Practical 1

Aim: Install and understand Docker container, Node.js, Java and Hyperledger Fabric, Ethereum and perform necessary software installation on local machine/create instance on Cloud to run.
(Note: All the practicals are performed in Linux (Ubuntu))

Docker:

Installation:

```
sudo apt-get update
sudo apt-get install ca-certificates curl
sudo install -m 0755 -d /etc/apt/keyrings
sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg -o
/etc/apt/keyrings/docker.asc
sudo chmod a+r /etc/apt/keyrings/docker.asc

# Add the repository to Apt sources:
echo \
  "deb [arch=$(dpkg --print-architecture)
signed-by=/etc/apt/keyrings/docker.asc]
https://download.docker.com/linux/ubuntu \
  $(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt-get update

# Installing docker
sudo apt-get install docker-ce docker-ce-cli containerd.io
docker-buildx-plugin docker-compose-plugin docker-compose

# Adding current user to docker group
# (This gives user root privileges so be careful this is
# just for our convenience )
sudo usermod -aG docker $USER
newgrp docker

# reboot the system to take effect
```

```
➜ ~ sudo apt-get update
sudo apt-get install ca-certificates curl
sudo install -m 0755 -d /etc/apt/keyrings
sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg -o /etc/apt/keyrings/docker.asc
sudo chmod a+r /etc/apt/keyrings/docker.asc

# Add the repository to Apt sources:
echo \
  "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc] https://download.docker.com/linux/ubuntu \
  $(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt-get update

# Installing docker
sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin
Hit:1 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ca-certificates is already the newest version (20230311ubuntu0.22.04.1).
ca-certificates set to manually installed.
```

Verify if docker is working

sudo docker pull busybox

```
➜ ~ sudo docker pull busybox
Using default tag: latest
latest: Pulling from library/busybox
9ad63333ebc9: Pull complete
Digest: sha256:6d9ac9237a84afe1516540f40a0fafdc86859b2141954b4d643af7066d598b74
Status: Downloaded newer image for busybox:latest
docker.io/library/busybox:latest
➜ ~
```

sudo docker images

```
➜ ~ sudo docker images
REPOSITORY   TAG       IMAGE ID       CREATED       SIZE
busybox      latest    3f57d9401f8d   3 weeks ago   4.26MB
➜ ~
```

Node.js

Installation:

```
curl -fsSL https://deb.nodesource.com/setup_20.x | sudo -E bash -
&&\
sudo apt-get install -y nodejs
```

```
→ ~ curl -fsSL https://deb.nodesource.com/setup_20.x | sudo -E bash - &&\
sudo apt-get install -y nodejs
2024-02-13 22:51:14 - Installing pre-requisites
Hit:1 https://download.docker.com/linux/ubuntu jammy InRelease
Hit:2 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:5 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ca-certificates is already the newest version (20230311ubuntu0.22.04.1).
curl is already the newest version (7.81.0-1ubuntu1.15).
gnupg is already the newest version (2.2.27-3ubuntu2.1).
gnupg set to manually installed.
The following NEW packages will be installed:
  apt-transport-https
0 upgraded, 1 newly installed, 0 to remove and 170 not upgraded.
Need to get 1,510 B of archives.
After this operation, 170 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 apt-transport-https all 2.4.11 [1,510 B]
Fetched 1,510 B in 1s (2,971 B/s)
Selecting previously unselected package apt-transport-https.
```

Verifying the version of node.js

node -v

```
→ ~ node -v
v20.11.0
→ ~
```

Creating a simple web server in node.js

Create a file named server.js with the following contents

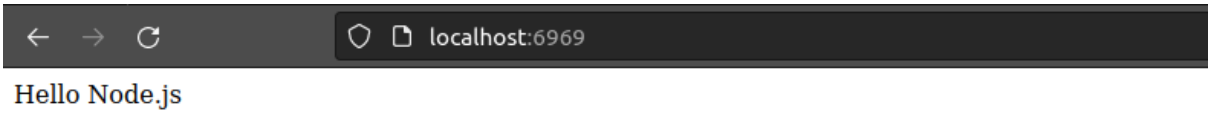
```
const http = require("http")

http.createServer((req, res) => {
  res.writeHead(200, {"content-type": "text/html"});
  res.end("Hello Node.js")
}).listen(6969, () => console.log("Listening on port 6969"))
```

Run the server using: **node server.js**

```
→ ~ node server.js
Listening on port 6969
```

Now open the browser and type http://localhost:6969 you will see a webpage



Installing Java

```
sudo apt install default-jdk
```

```
→  ~ sudo apt install default-jdk
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
```

Verifying java installation

```
java --version
```

```
→  ~ java --version
openjdk 11.0.21 2023-10-17
OpenJDK Runtime Environment (build 11.0.21+9-post-Ubuntu-0ubuntu122.04)
OpenJDK 64-Bit Server VM (build 11.0.21+9-post-Ubuntu-0ubuntu122.04, mixed mode, sharing)
→  ~
```

Golang:
Download latest version of go from the website for linux (instructions)

```
 sudo rm -rf /usr/local/go && sudo tar -C /usr/local -xzf
go1.22.0.linux-amd64.tar.gz
```

Append the below line in your rc file (~/.bashrc or ~/.zshrc)

```
export PATH=$PATH:/usr/local/go/bin
```

Once done restart your terminal

Verify golang

```
go version
```

```
→  ~ go version
go version go1.22.0 linux/amd64
→  ~
```

Git:

```
sudo apt install git
```

Verify git

```
git --version
```

```
➜  ~ git --version
git version 2.34.1
➜  ~
```

Hyperledger Fabric:
Before installing hyper ledger make sure docker is up and running (**sudo systemctl status docker)**

```
curl -sSL http://bit.ly/2ysbOFE | bash -s 2.2.0
```

```
➜  ~ curl -sSL http://bit.ly/2ysbOFE | bash -s


Clone hyperledger/fabric-samples repo

===> Changing directory to fabric-samples
fabric-samples v2.5.4 does not exist, defaulting to main. fabric-samples main branch is intended to work with recent versions of fabric.

Pull Hyperledger Fabric binaries

===> Downloading version 2.5.4 platform specific fabric binaries
===> Downloading:  https://github.com/hyperledger/fabric/releases/download/v2.5.4/hyperledger-fabric-linux-amd64-2.5.4.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
100 99.3M  100 99.3M    0     0   710k      0  0:02:23  0:02:23 --:--:--  698k
==> Done.
===> Downloading version 1.5.7 platform specific fabric-ca-client binary
===> Downloading:  https://github.com/hyperledger/fabric-ca/releases/download/v1.5.7/hyperledger-fabric-ca-linux-amd64-1.5.7.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
```

Ethereum:
Running Ethereum IDE online (Remix IDE)