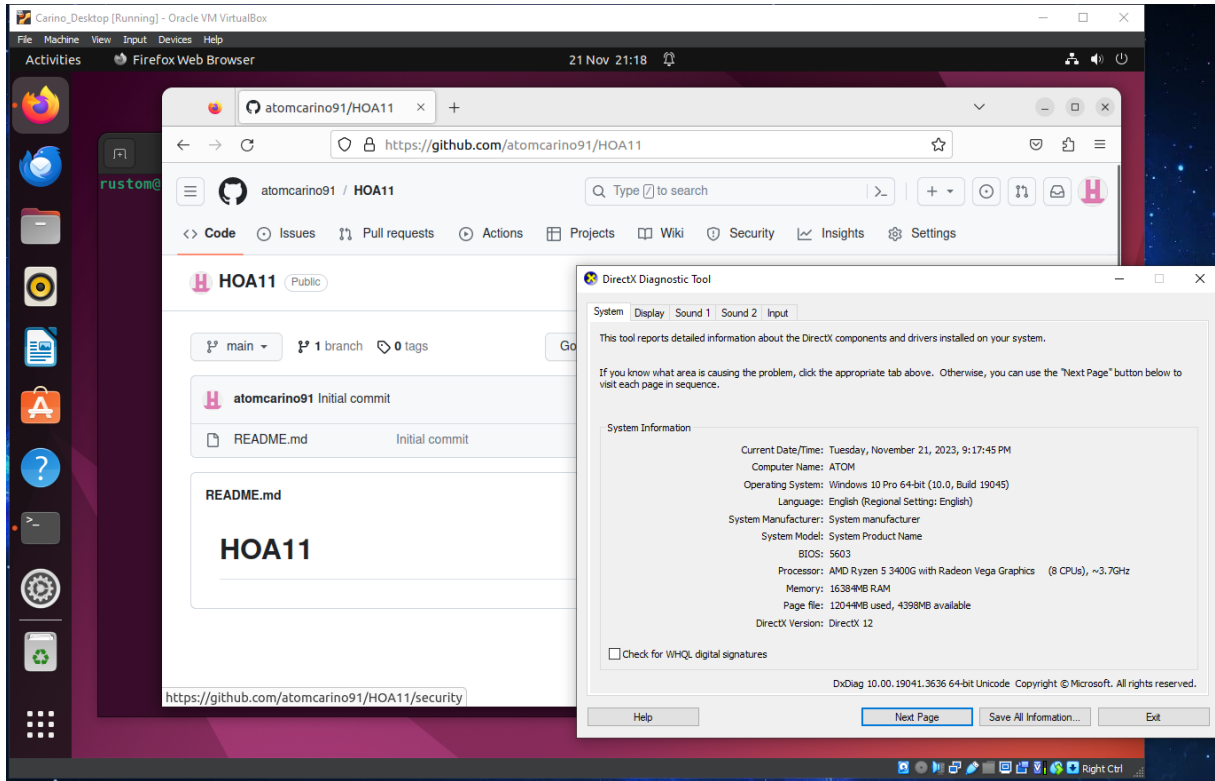
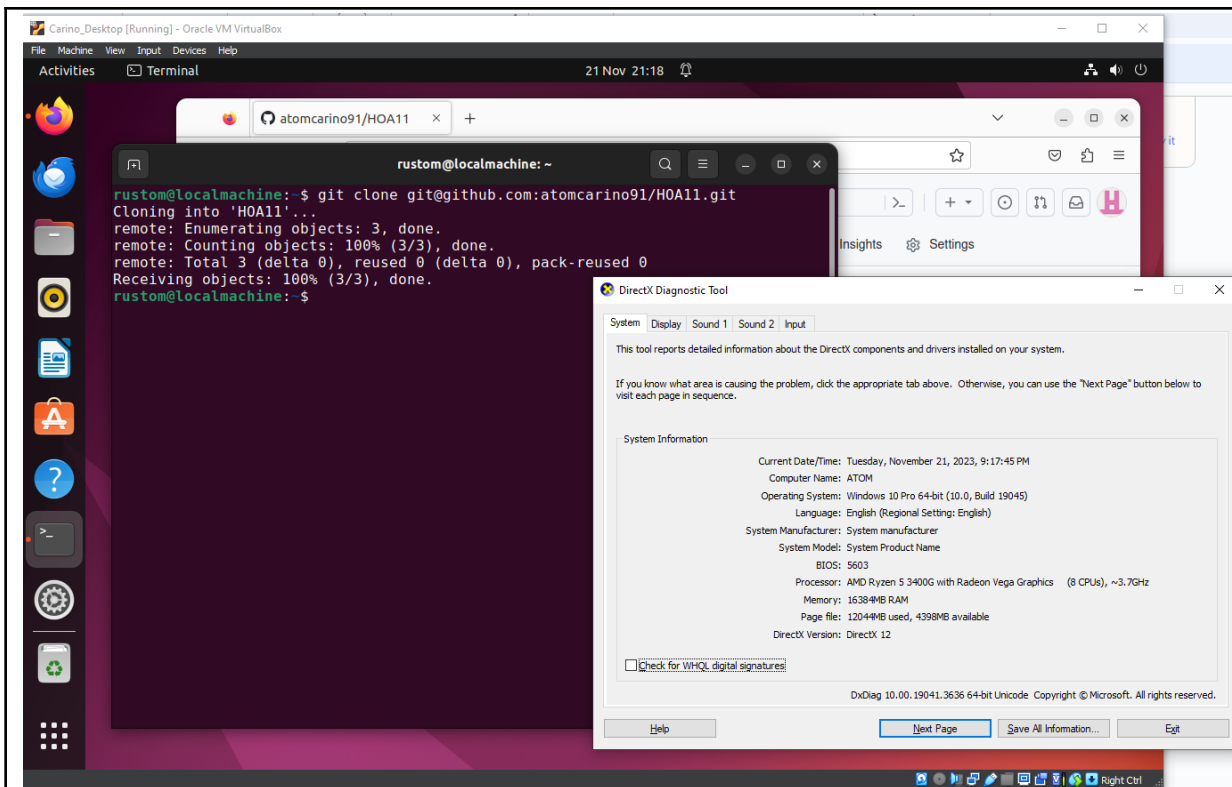


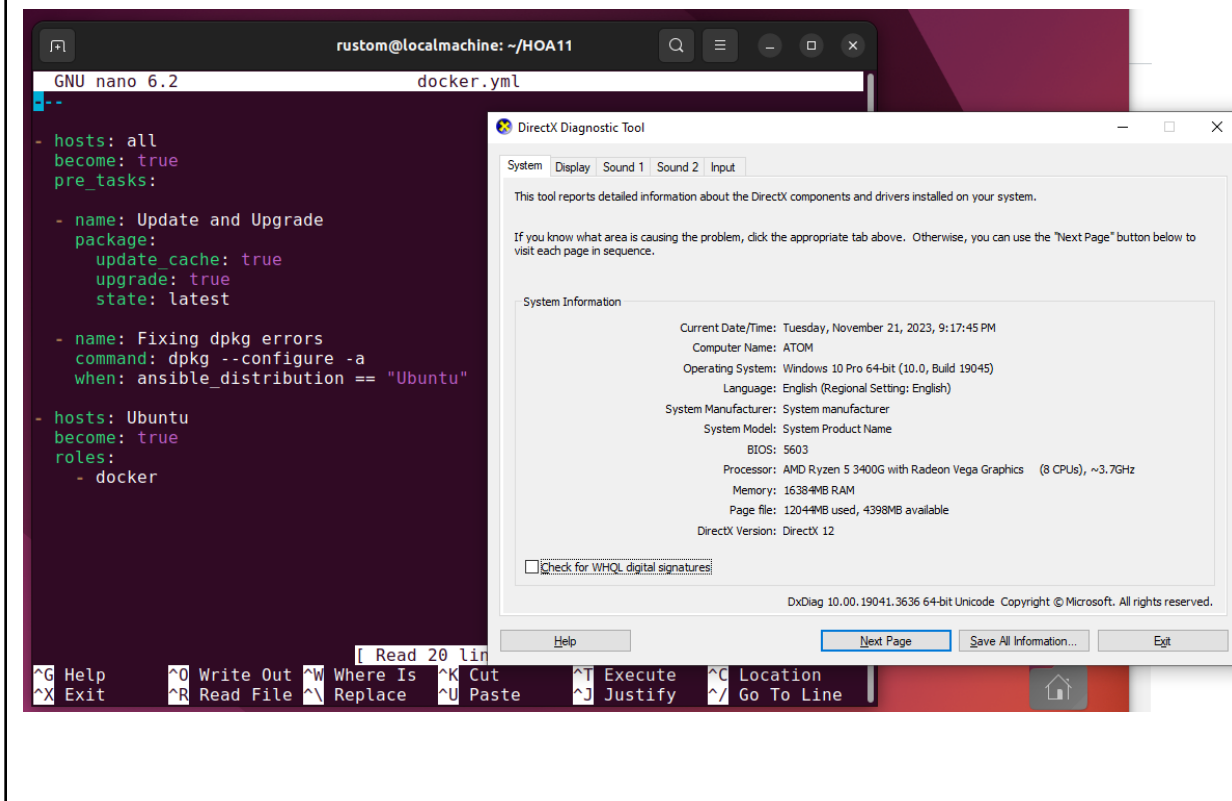
Name: Rustom C. Cariño	Date Performed: 11/21/2023
Course/Section: CPE31S5	Date Submitted: 11/23/2023
Instructor: Engr. Roman Richard	Semester and SY: 1st semester 2023-20234
Activity 11: Containerization	
1. Objectives	
Create a Dockerfile and form a workflow using Ansible as Infrastructure as Code (IaC) to enable Continuous Delivery process	
2. Discussion	
<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: https://docs.docker.com/get-started/overview/</p> <p>You may also check the difference between containers and virtual machines. Click the link given below.</p> <p>Source: https://docs.microsoft.com/en-us/virtualization/windowscontainers/about/containers-vs-vm</p>	
3. Tasks	
<ol style="list-style-type: none"> 1. Create a new repository for this activity. 2. Install Docker and enable the docker socket. 3. Add to Docker group to your current user. 4. Create a Dockerfile to install web and DB server. 5. Install and build the Dockerfile using Ansible. 6. Add, commit and push it to your repository. 	
4. Output (screenshots and explanations)	

1. Creating New Repository





2. Creating playbook



3. Install docker

The screenshot shows a terminal window with the title bar "rustom@localmachine: ~/HOA11/docker/tasks". The terminal is running GNU nano 6.2, editing a file named "install.yml". The file contains a list of tasks for installing Docker:

```
- name: Uninstall outdated docker
  apt:
    name:
      - docker
      - docker-engine
      - docker.io
      - containerd
      - runc
    state: absent

- name: Creating a directory for packages
  file:
    path: /home/userver/docker-deb
    state: directory

- name: Downloading docker components
  get_url:
    url: "https://download.docker.com/linux/ubuntu/di
    dest: /home/userver/docker-deb
  with_items:
    - "{{ docker_apps.containerd }}.deb"
    - "{{ docker_apps.docker_ce_cli }}.deb"
    - "{{ docker_apps.docker_ce }}.deb"
    - "{{ docker_apps.docker_compose }}.deb"

- name: Installing docker components
  shell: |
    cd /home/userver/docker-deb
    dpkg -i "{{ item }}"
  with_items:
    - "{{ docker_apps.containerd }}.deb"
    - "{{ docker_apps.docker_ce_cli }}.deb"
```

Overlaid on the terminal is the "DirectX Diagnostic Tool" window. It has tabs for "System", "Display", "Sound 1", "Sound 2", and "Input". The "System" tab is selected, showing "System Information". The information includes:

- Current Date/Time: Tuesday, November 21, 2023, 9:17:45 PM
- Computer Name: ATOM
- Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
- Language: English (Regional Settings: English)
- System Manufacturer: System manufacturer
- System Model: System Product Name
- BIOS: 5603
- Processor: AMD Ryzen 5 3400G with Radeon Vega Graphics (8 CPUs), ~3.7GHz
- Memory: 16384MB RAM
- Page file: 12044MB used, 4398MB available
- DirectX Version: DirectX 12

At the bottom of the DirectX Diagnostic Tool window, there is a checkbox for "Check for WHQL digital signatures" and a copyright notice: "DxDiag 10.00.19041.3636 64-bit Unicode Copyright © Microsoft. All rights reserved." Buttons for "Help", "Next Page", "Save All Information...", and "Exit" are also present.

4. Running playbook

```
rustom@localmachine:~/HOA11$ ansible-playbook --ask-become-pass docker.yml
BECOME password:

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [192.168.56.120]

TASK [Update and Upgrade] *****
changed: [192.168.56.120]

TASK [Fixing dpkg errors] *****
changed: [192.168.56.120]

PLAY [Ubuntu] *****

TASK [Gathering Facts] *****
ok: [192.168.56.120]

TASK [docker : Uninstall outdated docker] *****
ok: [192.168.56.120]

TASK [docker : Creating a directory for packages] *****
changed: [192.168.56.120]

TASK [docker : Downloading docker components] *****
changed: [192.168.56.120] => (item=containerd.io_1.6.9-1_amd64.deb)
changed: [192.168.56.120] => (item=docker-ce-cli_20.10.21~3-0~ubuntu-jammy_amd64.deb)
changed: [192.168.56.120] => (item=docker-ce_20.10.21~3-0~ubuntu-jammy_amd64.deb)
changed: [192.168.56.120] => (item=docker-compose-plugin_2.6.0~ubuntu-jammy_amd64.deb)

TASK [docker : Installing docker components] *****
changed: [192.168.56.120] => (item=containerd.io_1.6.9-1_amd64.deb)
changed: [192.168.56.120] => (item=docker-ce-cli_20.10.21~3-0~ubuntu-jammy_amd64.deb)
changed: [192.168.56.120] => (item=docker-ce_20.10.21~3-0~ubuntu-jammy_amd64.deb)
changed: [192.168.56.120] => (item=docker-compose-plugin_2.6.0~ubuntu-jammy_amd64.deb)

TASK [docker : Fixing /var/run/docker.sock error] *****
changed: [192.168.56.120]

TASK [docker : Ensure group docker exists] *****
ok: [192.168.56.120]

TASK [docker : Adding docker to the group of the current user] *
changed: [192.168.56.120]

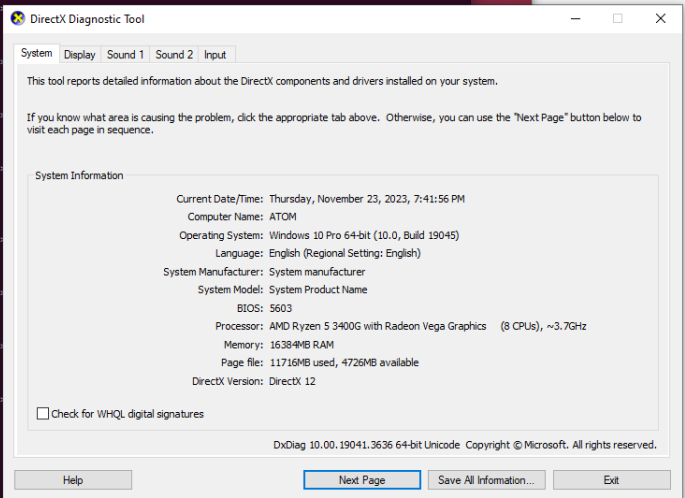
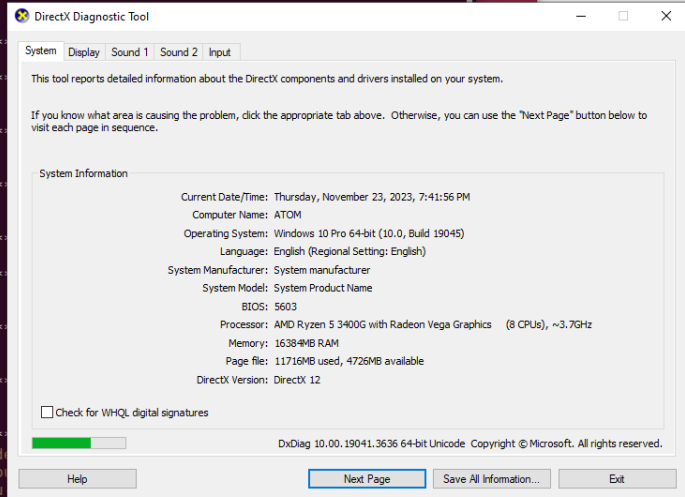
TASK [docker : Start docker services] *****
ok: [192.168.56.120] => (item=docker)
ok: [192.168.56.120] => (item=containerd)

TASK [docker : Install python] *****
ok: [192.168.56.120]

TASK [docker : Install python sdk] *****
changed: [192.168.56.120]

TASK [docker : Verifying docker service] *****
changed: [192.168.56.120]

TASK [docker : debug] *****
ok: [192.168.56.120] => {
  "msg": {
    "changed": true,
    "cmd": "systemctl list-unit-files | grep docker",
    "delta": "0:00:01.671668",
    "end": "2023-11-23 15:22:37.275427",
    "failed": false,
```



```
rustom@localmachine: ~/HOA11

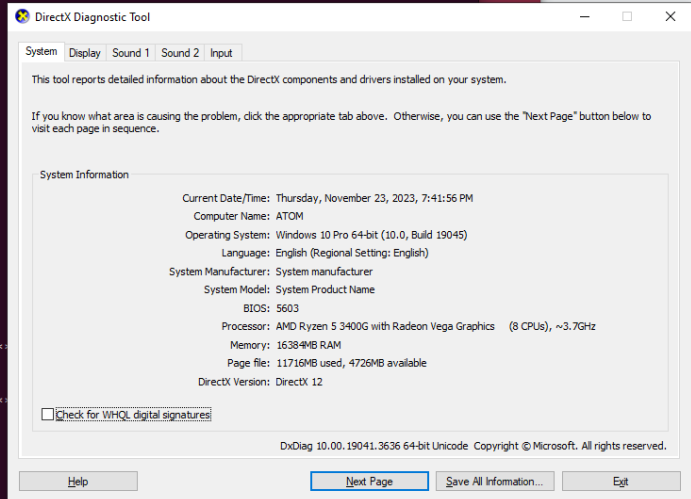
}

TASK [docker : Verifying user groups] *****
changed: [192.168.56.120]

TASK [docker : debug] *****
ok: [192.168.56.120] => {
  "msg": {
    "changed": true,
    "cmd": "groups userver",
    "delta": "0:00:00.009260",
    "end": "2023-11-23 15:22:37.722995",
    "failed": false,
    "msg": "",
    "rc": 0,
    "start": "2023-11-23 15:22:37.713735",
    "stderr": "",
    "stderr_lines": [],
    "stdout": "userver : userver docker",
    "stdout_lines": [
      "userver : userver docker"
    ]
  }
}

TASK [docker : Verifying docker installation] *****
changed: [192.168.56.120]

TASK [docker : debug] *****
ok: [192.168.56.120] => {
  "msg": {
    "changed": true,
    "cmd": "docker --version",
    "delta": "0:00:00.257623",
    "end": "2023-11-23 15:22:38.432021",
    "failed": false,
```



```
TASK [docker : Creating a directory for Dockerfile] *****
changed: [192.168.56.120]

TASK [docker : Copying the Dockerfile] *****
changed: [192.168.56.120]

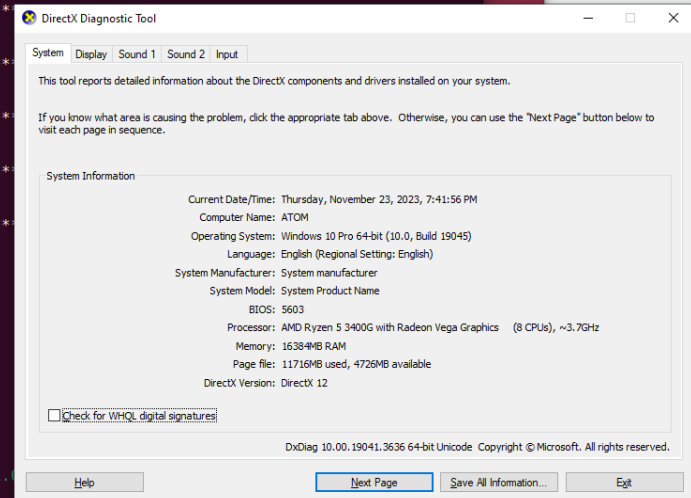
TASK [docker : Creating volume] *****
changed: [192.168.56.120]

TASK [docker : Building image] *****
changed: [192.168.56.120]

TASK [docker : Deploying container] *****
changed: [192.168.56.120]

TASK [docker : Verify if lamp-userver container is running] *****
changed: [192.168.56.120]

TASK [docker : debug] *****
ok: [192.168.56.120] => {
  "msg": {
    "changed": true,
    "cmd": "docker ps",
    "delta": "0:00:00.039551",
    "end": "2023-11-23 15:25:32.557146",
    "failed": false,
    "msg": "",
    "rc": 0,
    "start": "2023-11-23 15:25:32.517595",
    "stderr": "",
    "stderr_lines": [],
    "stdout": "CONTAINER ID        IMAGE               COMMAND
PORTS          NAMES\n4143217025b7    lamp-userver:1.1   Less than a second  0.0.0.0:8080->80/tcp  lamp-userver",
    "stdout_lines": [
      "CONTAINER ID        IMAGE               COMMAND
CREATED          STATUS          PO"
    ]
  }
}
```



5. Playbook result

```
rustom@localmachine: ~/HOA11

TASK [docker : Deploying container] *****
changed: [192.168.56.120]

TASK [docker : Verify if lamp-userver container is running] **
changed: [192.168.56.120]

TASK [docker : debug] *****
ok: [192.168.56.120] => {
  "msg": {
    "changed": true,
    "cmd": "docker ps",
    "delta": "0:00:00.039551",
    "end": "2023-11-23 15:25:32.557146",
    "failed": false,
    "msg": "",
    "rc": 0,
    "start": "2023-11-23 15:25:32.517595",
    "stderr": "",
    "stderr_lines": [],
    "stdout": "CONTAINER ID   IMAGE                                COMMAND
PORTS          NAMES\n4143217025b7   lamp-userver:1.0                    \"/bin/sh -c 'a
Less than a second 0.0.0.0:8080->80/tcp   lamp-userver",
    "stdout_lines": [
      "CONTAINER ID   IMAGE                                COMMAND
      NAMES",
      "4143217025b7   lamp-userver:1.0                    \"/bin/sh -c 'a
0.0.0.0:8080->80/tcp   lamp-userver"
    ]
  }
}

PLAY RECAP *****
192.168.56.120      : ok=27  changed=17  unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

rustom@localmachine:~/HOA11$
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Input

This tool reports detailed information about the DirectX components and drivers installed on your system.

If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

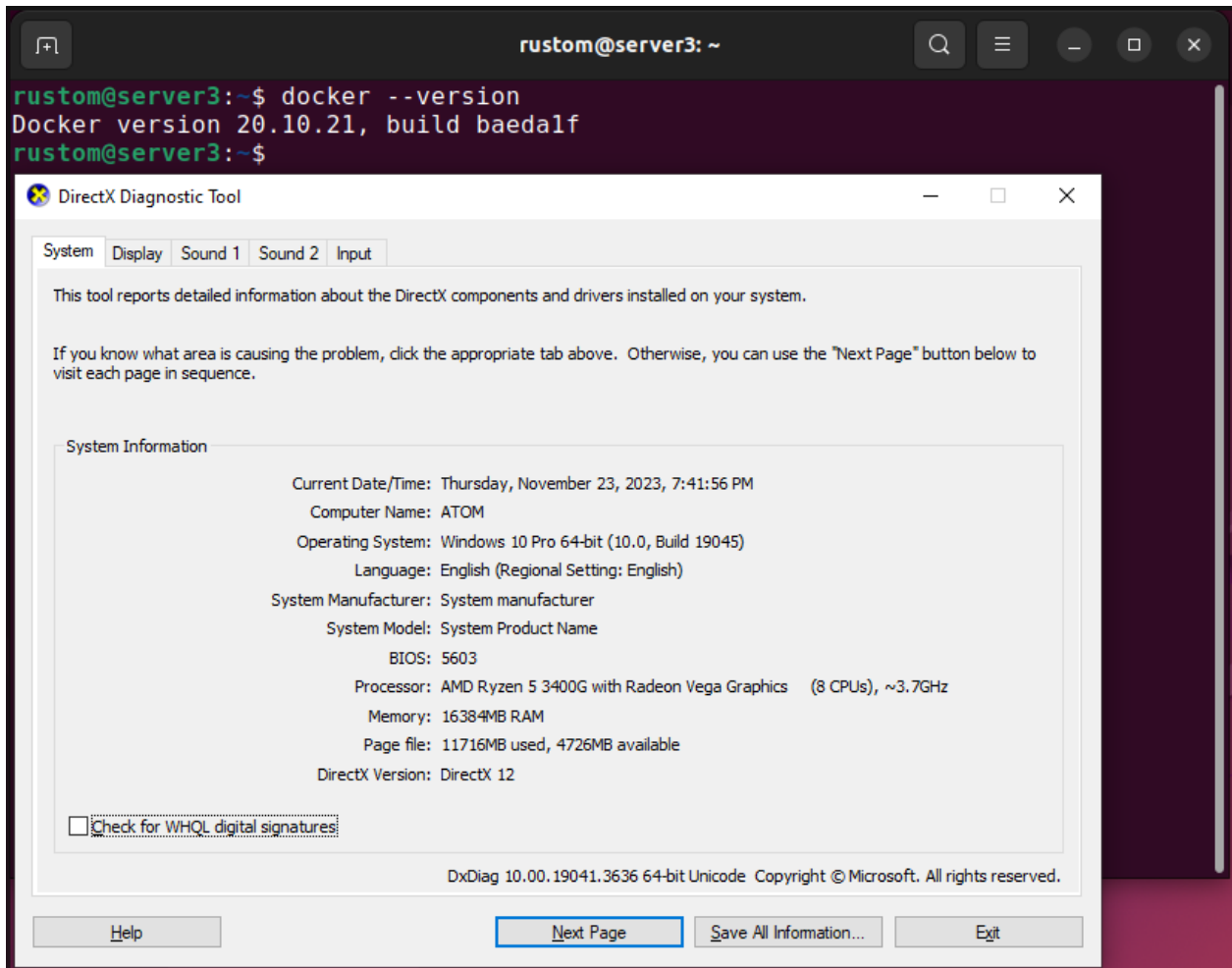
Current Date/Time: Thursday, November 23, 2023, 7:41:56 PM
Computer Name: ATOM
Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
Language: English (Regional Setting: English)
System Manufacturer: System manufacturer
System Model: System Product Name
BIOS: 5603
Processor: AMD Ryzen 5 3400G with Radeon Vega Graphics (8 CPUs), ~3.7GHz
Memory: 16384MB RAM
Page file: 11716MB used, 4726MB available
DirectX Version: DirectX 12

☐ Check for WHQL digital signatures

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Help | Next Page | Save All Information... | Exit

6. Proof that docker is installed in server.



rustom@server3: ~

+

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Docker version 20.10.21, build baed1f

rustom@server3:~\$ sudo systemctl docker

[sudo] password for rustom:

Unknown command verb docker.

rustom@server3:~\$ sudo systemctl status docker

● docker.service - Docker Application Container Engine

Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset

Active: active (running) since Thu 2023-11-23 20:06:09 CST; 26min ago

TriggeredBy: ● docker.socket

Docs: https://docs.docker.com

Main PID: 828 (dockerd)

Tasks: 8

Memory: 88.1M

CPU: 728ms

CGroup: /system.slice/docker.service

└─828 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/conta

Nov 23 20:06:08 server3

Nov 23 20:06:08 server3

Nov 23 20:06:08 server3

Nov 23 20:06:08 server3

Nov 23 20:06:08 server3

Nov 23 20:06:09 server3

Nov 23 20:06:09 server3

Nov 23 20:06:09 server3

Nov 23 20:06:09 server3

Nov 23 20:06:09 server3

lines 1-22/22 (END)

DirectX Diagnostic Tool

System Display Sound 1 Sound 2 Input

This tool reports detailed information about the DirectX components and drivers installed on your system.

If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time: Thursday, November 23, 2023, 7:41:56 PM

Computer Name: ATOM

Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)

Language: English (Regional Setting: English)

System Manufacturer: System manufacturer

System Model: System Product Name

BIOS: 5603

Processor: AMD Ryzen 5 3400G with Radeon Vega Graphics (8 CPUs), ~3.7GHz

Memory: 16384MB RAM

Page file: 11716MB used, 4726MB available

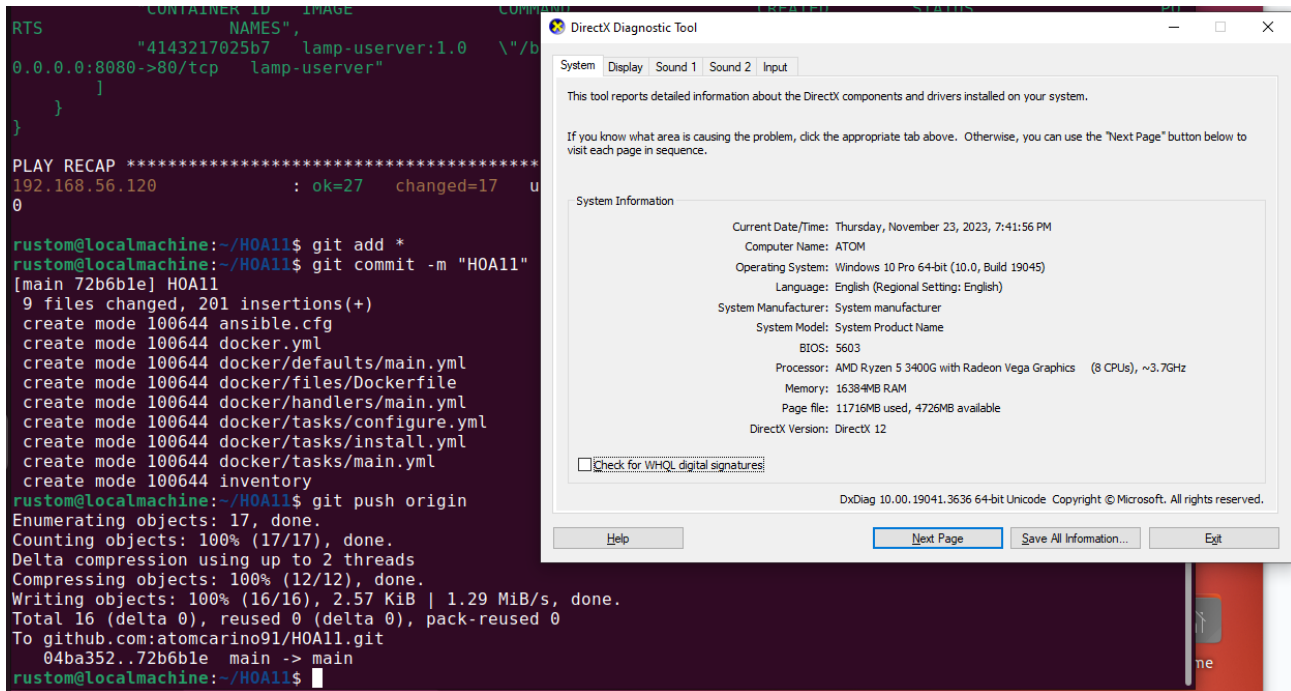
DirectX Version: DirectX 12

☐ Check for WHQL digital signatures

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Help Next Page Save All Information... Exit

7. Add, commit and push to your repository.



```
RTS
CONTAINER ID   IMAGE                                COMMAND
"4143217025b7  lamp-userver:1.0                  \"/b
0.0.0.0:8080->80/tcp  lamp-userver"
}
}

PLAY RECAP *****
192.168.56.120    : ok=27   changed=17   u
0

rustom@localmachine:~/HOA11$ git add *
rustom@localmachine:~/HOA11$ git commit -m "HOA11"
[main 72b6b1e] HOA11
9 files changed, 201 insertions(+)
create mode 100644 ansible.cfg
create mode 100644 docker.yml
create mode 100644 docker/defaults/main.yml
create mode 100644 docker/files/Dockerfile
create mode 100644 docker/handlers/main.yml
create mode 100644 docker/tasks/configure.yml
create mode 100644 docker/tasks/install.yml
create mode 100644 docker/tasks/main.yml
create mode 100644 inventory
rustom@localmachine:~/HOA11$ git push origin
Enumerating objects: 17, done.
Counting objects: 100% (17/17), done.
Delta compression using up to 2 threads
Compressing objects: 100% (12/12), done.
Writing objects: 100% (16/16), 2.57 KiB | 1.29 MiB/s, done.
Total 16 (delta 0), reused 0 (delta 0), pack-reused 0
To github.com:atomcarino91/HOA11.git
04ba352..72b6b1e  main -> main
rustom@localmachine:~/HOA11$
```

DirectX Diagnostic Tool

System | Display | Sound 1 | Sound 2 | Input

This tool reports detailed information about the DirectX components and drivers installed on your system.

If you know what area is causing the problem, click the appropriate tab above. Otherwise, you can use the "Next Page" button below to visit each page in sequence.

System Information

Current Date/Time: Thursday, November 23, 2023, 7:41:56 PM
Computer Name: ATOM
Operating System: Windows 10 Pro 64-bit (10.0, Build 19045)
Language: English (Regional Setting: English)
System Manufacturer: System manufacturer
System Model: System Product Name
BIOS: 5603
Processor: AMD Ryzen 5 3400G with Radeon Vega Graphics (8 CPUs), ~3.7GHz
Memory: 16384MB RAM
Page file: 11716MB used, 4726MB available
DirectX Version: DirectX 12

☐ Check for WHQL digital signatures

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Help Next Page Save All Information... Exit

Reflections:

Answer the following:

1. What are the benefits of implementing containerizations?

Containerization in Ubuntu offers numerous benefits when implemented, including increased resource efficiency, improved application portability, enhanced scalability, faster development and deployment, simplified application management, improved isolation and security, support for microservices architecture, reduced vendor lock-in, enhanced collaboration and productivity, and future-proofing due to its strong community and industry support. These benefits make containers an ideal choice for businesses.

Conclusions:

In this activity I will be able to create a dockerfile and form a workflow using ansible as infrastructure as code to enable continuous delivery process. This activity involves installing Docker using an Ansible Playbook. It involves installing Docker, enabling it, building a Docker file, and deploying the container. The task is slightly easy, except for debugging and creating a new server due to a corrupted first server. The activity is knowledgeable in Docker installation, image building, and container deployment.