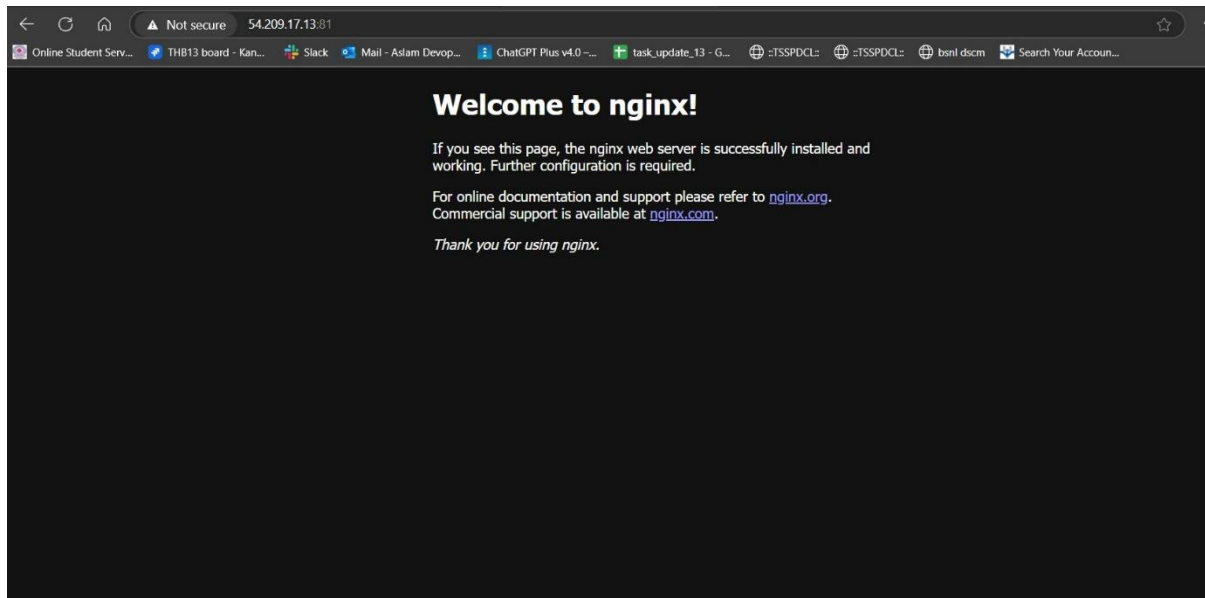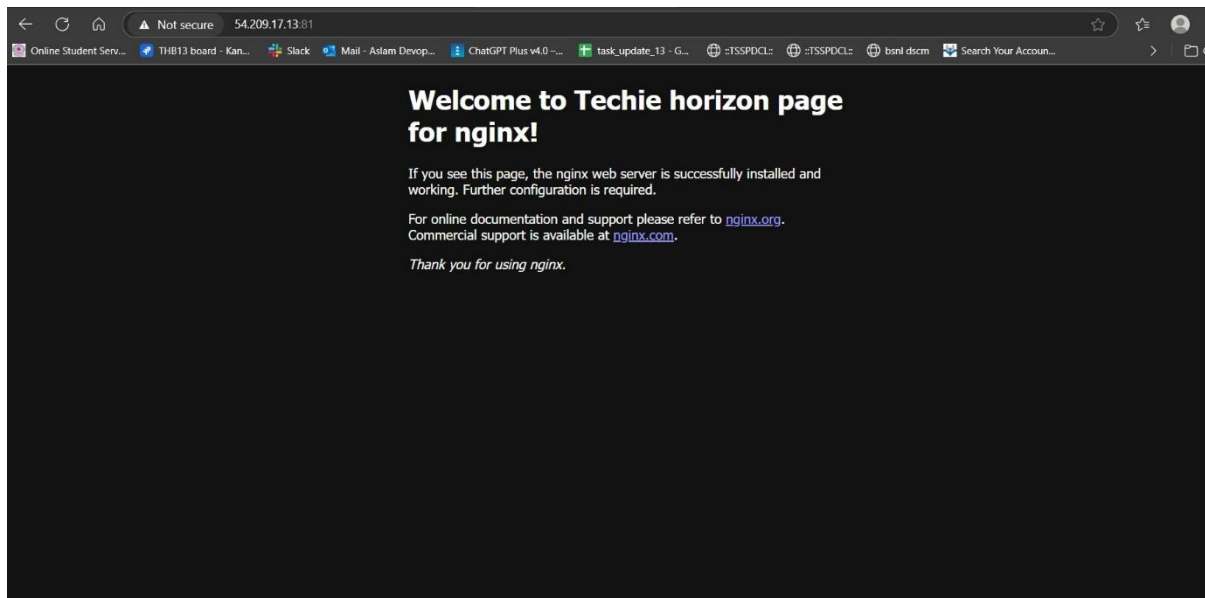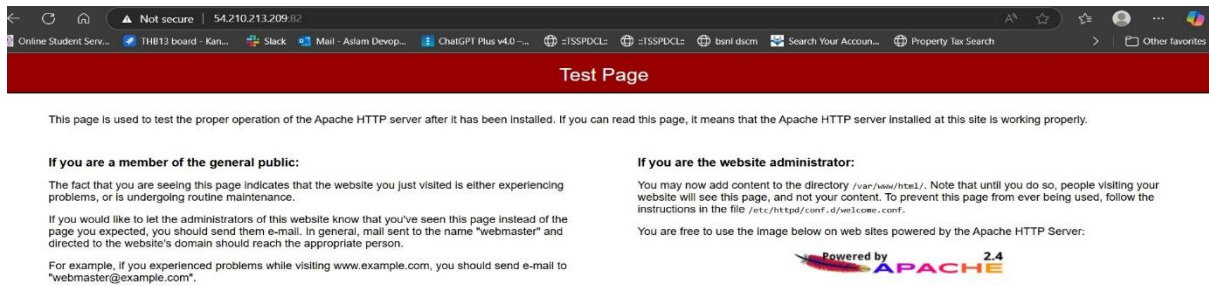**1) Install nginx and run nginx on port number 81.**
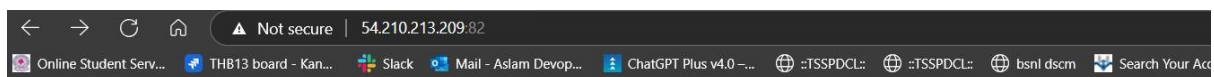

2) Deploy a sample index.html file on nginx.

3) Install Apache and run Apache on port number 82
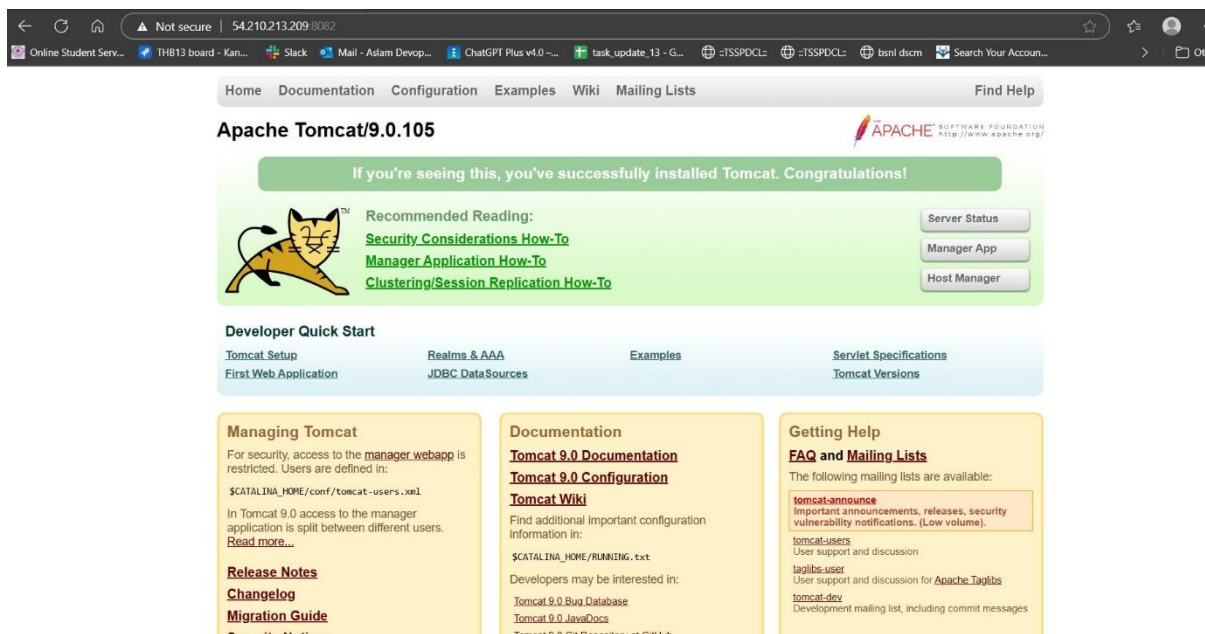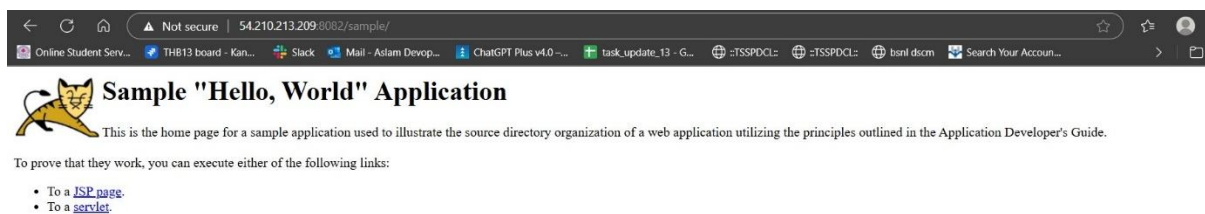

4) Deploy a sample index.html file on Apache.

5) Install Apache tomcat on port number 8082

6) Deploy a sample app on webapps

7) Create a tomcat.service file for tomcat.

```
[root@ip-172-31-66-207 bin]# systemctl start tomcat
[root@ip-172-31-66-207 bin]# systemctl status tomcat
● tomcat.service - Apache Tomcat Web Application Container
   Loaded: loaded (/etc/systemd/system/tomcat.service; disabled; vendor preset: disabled)
   Active: active (running) since Thu 2025-05-29 12:28:49 UTC; 8s ago
  Process: 30255 ExecStart=/home/ec2-user/tomcat/bin/startup.sh (code=exited, status=0/SUCCESS)
 Main PID: 30268 (java)
   CGroup: /system.slice/tomcat.service
           └─30268 /usr/bin/java -Djava.util.logging.config.file=/home/ec2-user/tomcat/conf/logging.properties -Djava.util.logging.manager=org.apache.juli.ClassLoaderLogManager -Djdk.tls.ephemeralDHKeySize=2...

May 29 12:28:49 ip-172-31-66-207.ec2.internal systemd[1]: Starting Apache Tomcat Web Application Container...
May 29 12:28:49 ip-172-31-66-207.ec2.internal startup.sh[30255]: Tomcat started.
May 29 12:28:49 ip-172-31-66-207.ec2.internal systemd[1]: Started Apache Tomcat Web Application Container.
[root@ip-172-31-66-207 bin]# cat /etc/systemd/system/tomcat.service
[Unit]
Description=Apache Tomcat Web Application Container
After=network.target

[Service]
Type=forking

Environment=CATALINA_PID=/home/ec2-user/tomcat/temp/tomcat.pid
Environment=CATALINA_HOME=/home/ec2-user/tomcat
Environment=CATALINA_BASE=/home/ec2-user/tomcat
Environment='CATALINA_OPTS='
Environment='JAVA_OPTS='
ExecStart=/home/ec2-user/tomcat/bin/startup.sh
ExecStop=/home/ec2-user/tomcat/bin/shutdown.sh
User=root
Group=root
UMask=0007
RestartSec=10
Restart=always

[Install]
WantedBy=multi-user.target
[root@ip-172-31-66-207 bin]#
```

8) Configure HA Proxy server

```
root@ip-172-31-31-61 ec2-user]# systemctl status httpd
 httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor prese
: disabled)
   Active: inactive (dead)
     Docs: man:httpd.service(8)
root@ip-172-31-31-61 ec2-user]# systemctl start httpd
root@ip-172-31-31-61 ec2-user]# systemctl status httpd
 httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor prese
: disabled)
   Active: active (running) since Thu 2025-05-29 01:44:51 UTC; 3s ago
     Docs: man:httpd.service(8)
 Main PID: 3488 (httpd)
   Status: "Processing requests..."
   CGroup: /system.slice/httpd.service
           ├─3488 /usr/sbin/httpd -DFOREGROUND
           ├─3489 /usr/sbin/httpd -DFOREGROUND
           ├─3490 /usr/sbin/httpd -DFOREGROUND
           ├─3491 /usr/sbin/httpd -DFOREGROUND
           ├─3492 /usr/sbin/httpd -DFOREGROUND
           └─3493 /usr/sbin/httpd -DFOREGROUND

ay 29 01:44:51 ip-172-31-31-61.ec2.internal systemd[1]: Starting The Apache ...
ay 29 01:44:51 ip-172-31-31-61.ec2.internal systemd[1]: Started The Apache H...
int: Some lines were ellipsized, use -l to show in full.
root@ip-172-31-31-61 ec2-user]# vi /etc/hosts
root@ip-172-31-31-61 ec2-user]# ping load_balancer -c 4
ING load_balancer (18.212.89.91) 56(84) bytes of data.
4 bytes from load_balancer (18.212.89.91): icmp_seq=1 ttl=254 time=0.742 ms
4 bytes from load_balancer (18.212.89.91): icmp_seq=2 ttl=254 time=0.832 ms
4 bytes from load_balancer (18.212.89.91): icmp_seq=3 ttl=254 time=1.01 ms
4 bytes from load_balancer (18.212.89.91): icmp_seq=4 ttl=254 time=0.571 ms

-- load_balancer ping statistics ---
 packets transmitted, 4 received, 0% packet loss, time 3043ms
tt min/avg/max/mdev = 0.571/0.788/1.010/0.162 ms
root@ip-172-31-31-61 ec2-user]# 
```
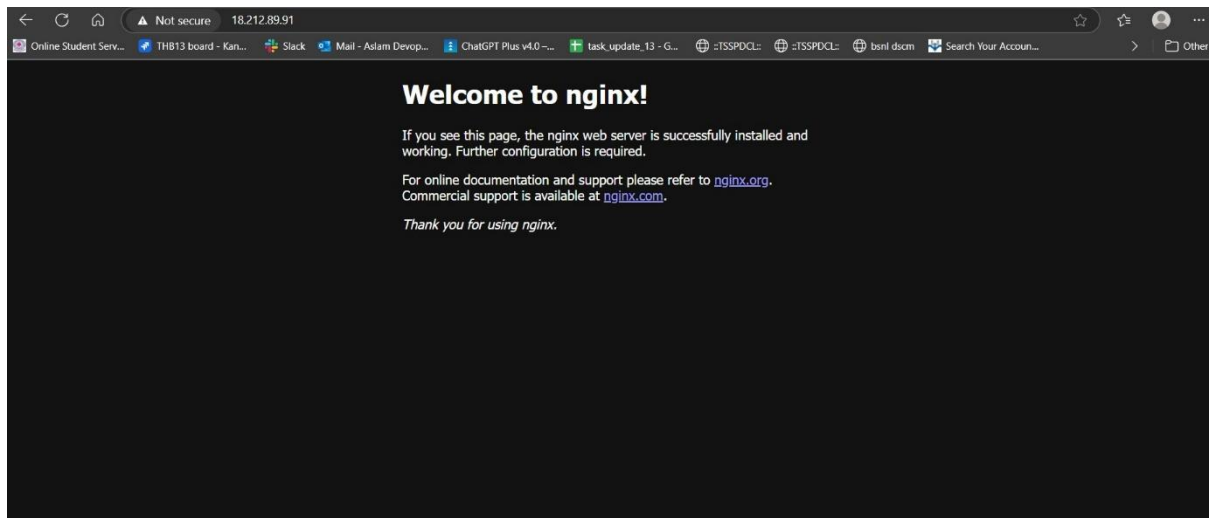
```
[root@ip-172-31-18-253 ec2-user]# systemctl status nginx
 nginx.service - The nginx HTTP and reverse proxy server
   Loaded: loaded (/usr/lib/systemd/system/nginx.service; disabled; vendor preset: disabled)
   Active: active (running) since Thu 2025-05-29 01:51:49 UTC; 1min 52s ago
  Process: 3500 ExecStart=/usr/sbin/nginx (code=exited, status=0/SUCCESS)
  Process: 3496 ExecStartPre=/usr/sbin/nginx -t (code=exited, status=0/SUCCESS)
  Process: 3495 ExecStartPre=/usr/bin/rm -f /run/nginx.pid (code=exited, status=0/SUCCESS)
 Main PID: 3502 (nginx)
   CGroup: /system.slice/nginx.service
           ├─3502 nginx: master process /usr/sbin/nginx
           └─3503 nginx: worker process

May 29 01:51:49 ip-172-31-18-253.ec2.internal systemd[1]: Starting The nginx HTTP and reverse proxy server...
May 29 01:51:49 ip-172-31-18-253.ec2.internal nginx[3496]: nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
May 29 01:51:49 ip-172-31-18-253.ec2.internal nginx[3496]: nginx: configuration file /etc/nginx/nginx.conf test is successful
May 29 01:51:49 ip-172-31-18-253.ec2.internal systemd[1]: Started The nginx HTTP and reverse proxy server.
[root@ip-172-31-18-253 ec2-user]# ping load_balancer -c 4
PING load_balancer (18.212.89.91) 56(84) bytes of data.
64 bytes from load_balancer (18.212.89.91): icmp_seq=1 ttl=254 time=0.906 ms
64 bytes from load_balancer (18.212.89.91): icmp_seq=2 ttl=254 time=1.10 ms
64 bytes from load_balancer (18.212.89.91): icmp_seq=3 ttl=254 time=0.518 ms
64 bytes from load_balancer (18.212.89.91): icmp_seq=4 ttl=254 time=1.11 ms

--- load_balancer ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3029ms
rtt min/avg/max/mdev = 0.518/0.910/1.111/0.242 ms
[root@ip-172-31-18-253 ec2-user]# 
```

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org. Commercial support is available at nginx.com.

Thank you for using nginx.

Test Page

This page is used to test the proper operation of the Apache HTTP server after it has been installed. If you can read this page, it means that the Apache HTTP server installed at this site is working properly.

If you are a member of the general public:

The fact that you are seeing this page indicates that the website you just visited is either experiencing problems, or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".

If you are the website administrator:

You may now add content to the directory /var/www/html/. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file /etc/httpd/conf.d/welcome.conf.

You are free to use the image below on web sites powered by the Apache HTTP Server:

[Powered by Apache]