

DevOps: Ansible and Docker

Ansible.

Ansible is an automation tool that uses building blocks called modules to configure and manage IT systems. These modules are like small, specialized tools that can perform specific tasks on remote servers, routers, switches, and other IT equipment.

or

Ansible is a general-purpose IT automation platform.

Getting Started with Ansible Commands:

Ansible Version.

ansible --version

```
ronak@ronak-Mi-NoteBook-14:~/ansible-project$ ansible --version
ansible 2.10.8
  config file = /home/ronak/ansible-project/ansible.cfg
  configured module search path = ['/home/ronak/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.10.12 (main, Nov 20 2023, 15:14:05) [GCC 11.4.0]
```

Let's play with ansible playbook

Local Variables in ansible playbook.

#create {playbook_name}.yml for ansible playbook.

- name: local_variable_in_ansible

hosts: localhost

vars:

- username: Ronak

tasks:

- name: console user data

debug:

msg:

"hello {{username}}"

```

ronak@ronak-Mi-NoteBook-14:~/ansible-project$ ansible-playbook play1.yml
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'

PLAY [local_variable_in_ansible] *****

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

TASK [console user data] *****
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/core.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/mathstuff.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
ok: [localhost] => {
  "msg": "hello Ronak"
}

PLAY RECAP *****
localhost                : ok=2    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```

Inventory Variables in absible playbook.

#play1.yml

```

- name: inventory_variable_in_ansible
  hosts: localhost
  vars_files:
    - ansible_inventory.yml
  tasks:
    - name: console data
      debug:
        msg:
          "inventory variable = {{Ini_variable}}"

```

#ansible_inventory.yml

Ini_variable: "This is inventory variable"

Special/Magic variable.

```

- name: magic_variable_in_ansible
  hosts: localhost
  tasks:
    - name: console data
      debug:
        msg:
          - "inventory hostname = {{inventory_hostname}}"
          - "ansible data time = {{ansible_date_time.date}}"
          - "ansible system    = {{ansible_system}}"
          - "ansible user id   = {{ansible_user_id}}"

```

#Get more magic variable from here

https://docs.ansible.com/ansible/latest/playbook_guide/playbooks_vars_facts.html

```
ronak@ronak-Mi-NoteBook-14:~/ansible-project$ ansible-playbook play1.yml
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'

PLAY [magic_variable_in_ansible] *****

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

TASK [console data] *****
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/core.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/mathstuff.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
ok: [localhost] => {
  "msg": [
    "inventory hostname = localhost",
    "ansible data time  = 2024-03-11",
    "ansible system     = Linux",
    "ansible user id    = ronak"
  ]
}

PLAY RECAP *****
localhost          : ok=2    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

interactive input:prompt

- name: promt_from_user_in_ansible

hosts: localhost

vars_prompt:

- name: username

prompt: enter your name

private: false

tasks:

- name: console output

debug:

msg:

"Hello {{username}} ."

```

ronak@ronak-Mi-NoteBook-14:~/ansible-project$ ansible-playbook play3.yml
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'
enter your name: ronak

PLAY [prompt_from_user_in_ansible] *****

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

TASK [console output] *****
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/core.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/mathstuff.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
ok: [localhost] => {
  "msg": "Hello ronak ."
}

PLAY RECAP *****
localhost                : ok=2    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```

with_items for multiple items.

- name: multiple_items
- hosts: localhost
- tasks:
 - name: console multiple list of items
 - debug:
 - msg: "Items {{item}}"
 - with_items:
 - name: ronak
 - age: 21
 - name: michale
 - age: 38
 - name: dwight
 - age: 33
 - name: jim
 - age: 30

```

ronak@ronak-Mi-NoteBook-14:~/ansible-project$ ansible-playbook play4.yml
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'

PLAY [multiple_items] *****

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

TASK [console multiple list of items] *****
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/core.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/mathstuff.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
ok: [localhost] => (item={'name': 'ronak', 'age': 21}) => {
  "msg": "Items {'name': 'ronak', 'age': 21}"
}
ok: [localhost] => (item={'name': 'michale', 'age': 38}) => {
  "msg": "Items {'name': 'michale', 'age': 38}"
}
ok: [localhost] => (item={'name': 'dwight', 'age': 33}) => {
  "msg": "Items {'name': 'dwight', 'age': 33}"
}
ok: [localhost] => (item={'name': 'jim', 'age': 30}) => {
  "msg": "Items {'name': 'jim', 'age': 30}"
}

PLAY RECAP *****
localhost                : ok=2    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```

when condition in ansible.

- name: prompt_from_user_in_ansible

hosts: localhost

vars_prompt:

- name: username

prompt: enter your name

private: false

- name: password

prompt: enter your password

tasks:

- name: console output

debug:

msg:

"Logged-in as {{username}}."

when: password == "1234"

```

ronak@ronak-Mi-NoteBook-14:~/ansible-project$ ansible-playbook play3.yml
[WARNING]: No inventory was parsed, only implicit localhost is available
[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match 'all'
enter your name: ronak
enter your password:

PLAY [prompt_from_user_in_ansible] *****

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

TASK [console output] *****
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/core.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
[WARNING]: Skipping plugin (/usr/lib/python3/dist-packages/ansible/plugins/filter/mathstuff.py) as it seems to be invalid: cannot
import name 'environmentfilter' from 'jinja2.filters' (/home/ronak/.local/lib/python3.10/site-packages/jinja2/filters.py)
ok: [localhost] => {
    "msg": "Logged-in as ronak ."
}

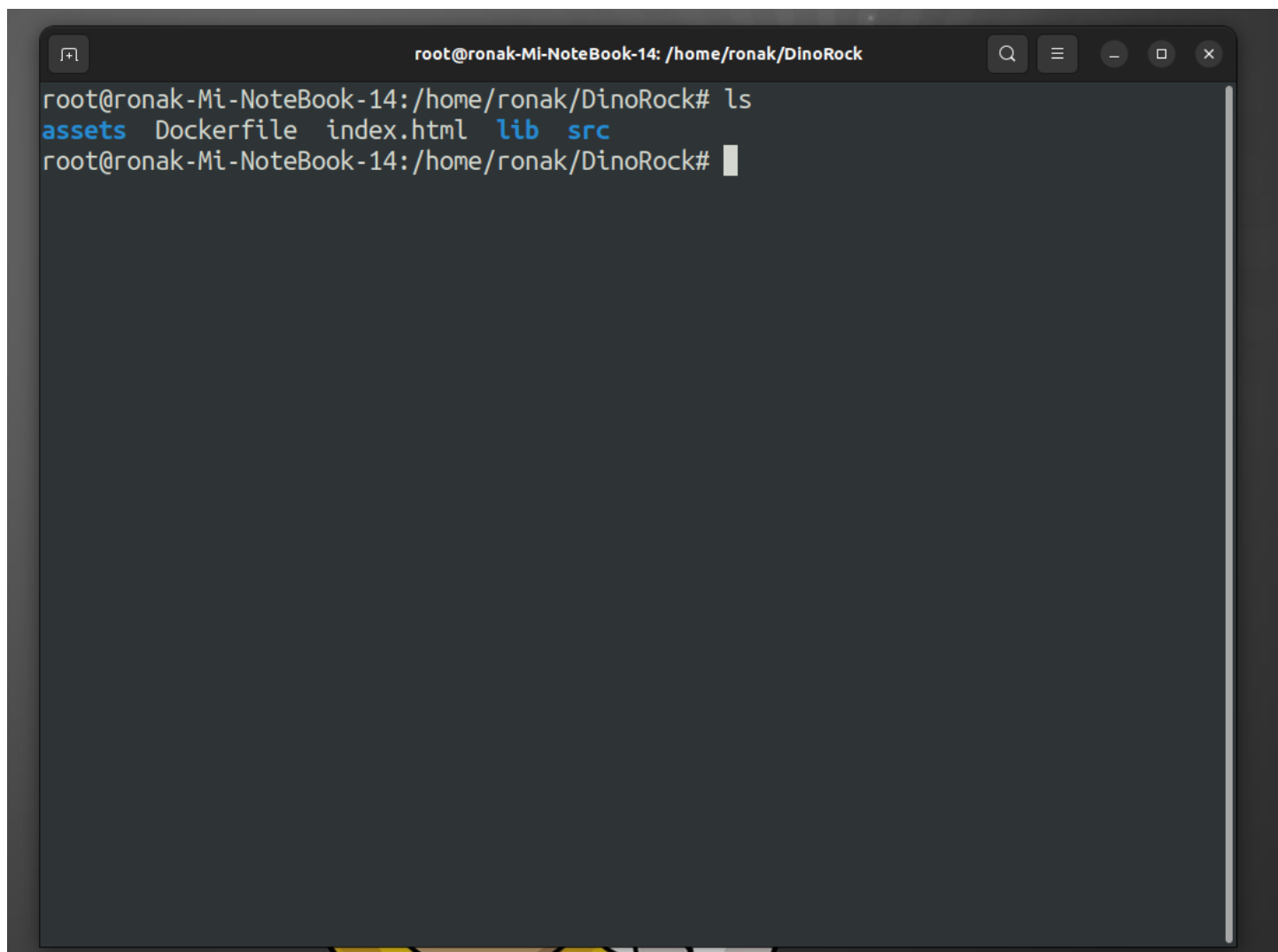
PLAY RECAP *****
localhost                : ok=2    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```

Docker.

Locate to directory.

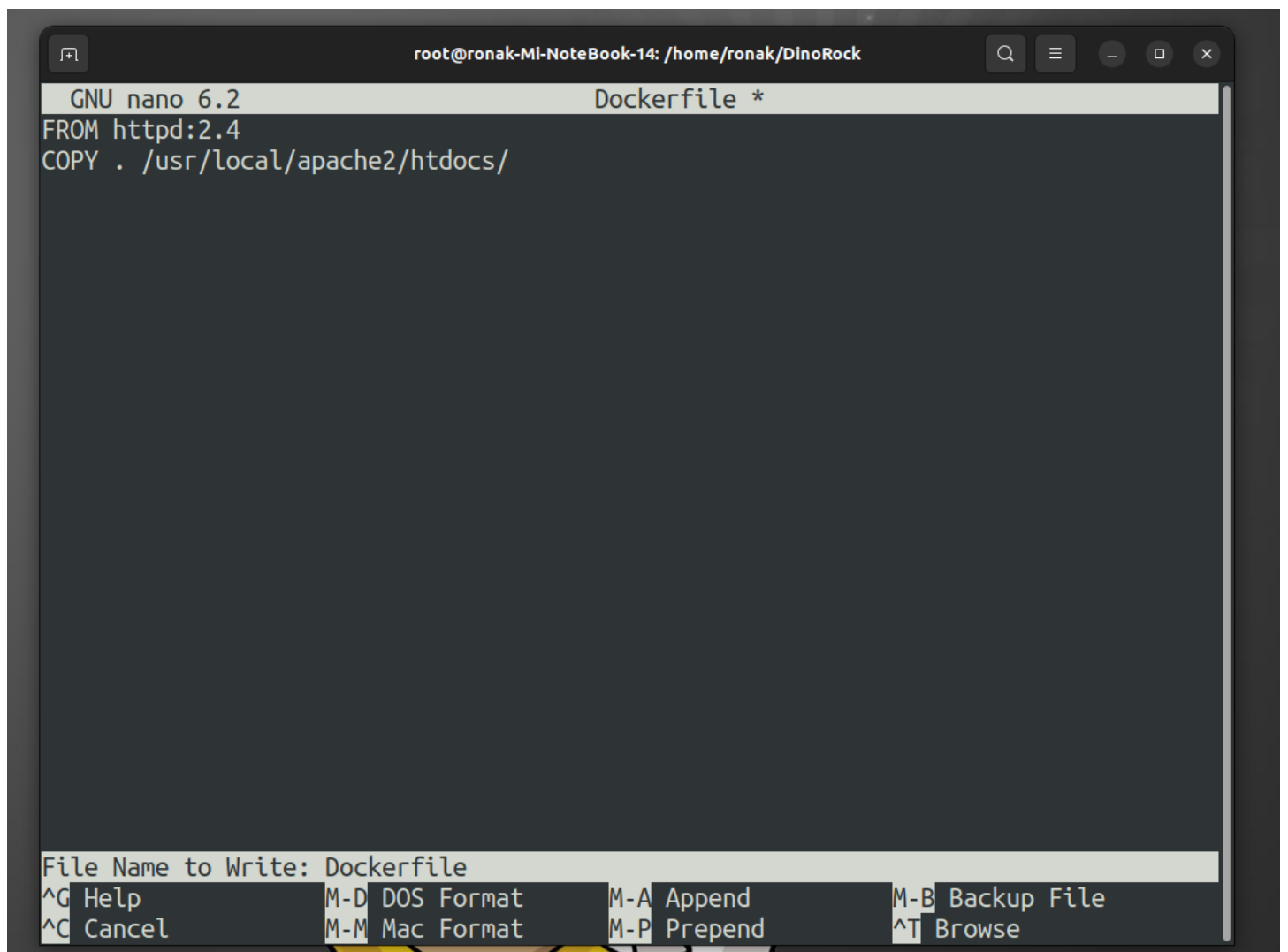
locating to the directory which to be dockerize

A terminal window with a dark background. The title bar at the top reads 'root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock'. The terminal shows the command 'ls' being executed, resulting in the output: 'assets Dockerfile index.html lib src'. The prompt 'root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock#' is visible at the end of the line.

```
root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock# ls
assets Dockerfile index.html lib src
root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock#
```

Creating Dockerfile

creating a dockerfile for HTML web game.



The screenshot shows a terminal window with the title bar "root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock". Inside the terminal, the GNU nano 6.2 text editor is open, editing a file named "Dockerfile *". The editor's content is as follows:

```
GNU nano 6.2 Dockerfile *
FROM httpd:2.4
COPY . /usr/local/apache2/htdocs/
```

The bottom of the terminal shows the "File Name to Write: Dockerfile" prompt and a menu of keyboard shortcuts:

^G Help	M-D DOS Format	M-A Append	M-B Backup File
^C Cancel	M-M Mac Format	M-P Prepend	^T Browse

Building an Docker image.

creating a docker image for the game dino rock


```
root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# ls
assets  Dockerfile  index.html  lib  src
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker build -t dinorock .
[+] Building 2.1s (8/8) FINISHED                                docker:default
=> [internal] load build definition from Dockerfile             0.0s
=> => transferring dockerfile: 87B                               0.0s
=> [internal] load metadata for docker.io/library/httpd:2.4    1.9s
=> [auth] library/httpd:pull token for registry-1.docker.io    0.0s
=> [internal] load .dockerignore                               0.0s
=> => transferring context: 2B                                    0.0s
=> [internal] load build context                                0.0s
=> => transferring context: 6.62kB                               0.0s
=> [1/2] FROM docker.io/library/httpd:2.4@sha256:374766f5bc5977c9b72fdb8ae3 0.0s
=> CACHED [2/2] COPY . /usr/local/apache2/htdocs/              0.0s
=> exporting to image                                           0.0s
=> => exporting layers                                           0.0s
=> => writing image sha256:884d132e2c5481abc8c858c91052878cb1726e5563f825dd 0.0s
=> => naming to docker.io/library/dinorock                      0.0s
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock#
```

Installing the httpd container/package.

installing httpd to display the HTML webpage to given port.(8000)

```
root@ronak-Mi-NoteBook-14: ~  
root@ronak-Mi-NoteBook-14:~# docker pull httpd  
Using default tag: latest  
latest: Pulling from library/httpd  
8a1e25ce7c4f: Pull complete  
8b0a7c8478f8: Pull complete  
4f4fb700ef54: Pull complete  
7f8fb0a042e0: Pull complete  
91e4b2f2b52a: Pull complete  
c78cdbf9617d: Pull complete  
Digest: sha256:374766f5bc5977c9b72fdb8ae3ed05b7fc89060e7edc88fcbf142d6988e58eeb  
Status: Downloaded newer image for httpd:latest  
docker.io/library/httpd:latest  
root@ronak-Mi-NoteBook-14:~#
```

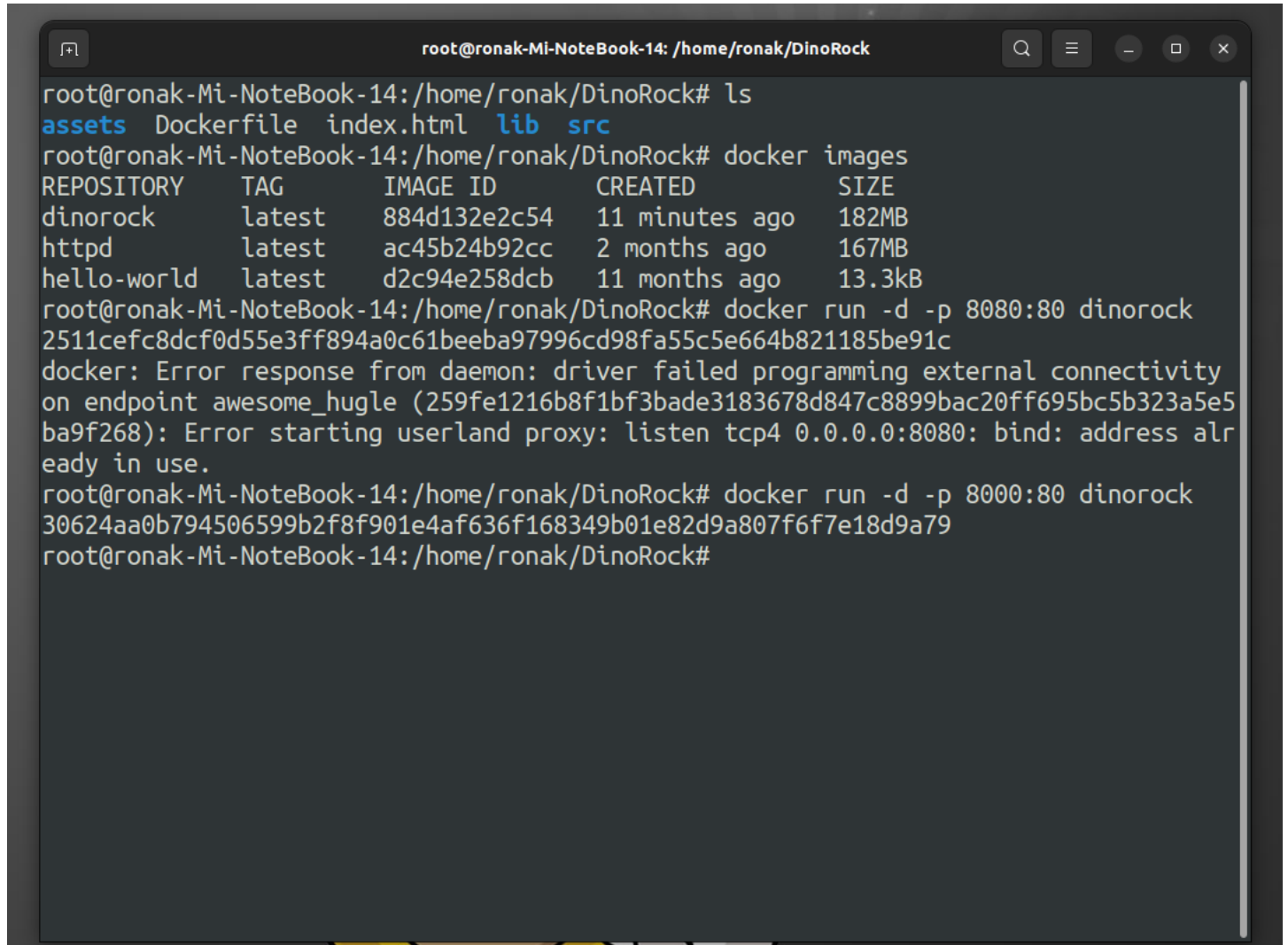
Listing docker images.

```
root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock  
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# ls  
assets Dockerfile index.html lib src  
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker images  
REPOSITORY      TAG       IMAGE ID       CREATED        SIZE  
dino-rock        latest    884d132e2c54   11 minutes ago 182MB  
httpd            latest    ac45b24b92cc   2 months ago  167MB  
hello-world      latest    d2c94e258dcb   11 months ago  13.3kB  
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock#
```

Running image at port 8000.

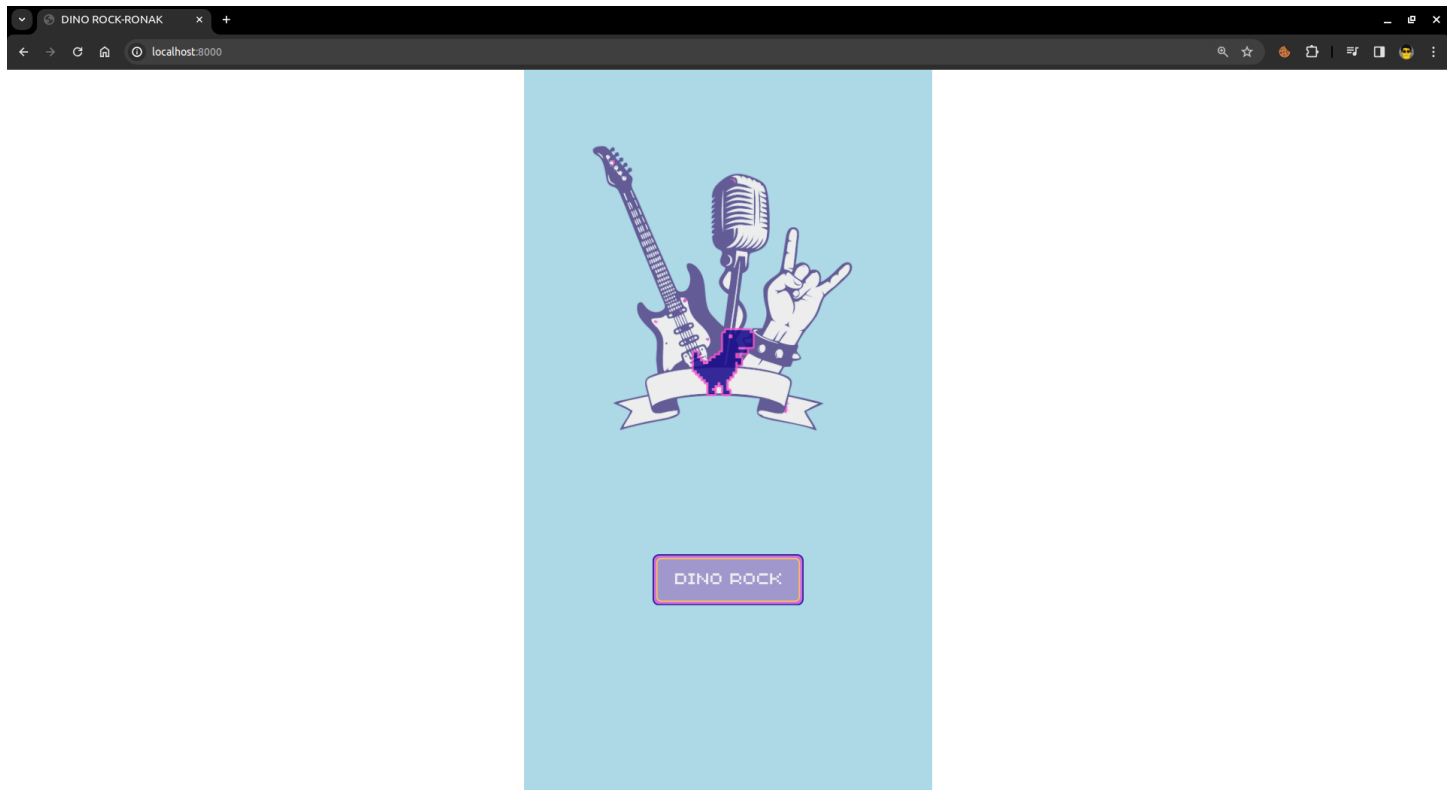
-d: stands for "detached mode"

-p: stands for "publish"

A terminal window titled 'root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock' with standard window controls. The terminal shows the following commands and output:

```
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# ls
assets Dockerfile index.html lib src
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker images
REPOSITORY      TAG         IMAGE ID      CREATED        SIZE
dinorock        latest     884d132e2c54  11 minutes ago 182MB
httpd           latest     ac45b24b92cc  2 months ago  167MB
hello-world     latest     d2c94e258dcb  11 months ago  13.3kB
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker run -d -p 8080:80 dinorock
2511cefc8dcf0d55e3ff894a0c61beeba97996cd98fa55c5e664b821185be91c
docker: Error response from daemon: driver failed programming external connectivity
on endpoint awesome_hugle (259fe1216b8f1bf3bade3183678d847c8899bac20ff695bc5b323a5e5
ba9f268): Error starting userland proxy: listen tcp4 0.0.0.0:8080: bind: address alr
eady in use.
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker run -d -p 8000:80 dinorock
30624aa0b794506599b2f8f901e4af636f168349b01e82d9a807f6f7e18d9a79
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock#
```

Output (port 8000)



Stopping the specific container


to stop the specific container from running

```
root@ronak-Mi-NoteBook-14: /home/ronak/DinoRock
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# ls
assets  Dockerfile  index.html  lib  src
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
dinatorock    latest    884d132e2c54   15 minutes ago 182MB
httpd         latest    ac45b24b92cc   2 months ago  167MB
hello-world    latest    d2c94e258dcb   11 months ago 13.3kB
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS
30624aa0b794   dinorock   "httpd-foreground"       2 minutes ago Up 2 minutes   0.0.0.0:8000->80/tcp, :::8000->80/tcp   naughty_shamir
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock#
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock# docker stop 30624aa0b794
30624aa0b794
root@ronak-Mi-NoteBook-14:/home/ronak/DinoRock#
```

Output (port 8000)

localhost

localhost:8000



This site can't be reached

localhost refused to connect.

Try:

- Checking the connection
- [Checking the proxy and the firewall](#)

ERR_CONNECTION_REFUSED

Details

Reload