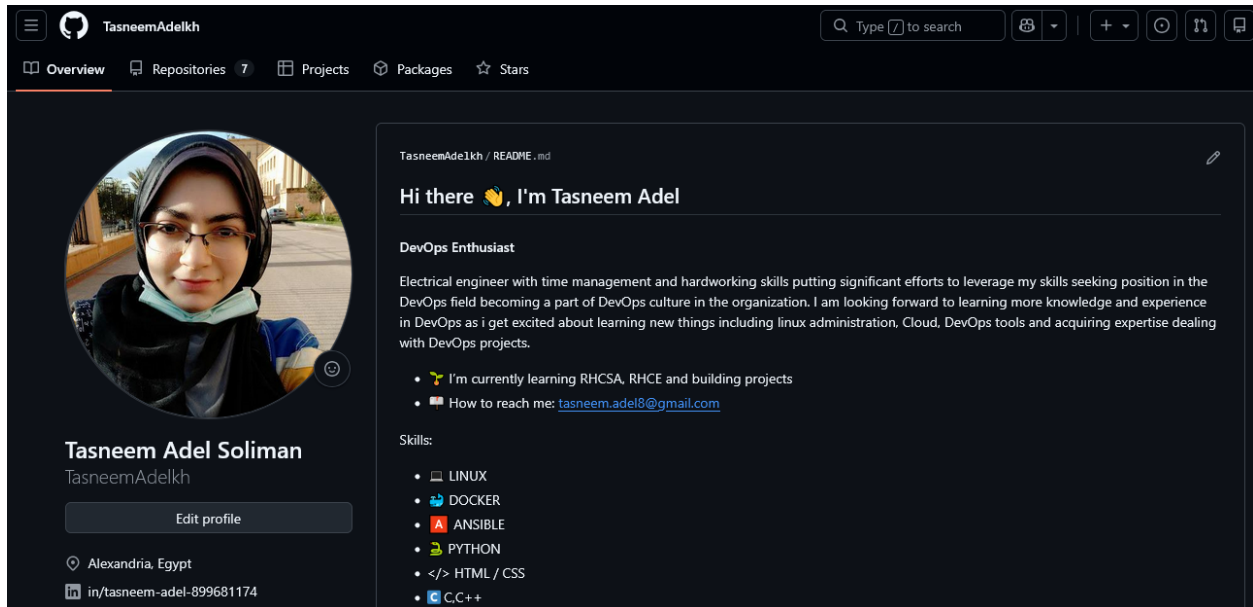


Lab 1

GitHub Account:

<https://github.com/TasneemAdelkh>



The screenshot shows a GitHub profile for 'TasneemAdelkh'. The profile includes a circular profile picture of a woman wearing a hijab and glasses. Below the picture, the name 'Tasneem Adel Soliman' is displayed, followed by the username 'TasneemAdelkh' and a button to 'Edit profile'. The location 'Alexandria, Egypt' and a LinkedIn link are also shown. To the right, the 'README.md' file is visible, containing a greeting 'Hi there 🙋, I'm Tasneem Adel', a bio as a 'DevOps Enthusiast', and a list of skills including LINUX, DOCKER, ANSIBLE, PYTHON, HTML/CSS, and C/C++.

TasneemAdelkh / README.md

Hi there 🙋, I'm Tasneem Adel

DevOps Enthusiast

Electrical engineer with time management and hardworking skills putting significant efforts to leverage my skills seeking position in the DevOps field becoming a part of DevOps culture in the organization. I am looking forward to learning more knowledge and experience in DevOps as i get excited about learning new things including linux administration, Cloud, DevOps tools and acquiring expertise dealing with DevOps projects.

- 🙋 I'm currently learning RHCSA, RHCE and building projects
- 📧 How to reach me: tasneem.adel8@gmail.com

Skills:

- 🐧 LINUX
- 🐳 DOCKER
- 📄 ANSIBLE
- 🐍 PYTHON
- 🔗 </> HTML / CSS
- 📄 C,C++

Downloading and Installing docker:

```
[tadel@serverb ~]$ sudo dnf install -y yum-utils --disablerepo=VM_BaseOS --disablerepo=VM_AppStream
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use subscription-manager to register.

Docker CE Stable - x86_64                               140 kB/s | 45 kB      00:00
Last metadata expiration check: 0:00:01 ago on Thu 26 Feb 2026 02:56:37 PM EET.
Dependencies resolved.
=====
Package           Architecture    Version           Repository         Size
=====
Installing:
yum-utils          noarch         4.3.0-11.el9_3   Local_VM_BaseOS   45 k
=====
Transaction Summary
=====
Install 1 Package

Total size: 45 k
Installed size: 23 k
Downloading Packages:
Running transaction check
Transaction check succeeded.
```

Installing yum-utils to enable us to add the docker repo easily.

The docker repo is added using the dnf-config-manager tool.

```

Install 6 Packages

Total download size: 100 M
Installed size: 393 M
Is this ok [y/N]: y
Downloading Packages:
(1/6): docker-buildx-plugin-0.31.1-1.el9.x86_64.rpm          1.1 MB/s | 21 MB     00:19
(2/6): docker-ce-29.2.1-1.el9.x86_64.rpm                   1.2 MB/s | 24 MB     00:19
(3/6): docker-ce-rootless-extras-29.2.1-1.el9.x86_64.rpm  1.0 MB/s | 3.4 MB    00:03
(4/6): docker-ce-cli-29.2.1-1.el9.x86_64.rpm               1.1 MB/s | 8.4 MB    00:07
(5/6): docker-compose-plugin-5.1.0-1.el9.x86_64.rpm        1.3 MB/s | 8.2 MB    00:06
(6/6): containerd.io-2.2.1-1.el9.x86_64.rpm                1.2 MB/s | 35 MB     00:29
-----
Total                                                    3.4 MB/s | 100 MB    00:29
Docker CE Stable - x86_64                               10 kB/s | 1.6 kB     00:00
Importing GPG key 0x621E9F35:
  Userid      : "Docker Release (CE rpm) <docker@docker.com>"
  Fingerprint: 060A 61C5 1B55 8A7F 742B 77AA C52F EB6B 621E 9F35
  From        : https://download.docker.com/linux/rhel/gpg
Is this ok [y/N]: t
Is this ok [y/N]: y
Key imported successfully
Running transaction check
Transaction check succeeded.

```

```

Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Installing     : docker-buildx-plugin-0.31.1-1.el9.x86_64 1/6
  Running scriptlet: docker-buildx-plugin-0.31.1-1.el9.x86_64 1/6
  Installing     : docker-compose-plugin-5.1.0-1.el9.x86_64 2/6
  Running scriptlet: docker-compose-plugin-5.1.0-1.el9.x86_64 2/6
  Installing     : docker-ce-cli-1:29.2.1-1.el9.x86_64      3/6
  Running scriptlet: docker-ce-cli-1:29.2.1-1.el9.x86_64      3/6
  Installing     : containerd.io-2.2.1-1.el9.x86_64         4/6
  Running scriptlet: containerd.io-2.2.1-1.el9.x86_64         4/6
  Installing     : docker-ce-rootless-extras-29.2.1-1.el9.x86_64 5/6
  Running scriptlet: docker-ce-rootless-extras-29.2.1-1.el9.x86_64 5/6
  Installing     : docker-ce-3:29.2.1-1.el9.x86_64         6/6
  Running scriptlet: docker-ce-3:29.2.1-1.el9.x86_64         6/6
  Verifying      : containerd.io-2.2.1-1.el9.x86_64         1/6
  Verifying      : docker-buildx-plugin-0.31.1-1.el9.x86_64 2/6
  Verifying      : docker-ce-3:29.2.1-1.el9.x86_64         3/6
  Verifying      : docker-ce-cli-1:29.2.1-1.el9.x86_64     4/6
  Verifying      : docker-ce-rootless-extras-29.2.1-1.el9.x86_64 5/6
  Verifying      : docker-compose-plugin-5.1.0-1.el9.x86_64 6/6
Installed products updated.

```

```

Installed:
  containerd.io-2.2.1-1.el9.x86_64          docker-buildx-plugin-0.31.1-1.el9.x86_64
  docker-ce-3:29.2.1-1.el9.x86_64         docker-ce-cli-1:29.2.1-1.el9.x86_64
  docker-ce-rootless-extras-29.2.1-1.el9.x86_64  docker-compose-plugin-5.1.0-1.el9.x86_64

Complete!
[tadel@serverb ~]$ █

```

All docker related packages are installed.

```
[tadel@serverb ~]$ systemctl enable --now docker
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /usr/lib/systemd/system/docker.service.
[tadel@serverb ~]$
```

Enabling and starting docker.

```
[tadel@serverb ~]$ sudo docker pull nginx:alpine
[sudo] password for tadel:
alpine: Pulling from library/nginx
589002ba0eae: Pull complete
5e7756927bef: Pull complete
bca5d04786e1: Pull complete
3e2c181db1b0: Pull complete
6b7b6c7061b7: Pull complete
399d0898a94e: Pull complete
955a8478f9ac: Pull complete
6d397a54a185: Pull complete
dda176b4ea00: Download complete
8a29e1f4877b: Download complete
Digest: sha256:1d13701a5f9f3fb01aaa88cef2344d65b6b5bf6b7d9fa4cf0dca557a8d7702ba
Status: Downloaded newer image for nginx:alpine
docker.io/library/nginx:alpine
[tadel@serverb ~]$
```

Pulling nginx:alpine image.

```
[tadel@serverb ~]$ sudo docker run -d -p 8080:80 --name Tasneem-ITI-46 nginx:alpine
2bdcdf5b4c335a868a9771bac659e48df8127787b733a480d3d151b0cbdddbbd
[tadel@serverb ~]$
[tadel@serverb ~]$ sudo docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
2bdcdf5b4c33   nginx:alpine   "/docker-entrypoint..." 4 seconds ago  Up 3 seconds  0.0.0.0:8080->80/tcp, [::]:8080->80/tcp  Tasneem-ITI-46
[tadel@serverb ~]$
```

Running the container in detached mode and having Tasneem-ITI-46 as its name.

```
[tadel@serverb ~]$ sudo docker run -d -p 8080:80 --name Tasneem-ITI-46-Apache --memory="70m" --cpus="1.0" httpd:alpine
Unable to find image 'httpd:alpine' locally
alpine: Pulling from library/httpd
abd702cd48c8: Pull complete
3688fd767e4a: Pull complete
b9df760bab4a: Pull complete
79273eb2147b: Pull complete
4f4fb700ef54: Pull complete
987f24f891f4: Pull complete
2bd78f43169f: Download complete
8c8ca383ec3c: Download complete
Digest: sha256:8f26f33a7002658050e9ab2cd6b77502619dfc89d0a6ba2e9e4a202e0ef04596
Status: Downloaded newer image for httpd:alpine
0025afbf37fa75ef5d39f4198b5c47bddb70f1af8f3a52d6d241d69d07b8b8fa
docker: Error response from daemon: failed to set up container networking: driver failed programming external connectivity on endpoint Tasneem-ITI-46-Apache (6e180e9b29d231da1d0f520abb679f44d08fe20f73fcbc9a5e5b9ccf2efb6a21): Bind for 0.0.0.0:8080 failed: port is already allocated
```

Pulling and running the httpd:alpine image but forgot to change the port number 8080 as its being used by the nginx container.

Hence, the container did not start but the image is pulled successfully.

```
[tadel@serverb ~]$ sudo docker run -d -p 8090:80 --name Tasneem-ITI-46-Apache --memory="70m" --cpus="1.0" httpd:alpine
67443b670a18e73753003fe00af79afdef269702ee9a7de67b6ae2ed5074ef1d
[tadel@serverb ~]$ sudo docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
67443b670a18   httpd:alpine   "httpd-foreground"      15 seconds ago Up 15 seconds  0.0.0.0:8090->80/tcp, [::]:8090->80/tcp   Tasneem
2bdcdf5b4c33   nginx:alpine   "/docker-entrypoint. ..." 9 minutes ago  Up 9 minutes  0.0.0.0:8080->80/tcp, [::]:8080->80/tcp   Tasneem
-ITI-46
[tadel@serverb ~]$
```

The container has been run with the memory and cpu cores limits.

```
[tadel@serverb ~]$ sudo cat /sys/fs/cgroup/system.slice/docker-67443b670a18e73753003fe00af79afdef269702ee9a7de67b6ae2ed5074ef1d.scope/memory.max
73400320
[tadel@serverb ~]$ sudo cat /sys/fs/cgroup/system.slice/docker-67443b670a18e73753003fe00af79afdef269702ee9a7de67b6ae2ed5074ef1d.scope/cpu
.max
100000 100000
[tadel@serverb ~]$ sudo cat /sys/fs/cgroup/system.slice/docker-2bdcdf5b4c335a868a9771bac659e48df8127787b733a480d3d151b0cbdddbbd.scope/cpu
.max
max 100000
[tadel@serverb ~]$ sudo cat /sys/fs/cgroup/system.slice/docker-2bdcdf5b4c335a868a9771bac659e48df8127787b733a480d3d151b0cbdddbbd.scope/memory.max
max
[tadel@serverb ~]$
```

- The maximum memory in the Apache container , which had the 70 MB memory limit in the command, is 73400320 byte.

Which is $70 * 1024 * 1024 = 73400320$ byte.

- And the max cpu, it says it uses 100000 microsec out of 100000 microsec. Which is the maximum consumed by the container over 100 msec interval window size.

∴ Max/ window size = $100000/100000 = 1$ core cpu.

- The nginx container has memory and cpu limits set to max, which means is the default and it means that no limit is set on the cpu or memory and they can take as much as they need only limited by the physical resources.

Bonus:

```
[tadel@serverb ~]$ sudo docker run -d --name memory-eater --memory="50m" --memory-swap="50m" alpine sh -c 'v=$(printf "%055000000d" 0)'
3b24a641877c96f5e1971d48ad01e3891a7cedfb8e639db5765baf371a2b4682
[tadel@serverb ~]$ sudo docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
3b24a641877c   alpine        "sh -c 'v=$(printf \"..." 11 seconds ago  Exited (137) 4 seconds ago  memory-eater
67443b670a18   httpd:alpine   "httpd-foreground"      18 hours ago  Up 18 hours  0.0.0.0:8090->80/tcp, [::]:8090->80/tcp   Tasneem-ITI-46-Apache
2bdcdf5b4c33   nginx:alpine   "/docker-entrypoint. ..." 18 hours ago  Up 18 hours  0.0.0.0:8080->80/tcp, [::]:8080->80/tcp   Tasneem-ITI-46
felccf6aea0f   nginx:alpine   "/docker-entrypoint. ..." 18 hours ago  Exited (0) 18 hours ago  my-nginx
[tadel@serverb ~]$
```

An alpine container is created with a command assigning a very large string into the variable 'v', the string is generated using the printf command, it is used to print character 0 and precede it with 55000000-1 zeros. Hence, generating a 55MB string which when loaded into the ram when being assigned to the variable going to exceed the 50MB RAM limit set on the container.

When the container started, it ended when it reached this command. And exited with 137 code.

```
[tadel@serverb ~]$ sudo docker inspect memory-eater
[
  {
    "Id": "3b24a641877c96f5e1971d48ad01e3891a7cedfb8e639db5765baf371a2b4682",
    "Created": "2026-02-27T08:09:08.00922559Z",
    "Path": "sh",
    "Args": [
      "-c",
      "v=$(printf \"%055000000d\" 0)"
    ],
    "State": {
      "Status": "exited",
      "Running": false,
      "Paused": false,
      "Restarting": false,
      "OOMKilled": true,
      "Dead": false,
      "Pid": 0,
      "ExitCode": 137,
    }
  }
]
```

When doing inspect on the container, it is shown that the status of the OOMKilled is true which means it exited by the OOM killer due to insufficient memory.