 Marwadi University Marwadi Chandarana Group	Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: Cloud Developing (01CT0720)	Aim: Cloud developing on AWS using AWS CloudShell and the AWS Cloud9 IDE.	
Experiment No: 01	Date:	Enrolment No: 92200133030

Aim :- Cloud developing on AWS using AWS CloudShell and the AWS Cloud9 IDE.

Lab overview and objectives

In this lab, you will take on the role of Sofia. You will connect to an AWS CloudShell environment and explore its capabilities. You will also connect to Visual Studio Code Integrated Development Environment (VS Code IDE), and explore the layout and its functionality.

After completing this lab, you should be able to do the following:

- Connect to AWS CloudShell and run AWS Command Line Interface (AWS CLI) commands and AWS SDK code from it.
- Connect to the VS Code IDE and explore its functionality.
- Copy files to and from Amazon Simple Storage Service (Amazon S3), CloudShell, and VS Code IDE.
- Install the AWS SDK for Python (Boto3) on an VS Code IDE instance.
- Use the VS Code IDE to create and run code files.

AWS service restrictions

In this lab environment, access to AWS services and service actions might be restricted to the ones that are needed to complete the lab instructions. You might encounter errors if you attempt to access other services or perform actions beyond the ones that are described in this lab.

Scenario

Frank and Martha are a married team who own and operate a small café business that sells desserts and coffee.

Their daughter, Sofia, works at the café. Sofia is pursuing a degree in cloud computing at a local university in the evenings and on the weekends. She has Python development skills and is learning more about how to develop solutions in the cloud.


Sofia is eager to start developing a web presence for the café. She thinks that before she starts coding, it would be a good idea to decide on a development environment for developing and running her code. She decides to explore at least two options that are available on AWS.

When you *start* the lab, the only pre-created resource in the AWS account is an empty S3 bucket.

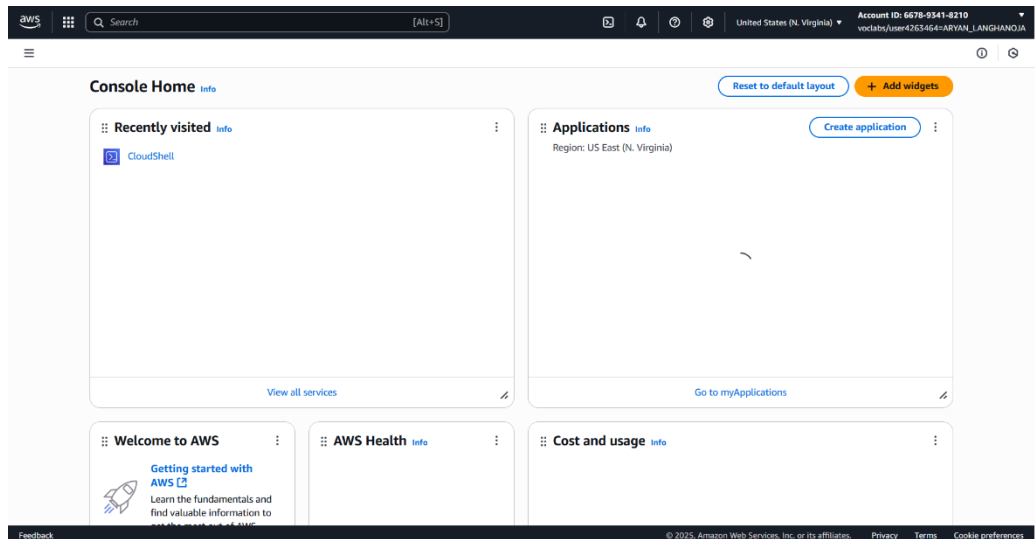
However, by the *end* of this lab, you will have explored VS Code IDE and performed the actions that are shown below:

Task 1: Exploring AWS CloudShell

AWS CloudShell is a browser-based, pre-authenticated shell that you can launch directly from the AWS Management Console. In this first task, you will connect to CloudShell and explore its capabilities, as shown in this diagram.

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5. In the AWS Management Console, at the top of the screen, choose the **AWS CloudShell** icon.

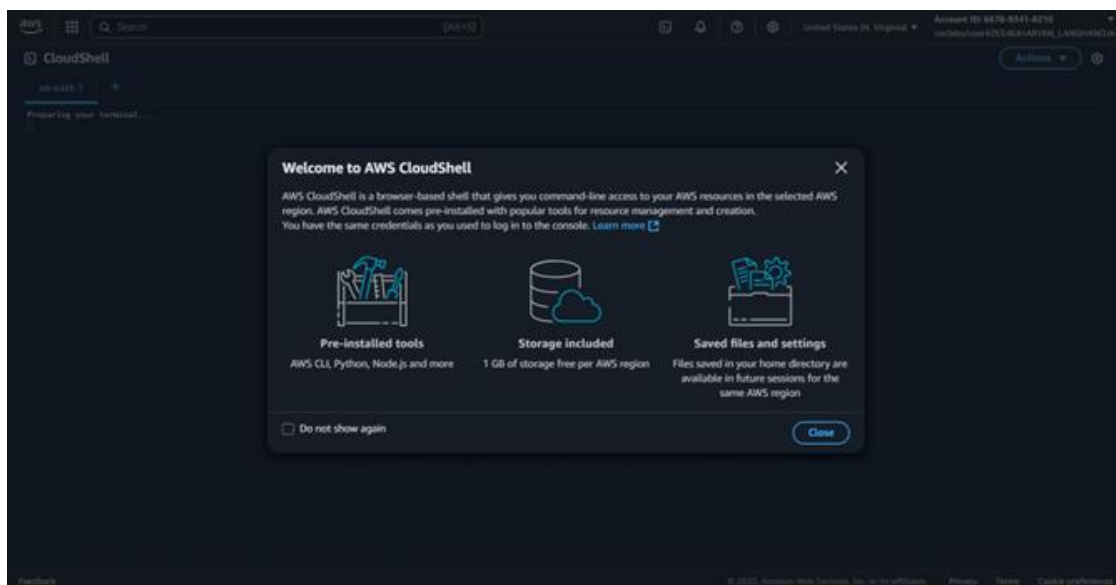



6. A new browser tab opens with the AWS CloudShell interface.

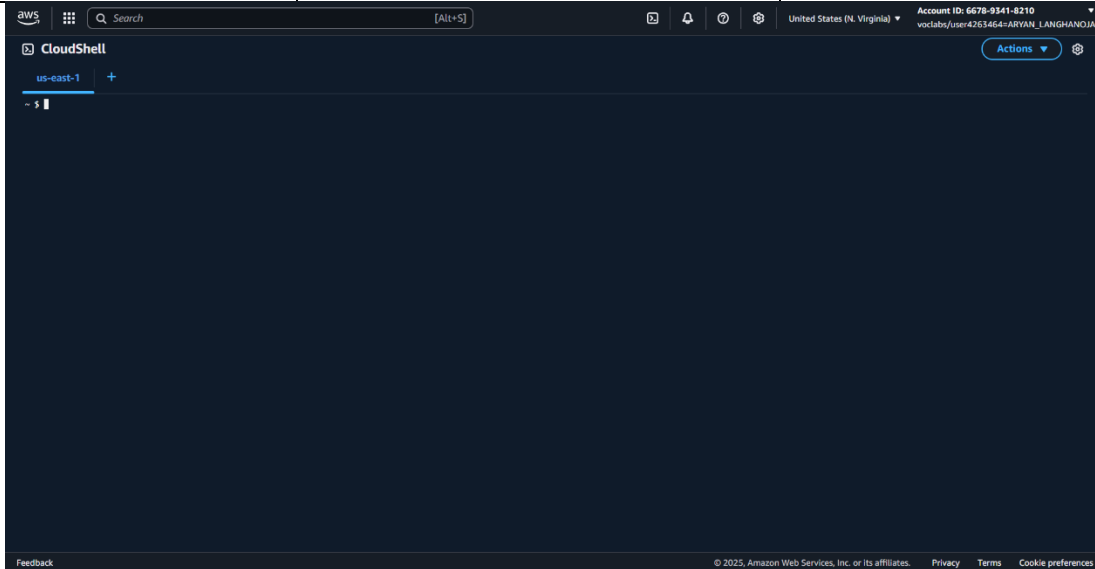
If a "Welcome to AWS CloudShell" pop-up window opens, choose **Close**.

It might take 1–2 minutes for the terminal to become available.

You should be able to access a terminal window with a prompt.



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7. Verify that the AWS CLI is installed.
 - At the CloudShell prompt, run the following command: `aws --version`
 - In the output after `aws-cli`, the version indicates that CloudShell is using AWS CLI version 2.x.x by default.



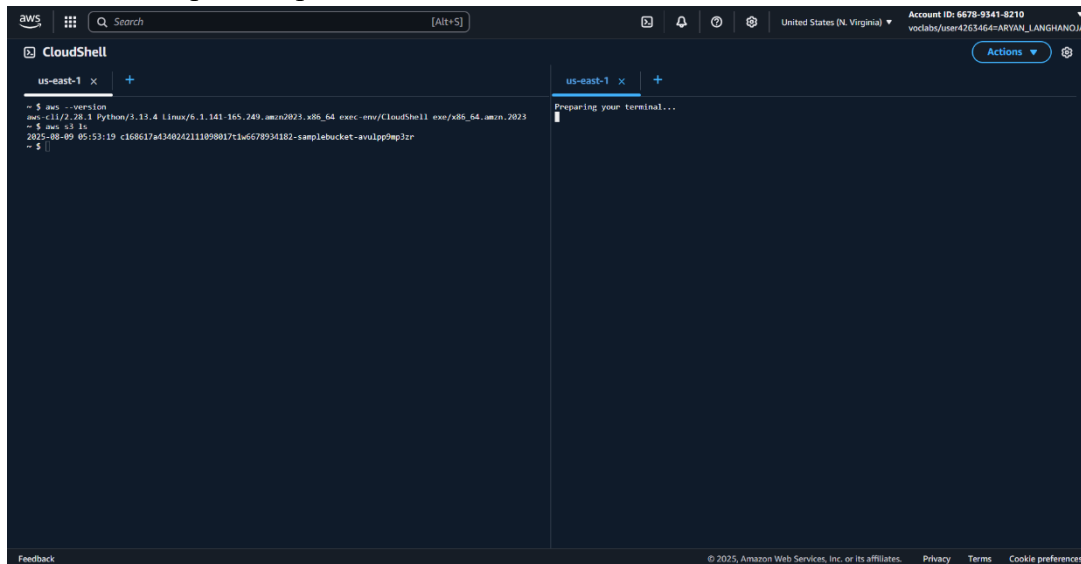
8. Test the ability to run an AWS CLI command.
 - Run the following simple AWS CLI command: `aws s3 ls`
 - A list of the S3 buckets that exist in the account is returned.

An empty sample bucket was automatically created when you started the lab. The bucket name should appear in the result set.



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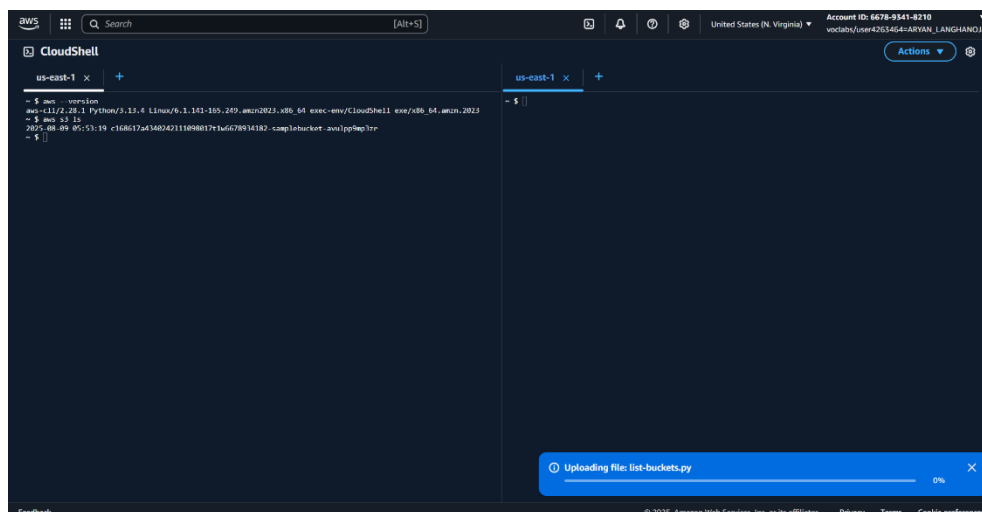
9. From the **Actions** menu, choose **Tabs layout > Split into columns**.
 - A second terminal window opens. This action demonstrates that you can have multiple terminal panels open at the same time.




10. Test the ability to run SDK for Python code.
 - Open the context (right-click) menu for the following link, and download the file to your computer:

[list-buckets.py](#)

- From the **Actions** menu, choose **Files > Upload file**, and then choose **Select file**.
- In the **File Upload** window, scroll to the **list-buckets.py** file that you downloaded, choose it, and then choose **Open**.
- Choose **Upload**.
- Close the *File upload successful* notification.



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○ In the terminal on the right side, run the following command: `cat list-buckets.py`
 The output shows the contents of the file that you uploaded:

```

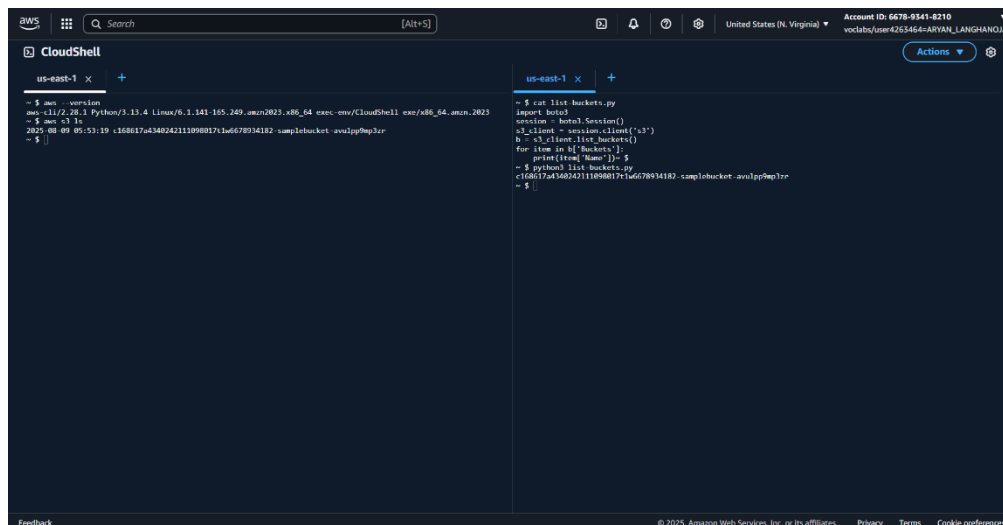
us-east-1 x +
~ $ cat list-buckets.py
import boto3
session = boto3.Session()
s3_client = session.client('s3')
b = s3_client.list_buckets()
for item in b['Buckets']:
    print(item['Name'])~ $
  
```

○ In the terminal on the right, run the SDK for Python code by issuing the following command: `python3 list-buckets.py`
 The name of the S3 bucket is returned.

```

~ $ python3 list-buckets.py
c168617a4340242111098017t1w6678934182-samplebucket-avulpp9mp3zr
~ $
  
```

○ Compare this output with the AWS CLI command output in the terminal on the left.
 You have now used two different programmatic ways to retrieve a list of the S3 buckets that exist in the AWS account.




11. Copy a file from CloudShell to an S3 bucket.

- Copy the name of the bucket that includes *-sample-bucket-* in the name.
- To copy the `list-buckets.py` file to the bucket, go to the terminal on the left and run the following command (replace *<bucket-name>* with your actual bucket name):

`aws s3 cp list-buckets.py s3://<bucket-name>`

If the upload is successful, an output similar to the following example is returned:

upload: ./list-buckets.py to s3://<bucket-name>/list-buckets.py

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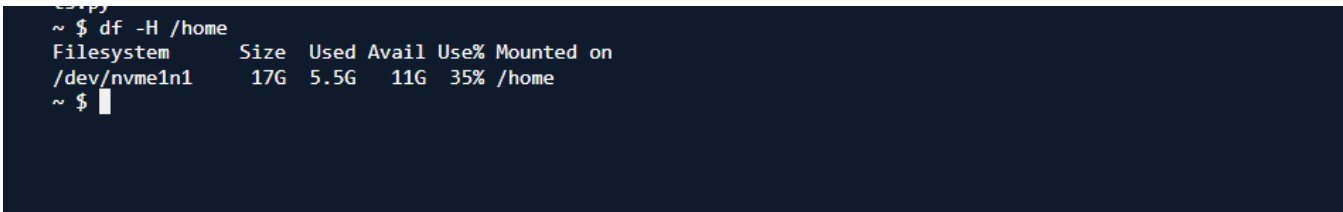


```

CloudShell
us-east-1 x +
~ $ aws --version
aws-cli/2.28.1 Python/3.13.4 Linux/6.1.141-165.249.amzn2023.x86_64 exec-env/CloudShell exe/x86_64.amzn.2023
~ $ aws s3 ls
2025-08-09 05:53:19 c168617a4340242111098017t1w6678934182-samplebucket-avulpp9mp3zr
~ $ aws s3 cp list-buckets.py s3://c168617a4340242111098017t1w6678934182-samplebucket-avulpp9mp3zr
upload: ./list-buckets.py to s3://c168617a4340242111098017t1w6678934182-samplebucket-avulpp9mp3zr/list-bucke
ts.py
~ $

```

12. When you use AWS CloudShell, you have persistent storage of 1 GB for each AWS Region at no additional cost.
13. The persistent storage is located in your home directory (\$HOME) and is private to you. If you run the `df -H /home` command in a terminal, the amount of storage that's available in your CloudShell environment is returned.




```

~ $ df -H /home
Filesystem      Size  Used Avail Use% Mounted on
/dev/nvme1n1    17G   5.5G   11G   35% /home
~ $

```

14. Data in your home directory persists between sessions. If you must store more than 1 GB, you can access an S3 bucket from CloudShell.

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Update from the café

Sofia was impressed with how quickly she could run commands and code in AWS CloudShell. She can already envision how she can use it to run PowerShell and other scripts. However, to build a website, she wants to use a fully-featured integrated development environment (IDE) where she can visually write, edit, run, and debug her code. CloudShell provides the vi and vim terminal-based text editors, but it doesn't provide many of the additional features that Sofia is looking for.

Faythe, a friend of Sofia, is an experienced AWS developer and consultant. When Faythe visited the café this morning to buy pastries, Sofia mentioned her search for a development environment and how she explored CloudShell. Faythe was impressed that Sofia knew about CloudShell and agreed that it's a useful tool.

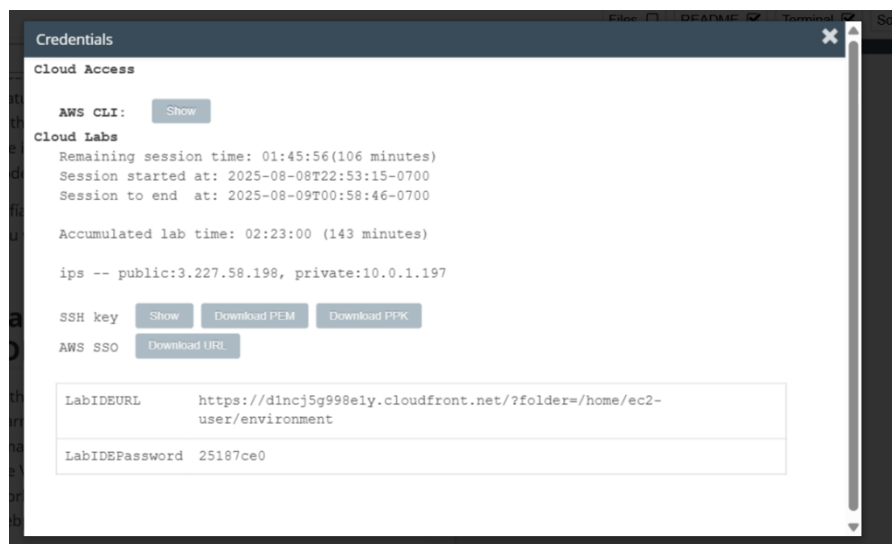
Meanwhile, Faythe suggested exploring the features of VS Code IDE. "Based on your description of the features that you want to use, I think you will like it! You can get started quickly by going to the VS Code IDE service page and launching an instance."

Sofia is eager to explore VS Code IDE which is what you will do next!


Task 2: Exploring VS Code IDE

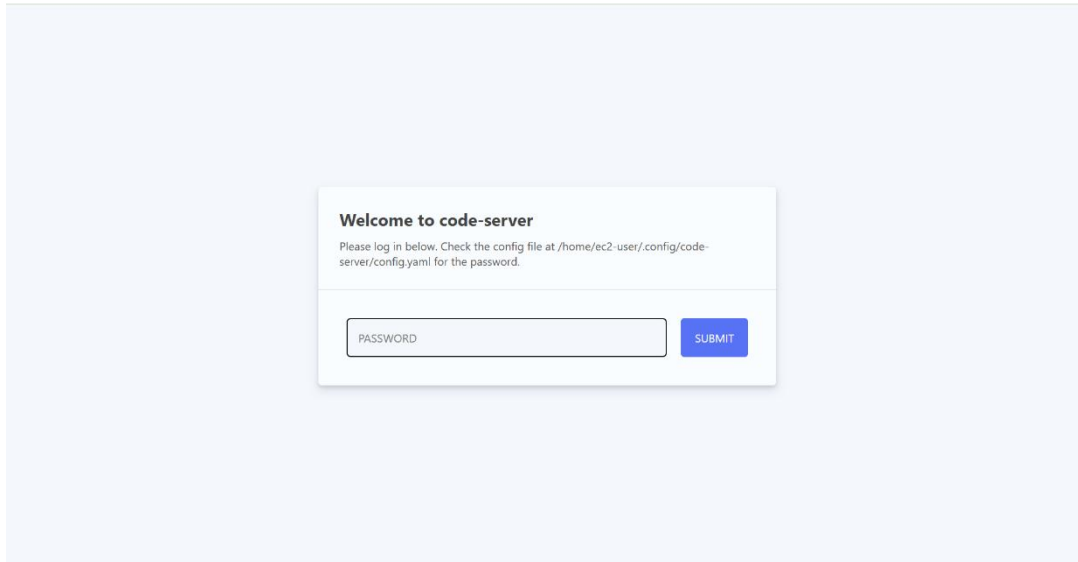
In this task, you will connect to VS Code IDE and learn how to use it. You will also interact with Amazon Simple Storage Service (Amazon S3) from the VS Code IDE. Finally, you will author a Hello World webpage in VS Code IDE and host the webpage in Amazon S3.

12. At the top of these instructions, choose Details followed by **AWS: Show**
13. Copy values from the table for the following and paste it into an editor of your choice for use later.
 - **LabIDEURL**
 - **LabIDEPassword**



14. In a new browser tab, paste the value for **LabIDEURL** to open the VS Code IDE.
15. On the prompt window **Welcome to code-server:**
 - Enter the value for **LabIDEPassword** you copied to the editor earlier
 - Choose **Submit** to open the VS Code IDE similar to below.

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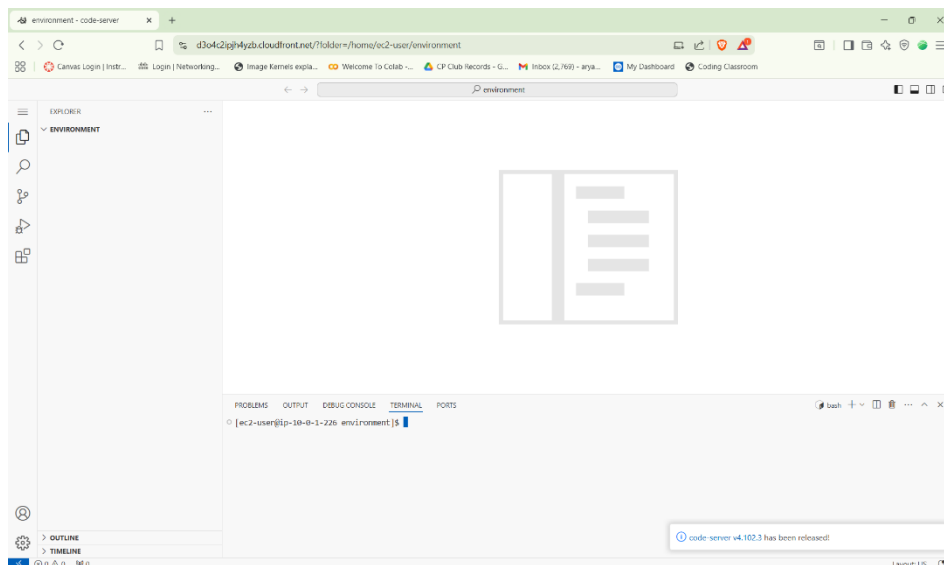


Note: User Interface similar to the following is displayed.

16. Observe the VS Code IDE user interface (UI).


- The bottom of the screen is a Bash terminal. This terminal provides functionality that's similar to AWS CloudShell.
- The left side of the screen is the navigation pane, which shows the file system.

This VS Code IDE environment runs on an Amazon Elastic Compute Cloud (Amazon EC2) instance that's now running in your AWS account.



17. Copy a file from Amazon S3 to your local storage in VS Code IDE by using the Bash terminal to run an AWS CLI command.

- In the Bash terminal get the name of your bucket by running the following command:
aws s3 ls
- While copying values to the IDE, if prompted by the browser, choose **Allow**.

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- IDE may also show different informatory prompts during your lab, **Close** the prompt by choosing **X** on the prompt window.
- Next, download the list-buckets.py file from Amazon S3 to the local storage on VS Code IDE by running the following command.

Replace `<bucket-name>` with your actual bucket name. Also be sure to include the period (.) at the end of the command, which indicates that the file should be downloaded to the current directory.

`aws s3 cp s3://<bucket-name>/list-buckets.py .`

The list-buckets.py file should now be listed in the navigation pane.

```
[ec2-user@ip-10-0-1-226 environment]$ aws s3 ls
2025-08-09 13:13:35 c168617a4340242111098017t1w6678934182-samplebucket-cwqvpdk3hpr
[ec2-user@ip-10-0-1-226 environment]$ aws s3 cp s3://c168617a4340242111098017t1w6678934182-samplebucket-cwqvpdk3hpr/list-buckets.py .
download: s3://c168617a4340242111098017t1w6678934182-samplebucket-cwqvpdk3hpr/list-buckets.py to ./list-buckets.py
[ec2-user@ip-10-0-1-226 environment]$
```

18. Open a code file that uses the SDK for Python and run it.

- Double-click the **list-buckets.py** file so that it opens in the file editor window. The code displays.
- In the Bash terminal window, run the following command to run the code:

`python3 list-buckets.py`

- The command does *not* run successfully. Instead, you see an error message:
ModuleNotFoundError: No module named 'boto3'

Python version 3 is already pre-installed on your VS Code IDE instance. However, the SDK for Python libraries are not installed.

- Return to the Bash terminal and install the SDK for Python libraries by running this command:

`sudo pip3 install boto3`

- Try running the Python code again.

This time, it should succeed and display the S3 bucket name.


```
[ec2-user@ip-10-0-1-226 environment]$ python3 list-buckets.py
c168617a4340242111098017t1w6678934182-samplebucket-cwqvpdk3hpr
[ec2-user@ip-10-0-1-226 environment]$
```

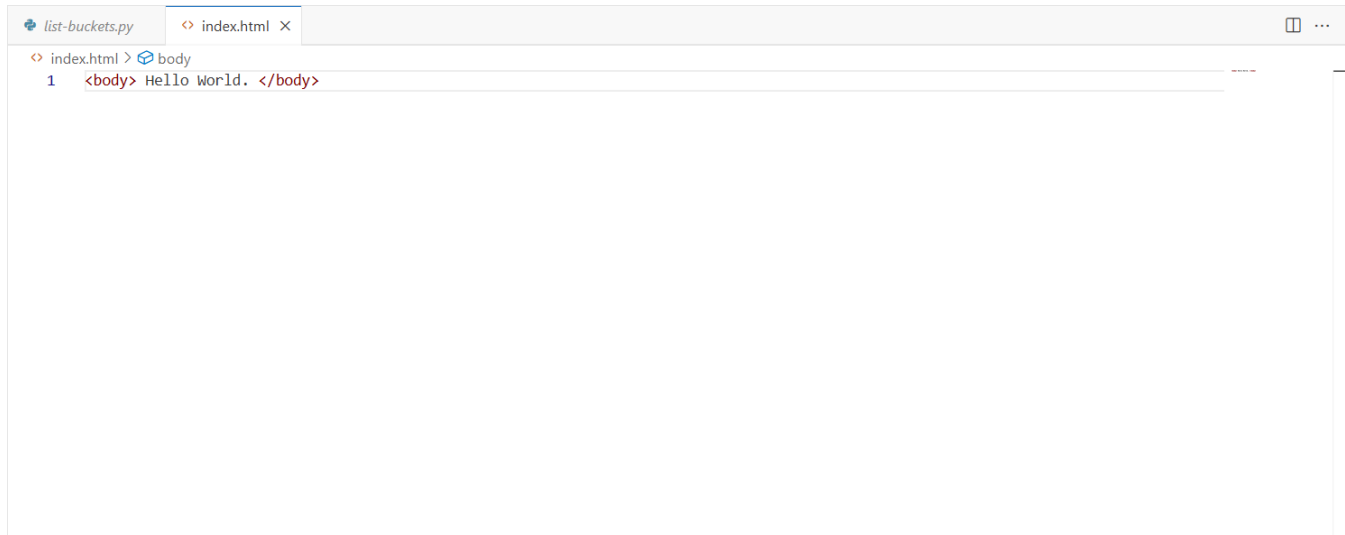
19. Create a new file and upload it to Amazon S3 by using the VS Code IDE CLI.

- In the navigation pane, choose menu, then choose **File > New Text File**.
- In the empty editor, add the following text:

`<body> Hello World. </body>`

- From the navigation pane, choose menu, then choose **File > Save**.
- Enter the file name `index.html`
- Choose **OK** to create file at the location `/home/ec2-user/environment/`.

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- Run the following command to upload the file to S3 bucket, replace with your bucket name:

```
aws s3 cp index.html s3://<bucket-name>/index.html
```

```
[ec2-user@ip-10-0-1-226 environment]$ aws s3 ls
2025-08-09 13:13:35 c168617a4340242111098017t1w6678934182-samplebucket-cwqvpgdk3hpr
[ec2-user@ip-10-0-1-226 environment]$ aws s3 cp index.html s3://c168617a4340242111098017t1w6678934182-samplebucket-cwqvpgdk3hpr/index.html
upload: ./index.html to s3://c168617a4340242111098017t1w6678934182-samplebucket-cwqvpgdk3hpr/index.html
[ec2-user@ip-10-0-1-226 environment]$
```

- If the command is successful, you will see the message similar to the following
upload: ./index.html to s3://3333333333-sample-bucket-638296109966/index.html

Update from the café

Sofia is pleased that she identified an IDE that has the features that she needs to develop the café website. She likes that VS Code IDE offers a graphical text editor, a file browser, a terminal for running AWS CLI commands, and code that uses the AWS SDKs. She's also glad that she knows about the features of CloudShell because she can open it from the AWS Management Console. CloudShell also provides some features that are similar to VS Code IDE but without the need to run an EC2 instance. In the next lab, Sofia will use VS Code IDE to accomplish her development objectives.


Submitting your work

- At the top of these instructions, choose **Submit** to record your progress and when prompted, choose **Yes**.

Tip: If you previously hid the terminal in the browser panel, expose it again by checking the Terminal checkbox in the top right. This will ensure that the lab instructions remain visible after you choose Submit.

- If the results don't display after a couple of minutes, return to the top of these instructions and choose Grades.

Tip: You can submit your work multiple times. After you change your work, choose **Submit** again.

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Your last submission is what will be recorded for this lab.

22. To find detailed feedback on your work, choose Details followed by **View Submission Report**.

Lab complete

Congratulations! You have completed the lab.

23. Choose End Lab at the top of this page, and then select **Yes** to confirm that you want to end the lab.

A panel indicates that *DELETE has been initiated... You may close this message box now.*

24. Select the **X** in the top right corner to close the panel.

Appendix

s3-permissions.py:

```
import boto3
```

```
BUCKET_NAME = 'YOUR_BUCKET_NAME'
```

```
FILE_NAME = 'index.html'
```

```
# setup s3 client named s3_client
```

```
s3_client = boto3.client('s3')
```

```
# create a function to put s3 bucket ownership controls with Rules set to BucketOwnerPreferred
```

```
def put_bucket_ownership_controls():
```


```
    response = s3_client.put_bucket_ownership_controls(
        Bucket=BUCKET_NAME,
        OwnershipControls={
            'Rules': [
                {
                    'ObjectOwnership': 'BucketOwnerPreferred'
                },
            ]
        }
    )
```

```
    return response
```

```
# create a function to set public access block values to false
```

```
def set_public_access_block():
```

```
    response = s3_client.put_public_access_block(
        Bucket=BUCKET_NAME,
        PublicAccessBlockConfiguration={
            'BlockPublicAcls': False,
            'IgnorePublicAcls': False,
            'BlockPublicPolicy': False,
            'RestrictPublicBuckets': False
        }
    )
```

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```

    }
  )
  return response

# create a function to allow public access to FILE_NAME
def allow_public_access_to_file():
    response = s3_client.put_object_acl(
        Bucket=BUCKET_NAME,
        Key=FILE_NAME,
        ACL='public-read'
    )
    return response

# call the functions
put_bucket_ownership_controls()
set_public_access_block()
allow_public_access_to_file()

```

Conclusion:-

In this Lab I Learned the AWS S3(Simple Storage System) Service. In that I had Learned How to Upload the File and Download the File in S3 bucket Using AWS Console and VS Code IDE terminal using command :-

Upload Command :-

```
aws s3 cp list-buckets.py s3://c168617a4340242111098017t1w6678934182-samplebucket-cwqvpgdk3hpr
```

```
aws s3 cp index.html s3://c168617a4340242111098017t1w6678934182-samplebucket-cwqvpgdk3hpr
```


Download Command :-

```
aws s3 cp s3:// c168617a4340242111098017t1w6678934182-samplebucket-cwqvpgdk3hpr/list-buckets.py
```

List The s3 Bucket :-

```
aws s3 ls
```

Checking the Disk Storage :-

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df -H /home

Result :-

Total score	10/10
[Task 1] list-buckets.py was copied to S3	5/5
[Task 3A] index.html was copied to S3	5/5