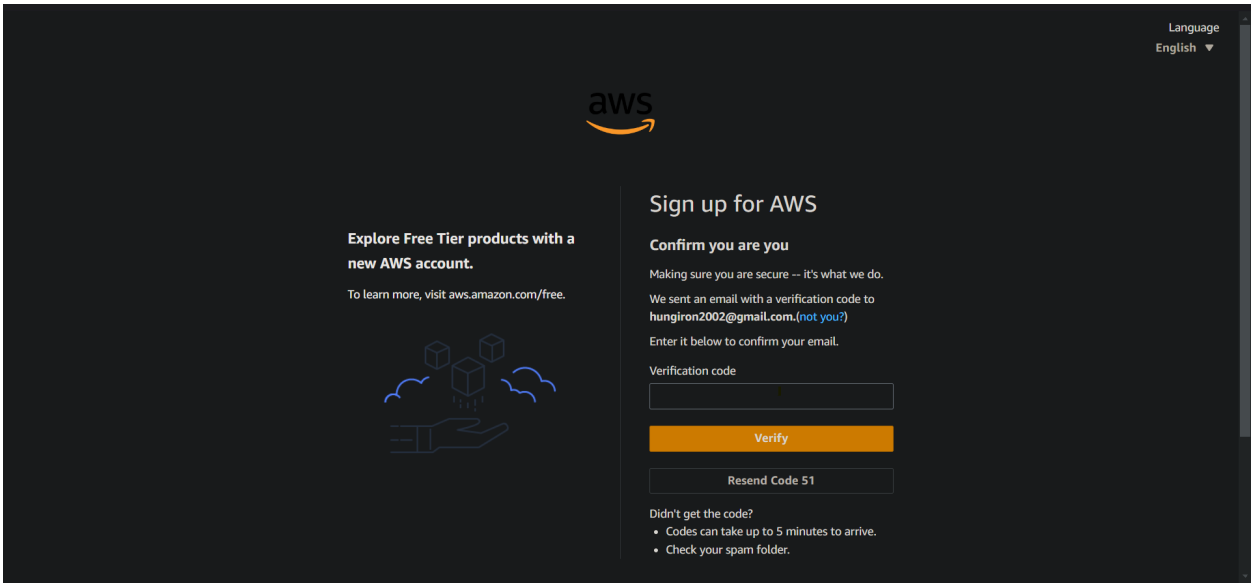
Cloud Computing Project 2

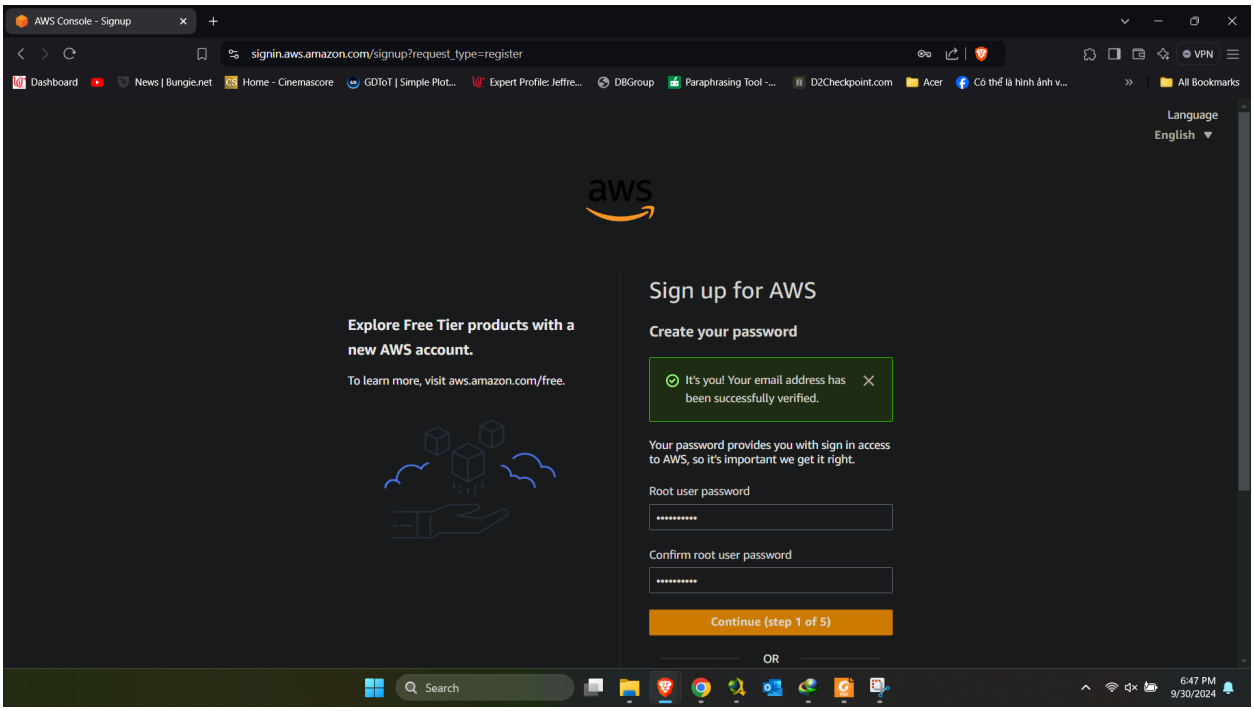
Created	@October 5, 2024 12:14 PM
Created by	Ⓗ Hungy Boi

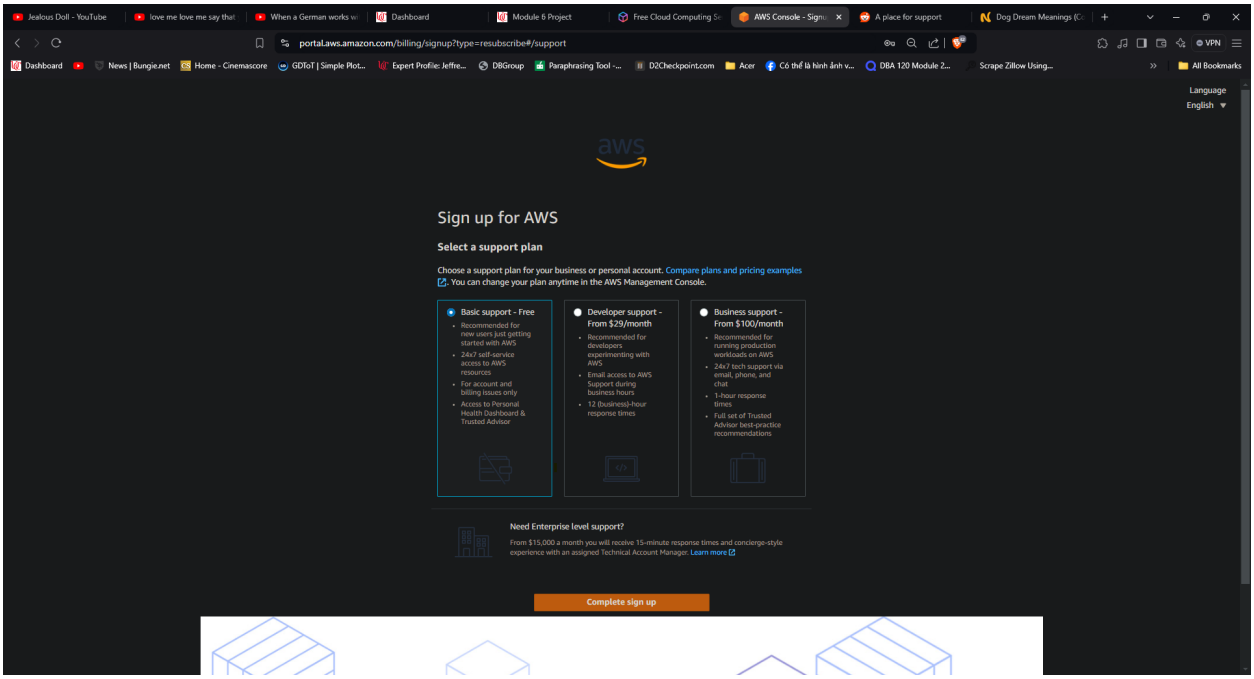
Webpage: http://ec2-3-133-58-209.us-east-2.compute.amazonaws.com/

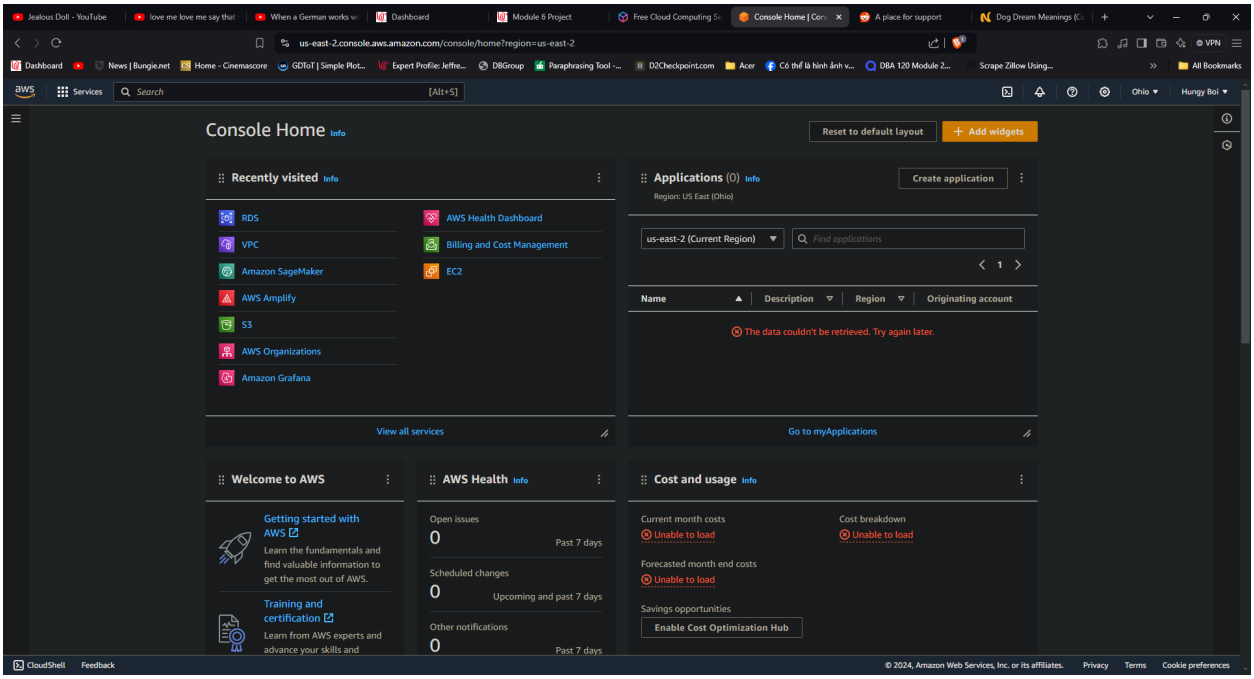
1. Launch an **EC2 instance** (any platform accepted but should be accessible through the internet).

- To create my AWS Free Tier account, I first visit the AWS website and click "Create an AWS Account." I then sign up by entering my email, choosing a strong password, and providing my contact information, including a valid phone number for verification. Once I'm signed up, I'm automatically enrolled in the Free Tier, which gives me 12 months of access to services like EC2, S3, RDS, and Lambda. I'll need to provide a credit card for identity verification.




AWS Console - Signup
signin.aws.amazon.com/signup?request_type=register
Language
English
Explore Free Tier products with a new AWS account.
To learn more, visit aws.amazon.com/free.
Sign up for AWS
Create your password
It's you! Your email address has been successfully verified.
Your password provides you with sign in access to AWS, so it's important we get it right.
Root user password
Confirm root user password
Continue (step 1 of 5)
OR
Search
6:47 PM
9/30/2024

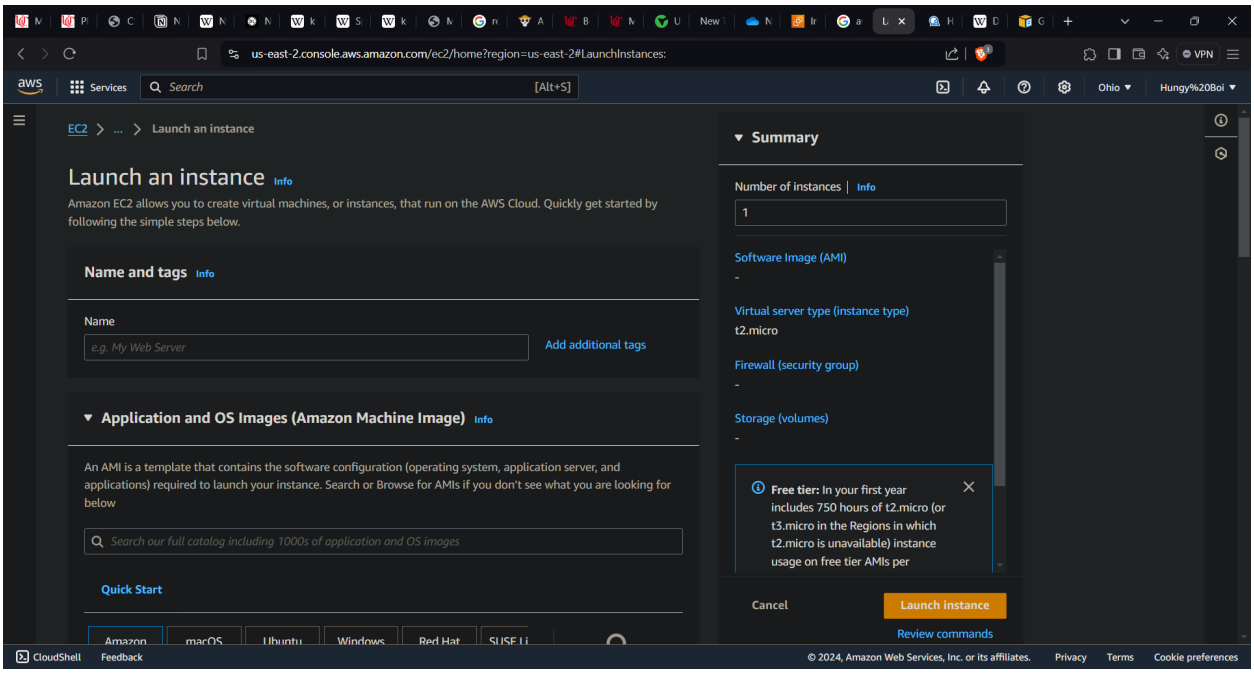

portal.aws.amazon.com/billing/signup?type=resubscribe#/support
Language
English
Sign up for AWS
Select a support plan
Choose a support plan for your business or personal account. Compare plans and pricing examples
You can change your plan anytime in the AWS Management Console.
Basic support - Free
Developer support - From $29/month
Business support - From $100/month
Need Enterprise level support?
Complete sign up



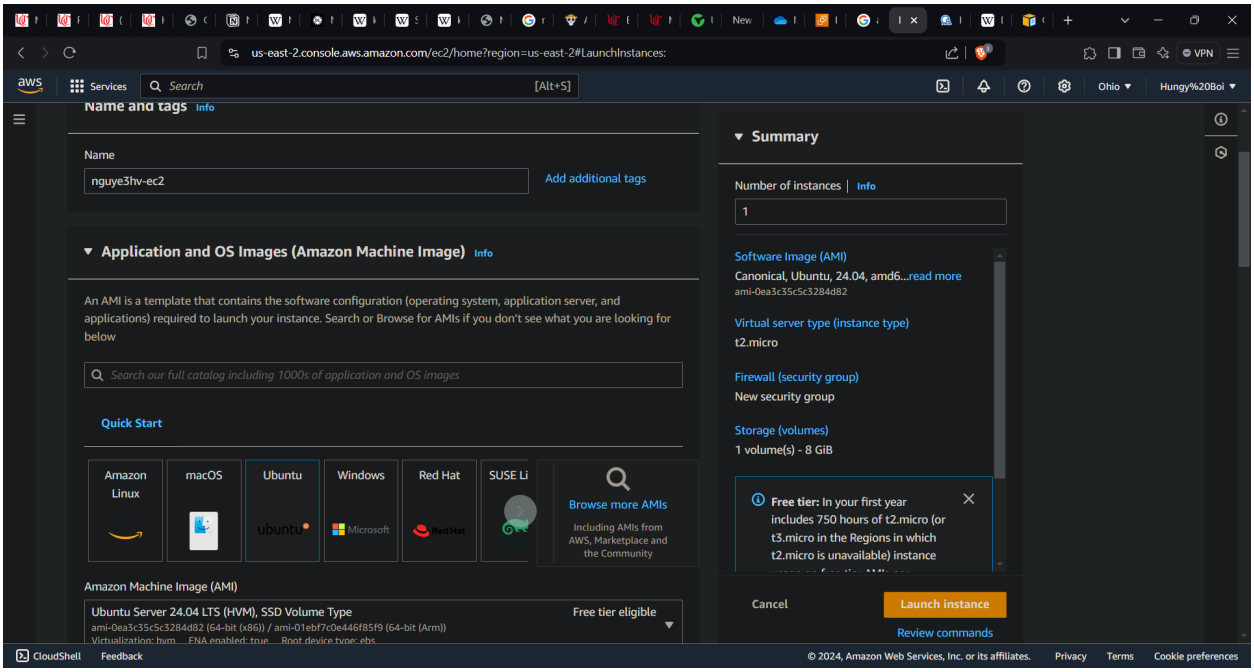
2. EC2 creation

To launch an EC2 instance on AWS, I first log in to the AWS Management Console and choose Ubuntu as my Amazon Machine Image (AMI). Then, I select the t2.micro instance type, which is free under the Free Tier. Next, I configure the Network Security Group by setting rules to allow SSH (port 22) and HTTP traffic (port 80) from the internet. I also create or select a key pair for login, using a .ppk file for my Windows machine. Finally, I launch the instance

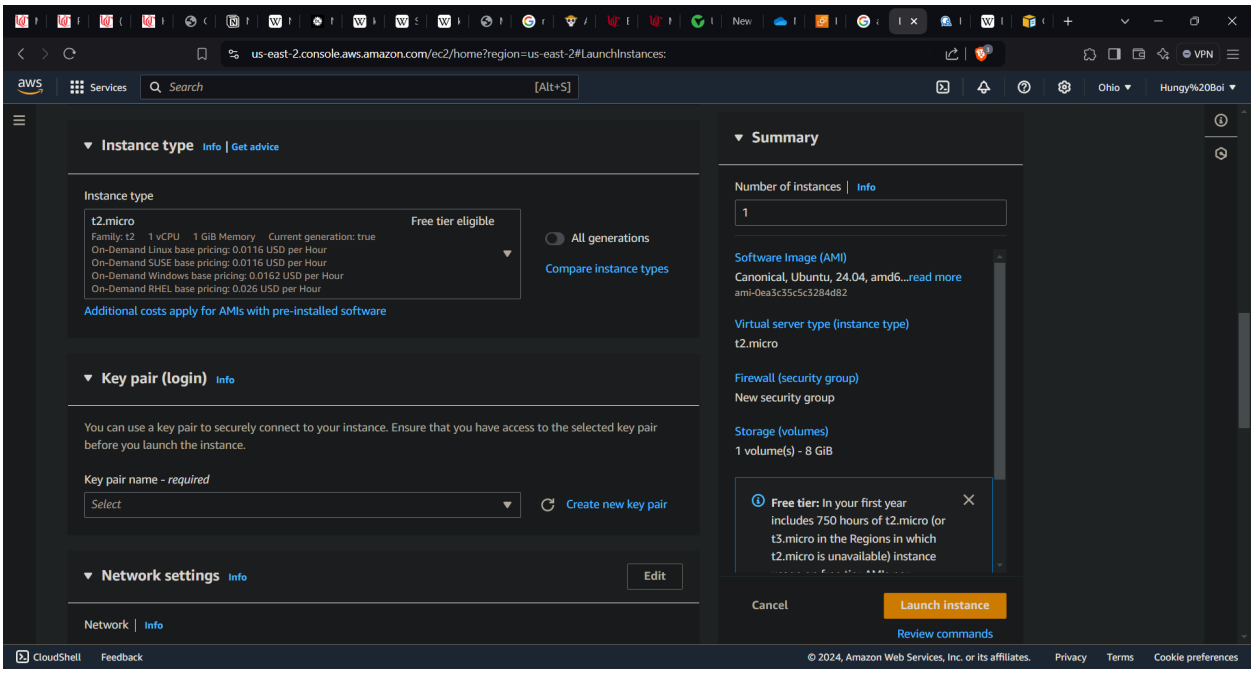
- EC2 Console:

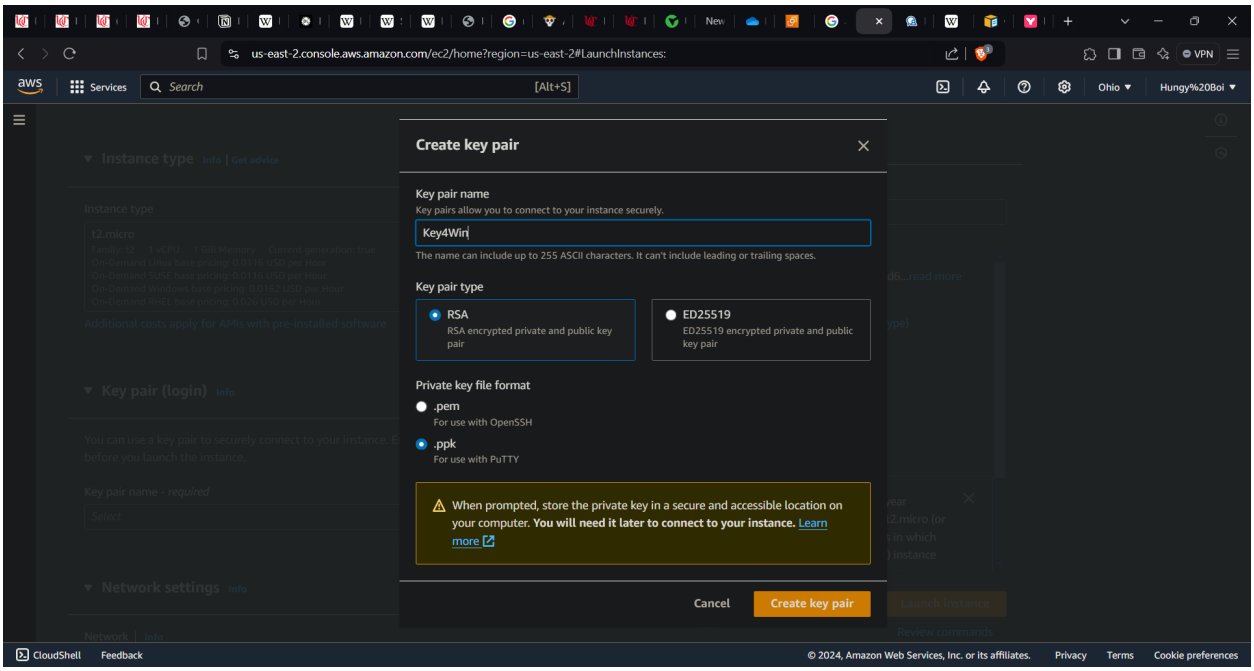


- Amazon Machine Image (AMI) :

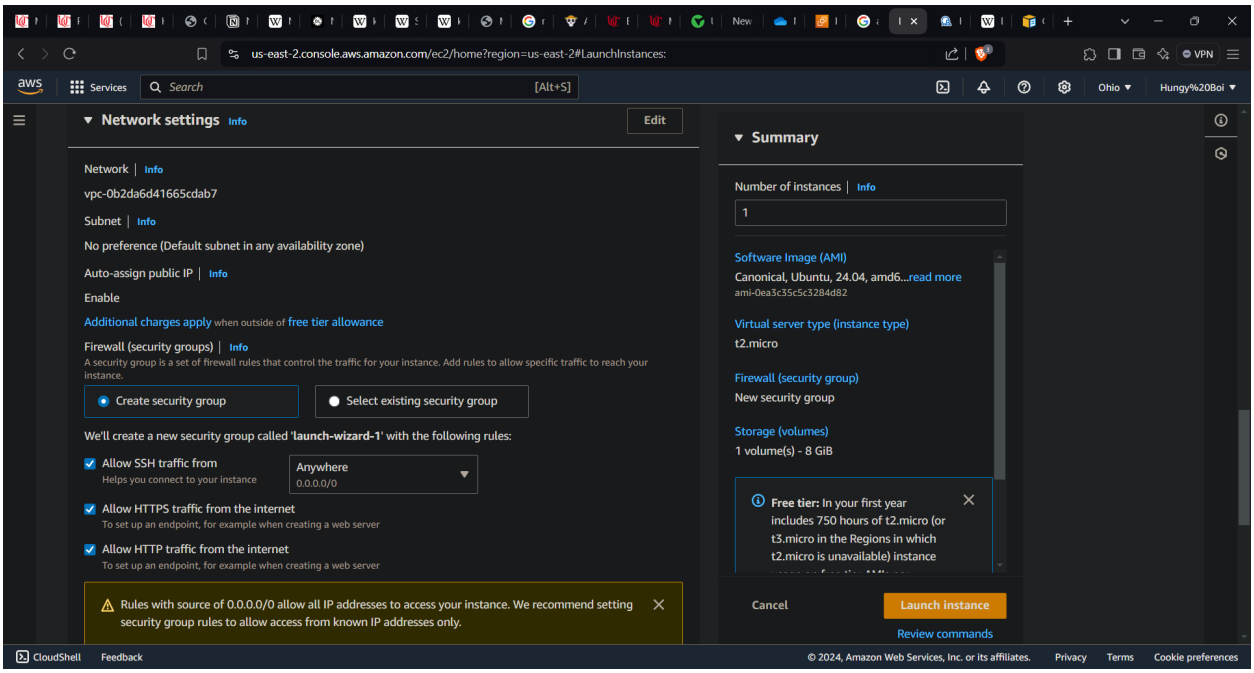


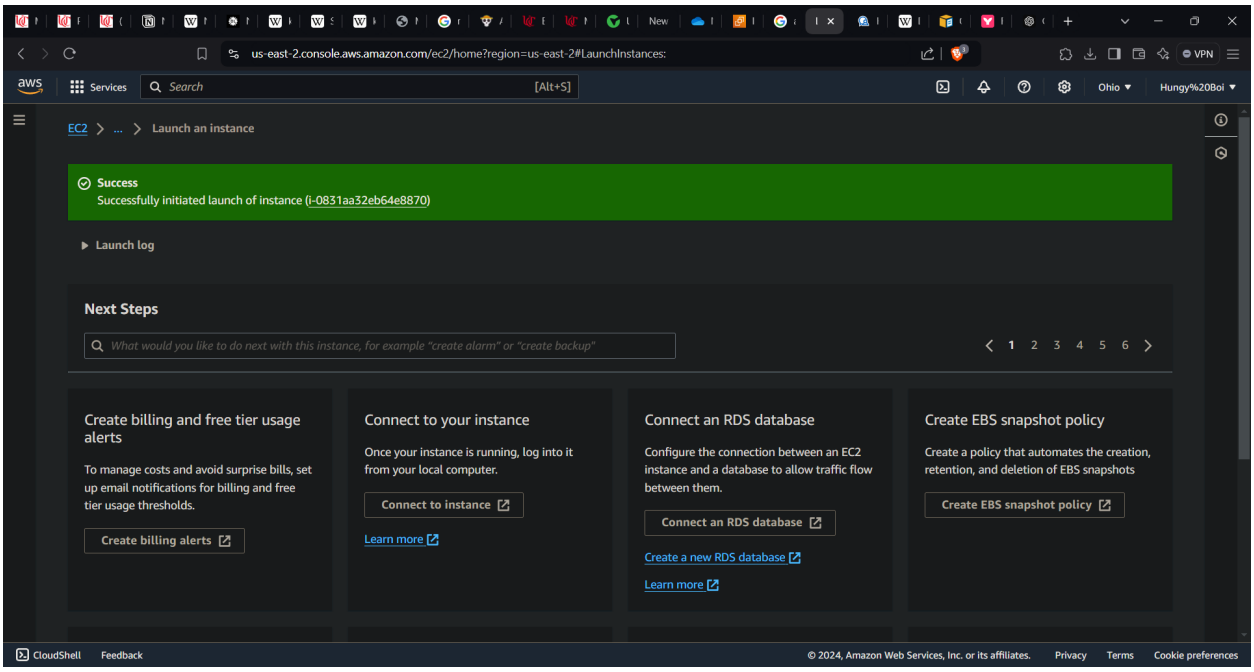
- Key pair (login):





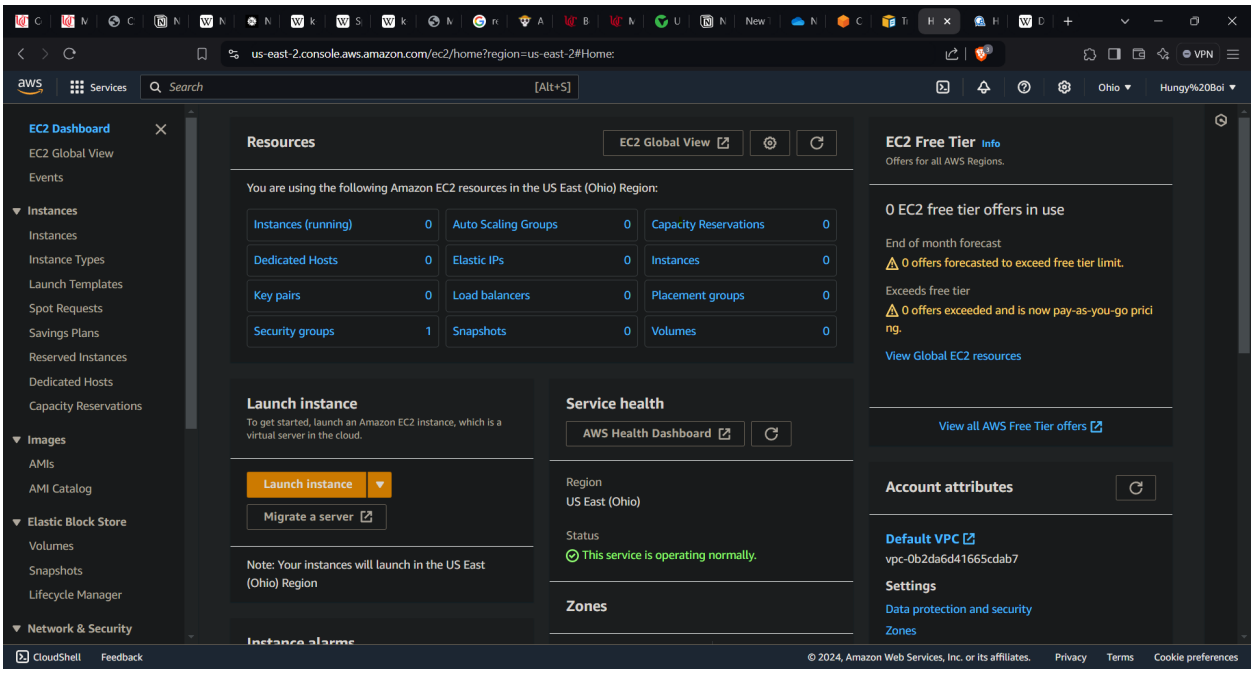
- Network settings

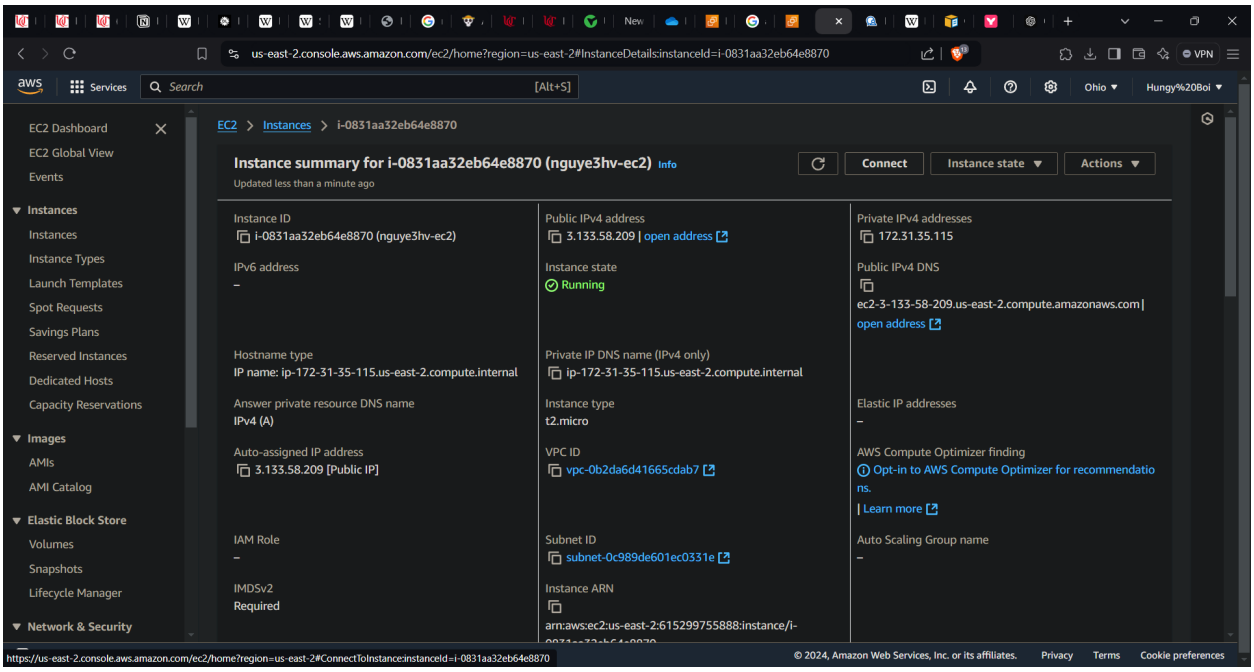




2. Configure web server and SQLite3 Database table

Once my instance is running, I click on the instance ID, go to Connect, and follow the instructions to SSH into my instance.


us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#Home:
Services
Search
[Alt+S]
Ohio
Hungy%20Boi
EC2 Dashboard
EC2 Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Snapshots
Lifecycle Manager
Network & Security
Resources
EC2 Global View
You are using the following Amazon EC2 resources in the US East (Ohio) Region:
Instances (running) 0
Auto Scaling Groups 0
Capacity Reservations 0
Dedicated Hosts 0
Elastic IPs 0
Instances 0
Key pairs 0
Load balancers 0
Placement groups 0
Security groups 1
Snapshots 0
Volumes 0
Launch instance
To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.
Launch instance
Migrate a server
Note: Your instances will launch in the US East (Ohio) Region
Service health
AWS Health Dashboard
Region
US East (Ohio)
Status
This service is operating normally.
Zones
EC2 Free Tier Info
Offers for all AWS Regions.
0 EC2 free tier offers in use
End of month forecast
0 offers forecasted to exceed free tier limit.
Exceeds free tier
0 offers exceeded and is now pay-as-you-go pricing.
View Global EC2 resources
View all AWS Free Tier offers
Account attributes
Default VPC
vpc-0b2da6d41665cdab7
Settings
Data protection and security
Zones
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences


us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#InstanceDetails:instanceId=i-0831aa32eb64e8870
Services
Search
[Alt+S]
Ohio
Hungy%20Boi
EC2 Dashboard
EC2 Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Snapshots
Lifecycle Manager
Network & Security
EC2 > Instances > i-0831aa32eb64e8870
Instance summary for i-0831aa32eb64e8870 (nguye3hv-ec2) Info
Updated less than a minute ago
Connect
Instance state
Actions
Instance ID
i-0831aa32eb64e8870 (nguye3hv-ec2)
IPv6 address
–
Hostname type
IP name: ip-172-31-35-115.us-east-2.compute.internal
Answer private resource DNS name
IPv4 (A)
Auto-assigned IP address
3.133.58.209 [Public IP]
IAM Role
–
IMDSv2
Required
Public IPv4 address
3.133.58.209 | open address
Instance state
Running
Private IP DNS name (IPv4 only)
ip-172-31-35-115.us-east-2.compute.internal
Instance type
t2.micro
VPC ID
vpc-0b2da6d41665cdab7
Subnet ID
subnet-0c989de601ec0331e
Instance ARN
arn:aws:ec2:us-east-2:615299755888:instance/i-
Private IPv4 addresses
172.31.35.115
Public IPv4 DNS
ec2-3-133-58-209.us-east-2.compute.amazonaws.com | open address
Elastic IP addresses
–
AWS Compute Optimizer finding
Opt-in to AWS Compute Optimizer for recommendations.
| Learn more
Auto Scaling Group name
–
https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#ConnectToInstance:instanceId=i-0831aa32eb64e8870
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Terms
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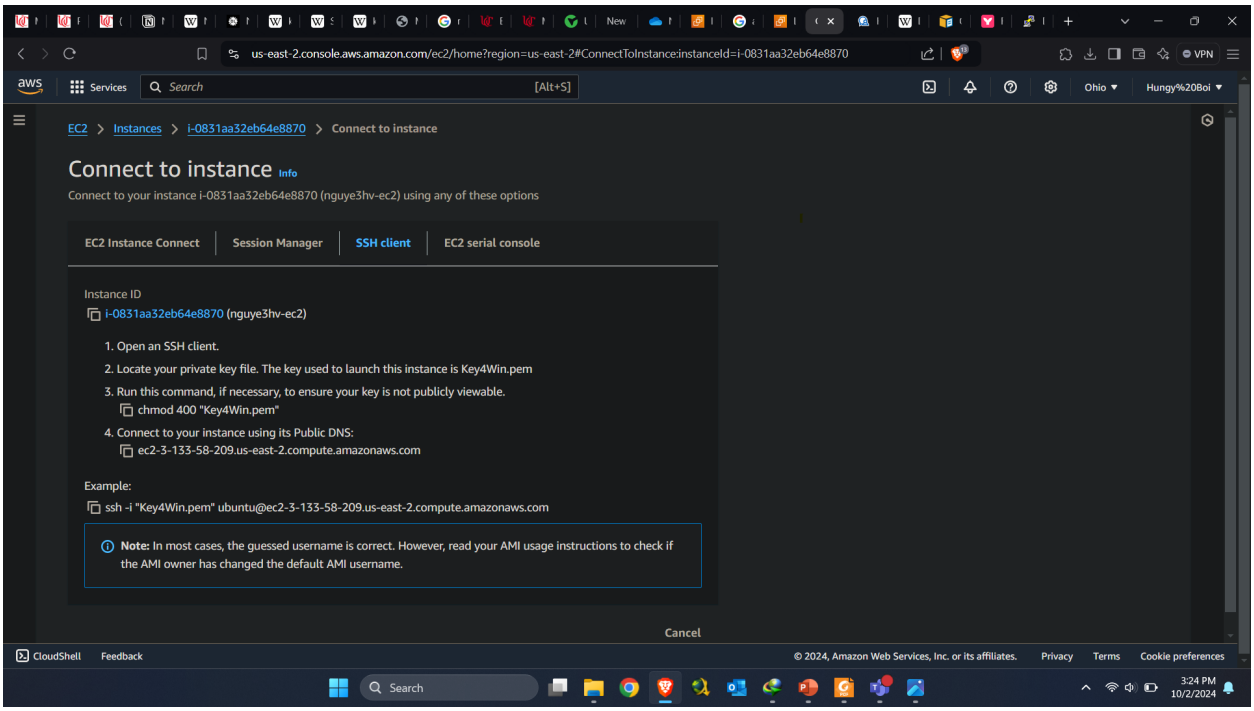
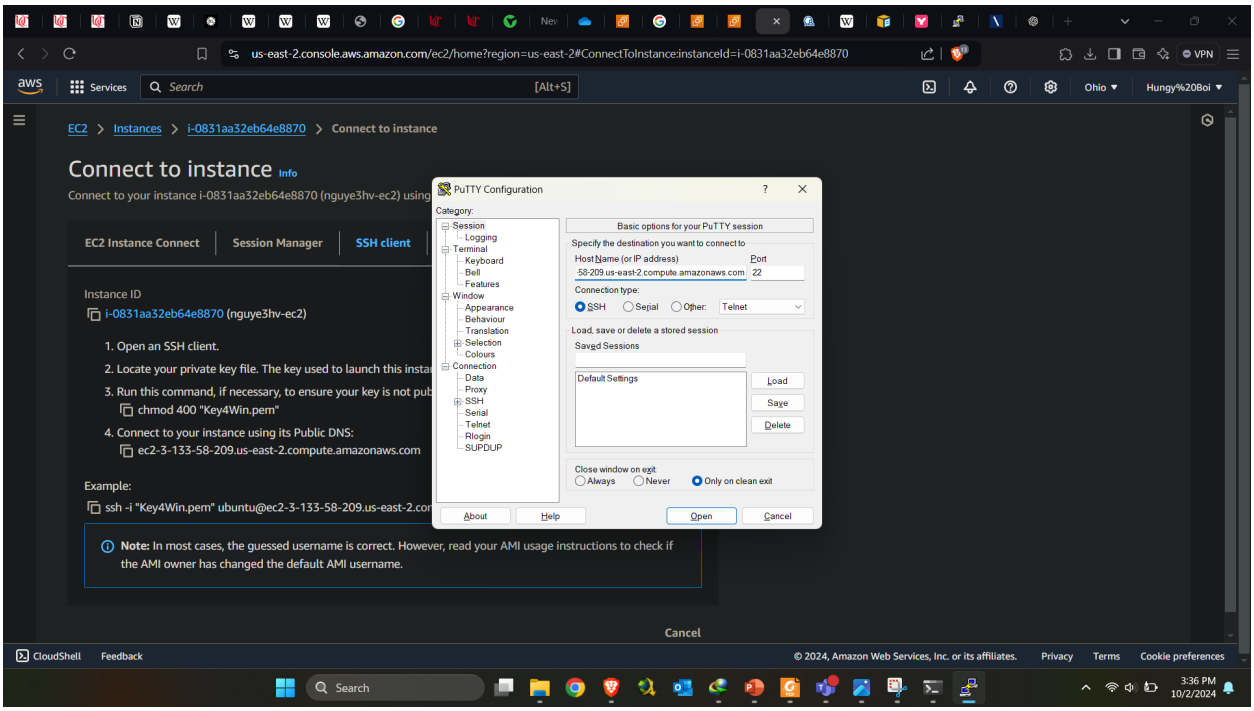
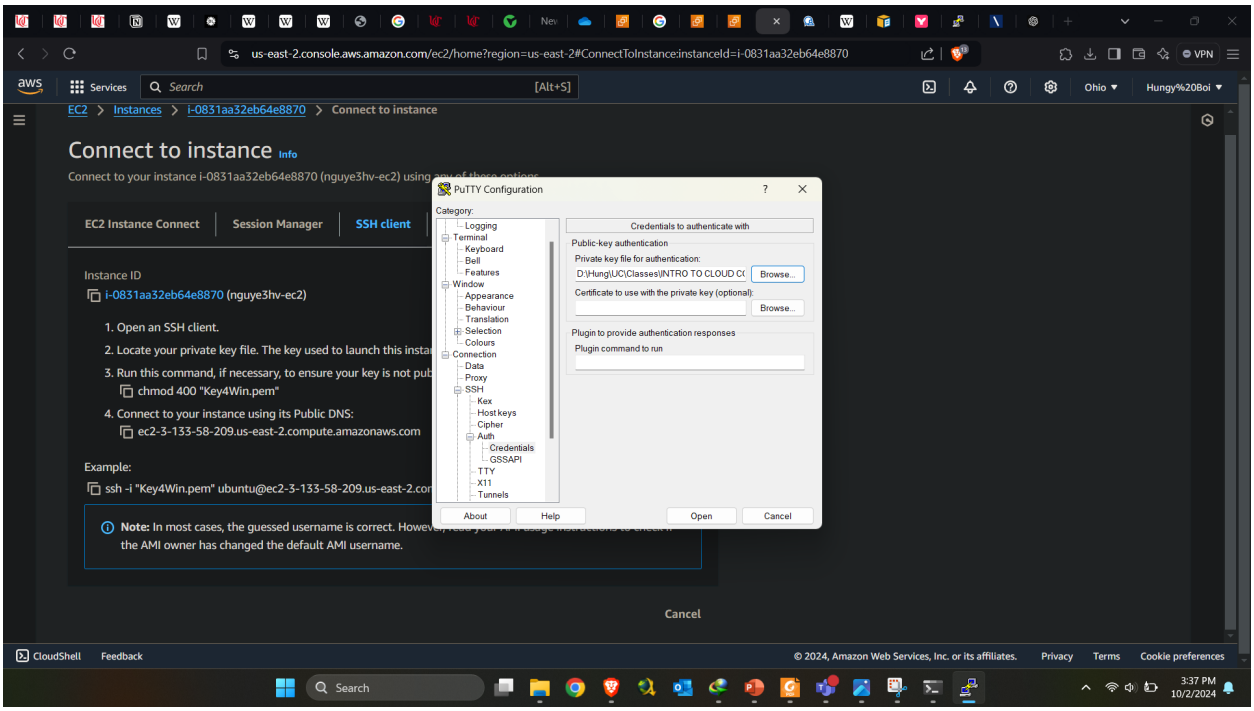
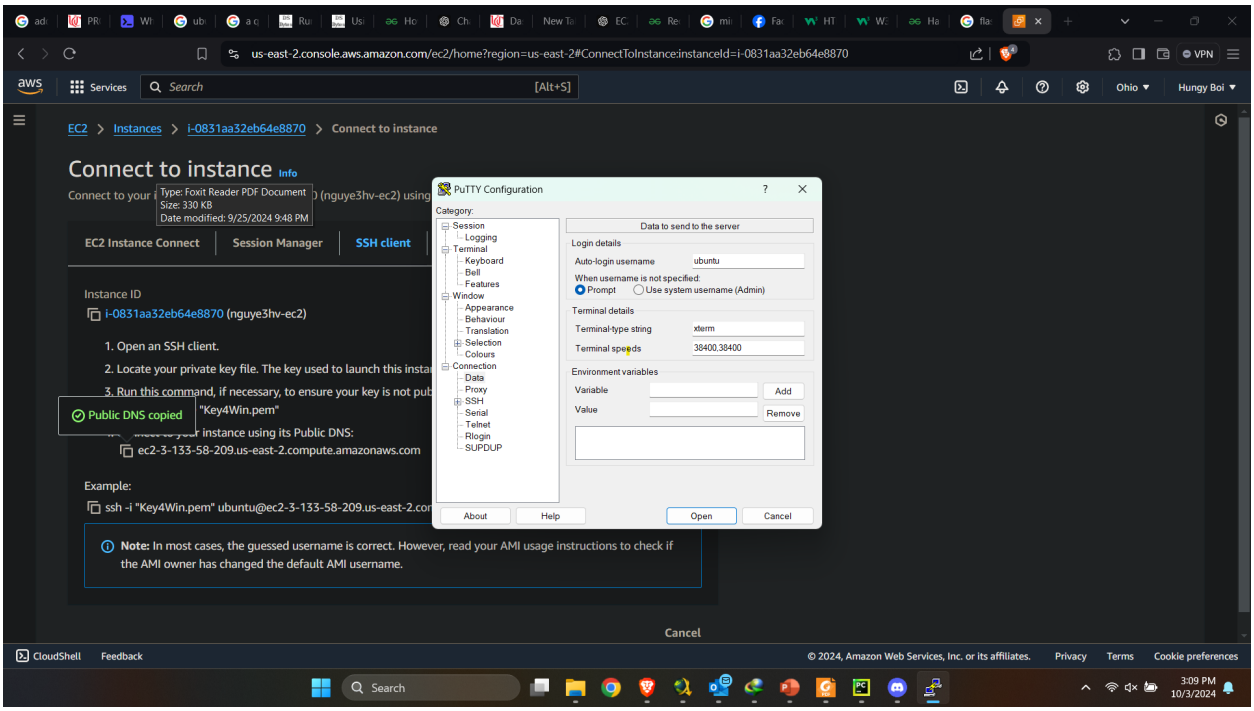
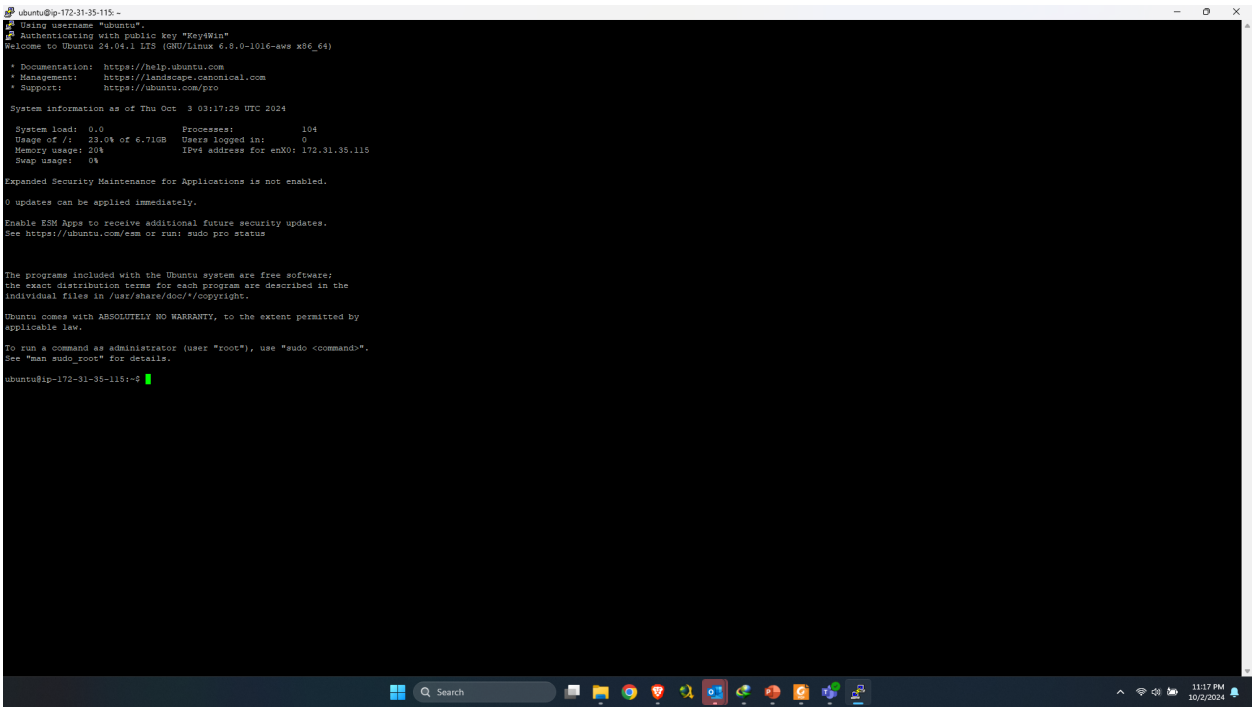


To connect to the EC2 instance using PuTTY, I set the hostname as my instance's DNS. Then I go to SSH, Auth, then Credentials then I select my download .ppk file as the key. Finally, I click on the Data button on the side tab and put in my auto-login username as *ubuntu*.


us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#ConnectToInstance:instanceId=i-0831aa32eb64e8870
EC2 > Instances > i-0831aa32eb64e8870 > Connect to instance
Connect to instance Info
EC2 Instance Connect
Session Manager
SSH client
Instance ID
i-0831aa32eb64e8870 (nguye3hv-ec2)
1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance
3. Run this command, if necessary, to ensure your key is not public
chmod 400 "Key4Win.pem"
4. Connect to your instance using its Public DNS:
ec2-3-133-58-209.us-east-2.compute.amazonaws.com
Example:
ssh -i "Key4Win.pem" ubuntu@ec2-3-133-58-209.us-east-2.com
Note: In most cases, the guessed username is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.
Cancel
PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
SSH
Serial
Telnet
Rlogin
SUPDUP
Basic options for your PuTTY session
Specify the destination you want to connect to
Host Name (or IP address)
Port
58-209.us-east-2.compute.amazonaws.com
22
Connection type:
SSH
Serial
Other:
Telnet
Load, save or delete a stored session
Saved Sessions
Default Settings
Load
Save
Delete
Close window on exit:
Always
Never
Only on clean exit
About
Help
Open
Cancel
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
3:36 PM
10/2/2024


us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#ConnectToInstance:instanceId=i-0831aa32eb64e8870
EC2 > Instances > i-0831aa32eb64e8870 > Connect to instance
Connect to instance Info
EC2 Instance Connect
Session Manager
SSH client
Instance ID
i-0831aa32eb64e8870 (nguye3hv-ec2)
1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance
3. Run this command, if necessary, to ensure your key is not public
chmod 400 "Key4Win.pem"
4. Connect to your instance using its Public DNS:
ec2-3-133-58-209.us-east-2.compute.amazonaws.com
Example:
ssh -i "Key4Win.pem" ubuntu@ec2-3-133-58-209.us-east-2.com
Note: In most cases, the guessed username is correct.
the AMI owner has changed the default AMI username.
Cancel
PuTTY Configuration
Category:
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
SSH
Kex
Host keys
Cipher
Auth
Credentials
GSSAPI
TTY
X11
Tunnels
Credentials to authenticate with
Public-key authentication
Private key file for authentication:
D:\Hung\UC\Classes\INTRO TO CLOUD C
Browse...
Certificate to use with the private key (optional):
Browse...
Plugin to provide authentication responses
Plugin command to run
About
Help
Open
Cancel
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
3:37 PM
10/2/2024

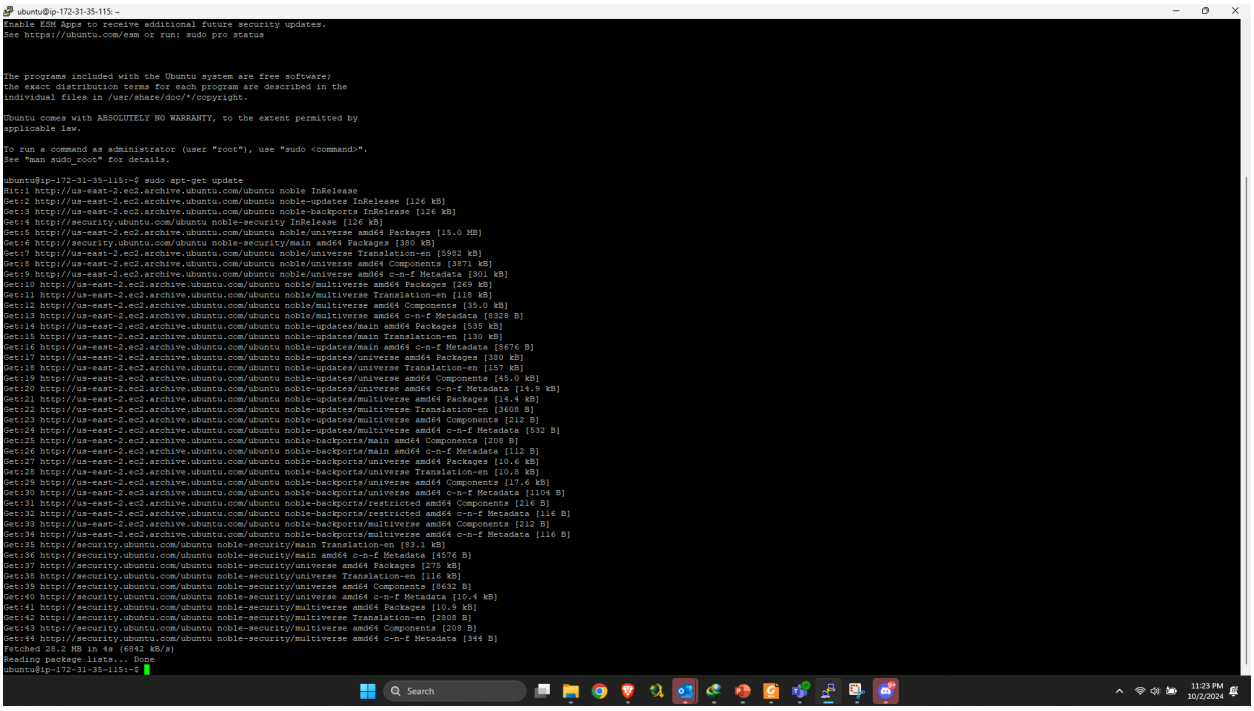




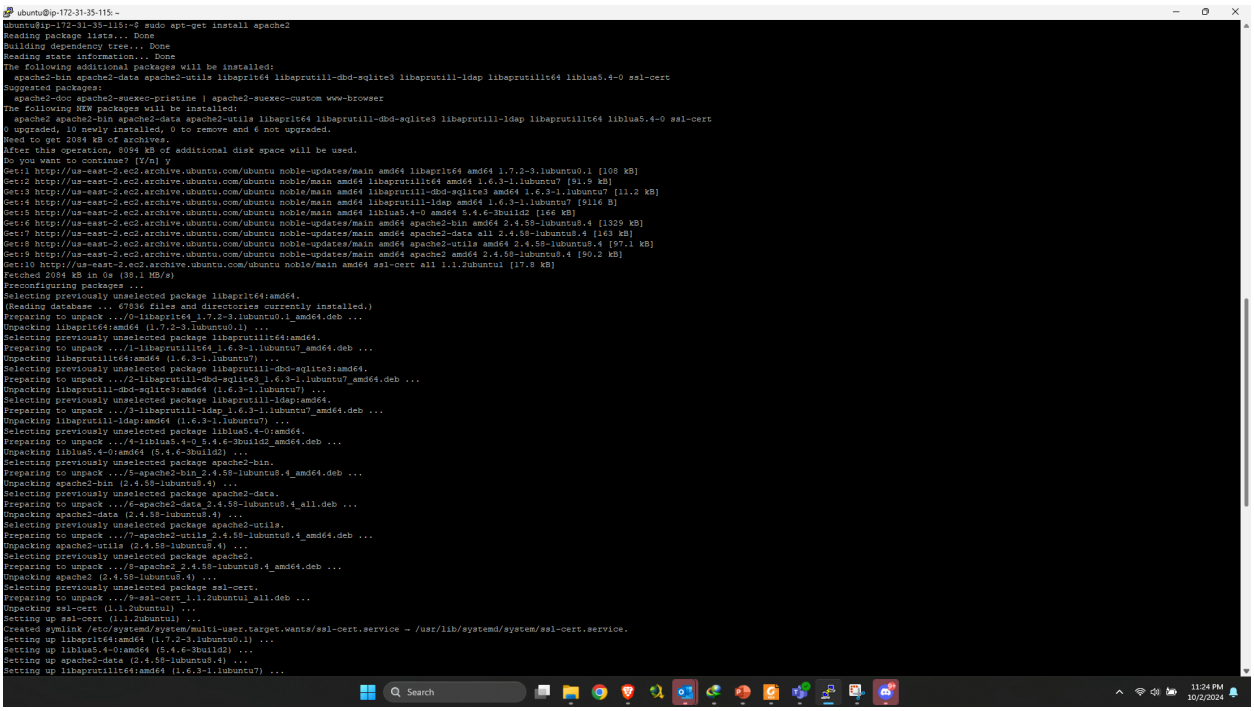
To install the Apache web server and mod_wsgi on my EC2 instance, I updated the package list with `sudo apt-get update`. Next, I install Apache using `sudo apt-get install apache2` and mod_wsgi with `sudo apt install libapache2-mod-wsgi-py3`. I then install Flask

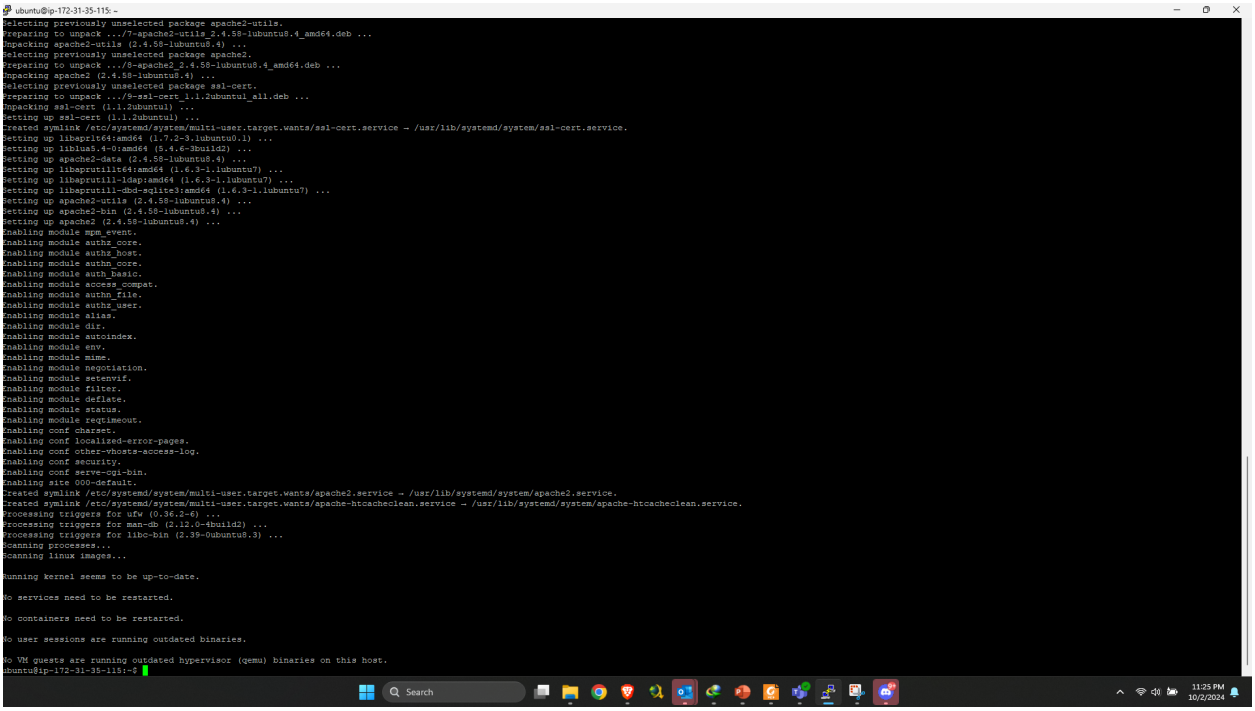
using the pip tool by running `sudo apt install python3-pip` followed by `sudo apt install python3-flask`. I also change the permissions of the `/home/ubuntu/` directory using `chmod 755 /home/ubuntu/`. Then, I install the ACL package by typing `sudo apt install acl` Finally, to test the configuration, I check the Apache error log with `tail /var/log/apache2/error.log`.

- Update all packages:

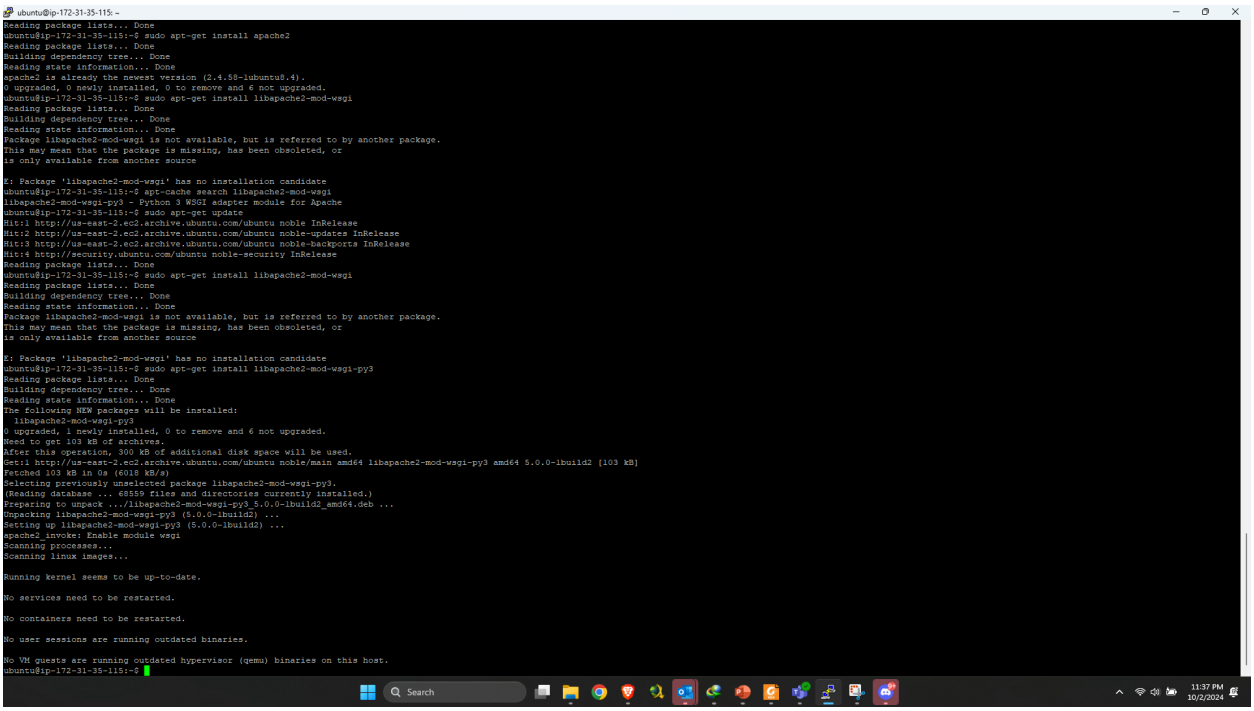


- Install Apache 2 package

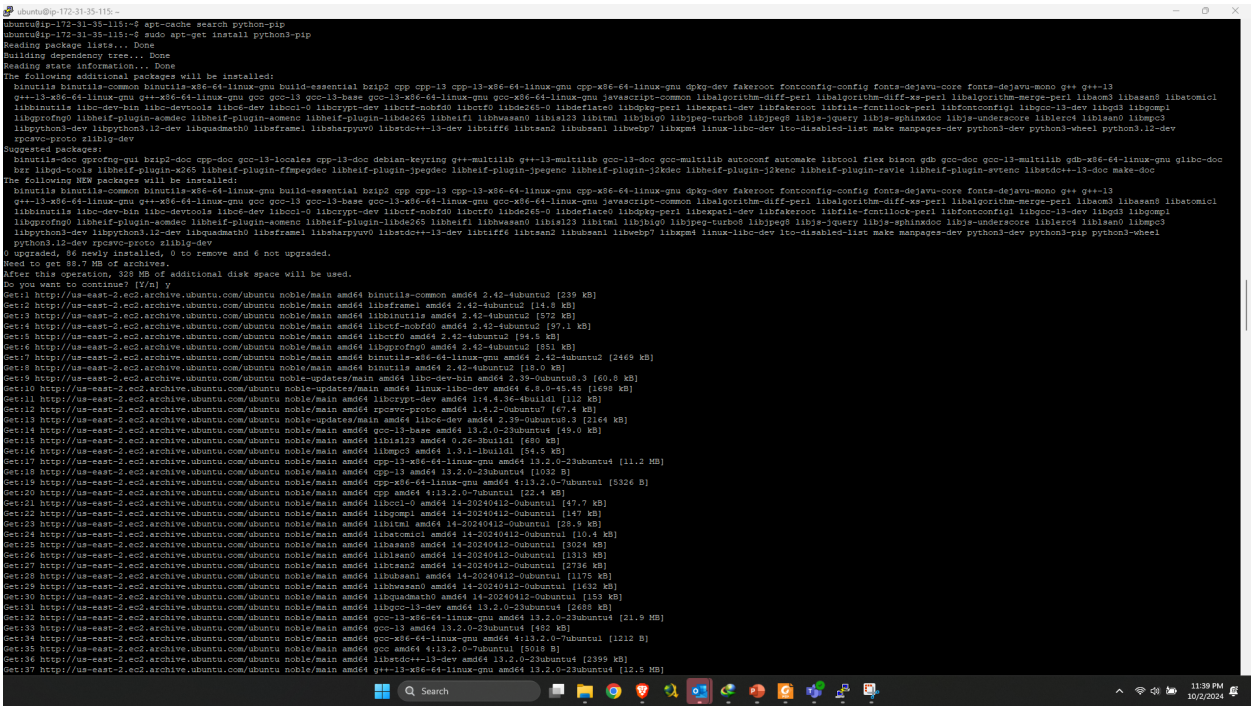




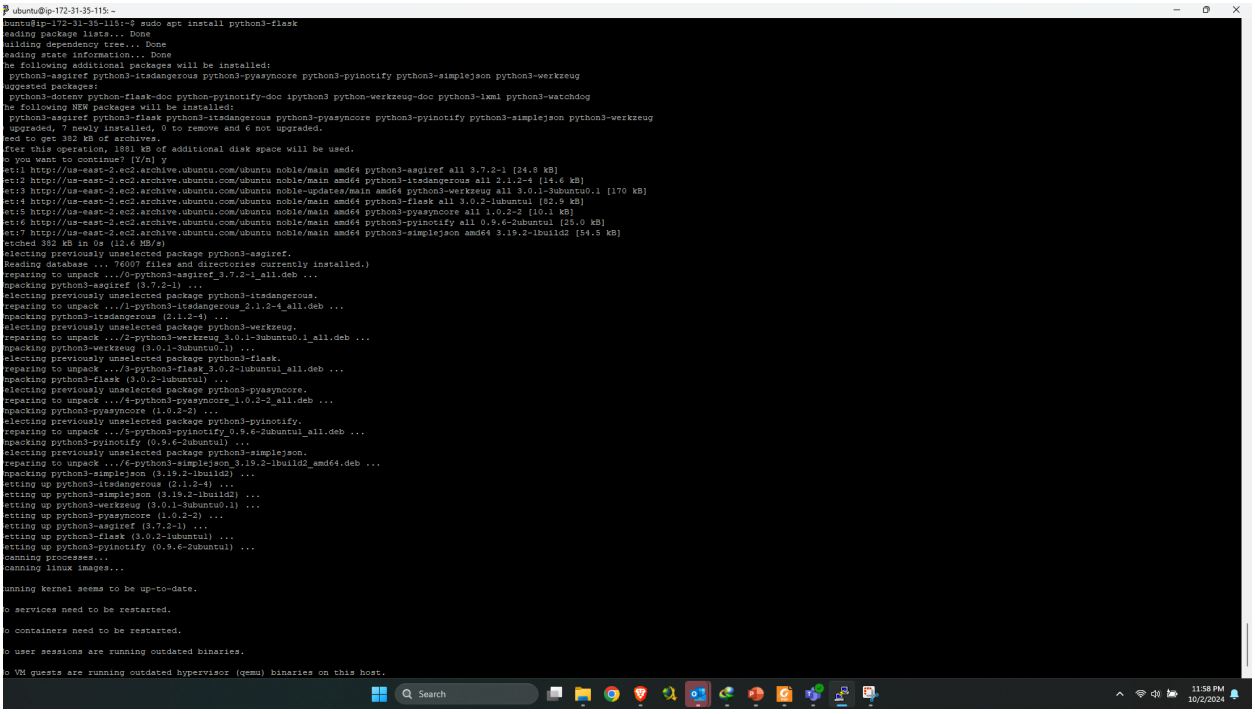
- Install mod_wsgi package



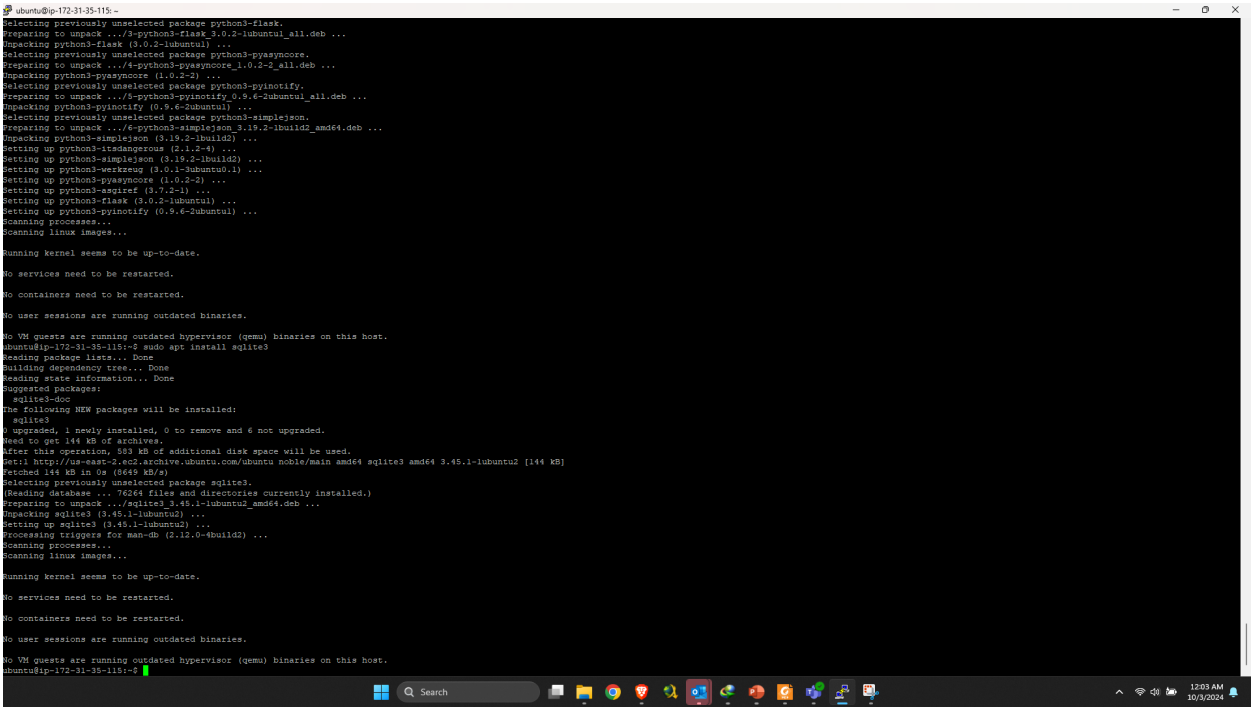
- Install python pip package



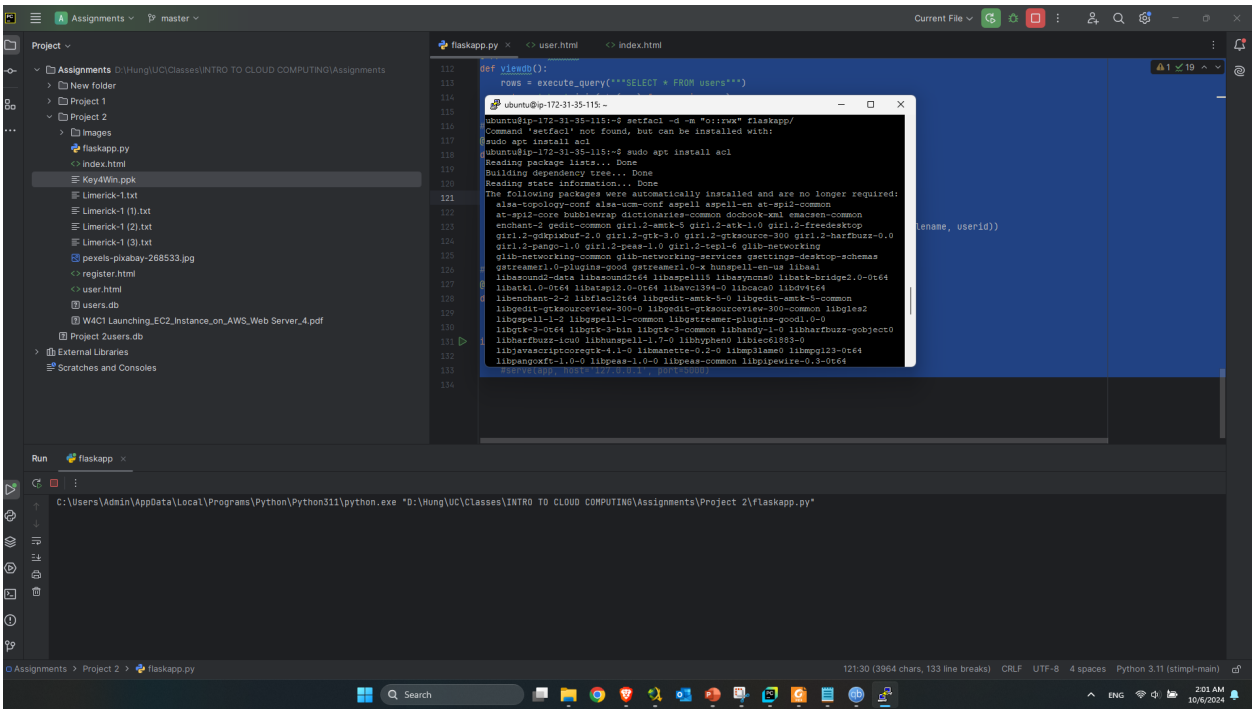
- Install the python flask package



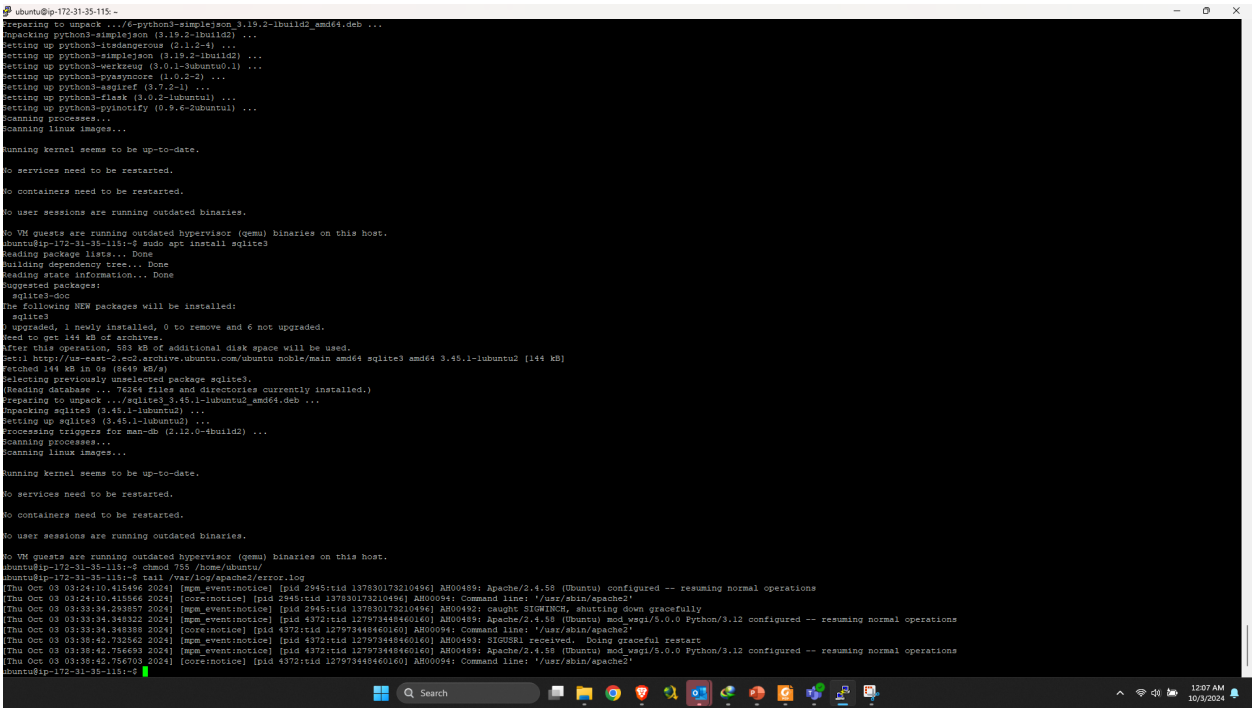
- Install Sqlite package



- Install ACL package

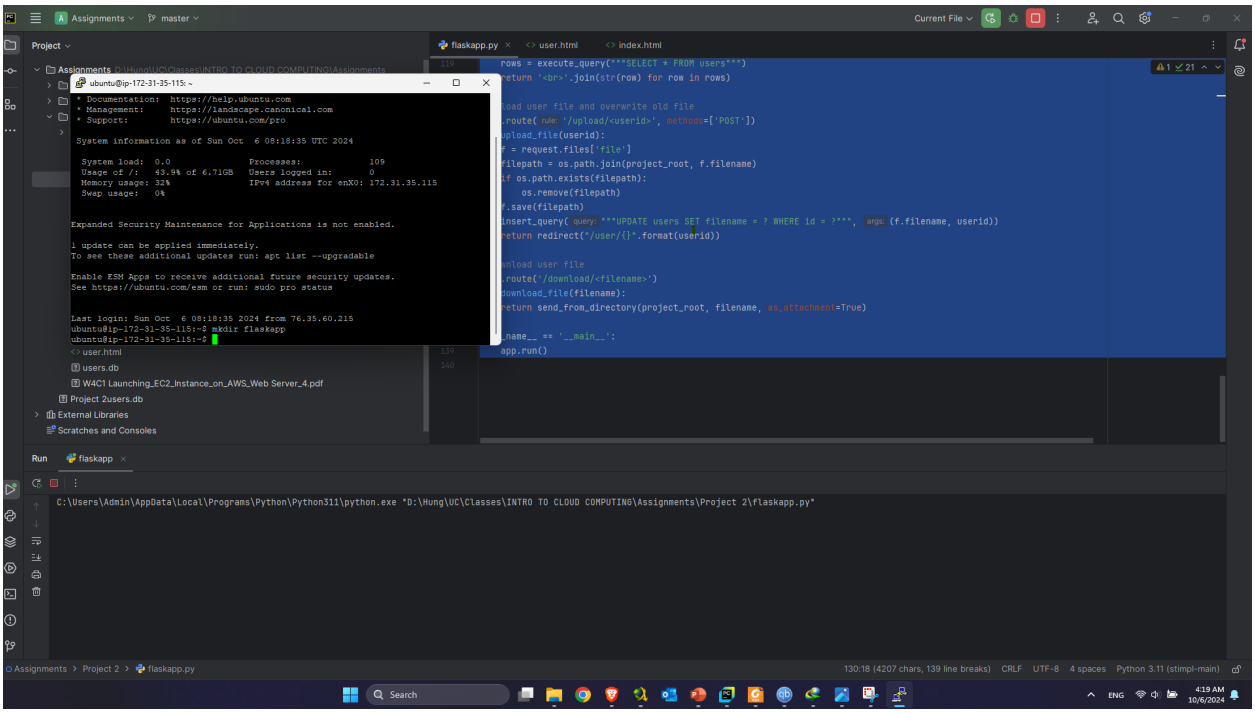


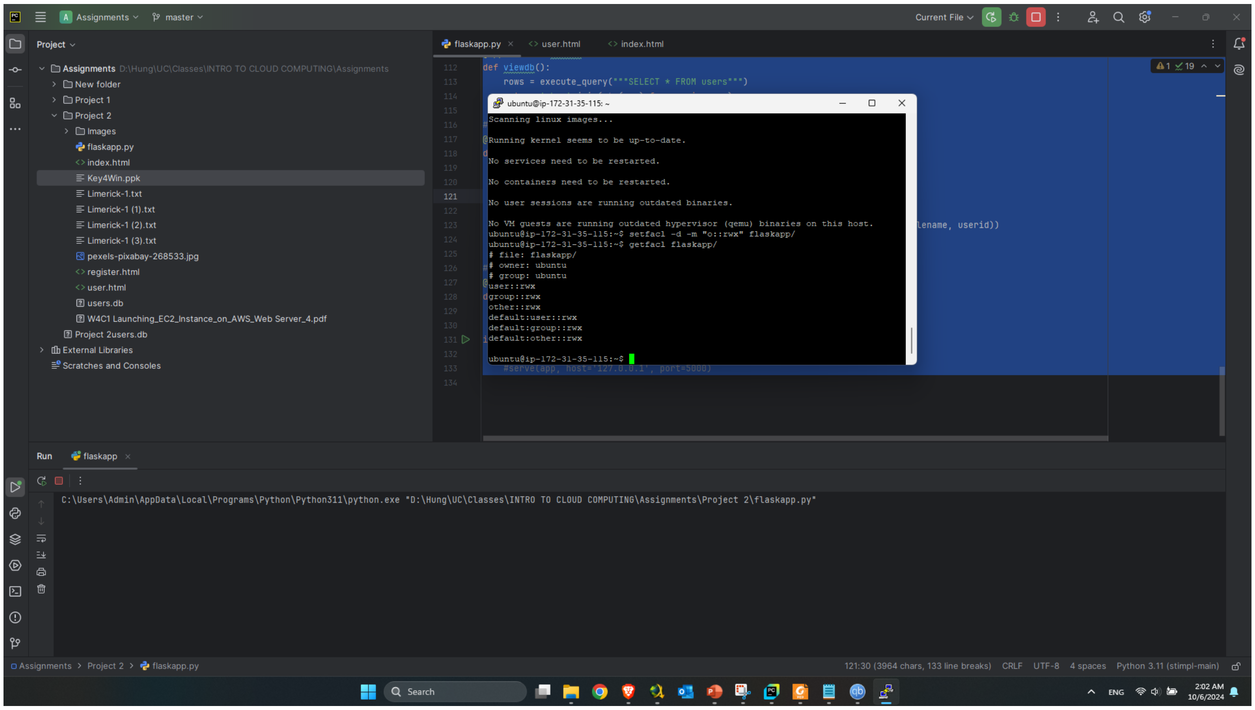
- Change permission of the home directory and check for error logs

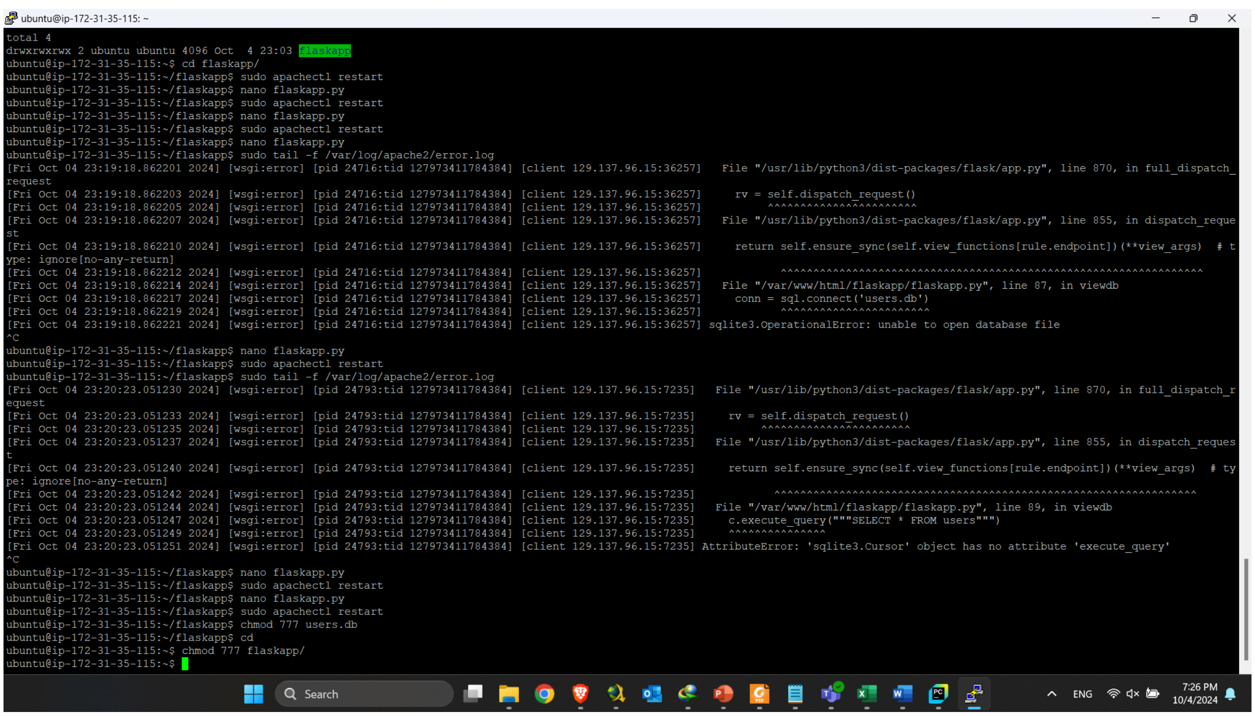


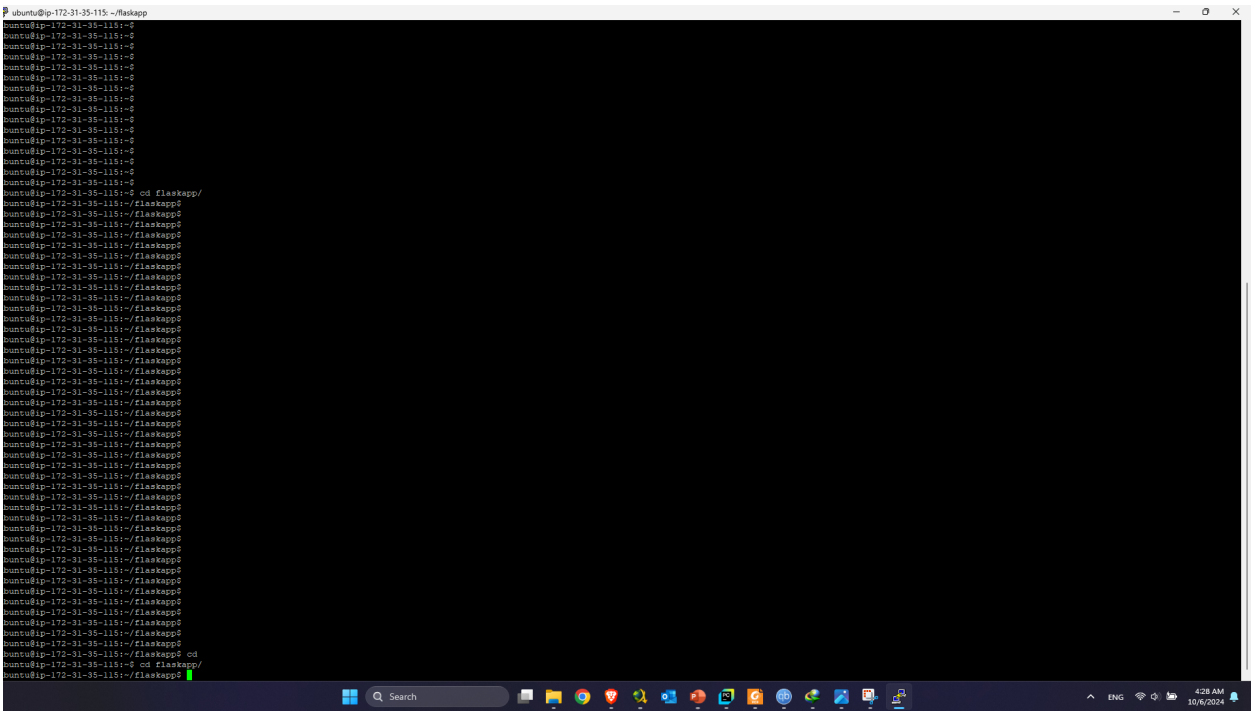
3. Design an interactive web page

First, I create a flaskapp directory in the home directory with `mkdir flaskapp` and set the default and directory permission to allow all users to read, write and execute files with `chmod 777 flaskapp` and `setfacl -d -m "o::rwx" flaskapp/` then change the working directory to flaskapp using `cd flaskapp`.

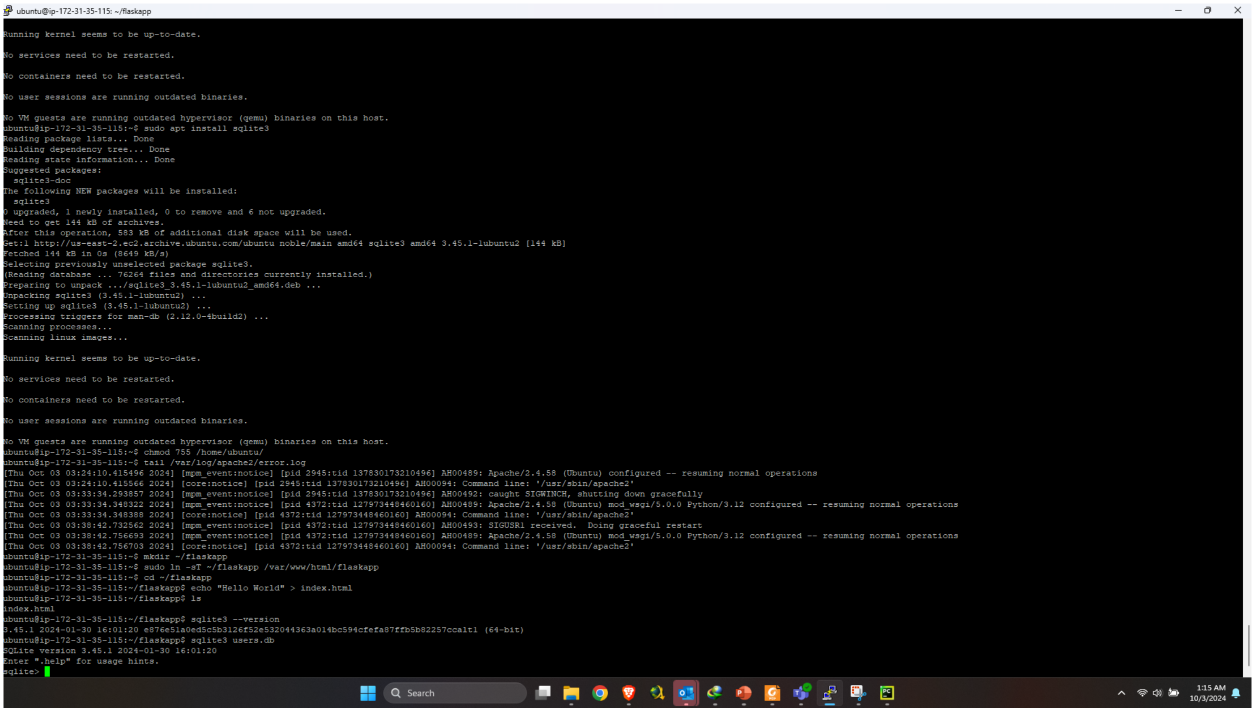


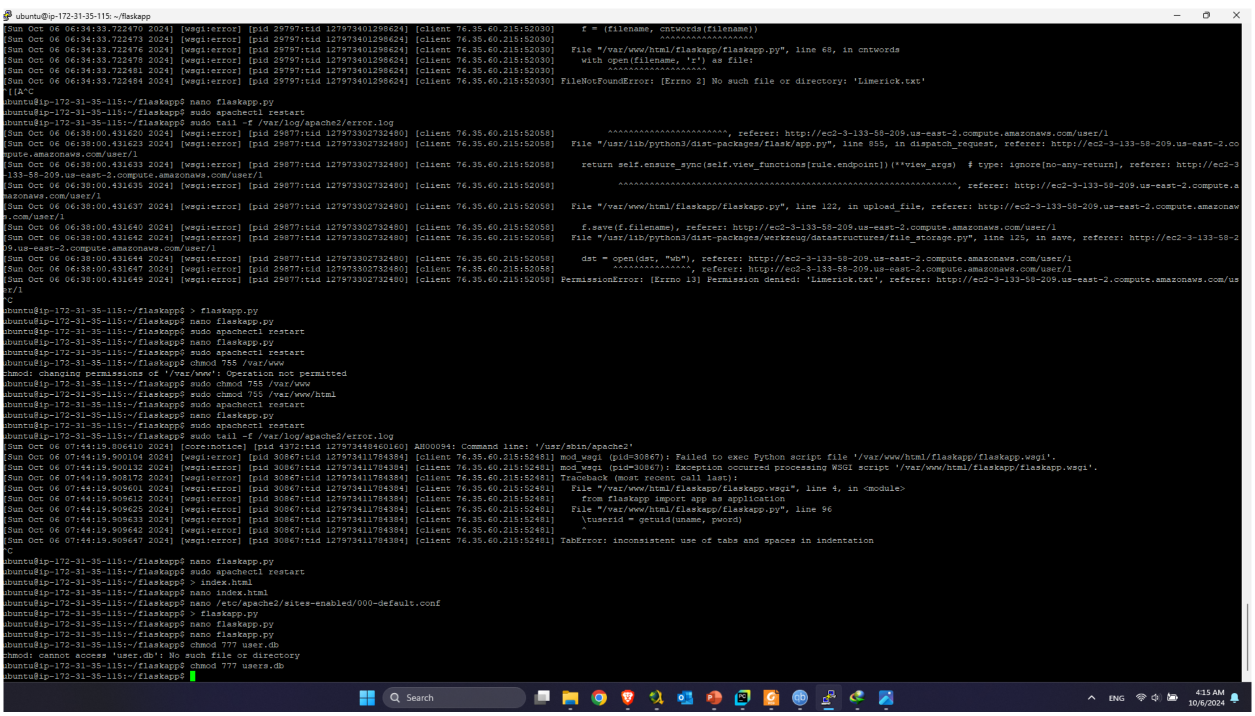

flaskapp.py
user.html
index.html
def viewdb():
rows = execute_query("""SELECT * FROM users""")
ubuntu@ip-172-31-35-115: ~
Scanning linux images...
Running kernel seems to be up-to-date.
No services need to be restarted.
No containers need to be restarted.
No user sessions are running outdated binaries.
No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-35-115:~$ setfacl -d -m "o::rwx" flaskapp/
ubuntu@ip-172-31-35-115:~$ getfacl flaskapp/
file: flaskapp/
owner: ubuntu
group: ubuntu
user::rwx
group::rwx
other::rwx
default:user::rwx
default:group::rwx
default:other::rwx
ubuntu@ip-172-31-35-115:~$
C:\Users\Admin\AppData\Local\Programs\Python\Python311\python.exe "D:\Hung\UC\Classes\INTRO TO CLOUD COMPUTING\Assignments\Project 2\flaskapp.py"


ubuntu@ip-172-31-35-115: ~
total 4
drwxrwxrwx 2 ubuntu ubuntu 4096 Oct 4 23:03 flaskapp
ubuntu@ip-172-31-35-115:~$ cd flaskapp/
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo apachectl restart
ubuntu@ip-172-31-35-115:~/flaskapp$ nano flaskapp.py
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo apachectl restart
ubuntu@ip-172-31-35-115:~/flaskapp$ nano flaskapp.py
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo apachectl restart
ubuntu@ip-172-31-35-115:~/flaskapp$ nano flaskapp.py
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo tail -f /var/log/apache2/error.log
[Fri Oct 04 23:19:18.862201 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   File "/usr/lib/python3/dist-packages/flask/app.py", line 870, in full_dispatch_request
[Fri Oct 04 23:19:18.862203 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   rv = self.dispatch_request()
[Fri Oct 04 23:19:18.862205 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   ^^^^^^^^^^^^^^^^^^^^^^^
[Fri Oct 04 23:19:18.862207 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   File "/usr/lib/python3/dist-packages/flask/app.py", line 855, in dispatch_request
[Fri Oct 04 23:19:18.862210 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   return self.ensure_sync(self.view_functions[rule.endpoint])(**view_args) # type: ignore[no-any-return]
[Fri Oct 04 23:19:18.862212 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   ^^^
[Fri Oct 04 23:19:18.862214 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   File "/var/www/html/flaskapp/flaskapp.py", line 87, in viewdb
[Fri Oct 04 23:19:18.862217 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   conn = sql.connect('users.db')
[Fri Oct 04 23:19:18.862219 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257]   ^^^^^^^^^^^^^^^^^^^^^^^
[Fri Oct 04 23:19:18.862221 2024] [wsgi:error] [pid 24716:tid 127973411784384] [client 129.137.96.15:36257] sqlite3.OperationalError: unable to open database file
^C
ubuntu@ip-172-31-35-115:~/flaskapp$ nano flaskapp.py
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo apachectl restart
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo tail -f /var/log/apache2/error.log
[Fri Oct 04 23:20:23.051230 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   File "/usr/lib/python3/dist-packages/flask/app.py", line 870, in full_dispatch_request
[Fri Oct 04 23:20:23.051233 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   rv = self.dispatch_request()
[Fri Oct 04 23:20:23.051235 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   ^^^^^^^^^^^^^^^^^^^^^^^
[Fri Oct 04 23:20:23.051237 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   File "/usr/lib/python3/dist-packages/flask/app.py", line 855, in dispatch_request
[Fri Oct 04 23:20:23.051240 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   return self.ensure_sync(self.view_functions[rule.endpoint])(**view_args) # type: ignore[no-any-return]
[Fri Oct 04 23:20:23.051242 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   ^^^
[Fri Oct 04 23:20:23.051244 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   File "/var/www/html/flaskapp/flaskapp.py", line 89, in viewdb
[Fri Oct 04 23:20:23.051247 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   c.execute_query("""SELECT * FROM users""")
[Fri Oct 04 23:20:23.051249 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235]   ^^^^^^^^^^^^^^^
[Fri Oct 04 23:20:23.051251 2024] [wsgi:error] [pid 24793:tid 127973411784384] [client 129.137.96.15:7235] AttributeError: 'sqlite3.Cursor' object has no attribute 'execute_query'
^C
ubuntu@ip-172-31-35-115:~/flaskapp$ nano flaskapp.py
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo apachectl restart
ubuntu@ip-172-31-35-115:~/flaskapp$ nano flaskapp.py
ubuntu@ip-172-31-35-115:~/flaskapp$ sudo apachectl restart
ubuntu@ip-172-31-35-115:~/flaskapp$ chmod 777 users.db
ubuntu@ip-172-31-35-115:~/flaskapp$ cd
ubuntu@ip-172-31-35-115:~$ chmod 777 flaskapp/
ubuntu@ip-172-31-35-115:~$

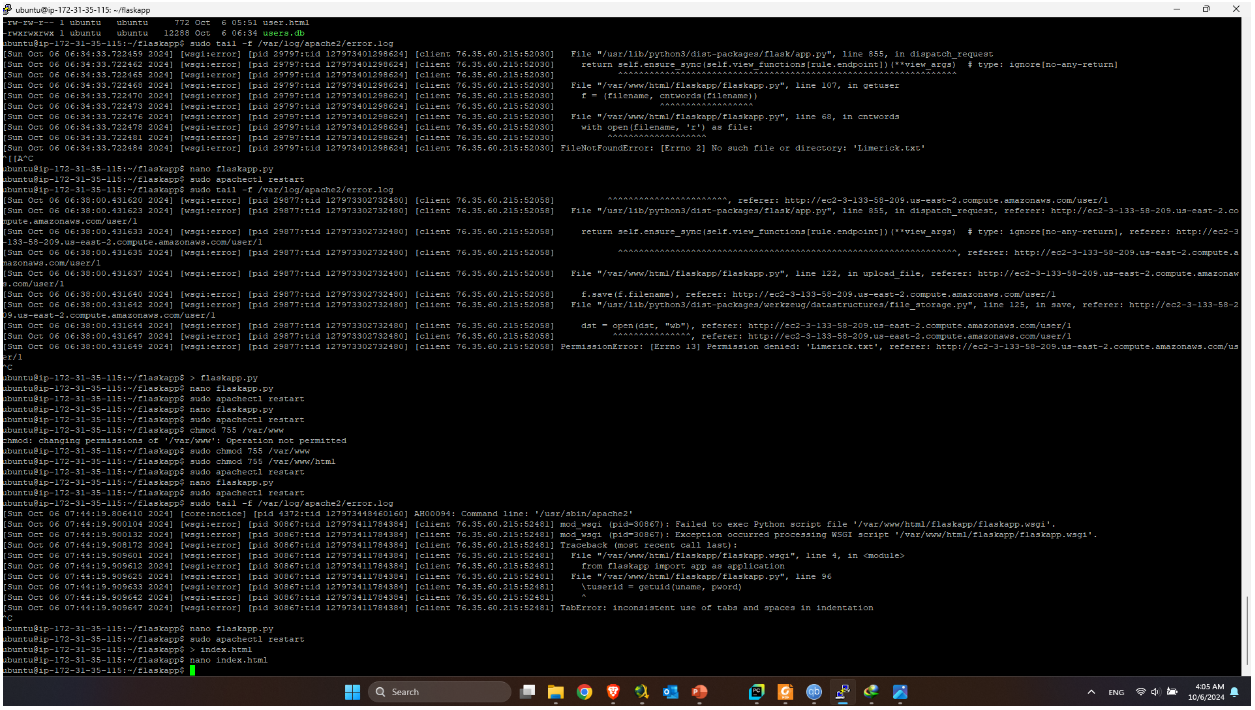


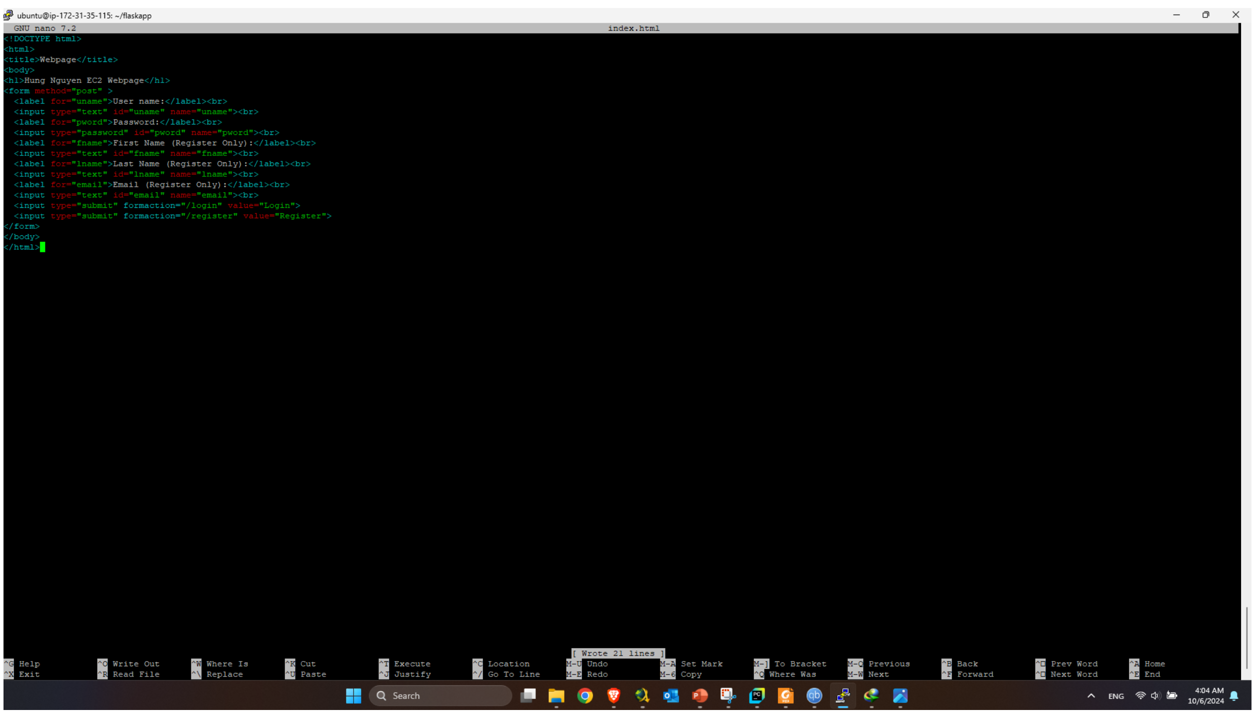
To create the web app, I first create a user database with `sqlite3 users.db` and change database file permission to allow all users to all users to read, write and execute the file using `chmod 777 users.db`. Then I add index.html, user.html, flaskapp.wsgi and flaskapp.py in the current directory. Then, I modify the apache configuration file located at `/etc/apache2/sites-enabled/000-default.conf` using `nano /etc/apache2/sites-enabled/000-default.conf`. Finally, I restart the server with the new configuration.



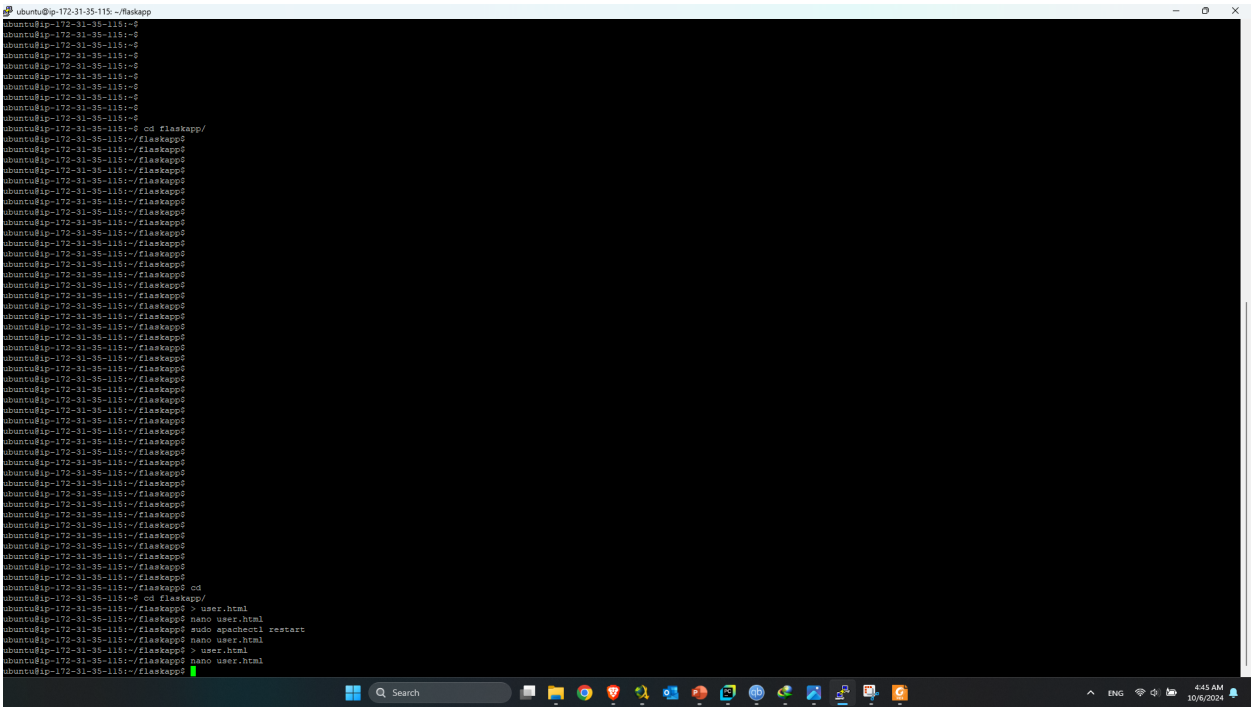


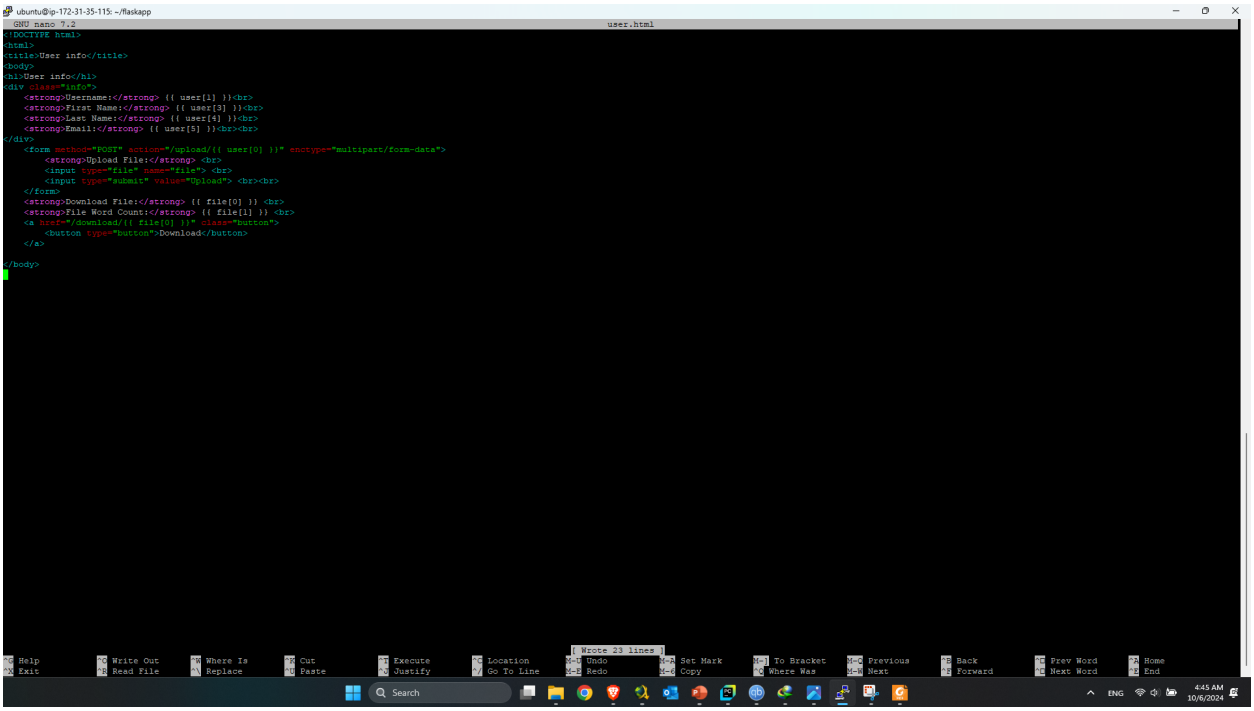
- Add index.html



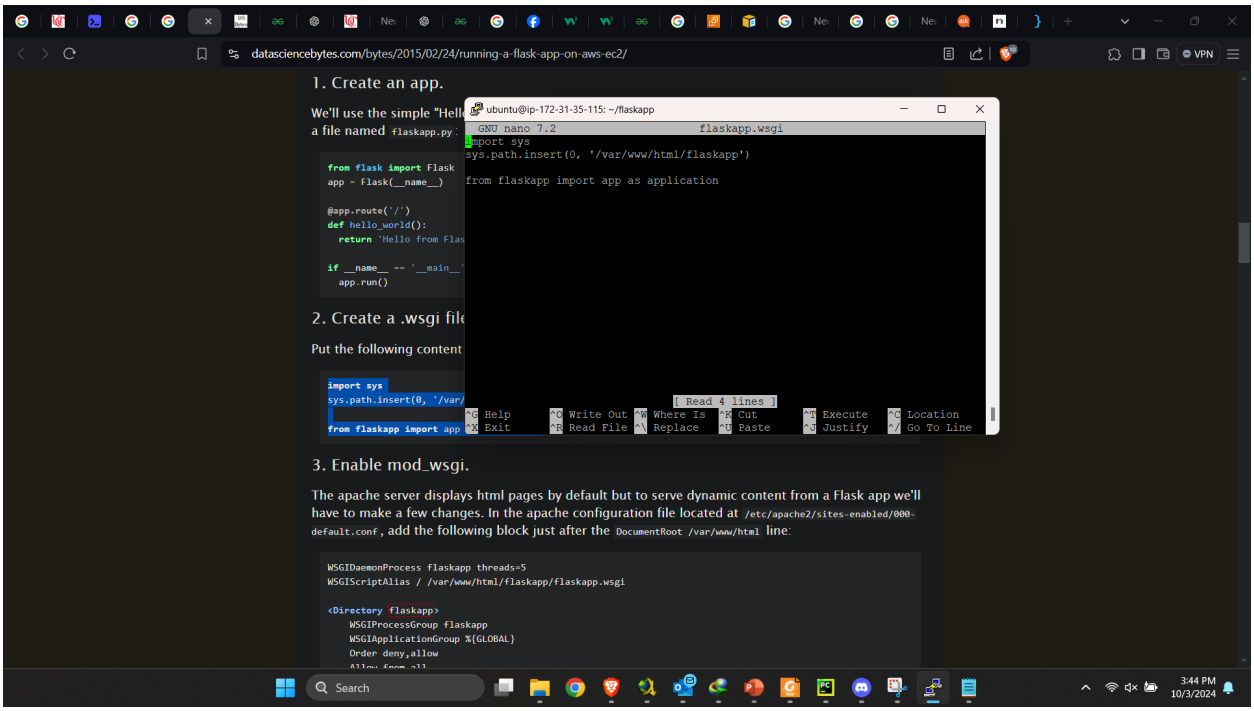


- Add user.html

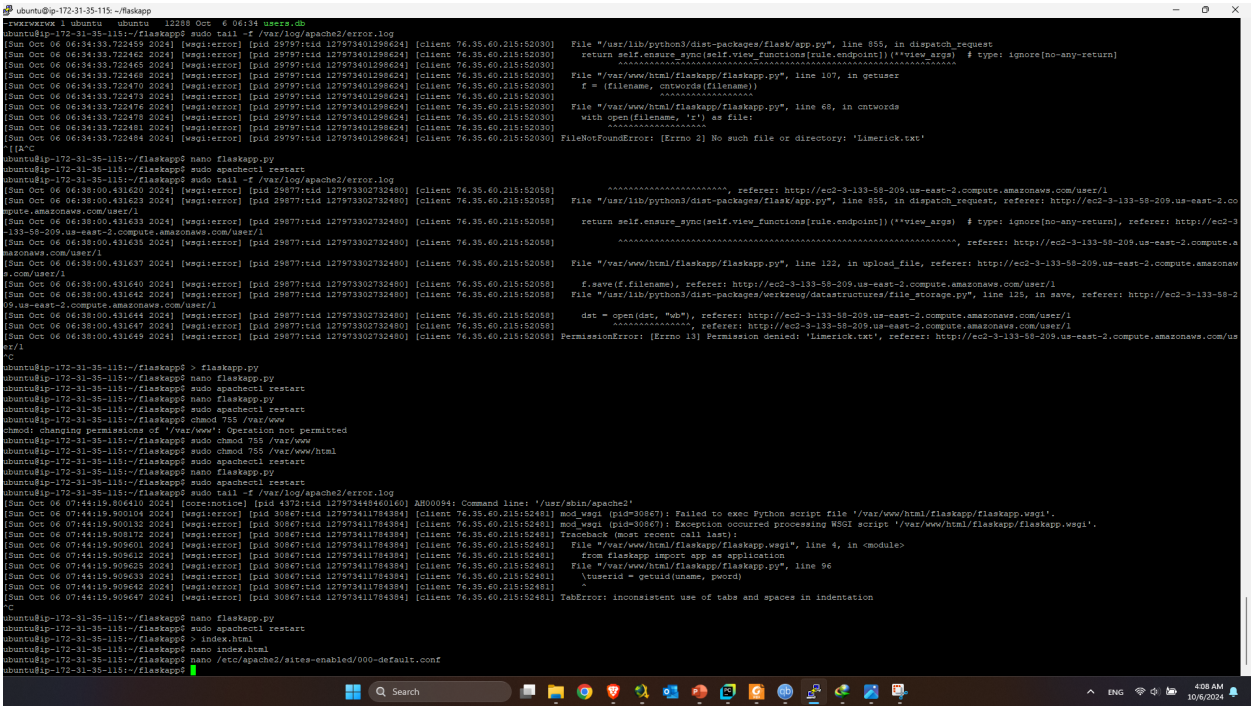


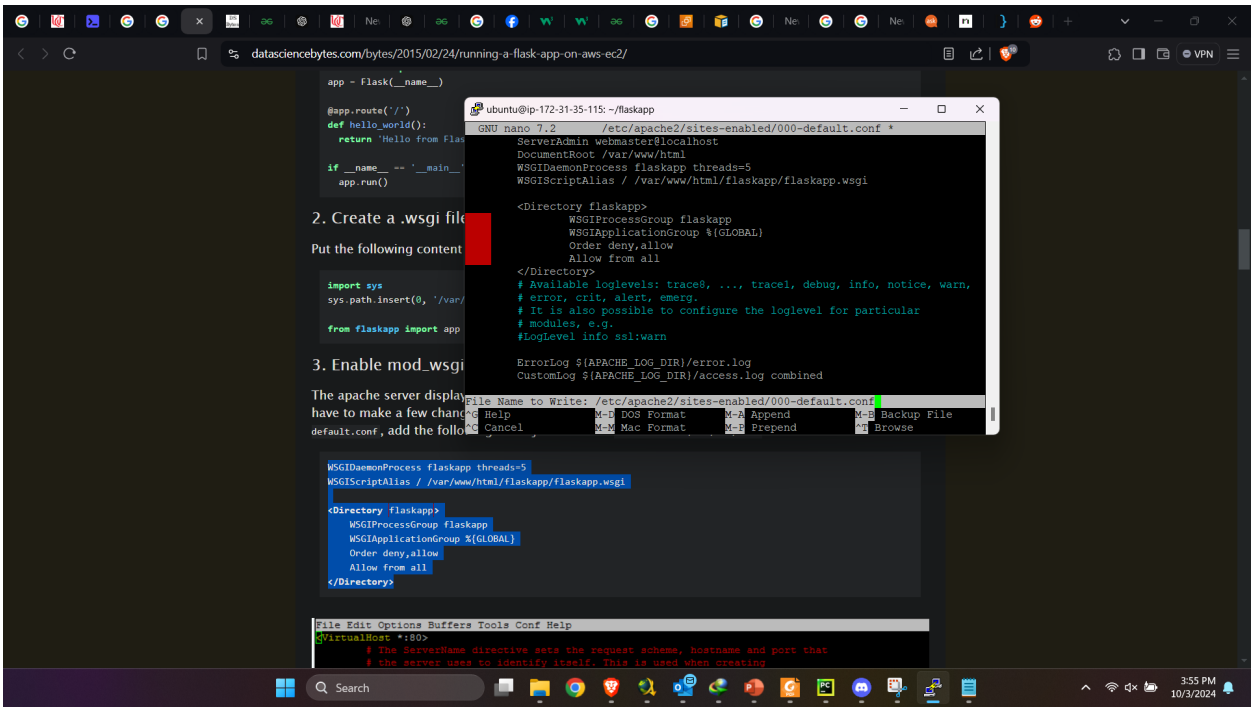


- Add flaskapp.wsgi

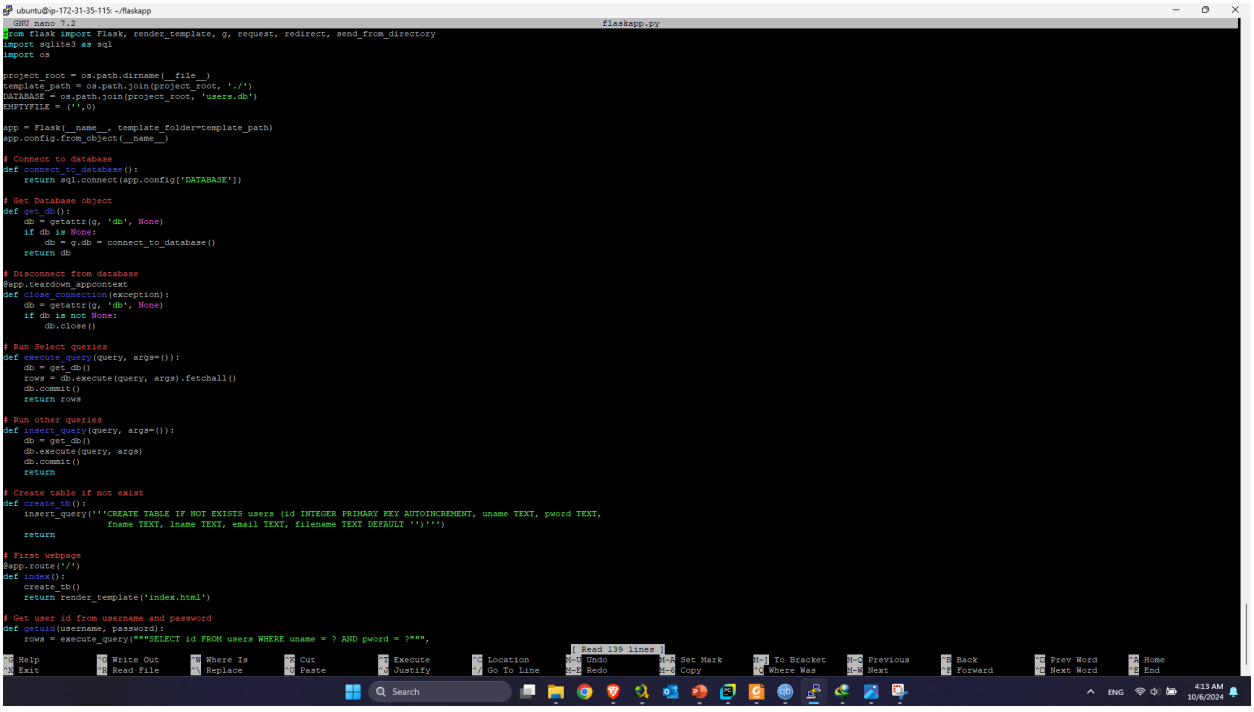


- Modify the apache configuration file located at `/etc/apache2/sites-enabled/000-default.conf`

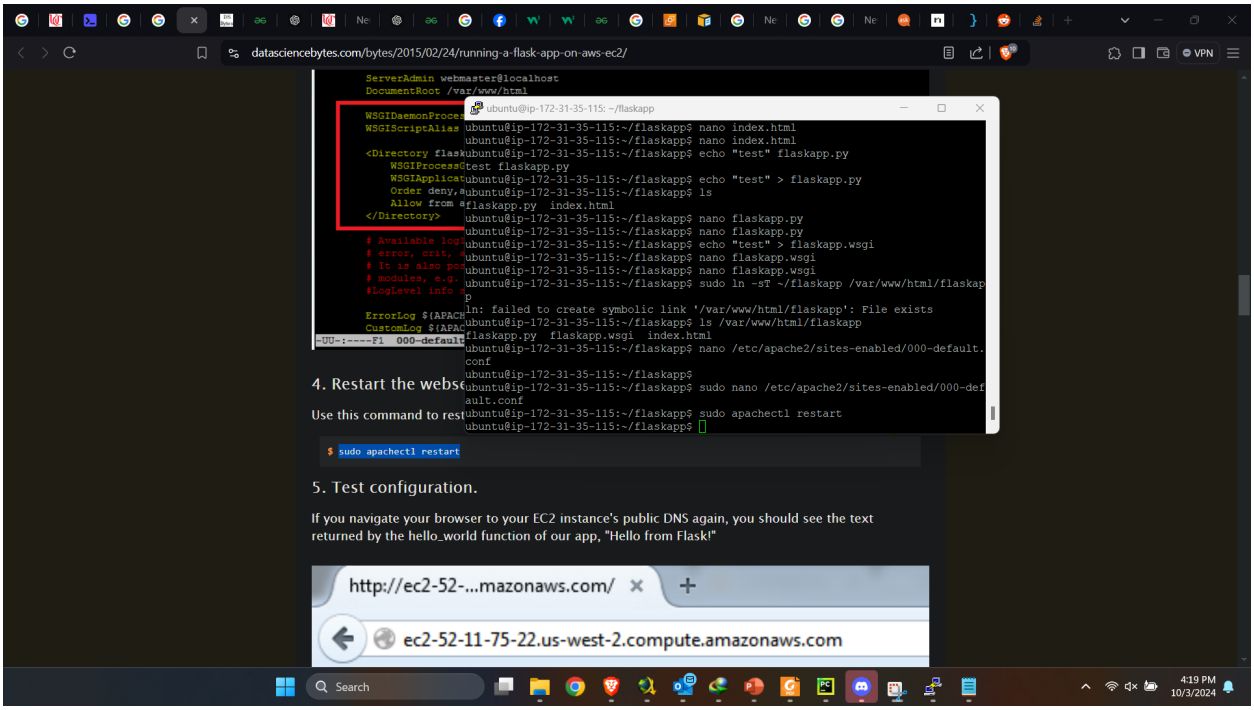




- Add flaskapp.py



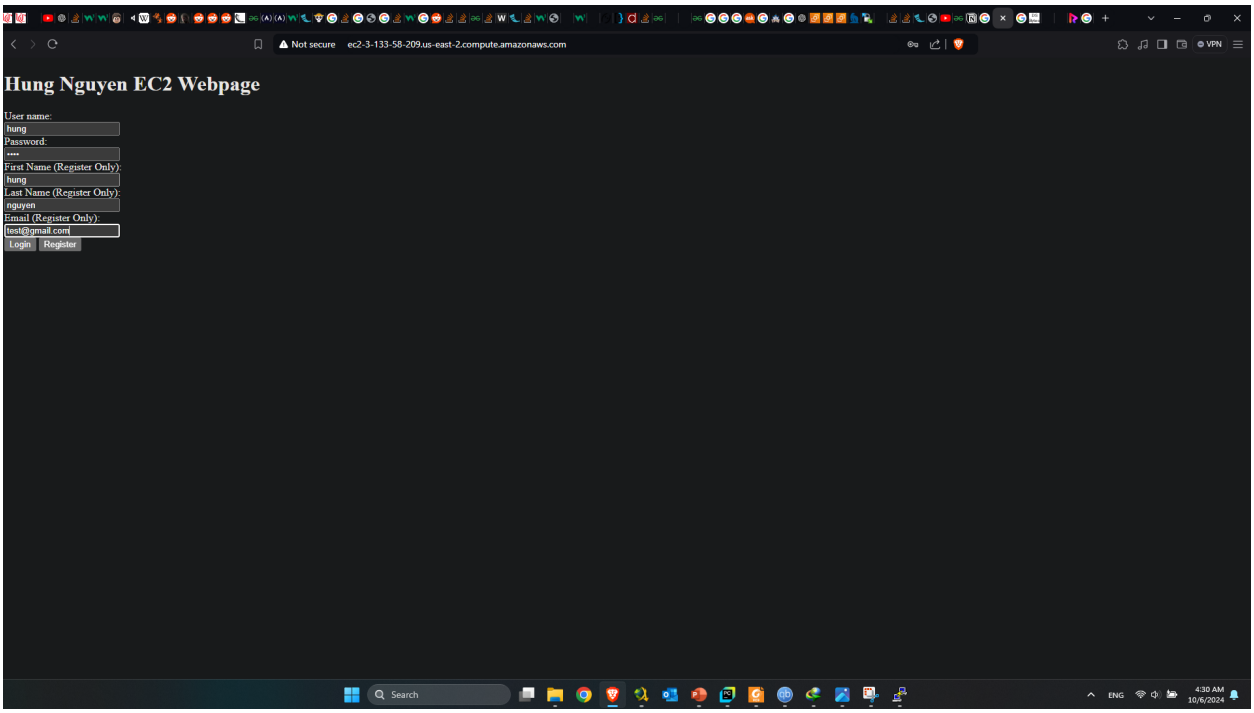
- Restart the server with the new configuration



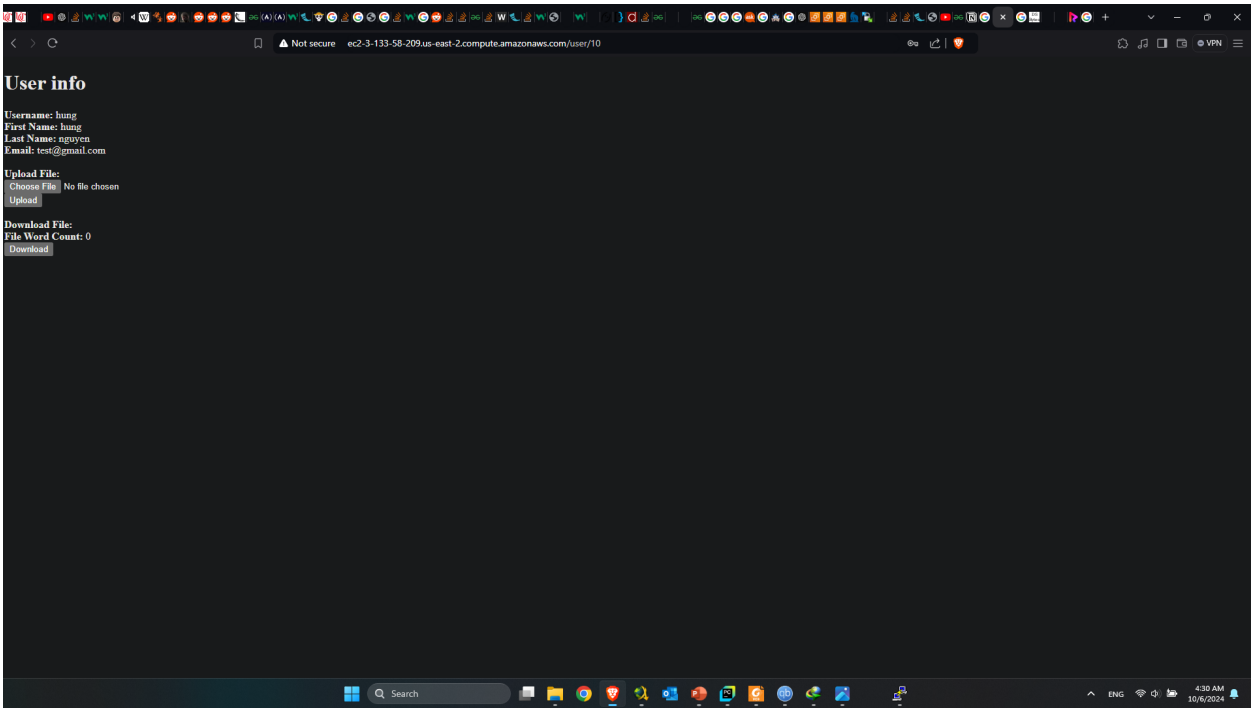
4. Webpage: http://ec2-3-133-58-209.us-east-2.compute.amazonaws.com/

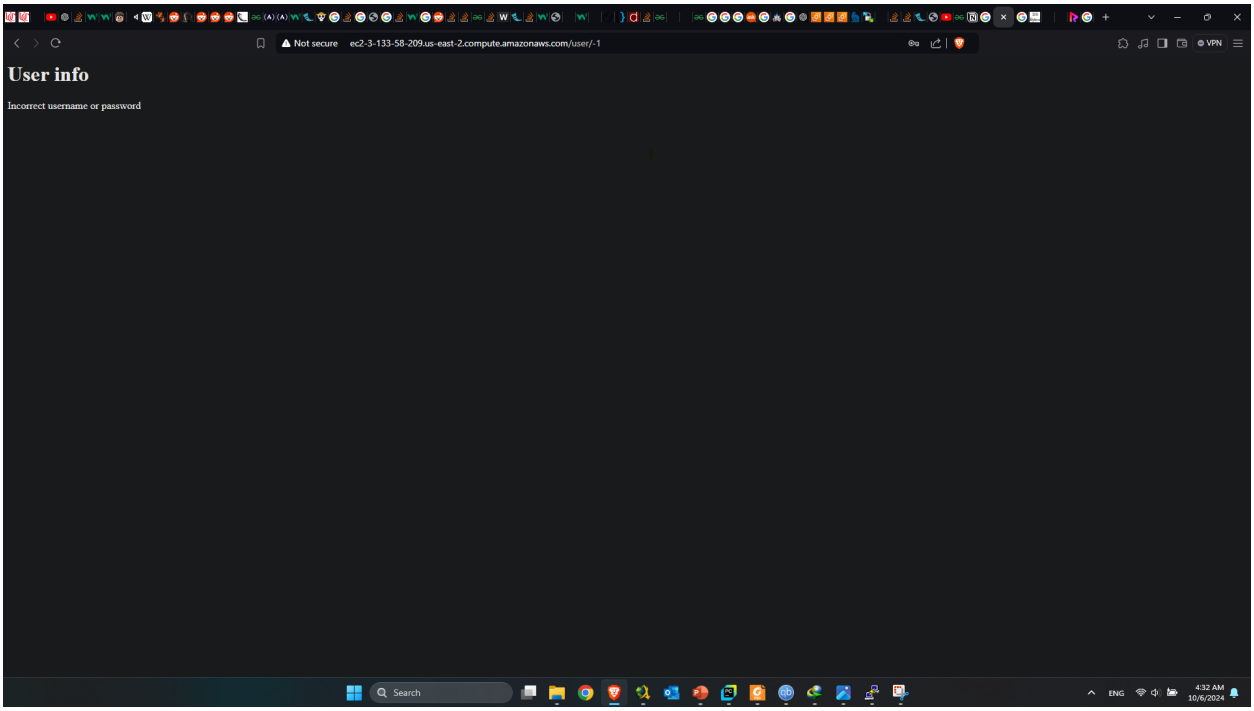
To sign in, I would put in my username and password then press on the login button. To register, I would put in my username, password, first name, last name, and email then press the Register button. Once I have logged in successfully or registered, the User info page is displayed with my username, first name, last name, and email. On the other hand, if I enter an incorrect password or username, the webpage will say “Incorrect username or password”.

- Login page



- User info page

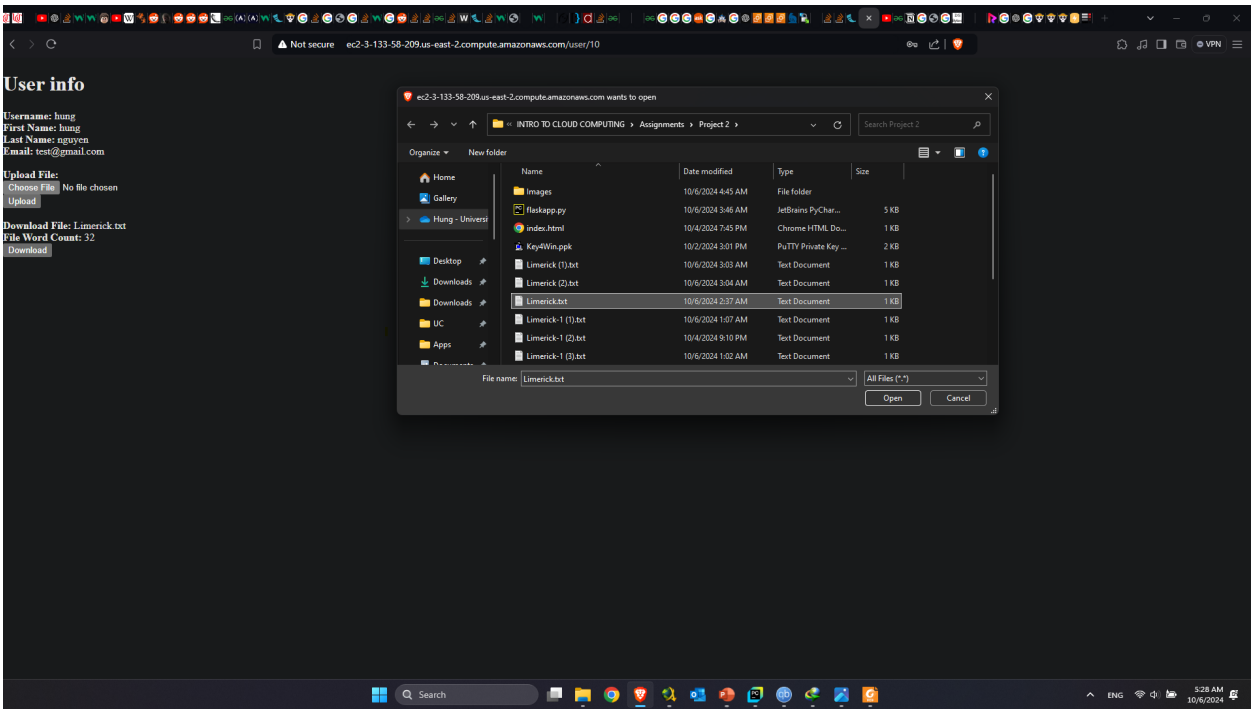


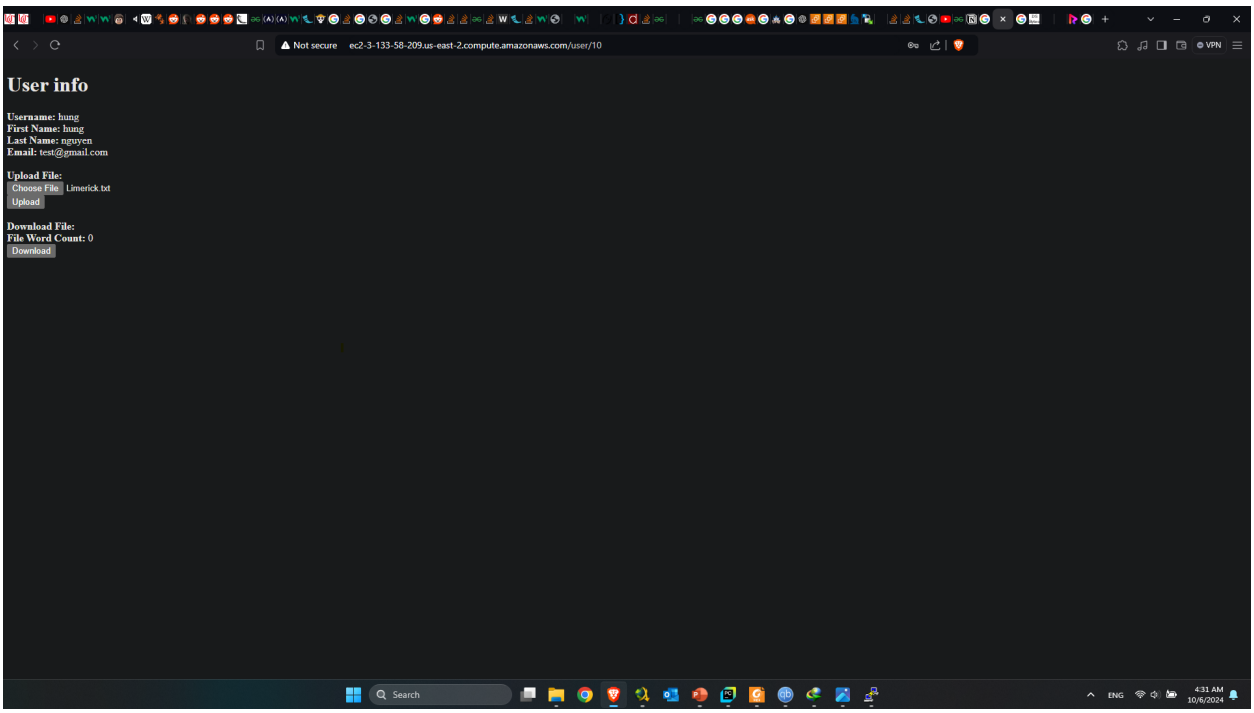


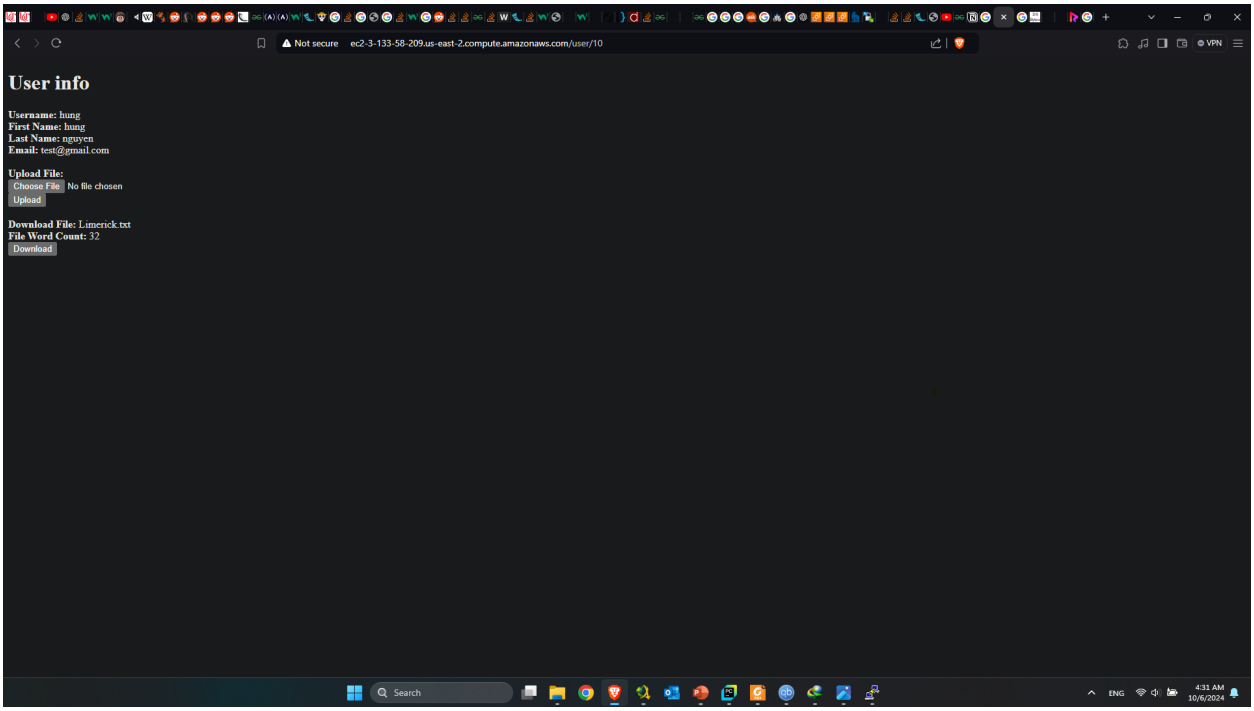
3. Extra credit

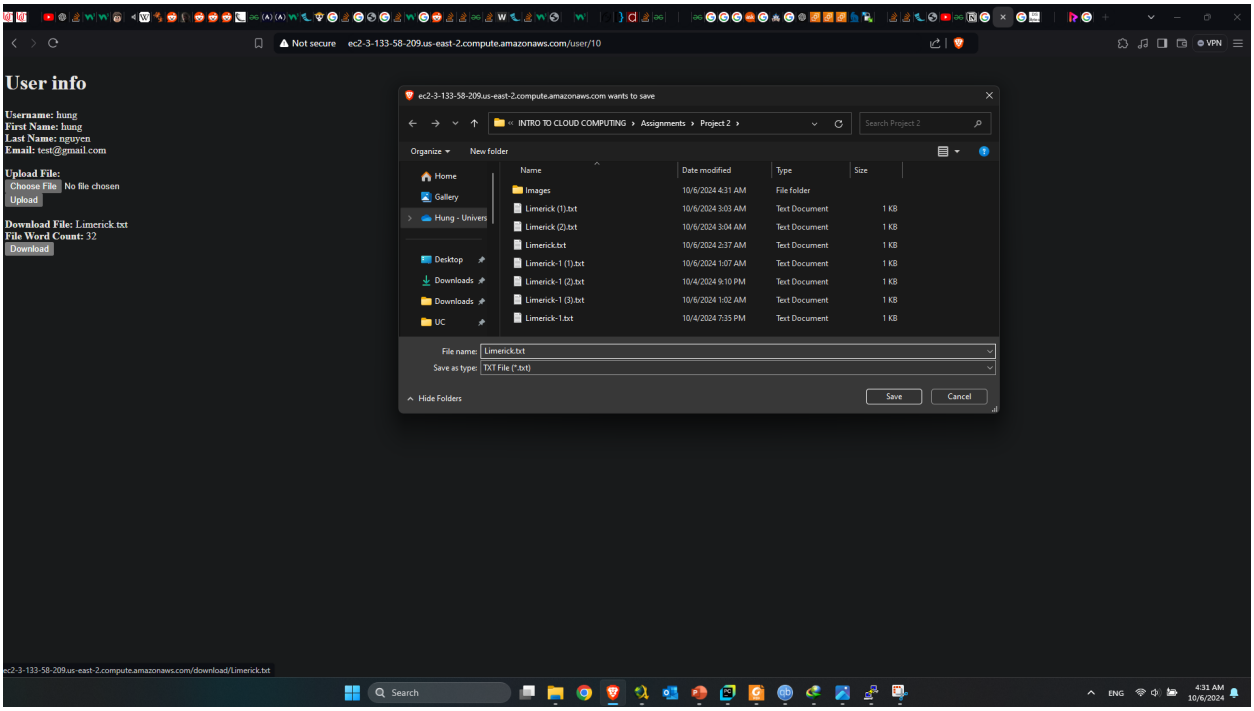
For uploading files, I would press on the Choose file button then select the file I want to upload. Then, I click on the upload button to upload the file to the server and show the word count and the download link. For downloading files, I would click on the Download button when there is a file name shown in the Download File section.

- User info page upload file and download file


Not secure ec2-3-133-58-209.us-east-2.compute.amazonaws.com/user/10
User info
Username: hung
First Name: hung
Last Name: nguyen
Email: test@gmail.com
Upload File:
Choose File No file chosen
Upload
Download File: Limerick.txt
File Word Count: 32
Download
ec2-3-133-58-209.us-east-2.compute.amazonaws.com wants to open
INTRO TO CLOUD COMPUTING › Assignments › Project 2 ›
Search Project 2
Organize
New folder
Home
Gallery
Hung - Universi
Desktop
Downloads
Downloads
UC
Apps
Name
Date modified
Type
Size
Images 10/6/2024 4:45 AM File folder
flaskapp.py 10/6/2024 3:46 AM JetBrains PyChar... 5 KB
index.html 10/4/2024 7:45 PM Chrome HTML Do... 1 KB
Key4Win.ppk 10/2/2024 3:01 PM PuTTY Private Key ... 2 KB
Limerick (1).txt 10/6/2024 3:03 AM Text Document 1 KB
Limerick (2).txt 10/6/2024 3:04 AM Text Document 1 KB
Limerick.txt 10/6/2024 2:37 AM Text Document 1 KB
Limerick-1 (1).txt 10/6/2024 1:07 AM Text Document 1 KB
Limerick-1 (2).txt 10/4/2024 9:10 PM Text Document 1 KB
Limerick-1 (3).txt 10/6/2024 1:02 AM Text Document 1 KB
File name: Limerick.txt
All Files (*.*)
Open
Cancel
Search
ENG
5:28 AM
10/6/2024


Not secure ec2-3-133-58-209.us-east-2.compute.amazonaws.com/user/10
User info
Username: hung
First Name: hung
Last Name: nguyen
Email: test@gmail.com
Upload File:
Choose File Limerick.txt
Upload
Download File:
File Word Count: 0
Download
Search
ENG
4:31 AM
10/6/2024


Not secure ec2-3-133-58-209.us-east-2.compute.amazonaws.com/user/10
User info
Username: hung
First Name: hung
Last Name: nguyen
Email: test@gmail.com
Upload File:
Choose File No file chosen
Upload
Download File: Limerick.txt
File Word Count: 32
Download


Not secure ec2-3-133-58-209.us-east-2.compute.amazonaws.com/user/10
User info
Username: hung
First Name: hung
Last Name: nguyen
Email: test@gmail.com
Upload File:
Choose File No file chosen
Upload
Download File: Limerick.txt
File Word Count: 32
Download
ec2-3-133-58-209.us-east-2.compute.amazonaws.com wants to save
INTRO TO CLOUD COMPUTING › Assignments › Project 2 ›
Search Project 2
Organize
New folder
Home
Gallery
Hung - Univers
Desktop
Downloads
Downloads
UC
Name
Date modified
Type
Size
Images 10/6/2024 4:31 AM File folder
Limerick (1).txt 10/6/2024 3:03 AM Text Document 1 KB
Limerick (2).txt 10/6/2024 3:04 AM Text Document 1 KB
Limerick.txt 10/6/2024 2:37 AM Text Document 1 KB
Limerick-1 (1).txt 10/6/2024 1:07 AM Text Document 1 KB
Limerick-1 (2).txt 10/4/2024 9:10 PM Text Document 1 KB
Limerick-1 (3).txt 10/6/2024 1:02 AM Text Document 1 KB
Limerick-1.txt 10/4/2024 7:35 PM Text Document 1 KB
File name: Limerick.txt
Save as type: TXT File (*.txt)
Hide Folders
Save
Cancel
ec2-3-133-58-209.us-east-2.compute.amazonaws.com/download/Limerick.txt