

CSI3007 – ADVANCED PYTHON PROGRAMMING

LAB ACTIVITY – 20

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INSTALLATION OF DOCKER DESKTOP:

```
matlab@sjt318scope018:~$ sudo apt install gnome-terminal
[sudo] password for matlab:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gnome-terminal is already the newest version (3.44.0-1ubuntu1).
0 upgraded, 0 newly installed, 0 to remove and 23 not upgraded.
matlab@sjt318scope018:~$ |
```

```
matlab@sjt318scope018:~$ sudo apt-get update
Get:2 https://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Hit:3 https://deb.nodesource.com/node_16.x focal InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:6 https://deb.debian.neo4j.com stable InRelease [44.3 kB]
Get:7 https://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,212 B]
Err:6 https://deb.debian.neo4j.com stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY C048F0B49DEEC457
Get:9 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:10 https://cloud.r-project.org/bin/linux/ubuntu jammy-cran40/ InRelease [3,632 B]
Get:11 https://ppa.launchpadcontent.net/ethereum/ethereum/ubuntu jammy InRelease [18.3 kB]
Get:12 https://repo.mongodb.org/apt/ubuntu jammy/mongodb-org/6.0 InRelease [4,009 B]
Get:8 https://downloads.metasploit.com/data/releases/metasploit-framework/apt Lucid InRelease [3,956 B]
Err:8 https://downloads.metasploit.com/data/releases/metasploit-framework/apt Lucid InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY C048F0B49DEEC457
Get:13 https://ppa.launchpadcontent.net/marutter/rutter4.0/ubuntu jammy InRelease [18.3 kB]
Get:15 https://repo.mongodb.org/apt/ubuntu jammy/mongodb-org/6.0/multiverse amd64 Packages [109 kB]
Get:16 https://ppa.launchpadcontent.net/mozillateam/ppa/ubuntu jammy InRelease [24.6 kB]
Get:17 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Ign:18 https://ppa.launchpadcontent.net/octave/stable/ubuntu jammy InRelease
Ign:1 https://downloads.apache.org/cassandra/debian 311x InRelease
Get:19 https://repo.mongodb.org/apt/ubuntu jammy/mongodb-org/6.0/multiverse arm64 Packages [106 kB]
Ign:5 https://downloads.apache.org/cassandra/debian 40x InRelease
Get:20 https://ppa.launchpadcontent.net/ethereum/ethereum/ubuntu jammy/main amd64 Packages [2,568 B]
Get:21 https://ppa.launchpadcontent.net/mozillateam/ppa/ubuntu jammy/main i386 Packages [3,608 B]
Get:22 https://ppa.launchpadcontent.net/mozillateam/ppa/ubuntu jammy/main amd64 Packages [35.5 kB]
Get:23 http://in.archive.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Err:25 https://ppa.launchpadcontent.net/octave/stable/ubuntu jammy Release
  404 Not Found [IP: 185.125.190.80 443]
Err:24 https://downloads.apache.org/cassandra/debian 311x Release
  404 Not Found [IP: 135.181.214.104 443]
Hit:14 https://apache.jfrog.io/artifactory/cassandra-deb 41x InRelease
Err:26 https://downloads.apache.org/cassandra/debian 40x Release
  404 Not Found [IP: 135.181.214.104 443]
Get:27 http://in.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [909 kB]
Get:28 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [3,060 kB]
Get:29 http://in.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [472 kB]
Get:30 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 DEP-11 Metadata [112 kB]
Get:31 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [19.0 kB]
Get:32 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [4,824 kB]
Get:33 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted i386 Packages [49.2 kB]
Get:34 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [895 kB]
Get:35 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 DEP-11 Metadata [212 B]
Get:36 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [640 B]
Get:37 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe i386 Packages [790 kB]
Get:38 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1,242 kB]
Get:39 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [307 kB]
Get:40 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 DEP-11 Metadata [359 kB]
Get:41 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [29.8 kB]
Get:42 http://in.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [57.6 kB]
Get:43 http://in.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 DEP-11 Metadata [940 B]
Get:44 http://in.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [600 B]
Get:45 http://in.archive.ubuntu.com/ubuntu jammy-backports/main amd64 DEP-11 Metadata [7,148 B]
```

```
matlab@sjt318scope018:~$ sudo apt-get install ca-certificates curl gnupg lsb-release
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
lsb-release is already the newest version (11.1.0ubuntu4).
ca-certificates is already the newest version (20240203~22.04.1).
curl is already the newest version (7.81.0-1ubuntu1.21).
gnupg is already the newest version (2.2.27-3ubuntu2.4).
0 upgraded, 0 newly installed, 0 to remove and 59 not upgraded.
matlab@sjt318scope018:~$ |
```

```

matlab@sjt318scope018:~$ sudo mkdir -p /etc/apt/keyrings
matlab@sjt318scope018:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/keyrings/docker.gpg
File '/etc/apt/keyrings/docker.gpg' exists. Overwrite? (y/N) y
matlab@sjt318scope018:~$ echo "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.gpg] https://download.docker.com/linux/ubuntu $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
matlab@sjt318scope018:~$

```

```

matlab@sjt318scope018:~$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  docker-buildx-plugin docker-ce-rootless-extras libslirp0 pigz slirp4netns
Suggested packages:
  cgroupfs-mount | cgroup-lite docker-model-plugin
The following NEW packages will be installed:
  containerd.io docker-buildx-plugin docker-ce docker-ce-cli docker-ce-rootless-extras docker-compose-plugin libslirp0 pigz slirp4netns
0 upgraded, 9 newly installed, 0 to remove and 59 not upgraded.
Need to get 105 MB of archives.
After this operation, 437 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 https://download.docker.com/linux/ubuntu jammy/stable amd64 containerd.io amd64 1.7.28-1-ubuntu.22.04-jammy [31.9 MB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 pigz amd64 2.6-1 [63.6 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libslirp0 amd64 4.6.1-1build1 [61.5 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy/universe amd64 slirp4netns amd64 1.0.1-2 [28.2 kB]
Get:5 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-ce-cli amd64 5:28.5.1-1-ubuntu.22.04-jammy [16.5 MB]
Get:6 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-ce amd64 5:28.5.1-1-ubuntu.22.04-jammy [19.7 MB]
Get:7 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-buildx-plugin amd64 0.29.1-1-ubuntu.22.04-jammy [15.9 MB]
Get:8 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-ce-rootless-extras amd64 5:28.5.1-1-ubuntu.22.04-jammy [6,482 kB]
Get:9 https://download.docker.com/linux/ubuntu jammy/stable amd64 docker-compose-plugin amd64 2.40.3-1-ubuntu.22.04-jammy [14.3 MB]
Fetched 105 MB in 9s (11.3 MB/s)
Selecting previously unselected package containerd.io.
(Reading database ... 395636 files and directories currently installed.)
Preparing to unpack .../0-containerd.io_1.7.28-1-ubuntu.22.04-jammy_amd64.deb ...
Unpacking containerd.io (1.7.28-1-ubuntu.22.04-jammy) ...
Selecting previously unselected package docker-ce-cli.
Preparing to unpack .../1-docker-ce-cli_5%3a28.5.1-1-ubuntu.22.04-jammy_amd64.deb ...
Unpacking docker-ce-cli (5:28.5.1-1-ubuntu.22.04-jammy) ...
Selecting previously unselected package docker-ce.
Preparing to unpack .../2-docker-ce_5%3a28.5.1-1-ubuntu.22.04-jammy_amd64.deb ...
Unpacking docker-ce (5:28.5.1-1-ubuntu.22.04-jammy) ...
Selecting previously unselected package pigz.
Preparing to unpack .../3-pigz_2.6-1_amd64.deb ...
Unpacking pigz (2.6-1) ...
Selecting previously unselected package docker-buildx-plugin.
Preparing to unpack .../4-docker-buildx-plugin_0.29.1-1-ubuntu.22.04-jammy_amd64.deb ...
Unpacking docker-buildx-plugin (0.29.1-1-ubuntu.22.04-jammy) ...
Selecting previously unselected package docker-ce-rootless-extras.
Preparing to unpack .../5-docker-ce-rootless-extras_5%3a28.5.1-1-ubuntu.22.04-jammy_amd64.deb ...
Unpacking docker-ce-rootless-extras (5:28.5.1-1-ubuntu.22.04-jammy) ...
Selecting previously unselected package docker-compose-plugin.
Preparing to unpack .../6-docker-compose-plugin_2.40.3-1-ubuntu.22.04-jammy_amd64.deb ...
Unpacking docker-compose-plugin (2.40.3-1-ubuntu.22.04-jammy) ...
Selecting previously unselected package libslirp0:amd64.
Preparing to unpack .../7-libslirp0_4.6.1-1build1_amd64.deb ...
Unpacking libslirp0:amd64 (4.6.1-1build1) ...
Selecting previously unselected package slirp4netns.
Preparing to unpack .../8-slirp4netns_1.0.1-2_amd64.deb ...
Unpacking slirp4netns (1.0.1-2) ...
Setting up docker-buildx-plugin (0.29.1-1-ubuntu.22.04-jammy) ...

```

Launching Docker Desktop:

```

matlab@sjt318scope018:~$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
containerd.io is already the newest version (1.7.28-1-ubuntu.22.04-jammy).
docker-buildx-plugin is already the newest version (0.29.1-1-ubuntu.22.04-jammy).
docker-buildx-plugin set to manually installed.
docker-ce-cli is already the newest version (5:28.5.1-1-ubuntu.22.04-jammy).
docker-ce is already the newest version (5:28.5.1-1-ubuntu.22.04-jammy).
docker-compose-plugin is already the newest version (2.40.3-1-ubuntu.22.04-jammy).
0 upgraded, 0 newly installed, 0 to remove and 59 not upgraded.
matlab@sjt318scope018:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2025-10-31 10:56:47 IST; 4min 23s ago
     TriggeredBy: ● docker.socket
   Docs: https://docs.docker.com
   Main PID: 19478 (dockerd)
    Tasks: 16
   Memory: 22.5M
      CPU: 202ms
   CGroup: /system.slice/docker.service
           └─19478 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Oct 31 10:56:46 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:46.766944723+05:30" level=info msg="CDI directory does not exist, skipping; failed to monitor for changes: no such file or directory" dir=/var
Oct 31 10:56:46 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:46.773243493+05:30" level=info msg="Creating a containerd client" address=/run/containerd/containerd.sock timeout=1m0s
Oct 31 10:56:46 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:46.822545600+05:30" level=info msg="Loading containers: start."
Oct 31 10:56:47 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:47.257588197+05:30" level=info msg="Loading containers: done."
Oct 31 10:56:47 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:47.264777952+05:30" level=info msg="Docker daemon" commit=f6215cc containerd-snapshotter=false storage-driver=overlay2 version=28.5.1
Oct 31 10:56:47 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:47.264825344+05:30" level=info msg="Initializing buildkit"
Oct 31 10:56:47 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:47.286202736+05:30" level=info msg="Completed buildkit initialization"
Oct 31 10:56:47 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:47.289709162+05:30" level=info msg="Daemon has completed initialization"
Oct 31 10:56:47 sjt318scope018 dockerd[19478]: time="2025-10-31T10:56:47.289818818+05:30" level=info msg="API listen on /run/docker.sock"
Oct 31 10:56:47 sjt318scope018 systemd[1]: Started Docker Application Container Engine.
lines 1-22/22 (END)

```

```
matlab@sjt318scope018:~$ sudo systemctl start docker
matlab@sjt318scope018:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
17eec7bbc9d7: Pull complete
Digest: sha256:56433a6be3fda188089fb548eae3d91df3ed0d6589f7c2656121b911198df065
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

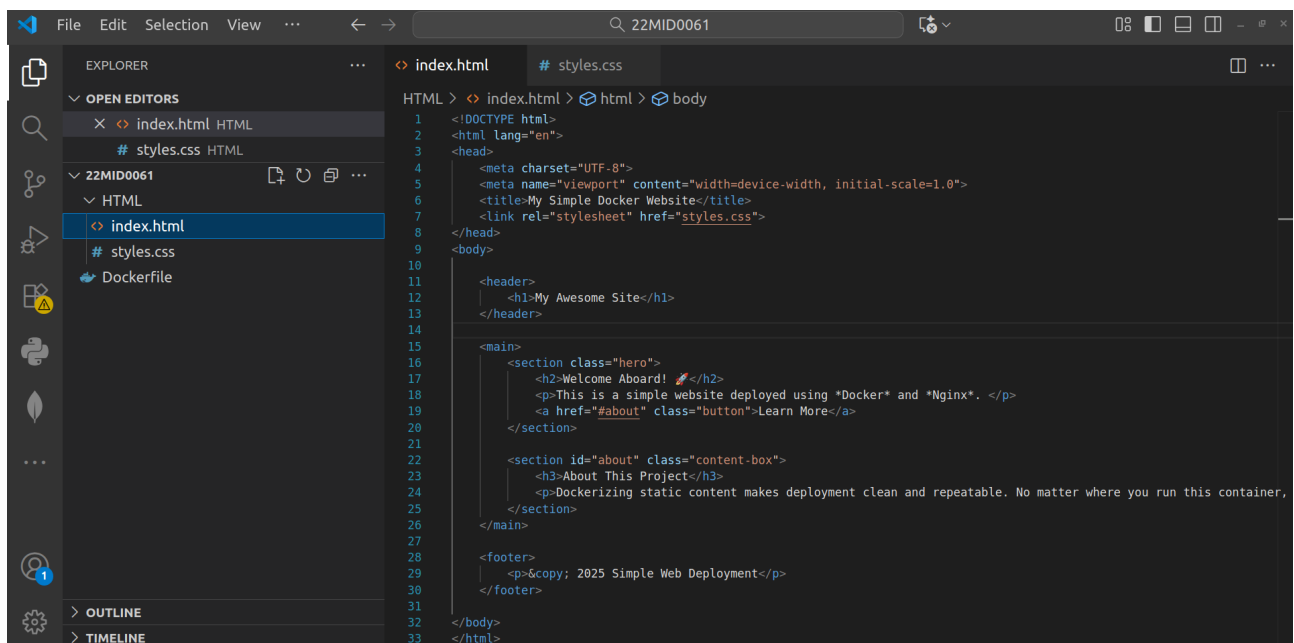
To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

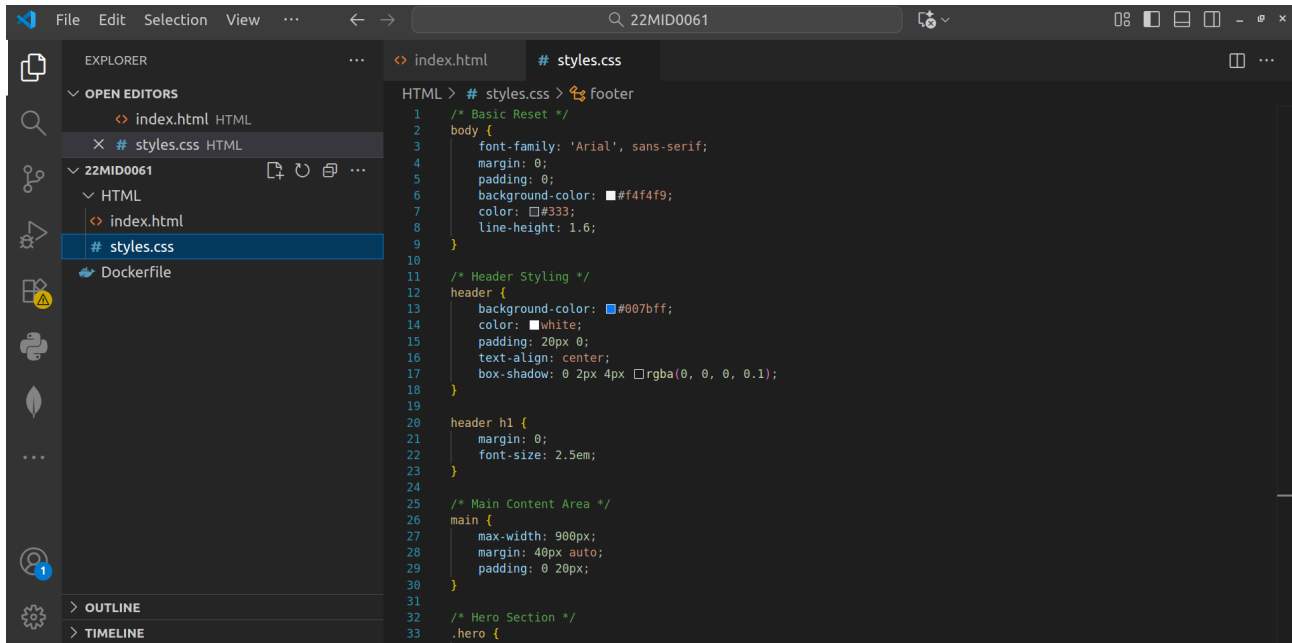
Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

matlab@sjt318scope018:~$ |
```

VSCODE SETUP:





The screenshot shows the Visual Studio Code editor interface. The Explorer sidebar on the left displays the project structure with files `index.html` and `# styles.css` under the `22MID0061` workspace. The main editor area shows the `styles.css` file with the following content:

```
HTML > # styles.css > footer
1  /* Basic Reset */
2  body {
3      font-family: 'Arial', sans-serif;
4      margin: 0;
5      padding: 0;
6      background-color: #f4f4f9;
7      color: #333;
8      line-height: 1.6;
9  }
10
11 /* Header Styling */
12 header {
13     background-color: #007bff;
14     color: white;
15     padding: 20px 0;
16     text-align: center;
17     box-shadow: 0 2px 4px rgba(0, 0, 0, 0.1);
18 }
19
20 header h1 {
21     margin: 0;
22     font-size: 2.5em;
23 }
24
25 /* Main Content Area */
26 main {
27     max-width: 900px;
28     margin: 40px auto;
29     padding: 0 20px;
30 }
31
32 /* Hero Section */
33 .hero {
```

OUTPUT:

