Challenge 04

1) Create a customized docker image by using Docker file.

--Create docker file:

```
FROM amazonlinux:latest
Maintainer Narendar
RUN yum update -y && \
  yum install -y nginx && \
  yum clean all
COPY index.html /usr/share/nginx/html/index.html
EXPOSE 80
CMD ["nginx", "-g", "daemon off;"]
```


```
FROM amazonlinux:latest
Maintainer Narendar
RUN yum update -y && \
   yum install -y nginx && \
   yum clean all
COPY index.html /usr/share/nginx/html/index.html
EXPOSE 80
CMD ["nginx", "-g", "daemon off;"]
~
~
```

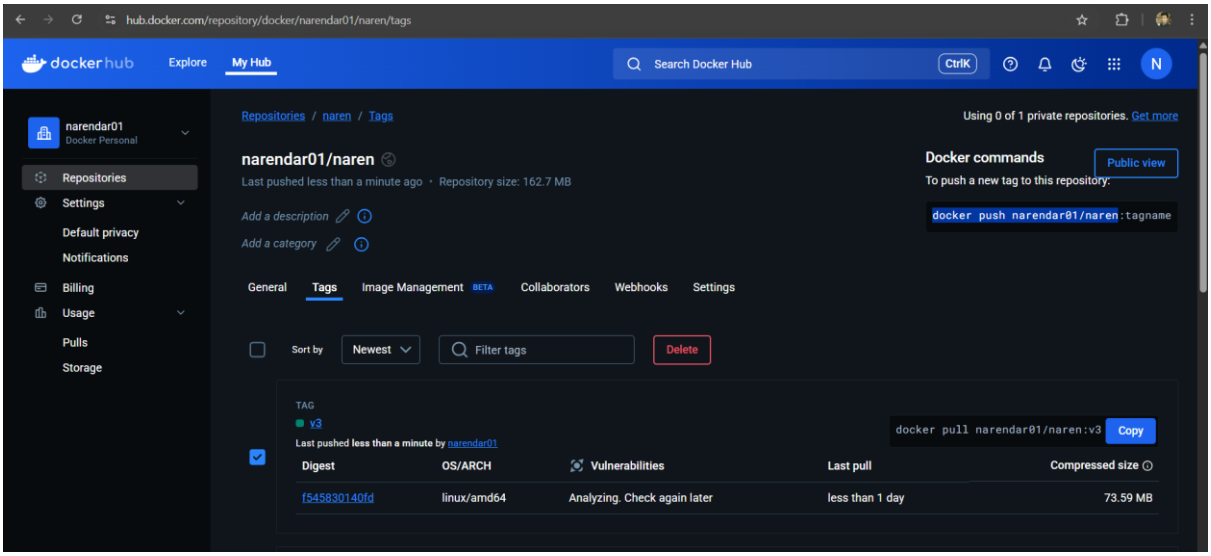
--image created using docker file

```
[root@ip-172-31-4-129 ~]# docker images
REPOSITORY                    TAG       IMAGE ID       CREATED          SIZE
narendar01/naren              v3        1bd79aebeb92   37 seconds ago   213MB
```

2) Push the image to docker hub

--push image to dockerhub

```
[root@ip-172-31-4-129 ~]# docker push narendar01/naren:v3
The push refers to repository [docker.io/narendar01/naren]
ae0060acedeb: Pushed
7cc3bf79ad1e: Pushed
1d5b4f951847: Layer already exists
v3: digest: sha256:f545830140fd274465ff7b84b635afcfcc5fb98972567f4948473a284fcc756a size: 948
[root@ip-172-31-4-129 ~]#
```

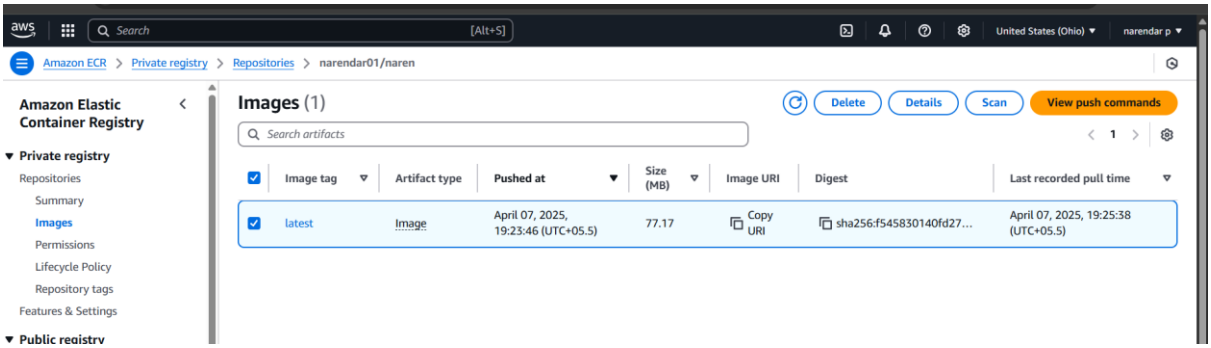


3) Push the same Image to Amazon ECR

--push image to Amazon ECR

```
[root@ip-172-31-4-129 ~]# docker build -t narendar01/naren .
[+] Building 0.3s (9/9) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 306B
 => [internal] load metadata for docker.io/library/amazonlinux:latest
 => [auth] library/amazonlinux:pull token for registry-1.docker.io
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [1/3] FROM docker.io/library/amazonlinux:latest@sha256:fc7c82b2ba834045bdf454ef0f9e73d6fdf01166e08671037c8ffdaa9de2cac4
 => [internal] load build context
 => => transferring context: 89B
 => CACHED [2/3] RUN yum update -y &&    yum install -y nginx &&    yum clean all
 => CACHED [3/3] COPY index.html /usr/share/nginx/html/index.html
 => exporting to image
 => => exporting layers
 => => writing image sha256:1bd79aebeb92dc3b713068cbb570b635e76c65ac305aedae34e155b4da03a189
 => => naming to docker.io/narendar01/naren
[root@ip-172-31-4-129 ~]# docker tag narendar01/naren:latest 971422718404.dkr.ecr.us-east-2.amazonaws.com/narendar01/naren:latest
[root@ip-172-31-4-129 ~]# docker push 971422718404.dkr.ecr.us-east-2.amazonaws.com/narendar01/naren:latest
The push refers to repository [971422718404.dkr.ecr.us-east-2.amazonaws.com/narendar01/naren]
ae0060acedeb: Pushed
7cc3bf79ad1e: Pushed
1d5b4f951847: Pushed
latest: digest: sha256:f545830140fd274465ff7b84b635afcfcc5fb98972567f4948473a284fcc756a size: 948
[root@ip-172-31-4-129 ~]#
```

--pushed image to AWS ECR



4) Provision one ec2 using terraform and install Jenkins.

```
   $ cat ec2.tf
resource "aws_instance" "jenkins_server" {
 ami                = "ami-00a929b66ed6e0de6" # your Amazon Linux 2 or AL2023 AMI
ID
 instance_type      = "t2.medium"
 key_name           = "raghu-key"
 subnet_id          = "subnet-0aed6777b6e8ca895" tags = {
  Name = "Jenkins-Server"
 } provisioner "remote-exec" {
  inline = [
   "sudo yum update -y",
   "sudo yum install -y wget",
   "sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-
stable/jenkins.repo",
   "sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key",
   "sudo yum upgrade -y",
   "sudo yum install -y java-17-amazon-corretto",
   "sudo yum install -y jenkins",
   "sudo systemctl enable jenkins",
   "sudo systemctl start jenkins"
  ]
 } connection {
  type     = "ssh"
  user     = "ec2-user" # or "admin" based on AMI
  private_key = file("raghu-key.pem")
  host     = self.public_ip
 }
}
```

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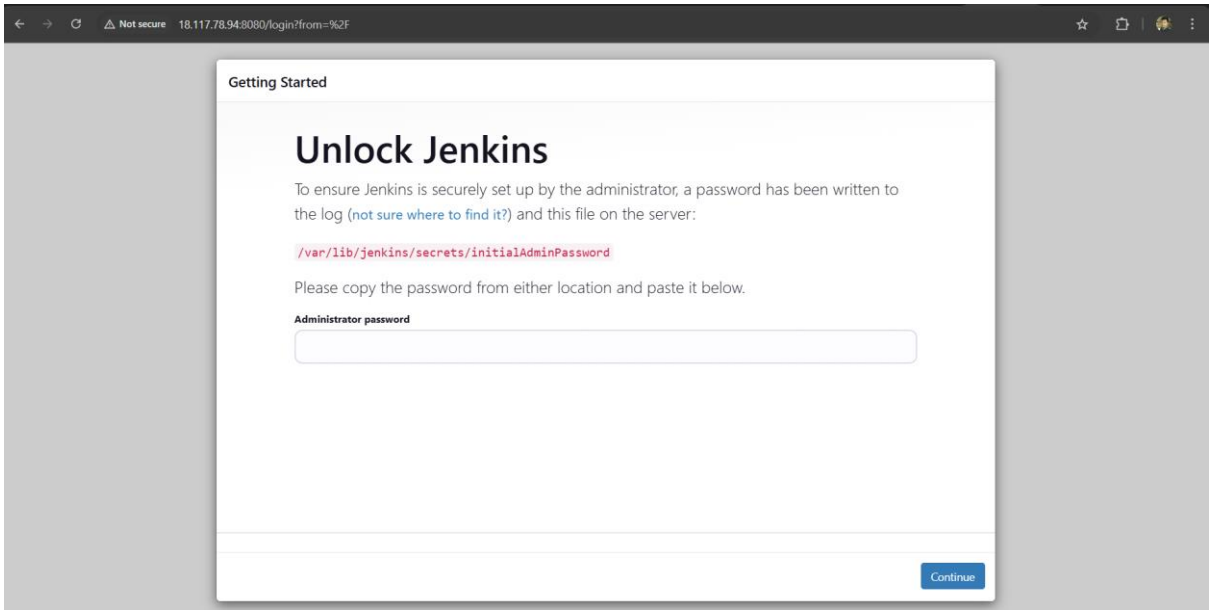
Raghu A

$ cat provider.tf

```
provider "aws" {
 region = "us-east-1" # change if you want
}
```

```
aws_instance.jenkins_server (remote-exec):   Verifying        : pigz-2.5-1    9/10
aws_instance.jenkins_server (remote-exec):   Verifying        : runc-1.2.4   10/10

aws_instance.jenkins_server (remote-exec): Installed:
aws_instance.jenkins_server (remote-exec):   containerd-1.7.27-1.amzn2023.0.1.x86_64
aws_instance.jenkins_server (remote-exec):   docker-25.0.8-1.amzn2023.0.1.x86_64
aws_instance.jenkins_server (remote-exec):   iptables-libs-1.8.8-3.amzn2023.0.2.x86_64
aws_instance.jenkins_server (remote-exec):   iptables-nft-1.8.8-3.amzn2023.0.2.x86_64
aws_instance.jenkins_server (remote-exec):   libcgroup-3.0-1.amzn2023.0.1.x86_64
aws_instance.jenkins_server (remote-exec):   libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64
aws_instance.jenkins_server (remote-exec):   libnfnetlink-1.0.1-19.amzn2023.0.2.x86_64
aws_instance.jenkins_server (remote-exec):   libnftnl-1.2.2-2.amzn2023.0.2.x86_64
aws_instance.jenkins_server (remote-exec):   pigz-2.5-1.amzn2023.0.3.x86_64
aws_instance.jenkins_server (remote-exec):   runc-1.2.4-1.amzn2023.0.1.x86_64

aws_instance.jenkins_server (remote-exec): Complete!
aws_instance.jenkins_server (remote-exec): Created symlink /etc/systemd/system/multi-user.target.wants/docker.serv
aws_instance.jenkins_server (remote-exec): Created symlink /etc/systemd/system/multi-user.target.wants/jenkins.ser
aws_instance.jenkins_server: Still creating... [1m40s elapsed]
aws_instance.jenkins_server: Creation complete after 1m45s [id=i-0530e5eab7b061f3b]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
[root@ip-172-31-15-116 ~]#
```



5) Create One jenkins job to Build and push the Docker image to DockerHub.

(https://github.com/betawins/Python-app.git)

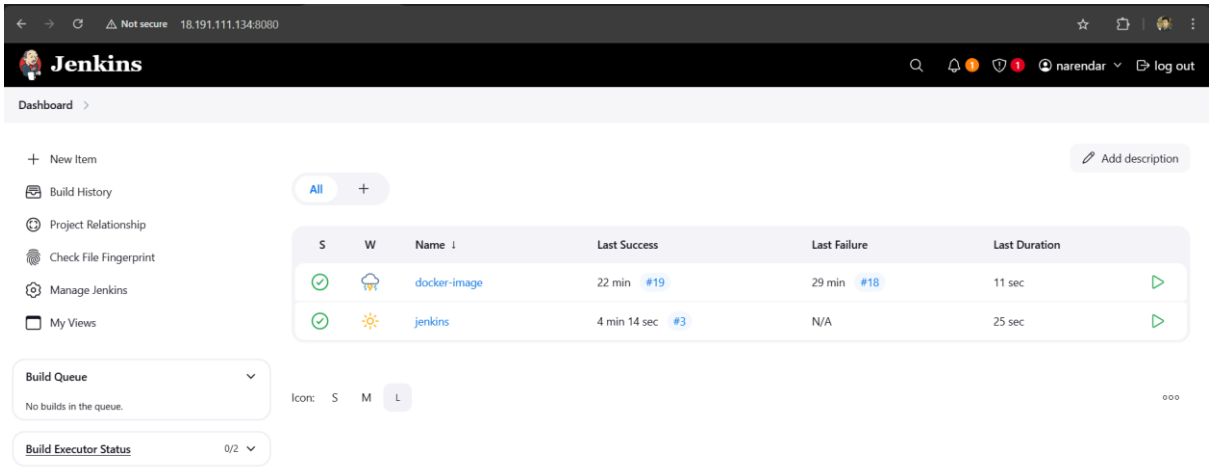
Declarative pipeline job:

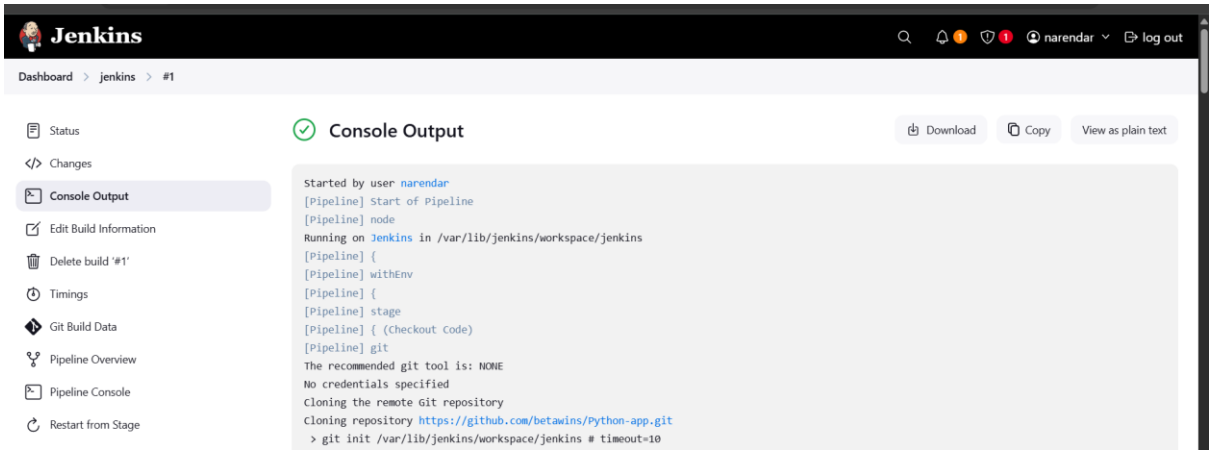
```
pipeline {

  agent any
```

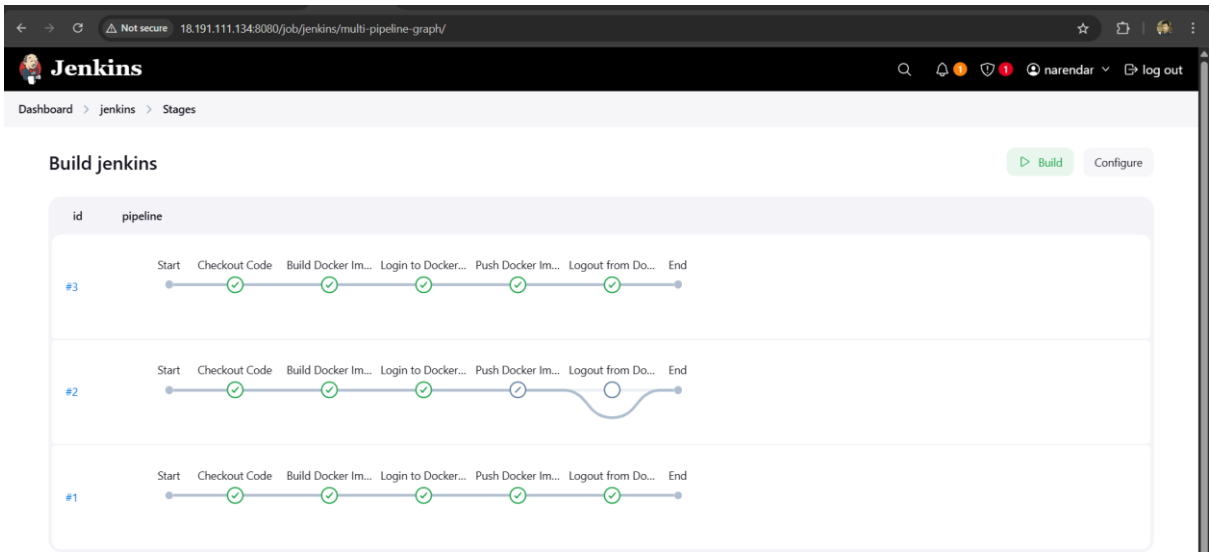
```
  environment {
    DOCKERHUB_CREDENTIALS = 'dockerhub'
    IMAGE_NAME = 'narendar01/python-app' // Change accordingly
    IMAGE_TAG = 'latest'
  }
  stages {
    stage('Checkout Code') {
      steps {
        git url: 'https://github.com/betawins/Python-app.git', branch: 'main'
      }
    }
    stage('Build Docker Image') {
      steps {
        sh """
          docker build -t ${IMAGE_NAME}:${IMAGE_TAG} .
        """
      }
    }
    stage('Login to DockerHub') {
      steps {
        withCredentials([usernamePassword(credentialsId:
"${DOCKERHUB_CREDENTIALS}", usernameVariable: 'USERNAME', passwordVariable:
'PASSWORD')]) {
          sh """
            echo "$PASSWORD" | docker login -u "$USERNAME" --password-stdin
          """
        }
      }
    }
```

```
        stage('Push Docker Image') {
            steps {
                sh """
                    docker push ${IMAGE_NAME}:${IMAGE_TAG}
                """
            }
        }
        stage('Logout from DockerHub') {
            steps {
                sh 'docker logout'
            }
        }
    }
}
```

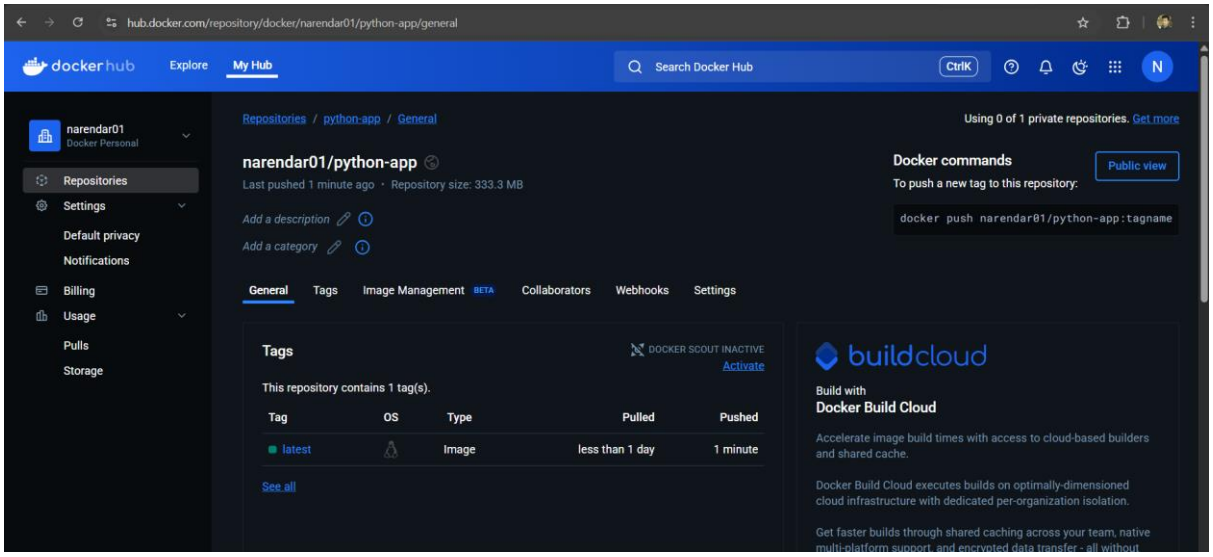
--Executed Pipeline:







--Pushed image to docker hub:



##
##

Source Codes: https://github.com/betawins/docker-tasks.git

1. From the source code of the frontend, Using that write a dockerfile & build a docker image, run & push that image to your docker registry

--install docker

--clone the code

```
[root@ip-172-31-12-212 ~]# git clone https://github.com/betawins/docker-tasks.git
fatal: destination path 'docker-tasks' already exists and is not an empty directory.
[root@ip-172-31-12-212 ~]# ls
docker-tasks
[root@ip-172-31-12-212 ~]# cd docker-tasks/
[root@ip-172-31-12-212 docker-tasks]# ls
Frontend_based_source  Java_based_source  NodeJs_based_source  README.md
[root@ip-172-31-12-212 docker-tasks]# cd Frontend_based_source/
[root@ip-172-31-12-212 Frontend_based_source]# ls
Dockerfile  index.html  javascript.js  style.css  todayDeal.js
[root@ip-172-31-12-212 Frontend_based_source]# vi Dockerfile
```

--Docker file

```
# Use Nginx to serve static frontend
FROM nginx:alpine

# Copy build output to nginx html dir
COPY . /usr/share/nginx/html

EXPOSE 80
CMD ["nginx", "-g", "daemon off;"]

~
```

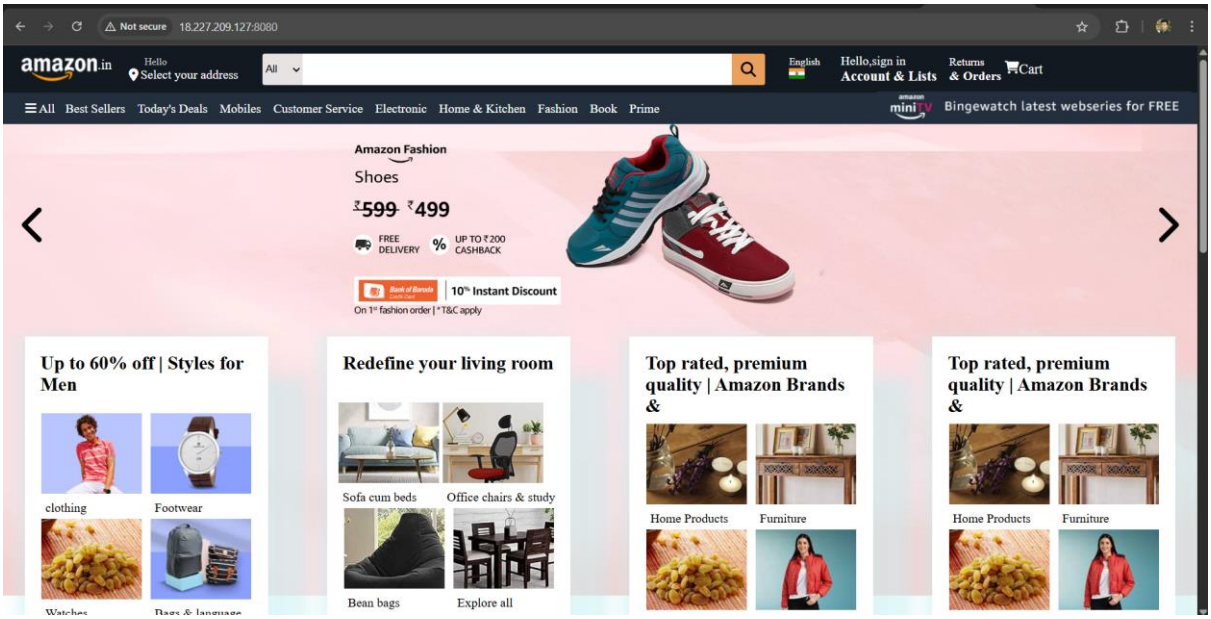
--building an image from Docker file

```
[root@ip-172-31-12-212 Frontend_based_source]# docker build -t narendar01/naren .
[+] Building 0.4s (7/7) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 269B
 => [internal] load metadata for docker.io/library/nginx:alpine
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [internal] load build context
 => => transferring context: 13.03kB
 => CACHED [1/2] FROM docker.io/library/nginx:alpine@sha256:4ff102c5d78d254a6f0da062b3cf39eaf07f01eec0927fd2
 => [2/2] COPY . /usr/share/nginx/html
 => exporting to image
 => => exporting layers
 => => writing image sha256:e5dc62b321dff0ef4361cb583a57e3bd43ecc6d3bd5916a0adcabac026b4e140
 => => naming to docker.io/narendar01/naren
[root@ip-172-31-12-212 Frontend_based_source]# docker images
REPOSITORY         TAG       IMAGE ID       CREATED         SIZE
narendar01/naren   latest    e5dc62b321df   9 seconds ago   48MB
```

--created container and run using image

```
[root@ip-172-31-12-212 Frontend_based_source]# docker run -d -p 8080:80 narendar01/naren
e2253a6d846c1d9e7829f23db3bab3a1e4f1122ea31a1601b28ee8e7c7bb6246
[root@ip-172-31-12-212 Frontend_based_source]# docker ps
CONTAINER ID   IMAGE              COMMAND                  CREATED         STATUS         PORTS                                     NAMES
e2253a6d846c   narendar01/naren   "/docker-entrypoint.…"   7 seconds ago   Up 5 seconds   0.0.0.0:8080->80/tcp, :::8080->80/tcp   xenodochial_torvalds
```

--access on web

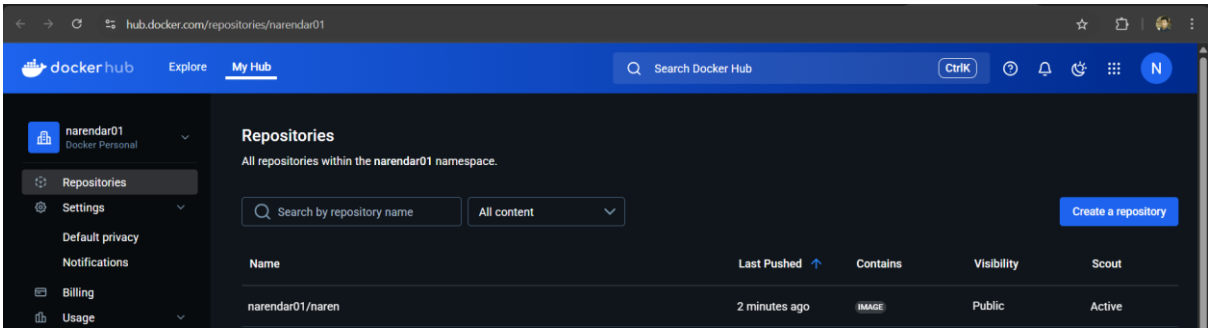


--login docker in server

--push image to docker hub

```
Login Succeeded
[root@ip-172-31-12-212 Frontend_based_source]# docker push narendar01/naren
Using default tag: latest
The push refers to repository [docker.io/narendar01/naren]
ae238cc5f794: Pushed
c18897d5e3dd: Mounted from library/nginx
9af9e76ea07f: Mounted from library/nginx
f1f70b13aacc: Mounted from library/nginx
252b6db79fae: Mounted from library/nginx
c9ce8cb4e76a: Mounted from library/nginx
8f3c313eb124: Mounted from library/nginx
c1761f3c364a: Mounted from library/nginx
08000c18d16d: Mounted from library/nginx
latest: digest: sha256:f7d763650bf4093fb634f76abe148ffcfd527f258ff2da259006be89d5a50a6d size: 2197
```

--pushed image to docker



2. From the Java Based Source Code, Write a dockerfile, build, run & push to docker registry.

--cd java_based_source and give ls

```
[root@ip-172-31-12-212 Java_based_source]# ls
Dockerfile  pom.xml  src
[root@ip-172-31-12-212 Java_based_source]#
```

--create docker file

```
FROM maven:3.9.6-eclipse-temurin-17-alpine AS builder

WORKDIR /app

# Copy the Maven project files
COPY pom.xml .
COPY src ./src

# Package the application
RUN mvn clean package -DskipTests

# Stage 2: Run the application
FROM openjdk:17-alpine

WORKDIR /app

# Copy the built jar from the builder stage
COPY --from=builder /app/target/*.jar app.jar

# Expose application port (change if needed)
EXPOSE 8080

# Run the application
ENTRYPOINT ["java", "-jar", "app.jar"]
```

--created image

```
[root@ip-172-31-12-212 Java_based_source]# docker build -t narendar01/naren-java .
[+] Building 26.0s (15/15) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 571B
 => [internal] load metadata for docker.io/library/openjdk:17-alpine
 => [internal] load metadata for docker.io/library/maven:3.9.6-eclipse-temurin-17-alpine
 => [auth] library/maven:pull token for registry-1.docker.io
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [builder 1/5] FROM docker.io/library/maven:3.9.6-eclipse-temurin-17-alpine@sha256:ffddac7
 => => resolve docker.io/library/maven:3.9.6-eclipse-temurin-17-alpine@sha256:ffddac7b0410135
```

```
[root@ip-172-31-12-212 Java_based_source]# docker images
REPOSITORY              TAG       IMAGE ID       CREATED              SIZE
narendar01/naren-java   latest    cc41f7e13783   About a minute ago   346MB
narendar01/naren        latest    e5dc62b321df   40 minutes ago       48MB
```

--run the container

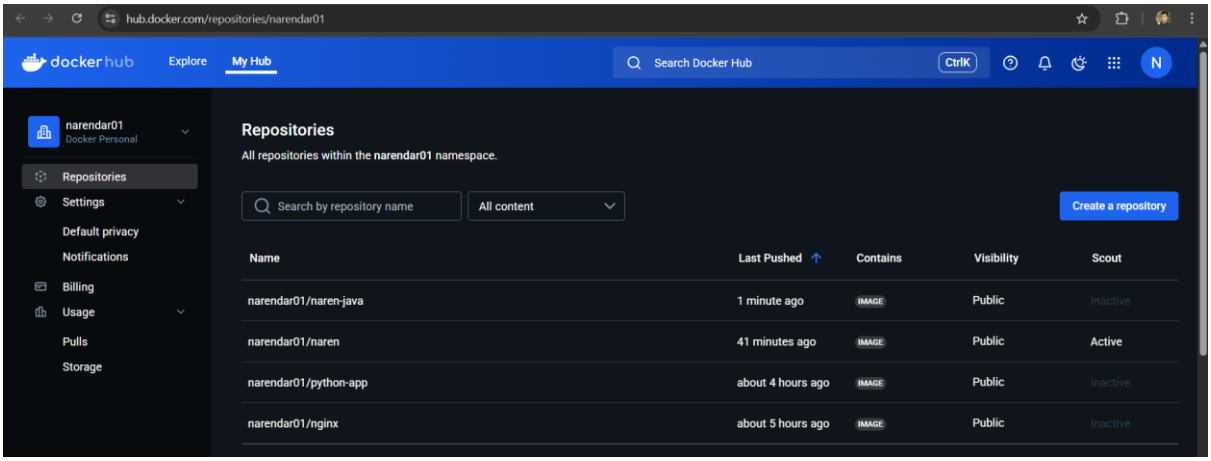
```
[root@ip-172-31-12-212 Java_based_source]# docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED          STATUS          PORTS                                                NAMES
798c728decaf   narendar01/naren-java  "java -jar app.jar"      16 seconds ago   Up 15 seconds   0.0.0.0:8081->8080/tcp, :::8081->8080/tcp            cool_shtern
e2253a6d846c   narendar01/naren       "/docker-entrypoint.…"   40 minutes ago   Up 40 minutes   0.0.0.0:8080->80/tcp, :::8080->80/tcp                xenodochial_torvalds
```

--access it in browser

--push image to docker hub

```
[root@ip-172-31-12-212 Java_based_source]# docker push narendar01/naren-java
Using default tag: latest
The push refers to repository [docker.io/narendar01/naren-java]
920c9f42dae0: Pushed
e4e7e6f0c1e9: Pushed
34f7184834b2: Mounted from library/openjdk
5836ece05bfd: Mounted from library/openjdk
72e830a4dff5: Mounted from library/openjdk
latest: digest: sha256:eee8742f991c48f701556988221c1d612932a2a40205795f94501f2e96876180 size: 1369
```

--pushed



3. From the NodeJs Based Source Code, Write a dockerfile, build with tag v1, run & push to docker registry.

--cd NodeJs_based_source and do ls

```
[root@ip-172-31-12-212 docker-tasks]# ls
Frontend_based_source  Java_based_source  NodeJs_based_source  README.md
[root@ip-172-31-12-212 docker-tasks]# cd NodeJs_based_source/
[root@ip-172-31-12-212 NodeJs_based_source]# ls
package-lock.json  package.json  public  src
```

--run dockerfile

```
FROM node:18

WORKDIR /app

COPY package*.json ./
RUN npm install

COPY . .

EXPOSE 3000
CMD ["npm", "start"]
```

--run dockerfile

```
[root@ip-172-31-12-212 NodeJs_based_source]# docker build -t narendar01/naren-nodejs:v1 .
[+] Building 68.0s (11/11) FINISHED
 => [internal] load build definition from Dockerfile
 => => transferring dockerfile: 208B
 => [internal] load metadata for docker.io/library/node:18
 => [auth] library/node:pull token for registry-1.docker.io
 => [internal] load .dockerignore
 => => transferring context: 2B
 => [1/5] FROM docker.io/library/node:18@sha256:564baa9ecca7b4d62fa5f054a106eb92d9892eb69e4f866769435e0f92f9538d
 => => resolve docker.io/library/node:18@sha256:564baa9ecca7b4d62fa5f054a106eb92d9892eb69e4f866769435e0f92f9538d
 => => sha256:aa6c239d30ee04dede270729f9502389b1a9546687ce656872536340ee0a9e03 2.49kB / 2.49kB
 => => sha256:de20d623379fc7c7ccf845a22c3153b920d57446ba7c8e64ba25d21a60b48ad6 6.39kB / 6.39kB
 => => sha256:23b7d26ef1d294256da0d70ce374277b9aab5ca683015073316005cb63d33849 48.49MB / 48.49MB
 => => sha256:1eb98adba0eb44a2e4facf9ca3626a4a66feedd0dd56d159cca90a35205744e7 64.40MB / 64.40MB
 => => sha256:564baa9ecca7b4d62fa5f054a106eb92d9892eb69e4f866769435e0f92f9538d 6.41kB / 6.41kB
 => => sha256:07d1b5af933d2dfc3d0dd509d6e20534825e4a537f7b006a6cb5b8e5a1f20905 24.01MB / 24.01MB
 => => sha256:b617a119f8a27982374d94ec6eb3738ae3d38d6fc2c34c865813926cf596a621 211.33MB / 211.33MB
```

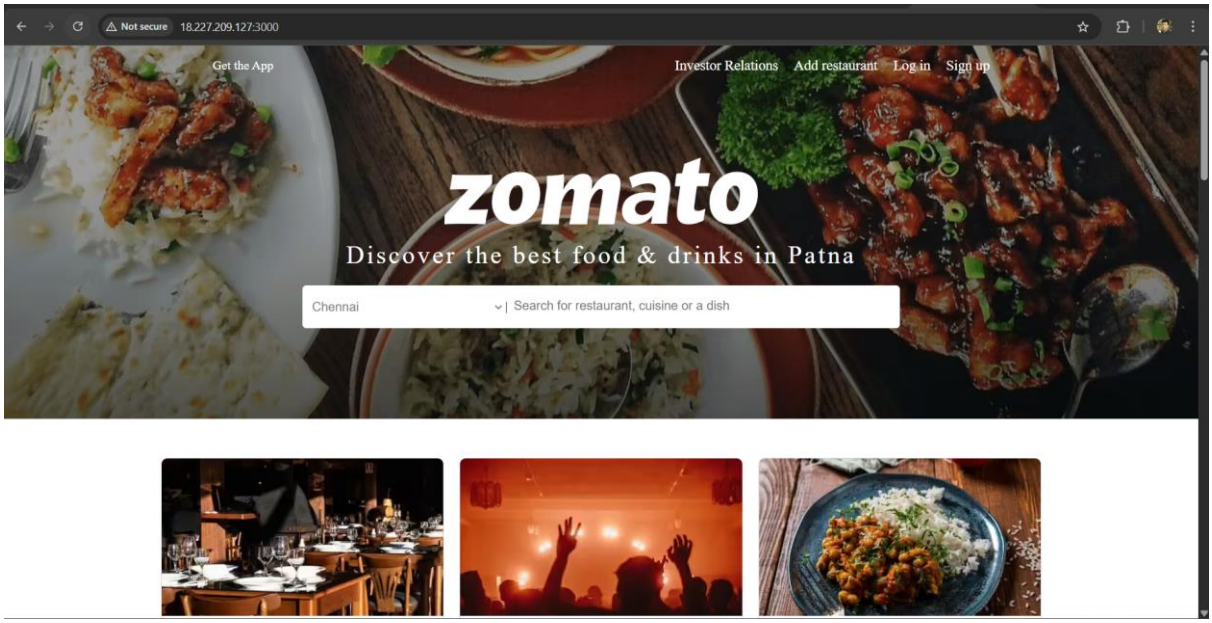
--image created with tag v1

```
[root@ip-172-31-12-212 NodeJs_based_source]# docker images
REPOSITORY                TAG       IMAGE ID       CREATED              SIZE
narendar01/naren-nodejs   v1        2a5937731ddc   10 minutes ago       1.47GB
narendar01/naren-java     latest    cc41f7e13783   31 minutes ago       346MB
narendar01/naren          latest    e5dc62b321df   About an hour ago    48MB
```

--run container

```
[root@ip-172-31-12-212 NodeJs_based_source]# docker container run -itd -p 3000:3000 narendar01/naren-nodejs:v1
a528329eda0395b9cce11c54caee6de7a86e0a63d00a34c465aad697069d21b9
[root@ip-172-31-12-212 NodeJs_based_source]# docker ps
CONTAINER ID   IMAGE                        COMMAND                  CREATED              STATUS              PORTS                                       NAMES
a528329eda03   narendar01/naren-nodejs:v1   "docker-entrypoint.s…"   6 seconds ago        Up 5 seconds        0.0.0.0:3000->3000/tcp, :::3000->3000/tcp   jovial
798c728decaf   narendar01/naren-java        "java -jar app.jar"      22 minutes ago       Up 22 minutes       0.0.0.0:8081->8080/tcp, :::8081->8080/tcp   cool_s
e2253a6d846c   narendar01/naren             "/docker-entrypoint.…"   About an hour ago    Up About an hour    0.0.0.0:8080->80/tcp, :::8080->80/tcp       xenodo
valds
```

--Access it on browser



4. Write a docker-compose dockerfile to setup wordpress with mysql Database

--install Docker-compose

```
[root@ip-172-31-12-212 ~]# sudo curl -SL https://github.com/docker/compose/releases/download/v2.24.2/docker-compose-linux-x86_64 -o /usr/local/bin/docker-compose
  % 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 58.1M  100 58.1M    0     0  52.7M      0  0:00:01  0:00:01 --:--:-- 67.9M
[root@ip-172-31-12-212 ~]# sudo chmod +x /usr/local/bin/docker-compose
[root@ip-172-31-12-212 ~]# docker-compose version
Docker Compose version v2.24.2
```

--create .yml file

```yaml
version: '3.8'

services:
  wordpress:
    image: wordpress:latest
    container_name: wordpress_app
    restart: always
    ports:
      - "8088:80"
    environment:
      WORDPRESS_DB_HOST: db
      WORDPRESS_DB_USER: wordpress
      WORDPRESS_DB_PASSWORD: wordpress
      WORDPRESS_DB_NAME: wordpress
    volumes:
      - wordpress_data:/var/www/html

  db:
    image: mysql:5.7
    container_name: wordpress_db
    restart: always
    environment:
      MYSQL_DATABASE: wordpress
      MYSQL_USER: wordpress
      MYSQL_PASSWORD: wordpress
      MYSQL_ROOT_PASSWORD: root
    volumes:
```

--run the file

```
[root@ip-172-31-12-212 wordpress]# docker-compose up -d
[+] Running 35/13
 ✓ db 11 layers [⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿]      0B/0B      Pulled
 ✓ wordpress 22 layers [⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿⣿]      0B/0B      Pulled
[+] Running 2/5
 ⠿ Network wordpress_default          Created
 ⠿ Volume "wordpress_wordpress_data"  Created
 ⠿ Volume "wordpress_db_data"         Created
 ✓ Container wordpress_db             Started
 ✓ Container wordpress_app            Started
```

```
[root@ip-172-31-12-212 wordpress]# docker-compose up
[+] Running 2/0
 ✓ Container wordpress_app  Running
 ✓ Container wordpress_db   Running
Attaching to wordpress_app, wordpress_db
^CGracefully stopping... (press Ctrl+C again to force)
[+] Stopping 2/2
 ✓ Container wordpress_db   Stopped
 ✓ Container wordpress_app  Stopped
canceled
```

--Now access in browser using 8000