The first image server.js used based on exercise from this course.

```
FROM debian
USER root
COPY package.json ./
WORKDIR /
RUN apt-get update
RUN apt-get install -y nodejs
RUN apt-get install -y npm
RUN npm install
COPY . .
ENTRYPOINT node server.js
```

Build first image.

```
winx@Winx-MBP dockerImage1 % docker build -t server1ssh .
[+] Building 74.1s (11/11) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 214B
 => [internal] load .dockerignore
 => => transferring context: 34B
 => [internal] load metadata for docker.io/library/debian:latest
 => [internal] load build context
 => => transferring context: 34B
 => [1/7] FROM docker.io/library/debian@sha256:45ee40a844048c2f6d0105899c1a17733530b56d481612608aab5e2e4048570b
 => CACHED [2/7] COPY package.json ./
 => CACHED [3/7] RUN apt-get update
 => CACHED [4/7] RUN apt-get install -y nodejs
 => [5/7] RUN apt-get install -y npm
 => [6/7] RUN npm install
 => exporting to image
 => => exporting layers
 => => writing image sha256:a0f7ddcf4276f446e58983d3f24d212f8029673ac1169b797d1309bb49051dc0
 => => naming to docker.io/library/server1ssh
```

The second image changed permitrootlogin to yes in the file ‘sshd_config’ and created ssluser with password eee in dockerfile, the net-tools installed then later can use ifconfig to see the ip address when the iamge is running.

```
FROM server1ssh
RUN apt-get install -y openssh-server
RUN sed -i 's/PermitRootLogin prohibit-password/PermitRootLogin yes/' /etc/ssh/sshd_config
RUN useradd -m -s /bin/bash -G sudo -p $(openssl passwd -1 eee) ssluser

RUN apt-get install -y python3
RUN apt-get install -y sudo
RUN apt-get install -y net-tools
ENV PORT=8081
EXPOSE 22
ENTRYPOINT service ssh start && node server.js
```

Build second image

```
winx@Winx-MBP dockerImage2 % docker build -t sshlogin .
[+] Building 8.5s (11/11) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 434B
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [internal] load metadata for docker.io/library/server1ssh:latest
 => [1/7] FROM docker.io/library/server1ssh
 => [2/7] RUN apt-get install -y openssh-server
 => [3/7] RUN sed -i 's/PermitRootLogin prohibit-password/PermitRootLogin yes/' /etc/ssh/sshd_config
 => [4/7] RUN useradd -m -s /bin/bash -G sudo -p $(openssl passwd -1 eee) ssluser
 => [5/7] RUN apt-get install -y python3
 => [6/7] RUN apt-get install -y sudo
 => [7/7] RUN apt-get install -y net-tools
 => exporting to image
 => => exporting layers
 => => writing image sha256:72f8874c988d6c48d3317de161a85235c32e3281bf2aa271ea7f91769023ef47
 => => naming to docker.io/library/sshlogin
```

List both of the docker image:

```
winx@Winx-MBP dockerImage2 % docker image ls
REPOSITORY                  TAG                 IMAGE ID       CREATED          SIZE
sshlogin                    latest              72f8874c988d   31 seconds ago   980MB
server1ssh                  latest              a0f7ddcf4276   2 minutes ago    959MB
```

Run docker image and list docker container:

```
winx@Winx-MBP ansible % docker container ls
CONTAINER ID   IMAGE                  COMMAND                  CREATED          STATUS          PORTS                  NAMES
eacf7f43e590   sshlogin               "/bin/sh -c 'service…"   57 seconds ago   Up 56 seconds   22/tcp                 loving_hamilton
e70c4a80c97b   server1ssh             "/bin/sh -c 'node se…"   9 minutes ago    Up 9 minutes                           inspiring_euler
```

Get ip address of the container by “docker exec container_id ifconfig”

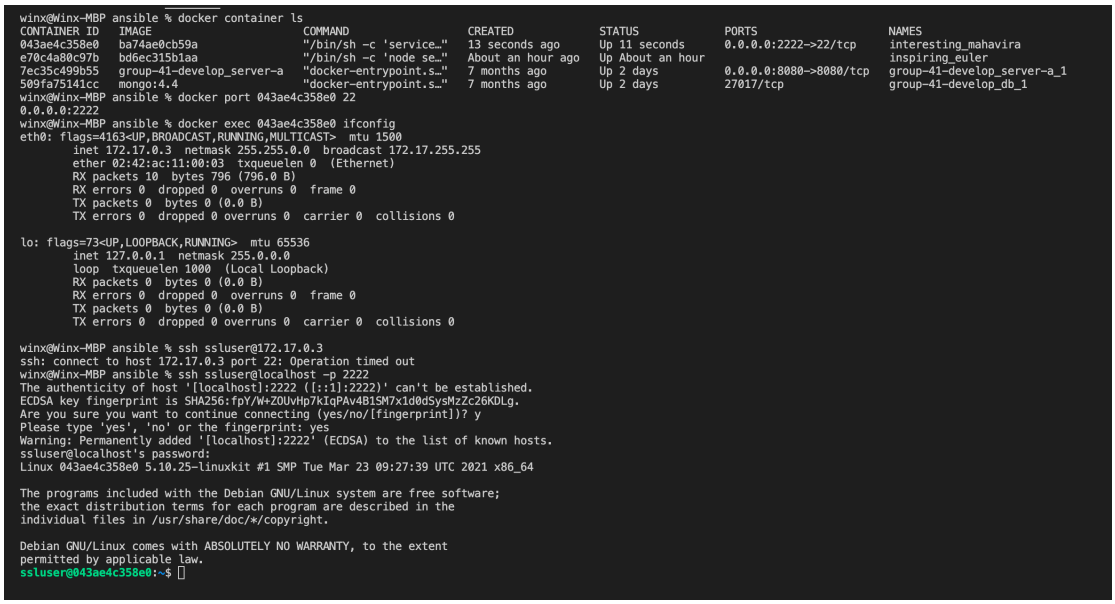
```
winx@Winx-MBP ansible % docker exec eacf7f43e590 ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.17.0.3  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:ac:11:00:03  txqueuelen 0  (Ethernet)
        RX packets 11  bytes 866 (866.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

I run the docker image with port 2222:22, at this point it is possible to start the image and ssh. If using localhost or machine’ s IP with port 2222, it will communicate to port 22 inside the container.

```
winx@Winx-MBP ansible % docker run -p 2222:22 ba74ae0cb59a
Starting OpenBSD Secure Shell server: sshd.
Listen on 8081
```

The ip address of the second image which installed openssh is 172.17.0.3 which is the docker internal ip. I used “sshssluser@172.17.0.3” with password “eee” to login:



The ansible installed in own machine, and the inventory file was created in the path ~/ansible/inventory.

```
winx@Winx-MBP / % cd ~
winx@Winx-MBP ~ % mkdir ansible
winx@Winx-MBP ~ % cd ansible
winx@Winx-MBP ansible % nano inventory
```

Get host from inventory:

```
winx@Winx-MBP ansible % ansible-inventory -i inventory --list
{
    "_meta": {
        "hostvars": {}
    },
    "all": {
        "children": [
            "ungrouped"
        ]
    },
    "ungrouped": {
        "hosts": [
            "192.168.50.155"
        ]
    }
}
```

Since there is no default ansible folder, it is created with “sudo mkdir ansible”. it is also needed to create hosts file in “~/etc/ansible” folder:

```
winx@Winx-MBP /etc % cd ansible
winx@Winx-MBP ansible % ls
winx@Winx-MBP ansible % nano hosts
winx@Winx-MBP ansible % sudo nano hosts
```

I used password ssh login, there are settings need to be change in sshd_config file:

“passwordauthentication yes”

“Permitrootlogin no”

“PubKeyAuthentication yes”

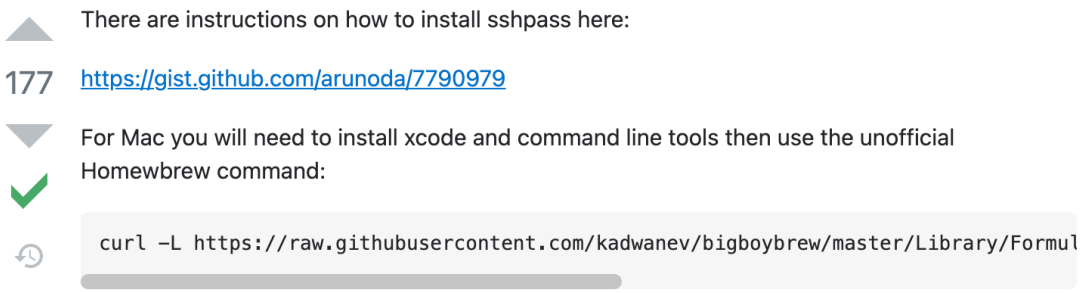
Then run the playbook, but seems missing sshpass:

```
winx@Winx-MBP ansible % ansible-playbook playbook/playbookdemo.yml

PLAY [My playbook] *************************************************************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************************************************************
fatal: [127.0.0.1]: FAILED! => {"msg": "to use the 'ssh' connection type with passwords or pkcs11_provider, you must install the sshpass program"}
```

Sshpass installed on own machine by the following command:



Then with the “—ask-pass” appended, it is possible to enter password while do ssh login, but it seems own machine is missing “sshpass”:

```
winx@Winx-MBP ansible % ansible-playbook playbook/playbookdemo.yml --ask-pass
SSH password:

PLAY [My playbook] *************************************************************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************************************************************
ok: [192.168.50.155]

TASK [check latest] ************************************************************************************************************************************************************************
fatal: [192.168.50.155]: FAILED! => {"changed": true, "cmd": ["apt-get", "update;", "apt-get", "install", "-y", "git"], "delta": "0:00:00.004958", "end": "2021-12-15 23:58:32.437158", "msg": "non-zero r
eturn code", "rc": 100, "start": "2021-12-15 23:58:32.432200", "stderr": "E: Invalid operation update;", "stderr_lines": ["E: Invalid operation update;"], "stdout": "", "stdout_lines": []}

PLAY RECAP *********************************************************************************************************************************************************************************
192.168.50.155             : ok=1    changed=0    unreachable=0    failed=1    skipped=0    rescued=0    ignored=0
```

Playbook:

playbook > ! playbookdemo.yml

```yaml
---
- name: My playbook
  hosts: server
  remote_user: ssluser
  tasks:
    - name: check latest
      #command: "apt-get update; apt-get install -y git"
      apt:
       name: git
       state: present
       update_cache: yes
    - name: list uptime
      shell: uptime
      register: hostname
```

After install " sshpass" locally, it is possble to get the result of playbook:

I dont know why even if I rerun the playbook, the result is the same.

I used macbook but it is not very easy to set up the environment, I spent quite many times for the ansible path, and the host file, and the ansible documentation. I did the login with password, then there were some issue with it, e.g. missing sshpass in own machine. I think my result is not very good, I didn' t attach the O2, O3, O4, because somehow even if I re-run the playbook, it didn' t change the output.