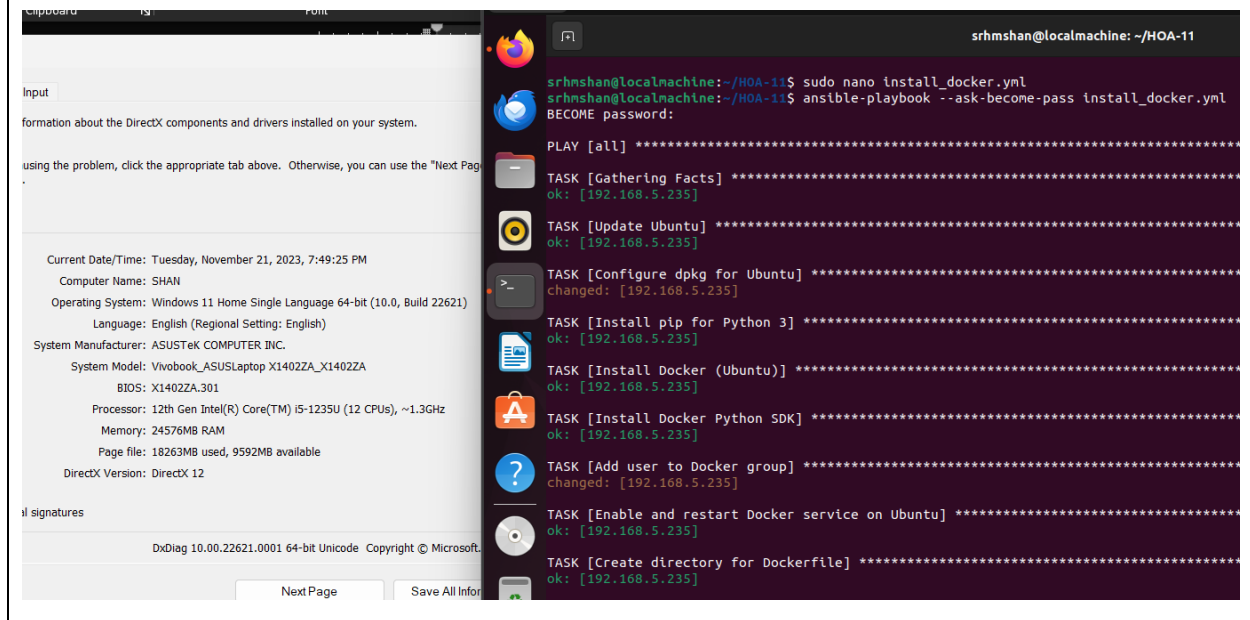
Create “install\_docker.yml” playbook.





Use the **sudo nano <file name>** to create a playbook **install\_docker.yml**.

Run “install\_docker.yml”





Current Date/Time: Tuesday, November 21, 2023, 7:49:25 PM  
Computer Name: SHAN  
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)  
Language: English (Regional Setting: English)  
System Manufacturer: ASUSTek COMPUTER INC.  
System Model: Vivobook\_ASUSLaptop X1402ZA\_X1402ZA  
BIOS: X1402ZA.301  
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz  
Memory: 24576MB RAM  
Page file: 18263MB used, 9592MB available  
DirectX Version: DirectX 12

TASK [Copy Dockerfile to the directory] \*\*\*\*\*  
ok: [192.168.5.235]  
TASK [Build Docker image from Dockerfile] \*\*\*\*\*  
[DEPRECATION WARNING]: The value of the "source" option was determined to be "build". Please set the "source" option of  
Autodetection will be removed in community.general 2.0.0. This feature will be removed from community.general in ver  
Deprecation warnings can be disabled by setting deprecation\_warnings=False in ansible.cfg.  
changed: [192.168.5.235]  
TASK [Run Docker container and expose port] \*\*\*\*\*  
changed: [192.168.5.235]  
PLAY RECAP \*\*\*\*\*  
192.168.5.235 : ok=12 changed=4 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

## Verify successful installation:

Font  
Input  
Information about the DirectX components and drivers installed on your system.  
using the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button.  
Current Date/Time: Tuesday, November 21, 2023, 7:52:12 PM  
Computer Name: SHAN  
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)  
Language: English (Regional Setting: English)  
System Manufacturer: ASUSTek COMPUTER INC.  
System Model: Vivobook\_ASUSLaptop X1402ZA\_X1402ZA  
BIOS: X1402ZA.301  
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz  
Memory: 24576MB RAM  
Page file: 18436MB used, 9418MB available  
DirectX Version: DirectX 12  
I signatures  
DxDiag 10.00.22621.0001 64-bit Unicode Copyright © Microsoft  
Next Page Save All Info

File Machine View Input Devices Help  
Activities Terminal  
Nov 21 19:52  
srhmschan@server1: ~  
srhmschan@server1:~\$ systemctl status docker  
● docker.service - Docker Application Container Engine  
Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)  
Active: active (running) since Tue 2023-11-21 19:44:38 PST; 6min ago  
TriggeredBy: ● docker.socket  
Docs: https://docs.docker.com  
Main PID: 838 (dockerd)  
Tasks: 11  
Memory: 100.9M  
CPU: 598ms  
CGroup: /system.slice/docker.service  
└─838 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock  
Nov 21 19:44:37 server1 dockerd[838]: time="2023-11-21T19:44:37.642823982+08:00" level=info msg=  
Nov 21 19:44:37 server1 dockerd[838]: time="2023-11-21T19:44:37.704419726+08:00" level=info msg=  
Nov 21 19:44:38 server1 dockerd[838]: time="2023-11-21T19:44:38.322272801+08:00" level=info msg=  
Nov 21 19:44:38 server1 dockerd[838]: time="2023-11-21T19:44:38.389494624+08:00" level=warning m  
Nov 21 19:44:38 server1 dockerd[838]: time="2023-11-21T19:44:38.541875579+08:00" level=info msg=  
Nov 21 19:44:38 server1 dockerd[838]: time="2023-11-21T19:44:38.617091094+08:00" level=info msg=  
Nov 21 19:44:38 server1 dockerd[838]: time="2023-11-21T19:44:38.736504572+08:00" level=info msg=  
Nov 21 19:44:38 server1 systemd[1]: Started Docker Application Container Engine.  
Nov 21 19:44:38 server1 dockerd[838]: time="2023-11-21T19:44:38.802698083+08:00" level=info msg=  
[!]+ Stopped systemctl status docker  
srhmschan@server1:~\$ docker run hello-world  
Unable to find image 'hello-world:latest' locally  
latest: Pulling from library/hello-world  
719385e32844: Pull complete  
Digest: sha256:c79d06dfdf3d3eb04c4fd0dc2bacab0992ebc243e083cabe208bac4dd7759e0  
Status: Downloaded newer image for hello-world:latest  
Hello from Docker!  
This message shows that your installation appears to be working correctly.  
To generate this message, Docker took the following steps:  
1. The Docker client contacted the Docker daemon.  
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.  
(and64)  
3. The Docker daemon created a new container from that image which runs the

## 6. Add, commit and push it to your repository.

Font  
Input  
Information about the DirectX components and drivers installed on your system.  
causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button.  
Current Date/Time: Tuesday, November 21, 2023, 7:54:19 PM  
Computer Name: SHAN  
Operating System: Windows 11 Home Single Language 64-bit (10.0, Build 22621)  
Language: English (Regional Setting: English)  
System Manufacturer: ASUSTek COMPUTER INC.  
System Model: Vivobook\_ASUSLaptop X1402ZA\_X1402ZA  
BIOS: X1402ZA.301  
Processor: 12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz  
Memory: 24576MB RAM  
Page file: 18337MB used, 9517MB available  
DirectX Version: DirectX 12  
git signatures  
DxDiag 10.00.22621.0001 64-bit Unicode Copyright © Microsoft  
Next Page Save All Info

Activities Terminal  
Nov 21 7:54 PM  
srhmschan@localmachine: ~/HOA-11  
srhmschan@localmachine:~/HOA-11\$ git status  
On branch main  
No commits yet  
Untracked files:  
(use "git add <file>..." to include in what will be committed)  
Dockerfile  
ansible.cfg  
install\_docker.yml  
inventory  
nothing added to commit but untracked files present (use "git add" to track)  
srhmschan@localmachine:~/HOA-11\$ git add .  
srhmschan@localmachine:~/HOA-11\$ git commit -m "Docker installation (progress)"  
[main (root-commit) eec32ec] Docker installation (progress)  
4 files changed, 93 insertions(+)  
create mode 100644 Dockerfile  
create mode 100644 ansible.cfg  
create mode 100644 install\_docker.yml  
create mode 100644 inventory  
srhmschan@localmachine:~/HOA-11\$ git push origin main  
Enumerating objects: 6, done.  
Counting objects: 100% (6/6), done.  
Delta compression using up to 2 threads  
Compressing objects: 100% (5/5), done.  
Writing objects: 100% (6/6), 1.18 KiB | 1.18 MiB/s, done.  
Total 6 (delta 0), reused 0 (delta 0), pack-reused 0  
To github.com:srhmschan/HOA-11.git  
\* [new branch] main -> main  
srhmschan@localmachine:~/HOA-11\$



The screenshot shows a Windows system information window on the left and a GitHub repository page on the right. The system information window displays details such as the current date/time (Tuesday, November 21, 2023, 7:58:06 PM), computer name (SHAN), operating system (Windows 11 Home Single Language 64-bit (10.0, Build 22621)), system manufacturer (ASUSTeK COMPUTER INC.), system model (Vivobook\_ASUSLaptop X1402ZA\_X1402ZA), BIOS (X1402ZA.301), processor (12th Gen Intel(R) Core(TM) i5-1235U (12 CPUs), ~1.3GHz), memory (24576MB RAM), page file (18578MB used, 9277MB available), and DirectX version (DirectX 12). The GitHub repository page shows the repository 'HOA-11' by 'srhmshan'. It includes a table of files with their commit hashes, names, and timestamps.

File	Commit	Timestamp
Dockerfile	eec32ec	4 minutes ago
ansible.cfg	eec32ec	4 minutes ago
install_docker.yml	eec32ec	4 minutes ago
inventory	eec32ec	4 minutes ago

## Reflections:

Answer the following:

1. What are the benefits of implementing containerizations?

Using Docker to implement containers or containerization can enhance the portability of processes or entire software systems resulting in efficiency. Moreover, containerization also enhances security and management by ensuring that files or images are stateless meaning that data is not stored.

## Conclusions:

**In this activity, I was able to create a Dockerfile and establish a workflow using Ansible as Infrastructure, as Code (IaC). This allowed for a Continuous Delivery process for Server1. The main challenge arose when I had to incorporate a software layer while using Ansible.**

**Working through the process of creating a Dockerfile and seamlessly integrating it into the framework posed some difficulties. However, by troubleshooting and resolving errors, I successfully managed the synergy between Ansible and Docker.**

**Despite the challenges of this activity, I was able to complete the integration within the given timeframe. This experience greatly improved my proficiency in handling these tasks. I was also able to provide insights, into implementing Containerization.**