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### Activity 7: Managing Files and Creating Roles in Ansible

#### 1. Objectives:

- 1.1 Manage files in remote servers
- 1.2 Implement roles in ansible

#### 2. Discussion:

In this activity, we look at the concept of copying a file to a server. We are going to create a file into our git repository and use Ansible to grab that file and put it into a particular place so that we could do things like customize a default website, or maybe install a default configuration file. We will also implement roles to consolidate plays.

#### Task 1: Create a file and copy it to remote servers

1. Using the previous directory we created, create a directory, and named it "*files*." Create a file inside that directory and name it "*default\_site.html*." Edit the file and put basic HTML syntax. Any content will do, as long as it will display text later. Save the file and exit.

```
jmaducal@workstation: ~/CPE232_John-Mark-Aducal/files
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ mkdir files
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ ls
ansible.cfg  files  install_apache.yml  inventory  README.md  site.yml
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ cd files
jmaducal@workstation:~/CPE232_John-Mark-Aducal/files$ nano default_site.html
```

I have created a new directory named files using mkdir command.

```
GNU nano 6.2 default_site.html
Task 1: Create a file and copy it to remote servers
```

Inside the files directory, I have created a file name default\_site.html

2. Edit the *site.yml* file and just below the *web\_servers* play, create a new file to copy the default html file for site:
  - name: copy default html file for site
  - tags: apache, apache2, httpd

```
copy:
  src: default_site.html
  dest: /var/www/html/index.html
  owner: root
  group: root
  mode: 0644
```

```
- name: copy default html file for site
  tags: apache, apache2, httpd
  copy:
    src: default_site.html
    dest: /var/www/html/index.html
    owner: root
    group: root
    mode: 0644
```

I edit the site.yml file, and insert a task that will copy default\_site.html file to remote servers.

3. Run the playbook *site.yml*. Describe the changes.

```
jmaducal@workstation: ~/CPE232_John-Mark-Aducal
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ ansible-playbook --ask-become-pass site.yml
BECOME password:

PLAY [all] *****
*

TASK [Gathering Facts] *****
*
ok: [CentOS]
ok: [server3]

TASK [install updates (CentOS)] *****
*
skipping: [server3]
ok: [CentOS]

TASK [install updates (Ubuntu)] *****
*
skipping: [CentOS]
changed: [server3]

PLAY [web_servers] *****
*

TASK [Gathering Facts] *****
*
ok: [CentOS]
ok: [server3]
```

```

TASK [install apache and php for Ubuntu servers] *****
*
skipping: [CentOS]
ok: [server3]

TASK [install apache and php for CentOS servers] *****
*
skipping: [server3]
ok: [CentOS]

TASK [start httpd (CentOS)] *****
*
skipping: [server3]
changed: [CentOS]

TASK [copy default html file for site] *****
*
changed: [CentOS]
changed: [server3]

PLAY [db_servers] *****
*

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

TASK [install mariadb package (CentOS)] *****
*

```

The task copying the default html file for remote servers has changed.

```

ok: [CentOS]

TASK [Mariadb- Restarting/Enabling] *****
*
changed: [CentOS]

TASK [install mariadb package (Ubuntu)] *****
*
skipping: [CentOS]

PLAY [file_servers] *****
*

TASK [Gathering Facts] *****
*
ok: [server3]

TASK [install samba package] *****
*
ok: [server3]

PLAY RECAP *****
*
CentOS                : ok=9    changed=3    unreachable=0    failed=0
skipped=3    rescued=0    ignored=0
server3        : ok=7    changed=2    unreachable=0    failed=0
skipped=3    rescued=0    ignored=0

```

4. Go to the remote servers (*web\_servers*) listed in your inventory. Use `cat` command to check if the `index.html` is the same as the local repository file (*default\_site.html*). Do both for Ubuntu and CentOS servers. On the CentOS server, go to the browser and type its IP address. Describe the output.

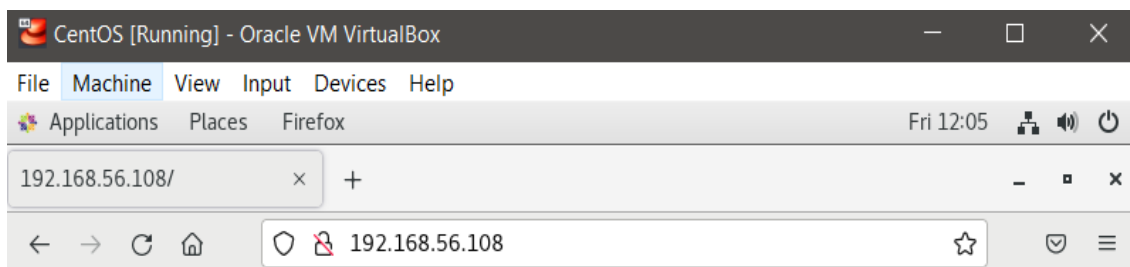
**For Ubuntu:**

```
jmaducal@server3: ~  
jmaducal@server3:~$ cat /var/www/html/index.html  
Task 1: Create a file and copy it to remote servers  
jmaducal@server3:~$
```

**For CentOS:**

```
jmaducal@CentOS:~  
File Edit View Search Terminal Help  
[jmaducal@CentOS ~]$ cat /var/www/html/index.html  
Task 1: Create a file and copy it to remote servers  
[jmaducal@CentOS ~]$
```

**CentOS Browser:**



Task 1: Create a file and copy it to remote servers

**After typing the IP address of CentOS in the browser.  
It shows the content of default\_site.html**

5. Sync your local repository with GitHub and describe the changes.

```

jmaducal@workstation: ~/CPE232_John-Mark-Aducal
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   install_apache.yml
        modified:   inventory
        modified:   site.yml

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        files/

no changes added to commit (use "git add" and/or "git commit -a")
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ git add install_apache.yml
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ git add inventory
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ git add site.yml
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ git add files/
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ git commit -m "CPE232 Act 7"
[main 3c039c5] CPE232 Act 7
 4 files changed, 17 insertions(+), 12 deletions(-)
 create mode 100644 files/default_site.html
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ git push origin main
Enumerating objects: 11, done.
Counting objects: 100% (11/11), done.
Compressing objects: 100% (6/6), done.
Writing objects: 100% (7/7), 871 bytes | 871.00 KiB/s, done.
Total 7 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To github.com:jmaducal12/CPE232_John-Mark-Aducal.git
 f834c8e..3c039c5  main -> main

```

John Mark Aducal CPE232 Act 7		3c039c5 4 minutes ago	🕒 13 commits
📁 files	CPE232 Act 7	4 minutes ago	
📄 README.md	JM Info	2 months ago	
📄 ansible.cfg	Act 6	7 days ago	
📄 install_apache.yml	CPE232 Act 7	4 minutes ago	
📄 inventory	CPE232 Act 7	4 minutes ago	
📄 site.yml	CPE232 Act 7	4 minutes ago	

GitHub Repo Link:

[https://github.com/jmaducal12/CPE232\\_John-Mark-Aducal.git](https://github.com/jmaducal12/CPE232_John-Mark-Aducal.git)

## Task 2: Download a file and extract it to a remote server

1. Edit the site.yml. Just before the web\_servers play, create a new play:
  - hosts: workstations  
become: true  
tasks:
    - name: install unzip  
package:  
name: unzip
    - name: install terraform  
unarchive:  
src:  
[https://releases.hashicorp.com/terraform/0.12.28/terraform\\_0.12.28\\_linux\\_amd64.zip](https://releases.hashicorp.com/terraform/0.12.28/terraform_0.12.28_linux_amd64.zip)  
dest: /usr/local/bin  
remote\_src: yes  
mode: 0755  
owner: root  
group: root

### Screenshot:

```
- hosts: workstation_servers
  become: true
  tasks:

  - name: install unzip
    package:
      name: unzip

  - name: install terraform
    unarchive:
      src: https://releases.hashicorp.com/terraform/0.12.28/terraform_0.12.28_linux_amd64.zip
      dest: /usr/local/bin
      remote_src: yes
      mode: 0755
      owner: root
      group: root
```

2. Edit the inventory file and add workstations group. Add any Ubuntu remote server. Make sure to remember the IP address.

```
jmaducal@workstation: ~/CPE232_John-Mark-Aduc  
GNU nano 6.2 inventory  
[web_servers]  
server3 ansible_host=192.168.56.110  
CentOS ansible_host=192.168.56.108  
  
[db_servers]  
CentOS ansible_host=192.168.56.108  
  
[file_servers]  
server3 ansible_host=192.168.56.110  
  
[workstation_servers]  
server3 ansible_host=192.168.56.110
```

3. Run the playbook. Describe the output.

```
jmaducal@workstation: ~/CPE232_John-Mark-Aduc  
PLAY [workstation_servers] *****  
*  
TASK [Gathering Facts] *****  
*  
ok: [server3]  
TASK [install unzip] *****  
*  
ok: [server3]  
TASK [install terraform] *****  
*  
changed: [server3]
```

The task install terraform and extract it to remote server (Ubuntu).

4. On the Ubuntu remote workstation, type terraform to verify installation of terraform. Describe the output.

```
jmaducal@server3: ~  
jmaducal@server3:~$ terraform --version  
Terraform v0.12.28  
  
Your version of Terraform is out of date! The latest version  
is 1.3.2. You can update by downloading from https://www.terraform.io/downloads  
.html  
jmaducal@server3:~$
```

I have successfully installed Terraform v0.12.28 in Ubuntu remote workstation server.

### Task 3: Create roles

1. Edit the site.yml. Configure roles as follows: (make sure to create a copy of the old site.yml file because you will be copying the specific plays for all groups)

```
---
- hosts: all
  become: true
  pre_tasks:

    - name: update repository index (CentOS)
      tags: always
      dnf:
        update_cache: yes
        changed_when: false
        when: ansible_distribution == "CentOS"
    - name: install updates (Ubuntu)
      tags: always
      apt:
        update_cache: yes
        changed_when: false
        when: ansible_distribution == "Ubuntu"

- hosts: all
  become: true
  roles:
    - base

- hosts: workstations
  become: true
  roles:
    - workstations

- hosts: web_servers
  become: true
  roles:
    - web_servers

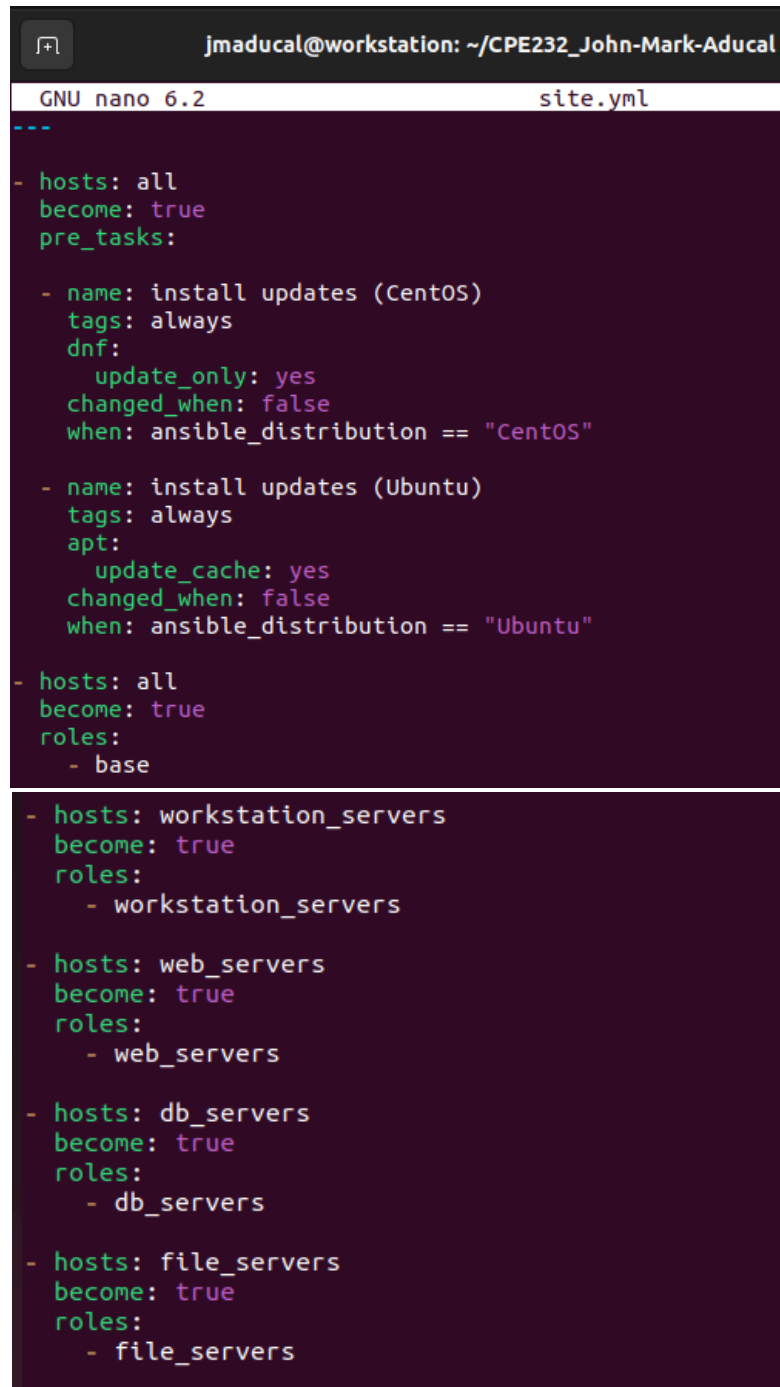
- hosts: db_servers
  become: true
  roles:
    - db_servers

- hosts: file_servers
  become: true
  roles:
    - file_servers
```

Save the file and exit.



### Screenshot:



```
GNU nano 6.2 site.yml
---
- hosts: all
  become: true
  pre_tasks:

  - name: install updates (CentOS)
    tags: always
    dnf:
      update_only: yes
    changed_when: false
    when: ansible_distribution == "CentOS"

  - name: install updates (Ubuntu)
    tags: always
    apt:
      update_cache: yes
    changed_when: false
    when: ansible_distribution == "Ubuntu"

- hosts: all
  become: true
  roles:
    - base

- hosts: workstation_servers
  become: true
  roles:
    - workstation_servers

- hosts: web_servers
  become: true
  roles:
    - web_servers

- hosts: db_servers
  become: true
  roles:
    - db_servers

- hosts: file_servers
  become: true
  roles:
    - file_servers
```

2. Under the same directory, create a new directory and name it roles. Enter the roles directory and create new directories: base, web\_servers, file\_servers, db\_servers and workstation\_servers. For each directory, create a directory and name it tasks.

```
jmaducal@workstation: ~/CPE232_John-Mark-Aducal/roles
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ mkdir roles
jmaducal@workstation:~/CPE232_John-Mark-Aducal$ cd roles
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ mkdir base
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ mkdir web_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ mkdir file_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ mkdir db_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ mkdir workstation_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ ls
base db_servers file_servers web_servers workstation_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ cd base
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/base$ mkdir tasks
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/base$ cd ..
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ cd web_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/web_servers$ mkdir tasks
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/web_servers$ cd ..
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ cd file_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/file_servers$ mkdir tasks
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/file_servers$ cd ..
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ cd db_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/db_servers$ mkdir tasks
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/db_servers$ cd ..
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ cd workstation_servers
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles/workstation_servers$ mkdir tasks
jmaducal@workstation:~/CPE232_John-Mark-Aducal/roles$ tree
.
├── base
│   └── tasks
├── db_servers
│   └── tasks
├── file_servers
│   └── tasks
├── web_servers
│   └── tasks
└── workstation_servers
    └── tasks

10 directories, 0 files
```

It display the content of roles directory in tree-like format.

3. Go to tasks for all directory and create a file. Name it main.yml. In each of the tasks for all directories, copy and paste the code from the old site.yml file. Show all contents of main.yml files for all tasks.

```
jmaducal@workstation: ~/CPE232_John-Mark-Aduc al/roles
jmaducal@workstation:~/CPE232_John-Mark-Aduc al/roles$ tree
.
├── base
│   └── tasks
│       └── main.yml
├── db_servers
│   └── tasks
│       └── main.yml
├── file_servers
│   └── tasks
│       └── main.yml
├── web_servers
│   └── tasks
│       └── main.yml
└── workstation_servers
    └── tasks
        └── main.yml

10 directories, 5 files
```

Inside the tasks of all directories, I have created main.yml file.

4. Run the site.yml playbook and describe the output.

```
jmaducal@workstation: ~/CPE232_John-Mark-Aduc al
TASK [base : install updates (CentOS)] *****
*
skipping: [server3]
ok: [CentOS]

TASK [base : install updates (Ubuntu)] *****
*
skipping: [CentOS]
ok: [server3]

TASK [base : install apache and php for Ubuntu servers] *****
*
skipping: [CentOS]
ok: [server3]

TASK [base : install apache and php for CentOS servers] *****
*
skipping: [server3]
ok: [CentOS]

TASK [base : start httpd (CentOS)] *****
*
skipping: [server3]
ok: [CentOS]

TASK [base : copy default html file for site] *****
*
ok: [CentOS]
```

```
TASK [base : copy default html file for site] *****
*
ok: [CentOS]
ok: [server3]

TASK [base : install mariadb package (CentOS)] *****
*
skipping: [server3]
ok: [CentOS]

TASK [base : Mariadb- Restarting/Enabling] *****
*
changed: [server3]
changed: [CentOS]

TASK [base : install mariadb package (Ubuntu)] *****
*
skipping: [CentOS]
ok: [server3]

TASK [base : install samba package] *****
*
ok: [server3]
ok: [CentOS]
```

```
PLAY [workstation_servers] *****
*

TASK [Gathering Facts] *****
*
ok: [server3]

TASK [workstation_servers : install updates (CentOS)] *****
*
skipping: [server3]

TASK [workstation_servers : install updates (Ubuntu)] *****
*
ok: [server3]

TASK [workstation_servers : install apache and php for Ubuntu servers] *****
*
ok: [server3]

TASK [workstation_servers : install apache and php for CentOS servers] *****
*
skipping: [server3]

TASK [workstation_servers : start httpd (CentOS)] *****
*
skipping: [server3]
```

```
TASK [workstation_servers : copy default html file for site] *****
*
ok: [server3]

TASK [workstation_servers : install mariadb package (CentOS)] *****
*
skipping: [server3]

TASK [workstation_servers : Mariadb- Restarting/Enabling] *****
*
changed: [server3]

TASK [workstation_servers : install mariadb package (Ubuntu)] *****
*
ok: [server3]

TASK [workstation_servers : install samba package] *****
*
ok: [server3]
```

```
PLAY [web_servers] *****
*

TASK [Gathering Facts] *****
*
ok: [server3]
ok: [CentOS]

TASK [web_servers : install updates (CentOS)] *****
*
skipping: [server3]
ok: [CentOS]

TASK [web_servers : install updates (Ubuntu)] *****
*
skipping: [CentOS]
ok: [server3]

TASK [web_servers : install apache and php for Ubuntu servers] *****
*
skipping: [CentOS]
ok: [server3]

TASK [web_servers : install apache and php for CentOS servers] *****
*
skipping: [server3]
ok: [CentOS]
```

```
TASK [web_servers : copy default html file for site] *****
*
ok: [CentOS]
ok: [server3]

TASK [web_servers : install mariadb package (CentOS)] *****
*
skipping: [server3]
ok: [CentOS]

TASK [web_servers : Mariadb- Restarting/Enabling] *****
*
changed: [server3]
changed: [CentOS]

TASK [web_servers : install mariadb package (Ubuntu)] *****
*
skipping: [CentOS]
ok: [server3]

TASK [web_servers : install samba package] *****
*
ok: [server3]
ok: [CentOS]
```

```
PLAY [db_servers] *****
*

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

TASK [db_servers : install updates (CentOS)] *****
*
ok: [CentOS]

TASK [db_servers : install updates (Ubuntu)] *****
*
skipping: [CentOS]

TASK [db_servers : install apache and php for Ubuntu servers] *****
*
skipping: [CentOS]

TASK [db_servers : install apache and php for CentOS servers] *****
*
ok: [CentOS]

TASK [db_servers : start httpd (CentOS)] *****
*
ok: [CentOS]
```

```
TASK [db_servers : copy default html file for site] *****
*
ok: [CentOS]

TASK [db_servers : install mariadb package (CentOS)] *****
*
ok: [CentOS]

TASK [db_servers : Mariadb- Restarting/Enabling] *****
*
changed: [CentOS]

TASK [db_servers : install mariadb package (Ubuntu)] *****
*
skipping: [CentOS]

TASK [db_servers : install samba package] *****
*
ok: [CentOS]
```

```
PLAY [file_servers] *****
*

TASK [Gathering Facts] *****
*
ok: [server3]

TASK [file_servers : install updates (CentOS)] *****
*
skipping: [server3]

TASK [file_servers : install updates (Ubuntu)] *****
*
ok: [server3]

TASK [file_servers : install apache and php for Ubuntu servers] *****
*
ok: [server3]

TASK [file_servers : install apache and php for CentOS servers] *****
*
skipping: [server3]

TASK [file_servers : start httpd (CentOS)] *****
*
skipping: [server3]
```

```
TASK [file_servers : copy default html file for site] *****
*
ok: [server3]

TASK [file_servers : install mariadb package (CentOS)] *****
*
skipping: [server3]

TASK [file_servers : Mariadb- Restarting/Enabling] *****
*
changed: [server3]

TASK [file_servers : install mariadb package (Ubuntu)] *****
*
ok: [server3]

TASK [file_servers : install samba package] *****
*
ok: [server3]

PLAY RECAP *****
*
CentOS                : ok=26   changed=3   unreachable=0   failed=0
skipped=10   rescued=0   ignored=0
server3           : ok=30   changed=4   unreachable=0   failed=0
skipped=17   rescued=0   ignored=0
```

After executing site.yml, I have notice that roles (base, web\_servers, file\_servers, db\_servers, workstation\_servers) plays the tasks in the main.yml file.

**Reflections:**

Answer the following:

**1. What is the importance of creating roles?**

Roles let you automatically load related vars, files, tasks, handlers, and other Ansible artifacts based on a known file structure. After you group your content in roles, you can easily reuse them and share them with other users.

**2. What is the importance of managing files?**

Managing files using ansible is necessary especially if you want to make changes like for example copy a file from local machine to a remote target machines. Change file ownership, group and permission. Create a symbolic link, create files and directory from local machine to a certain target machine etc.

**HONOR PLEDGE:**

I affirm that I will not give or receive any unauthorized help on this activity, and that all work will be my own.