FATIMA JINNAH WOMEN UNIVERSITY

Department of Software Engineering

LAB #09

SUBJECT: CLOUD COMPUTING

SUBMITTED TO: SIR MUHAMMAD SHOAIB

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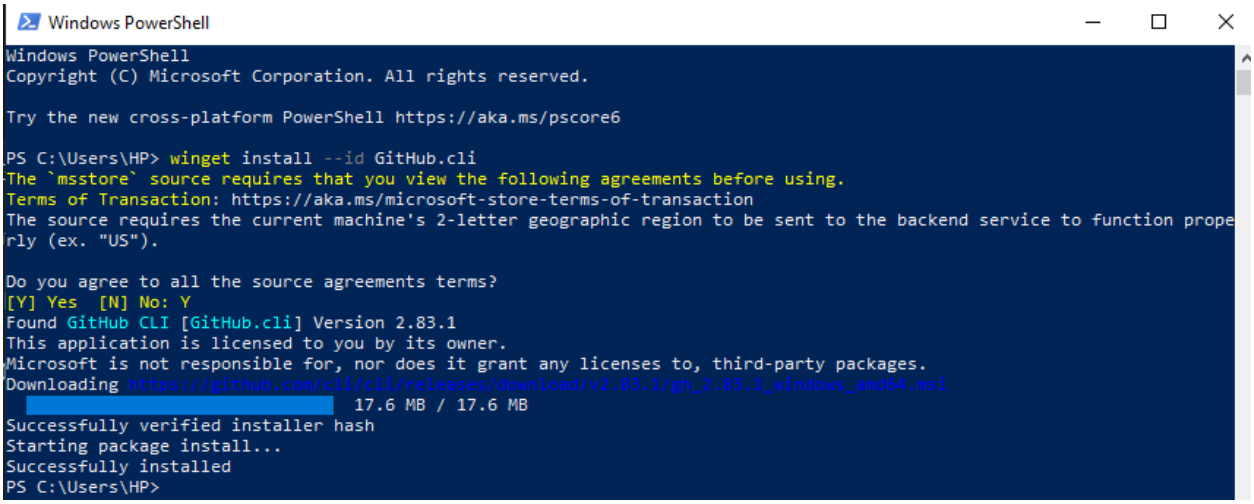
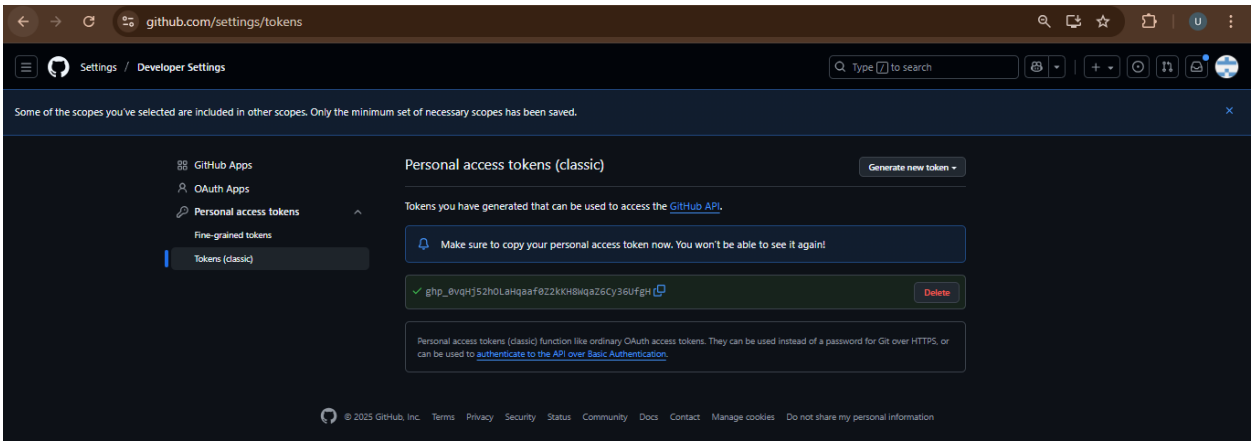
REGISTRATION NO: 2023-BSE-066

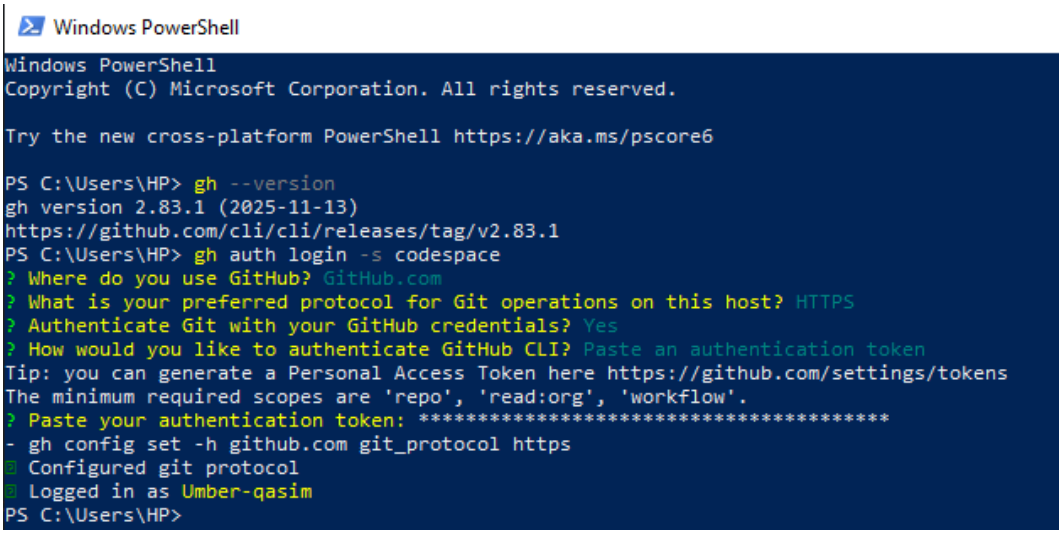
CLASS: BSSE V-B

GH CLI (Codespaces), AWS CLI, EC2, IAM, Security Groups, Filters & Queries

Task#01: GitHub CLI, Codespace setup and authentication







```
PS C:\Users\HP> gh codespace list
no codespaces found
PS C:\Users\HP>
```

```
PS C:\Users\HP> gh codespace create --repo Umber-qasim/Lab9 --branch main --machine basicLinux32gb
  Codespaces usage for this repository is paid for by Umber-qasim
turbo-space-pancake-g4vxxxpwvgvxfv5xr
PS C:\Users\HP> gh codespace ssh -c turbo-space-pancake-g4vxxxpwvgvxfv5xr
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-1030-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

@Umber-qasim /workspaces/Lab9 (main) $
```

Task#02: Install AWS CLI inside the Codespace and configure it

Windows PowerShell

```
  inflating: aws/dist/awscli/botocore/data/apigatewaymanagementapi/2018-11-29/service-2.json
   creating: aws/dist/awscli/botocore/data/pinpoint-sms-voice/2018-09-05/
  inflating: aws/dist/awscli/botocore/data/pinpoint-sms-voice/2018-09-05/service-2.json
  inflating: aws/dist/awscli/botocore/data/pinpoint-sms-voice/2018-09-05/endpoint-rule-set-1.json
   creating: aws/dist/awscli/botocore/.changes/next-release/
  inflating: aws/dist/awscli/botocore/.changes/next-release/api-change-connect-59117.json
  inflating: aws/dist/awscli/topics/return-codes.rst
  inflating: aws/dist/awscli/topics/ddb-expressions.rst
  inflating: aws/dist/awscli/topics/config-vars.rst
  inflating: aws/dist/awscli/topics/topic-tags.json
  inflating: aws/dist/awscli/topics/s3-config.rst
  inflating: aws/dist/awscli/topics/s3-faq.rst
   creating: aws/dist/awscli/customizations/sso/
   creating: aws/dist/awscli/customizations/wizard/
   creating: aws/dist/awscli/customizations/wizard/wizards/
   creating: aws/dist/awscli/customizations/wizard/wizards/configure/
   creating: aws/dist/awscli/customizations/wizard/wizards/dynamodb/
   creating: aws/dist/awscli/customizations/wizard/wizards/events/
   creating: aws/dist/awscli/customizations/wizard/wizards/iam/
   creating: aws/dist/awscli/customizations/wizard/wizards/lambda/
  inflating: aws/dist/awscli/customizations/wizard/wizards/iam/new-role.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/configure/_main.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/events/new-rule.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/dynamodb/new-table.yml
  inflating: aws/dist/awscli/customizations/wizard/wizards/lambda/new-function.yml
  inflating: aws/dist/awscli/customizations/sso/index.html
  inflating: aws/dist/awscli/data/cli.json
  inflating: aws/dist/awscli/data/metadata.json
  inflating: aws/dist/awscli/data/ac.index
   creating: aws/dist/prompt_toolkit-3.0.51.dist-info/licenses/
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/INSTALLER
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/top_level.txt
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/METADATA
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/WHEEL
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/RECORD
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/licenses/LICENSE
  inflating: aws/dist/prompt_toolkit-3.0.51.dist-info/licenses/AUTHORS.rst
  inflating: aws/dist/wheel-0.45.1.dist-info/direct_url.json
  inflating: aws/dist/wheel-0.45.1.dist-info/entry_points.txt
  inflating: aws/dist/wheel-0.45.1.dist-info/RECORD
  inflating: aws/dist/wheel-0.45.1.dist-info/LICENSE.txt
  inflating: aws/dist/wheel-0.45.1.dist-info/WHEEL
  inflating: aws/dist/wheel-0.45.1.dist-info/INSTALLER
  inflating: aws/dist/wheel-0.45.1.dist-info/METADATA
  inflating: aws/dist/wheel-0.45.1.dist-info/REQUESTED
@Umber-qasim /workspaces/Lab9 (main) $ sudo ./aws/install
You can now run: /usr/local/bin/aws --version
@Umber-qasim /workspaces/Lab9 (main) $ aws --version
aws-cli/2.32.14 Python/3.13.9 Linux/6.8.0-1030-azure exe/x86_64.ubuntu.24
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws configure
AWS Access Key ID [None]: [redacted]
AWS Secret Access Key [None]: [redacted]
Default region name [None]: me-central-1
Default output format [None]: json
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim /workspaces/Lab9 (main) $ cat ~/.aws/credentials
[default]
aws_access_key_id = [redacted]
aws_secret_access_key = [redacted]
@Umber-qasim /workspaces/Lab9 (main) $ cat ~/.aws/config
[default]
region = me-central-1
output = json
@Umber-qasim /workspaces/Lab9 (main) $ aws sts get-caller-identity
{
    "UserId": "AIDAWVVSRLSE5SHMR754K",
    "Account": "458862189705",
    "Arn": "arn:aws:iam::458862189705:user/Admin"
}
@Umber-qasim /workspaces/Lab9 (main) $
```

Task#03: Create security group and add ingress rules using Codespace IP

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-vpcs --query "Vpcs[*].VpcId" --output text
vpc-0d2fbb78883682acc
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 create-security-group   --group-name 'MySecurityGroup'   --description 'My Security Group'   --vpc-id 'vpc-0d2fbb78883682acc'
{
    "GroupId": "sg-0eb3714c44ea7837a",
    "SecurityGroupArn": "arn:aws:ec2:me-central-1:458862189705:security-group/sg-0eb3714c44ea7837a"
}
@Umber-qasim /workspaces/Lab9 (main) $
```



```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-security-groups --group-ids sg-0eb3714c44ea7837a
{
    "SecurityGroups": [
        {
            "GroupId": "sg-0eb3714c44ea7837a",
            "IpPermissionsEgress": [
                {
                    "IpProtocol": "-1",
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "0.0.0.0/0"
                        }
                    ],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                }
            ],
            "VpcId": "vpc-0d2fbb78883682acc",
            "SecurityGroupArn": "arn:aws:ec2:me-central-1:458862189705:security-group/sg-0eb3714c44ea7837a",
            "OwnerId": "458862189705",
            "GroupName": "MySecurityGroup",
            "Description": "My Security Group",
            "IpPermissions": []
        }
    ]
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ curl icanhazip.com
4.240.18.228
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 authorize-security-group-ingress \
>   --group-id sg-0eb3714c44ea7837a \
>   --protocol tcp \
>   --port 22 \
>   --cidr 4.240.18.228/32

{
    "Return": true,
    "SecurityGroupRules": [
        {
            "SecurityGroupRuleId": "sgr-0be4f38ce12ec6e17",
            "GroupId": "sg-0eb3714c44ea7837a",
            "GroupOwnerId": "458862189705",
            "IsEgress": false,
            "IpProtocol": "tcp",
            "FromPort": 22,
            "ToPort": 22,
            "CidrIpv4": "4.240.18.228/32",
            "SecurityGroupRuleArn": "arn:aws:ec2:me-central-1:458862189705:security-group-rule/sgr-0be4f38ce12ec6e17"
        }
    ]
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-security-groups --group-ids sg-0eb3714c44ea7837a
{
    "SecurityGroups": [
        {
            "GroupId": "sg-0eb3714c44ea7837a",
            "IpPermissionsEgress": [
                {
                    "IpProtocol": "-1",
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "0.0.0.0/0"
                        }
                    ],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                }
            ],
            "VpcId": "vpc-0d2fbb78883682acc",
            "SecurityGroupArn": "arn:aws:ec2:me-central-1:458862189705:security-group/sg-0eb3714c44ea7837a",
            "OwnerId": "458862189705",
            "GroupName": "MySecurityGroup",
            "Description": "My Security Group",
            "IpPermissions": [
                {
                    "IpProtocol": "tcp",
                    "FromPort": 22,
                    "ToPort": 22,
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "4.240.18.228/32"
                        }
                    ],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                }
            ]
        }
    ]
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 authorize-security-group-ingress \
>   --group-id sg-0eb3714c44ea7837a \
>   --ip-permissions '{"FromPort":80,"ToPort":80,"IpProtocol":"tcp","IpRanges":[{"CidrIp":"4.240.18.228/32"}]}'
{
    "Return": true,
    "SecurityGroupRules": [
        {
            "SecurityGroupRuleId": "sgr-0ffd70b0a83bf3d58",
            "GroupId": "sg-0eb3714c44ea7837a",
            "GroupOwnerId": "458862189705",
            "IsEgress": false,
            "IpProtocol": "tcp",
            "FromPort": 80,
            "ToPort": 80,
            "CidrIpv4": "4.240.18.228/32",
            "SecurityGroupRuleArn": "arn:aws:ec2:me-central-1:458862189705:security-group-rule/sgr-0ffd70b0a83bf3d58"
        }
    ]
}
```

Windows PowerShell


```
{
    "SecurityGroups": [
        {
            "GroupId": "sg-0eb3714c44ea7837a",
            "IpPermissionsEgress": [
                {
                    "IpProtocol": "-1",
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "0.0.0.0/0"
                        }
                    ],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                }
            ],
            "VpcId": "vpc-0d2fbb78883682acc",
            "SecurityGroupArn": "arn:aws:ec2:me-central-1:458862189705:security-group/sg-0eb3714c44ea7837a",
            "OwnerId": "458862189705",
            "GroupName": "MySecurityGroup",
            "Description": "My Security Group",
            "IpPermissions": [
                {
                    "IpProtocol": "tcp",
                    "FromPort": 80,
                    "ToPort": 80,
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "4.240.18.228/32"
                        }
                    ],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                },
                {
                    "IpProtocol": "tcp",
                    "FromPort": 22,
                    "ToPort": 22,
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "4.240.18.228/32"
                        }
                    ],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                }
```


Task#04: Create a key pair, describe key pairs, and launch EC2 instance

```
@Umber-qasim ⧉ /workspaces/Lab9 (main) $ aws ec2 create-key-pair \
>   --key-name MyED25519Key \
>   --key-type ed25519 \
>   --key-format pem \
>   --query 'KeyMaterial' \
>   --output text > MyED25519Key.pem
@Umber-qasim ⧉ /workspaces/Lab9 (main) $ ls -l MyED25519Key.pem
-rw-rw-rw- 1 codespace codespace 388 Dec 11 09:39 MyED25519Key.pem
@Umber-qasim ⧉ /workspaces/Lab9 (main) $
```

```
@Umber-qasim ⧉ /workspaces/Lab9 (main) $ aws ec2 describe-key-pairs
{
    "KeyPairs": [
        {
            "KeyPairId": "key-09b2babf41ffdbb32",
            "KeyType": "ed25519",
            "Tags": [],
            "CreateTime": "2025-12-11T09:39:32.074000+00:00",
            "KeyName": "MyED25519Key",
            "KeyFingerprint": "[redacted]"
        }
    ]
}
```

```
@Umber-qasim ⧉ /workspaces/Lab9 (main) $ aws ec2 delete-key-pair --key-name MyED25519Key
{
    "Return": true,
    "KeyPairId": "key-09b2babf41ffdbb32"
}
```

Windows PowerShell


```
{
    "ReservationId": "r-0d6a9522acd1a121c",
    "OwnerId": "458862189705",
    "Groups": [],
    "Instances": [
        {
            "Architecture": "x86_64",
            "BlockDeviceMappings": [],
            "ClientToken": "f866d15d-9d79-4f64-b84b-27acb3a67dcb",
            "EbsOptimized": false,
            "EnaSupport": true,
            "Hypervisor": "xen",
            "NetworkInterfaces": [
                {
                    "Attachment": {
                        "AttachTime": "2025-12-11T10:33:12+00:00",
                        "AttachmentId": "eni-attach-06f078147d8e8ecb0",
                        "DeleteOnTermination": true,
                        "DeviceIndex": 0,
                        "Status": "attaching",
                        "NetworkCardIndex": 0
                    },
                    "Description": "",
                    "Groups": [
                        {
                            "GroupId": "sg-0eb3714c44ea7837a",
                            "GroupName": "MySecurityGroup"
                        }
                    ],
                    "Ipv6Addresses": [],
                    "MacAddress": "0a:6b:b7:22:5a:2d",
                    "NetworkInterfaceId": "eni-0e67837ade6d14221",
                    "OwnerId": "458862189705",
                    "PrivateDnsName": "ip-172-31-20-197.me-central-1.compute.internal",
                    "PrivateIpAddress": "172.31.20.197",
                    "PrivateIpAddresses": [
                        {
                            "Primary": true,
                            "PrivateDnsName": "ip-172-31-20-197.me-central-1.compute.internal",
                            "PrivateIpAddress": "172.31.20.197"
                        }
                    ],
                    "SourceDestCheck": true,
                    "Status": "in-use",
                    "SubnetId": "subnet-008a6375773a6d67d",
                    "VpcId": "vpc-0d2fbb78883682acc",
                    "InterfaceType": "interface",
                    "Operator": {
                        "Managed": false
:
```


```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>   --query "Reservations[*].Instances[*].[InstanceId,PublicIpAddress]" \
>   --output table
----------------------------------------
|           DescribeInstances          |
+----------------------+---------------+
|  i-0aecc05685aa6e07d |  3.28.186.90  |
+----------------------+---------------+
```

```
@Umber-qasim /workspaces/Lab9 (main) $ curl icanhazip.com
20.192.21.48
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 authorize-security-group-ingress \
>   --group-id sg-0eb3714c44ea7837a \
>   --protocol tcp \
>   --port 22 \
>   --cidr 20.192.21.48/32
{
    "Return": true,
    "SecurityGroupRules": [
        {
            "SecurityGroupRuleId": "sgr-0e1e4787c893e1e4c",
            "GroupId": "sg-0eb3714c44ea7837a",
            "GroupOwnerId": "458862189705",
            "IsEgress": false,
            "IpProtocol": "tcp",
            "FromPort": 22,
            "ToPort": 22,
            "CidrIpv4": "20.192.21.48/32",
            "SecurityGroupRuleArn": "arn:aws:ec2:me-central-1:458862189705:security-group-rule/sgr-0e1e4787c893e1e4c"
        }
    ]
}
@Umber-qasim /workspaces/Lab9 (main) $ chmod 400 MyED25519Key.pem
@Umber-qasim /workspaces/Lab9 (main) $ ssh -i MyED25519Key.pem ec2-user@3.28.186.90
The authenticity of host '3.28.186.90 (3.28.186.90)' can't be established.
ED25519 key fingerprint is SHA256:W88yKVyFpdnXdejEyeD7ZLmZNjJaQ8Ty2eB1pLvyEP8.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '3.28.186.90' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-172-31-20-197 ~]$
```

ec2-user@ip-172-31-20-197:~

```
[ec2-user@ip-172-31-20-197 ~]$ exit
logout
Connection to 3.28.186.90 closed.
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 stop-instances --instance-ids i-0aece65665aa6e6fd
{
    "StoppingInstances": [
        {
            "InstanceId": "i-0aece65665aa6e6fd",
            "CurrentState": {
                "Code": 64,
                "Name": "stopping"
            },
            "PreviousState": {
                "Code": 16,
                "Name": "running"
            }
        }
    ]
}
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 start-instances --instance-ids i-0aece65665aa6e6fd
{
    "StartingInstances": [
        {
            "InstanceId": "i-0aece65665aa6e6fd",
            "CurrentState": {
                "Code": 0,
                "Name": "pending"
            },
            "PreviousState": {
                "Code": 80,
                "Name": "stopped"
            }
        }
    ]
}
@Umber-qasim /workspaces/Lab9 (main) $
```

Task#05: Understand AWS describe-* commands

Security Groups

ec2-user@ip-172-31-20-197:~


```
{
    "SecurityGroups": [
        {
            "GroupId": "sg-098e2430f9603d702",
            "IpPermissionsEgress": [
                {
                    "IpProtocol": "-1",
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "0.0.0.0/0"
                        }
                    ],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                }
            ],
            "VpcId": "vpc-0d2fbb78883682acc",
            "SecurityGroupArn": "arn:aws:ec2:me-central-1:458862189705:security-group/sg-098e2430f9603d702",
            "OwnerId": "458862189705",
            "GroupName": "default",
            "Description": "default VPC security group",
            "IpPermissions": [
                {
                    "IpProtocol": "-1",
                    "UserIdGroupPairs": [
                        {
                            "UserId": "458862189705",
                            "GroupId": "sg-098e2430f9603d702"
                        }
                    ],
                    "IpRanges": [],
                    "Ipv6Ranges": [],
                    "PrefixListIds": []
                }
            ]
        },
        {
            "GroupId": "sg-0eb3714c44ea7837a",
            "IpPermissionsEgress": [
                {
                    "IpProtocol": "-1",
                    "UserIdGroupPairs": [],
                    "IpRanges": [
                        {
                            "CidrIp": "0.0.0.0/0"
                        }
                    ],
                    "Ipv6Ranges": [],
:
```

VPCs

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-vpcs
{
    "Vpcs": [
        {
            "OwnerId": "458862189705",
            "InstanceTenancy": "default",
            "CidrBlockAssociationSet": [
                {
                    "AssociationId": "vpc-cidr-assoc-087159bada32a795c",
                    "CidrBlock": "172.31.0.0/16",
                    "CidrBlockState": {
                        "State": "associated"
                    }
                }
            ],
            "IsDefault": true,
            "BlockPublicAccessStates": {
                "InternetGatewayBlockMode": "off"
            },
            "VpcId": "vpc-0d2fbb78883682acc",
            "State": "available",
            "CidrBlock": "172.31.0.0/16",
            "DhcpOptionsId": "dopt-0f6507644ddf11aee"
        }
    ]
}
```

Subnets

ec2-user@ip-172-31-20-197:~

```
{
    "Subnets": [
        {
            "AvailabilityZoneId": "mec1-az2",
            "MapCustomerOwnedIpOnLaunch": false,
            "OwnerId": "458862189705",
            "AssignIpv6AddressOnCreation": false,
            "Ipv6CidrBlockAssociationSet": [],
            "SubnetArn": "arn:aws:ec2:me-central-1:458862189705:subnet/subnet-008a6375773a6d67d",
            "EnableDns64": false,
            "Ipv6Native": false,
            "PrivateDnsNameOptionsOnLaunch": {
                "HostnameType": "ip-name",
                "EnableResourceNameDnsARecord": false,
                "EnableResourceNameDnsAAAARecord": false
            },
            "BlockPublicAccessStates": {
                "InternetGatewayBlockMode": "off"
            },
            "SubnetId": "subnet-008a6375773a6d67d",
            "State": "available",
            "VpcId": "vpc-0d2fbb78883682acc",
            "CidrBlock": "172.31.16.0/20",
            "AvailableIpAddressCount": 4090,
            "AvailabilityZone": "me-central-1b",
            "DefaultForAz": true,
            "MapPublicIpOnLaunch": true
        },
        {
            "AvailabilityZoneId": "mec1-az3",
            "MapCustomerOwnedIpOnLaunch": false,
            "OwnerId": "458862189705",
            "AssignIpv6AddressOnCreation": false,
            "Ipv6CidrBlockAssociationSet": [],
            "SubnetArn": "arn:aws:ec2:me-central-1:458862189705:subnet/subnet-0e2b03348f83d9464",
            "EnableDns64": false,
            "Ipv6Native": false,
            "PrivateDnsNameOptionsOnLaunch": {
                "HostnameType": "ip-name",
                "EnableResourceNameDnsARecord": false,
                "EnableResourceNameDnsAAAARecord": false
            },
            "BlockPublicAccessStates": {
                "InternetGatewayBlockMode": "off"
            },
            "SubnetId": "subnet-0e2b03348f83d9464",
            "State": "available",
            "VpcId": "vpc-0d2fbb78883682acc",
            "CidrBlock": "172.31.0.0/20",
:
```

Instances

ec2-user@ip-172-31-20-197:~


```
{
    "Reservations": [
        {
            "ReservationId": "r-0d6a9522acd1a121c",
            "OwnerId": "458862189705",
            "Groups": [],
            "Instances": [
                {
                    "Architecture": "x86_64",
                    "BlockDeviceMappings": [
                        {
                            "DeviceName": "/dev/xvda",
                            "Ebs": {
                                "AttachTime": "2025-12-11T10:33:12+00:00",
                                "DeleteOnTermination": true,
                                "Status": "attached",
                                "VolumeId": "vol-025944eaaae6b85e3"
                            }
                        }
                    ],
                    "ClientToken": "f866d15d-9d79-4f64-b84b-27acb3a67dcb",
                    "EbsOptimized": false,
                    "EnaSupport": true,
                    "Hypervisor": "xen",
                    "NetworkInterfaces": [
                        {
                            "Association": {
                                "IpOwnerId": "amazon",
                                "PublicDnsName": "ec2-3-29-127-241.me-central-1.compute.amazonaws.com",
                                "PublicIp": "3.29.127.241"
                            },
                            "Attachment": {
                                "AttachTime": "2025-12-11T10:33:12+00:00",
                                "AttachmentId": "eni-attach-06f078147d8e8ecb0",
                                "DeleteOnTermination": true,
                                "DeviceIndex": 0,
                                "Status": "attached",
                                "NetworkCardIndex": 0
                            },
                            "Description": "",
                            "Groups": [
                                {
                                    "GroupId": "sg-0eb3714c44ea7837a",
                                    "GroupName": "MySecurityGroup"
                                }
                            ],
                            "Ipv6Addresses": [],
                            "MacAddress": "0a:6b:b7:22:5a:2d",
                            "NetworkInterfaceId": "eni-0e67837ade6d14221",
:
```

Regions

ec2-user@ip-172-31-20-197:~


```
{
    "Regions": [
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "ap-south-1",
            "Endpoint": "ec2.ap-south-1.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "eu-north-1",
            "Endpoint": "ec2.eu-north-1.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "eu-west-3",
            "Endpoint": "ec2.eu-west-3.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "eu-west-2",
            "Endpoint": "ec2.eu-west-2.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "eu-west-1",
            "Endpoint": "ec2.eu-west-1.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "ap-northeast-3",
            "Endpoint": "ec2.ap-northeast-3.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "ap-northeast-2",
            "Endpoint": "ec2.ap-northeast-2.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "RegionName": "ap-northeast-1",
            "Endpoint": "ec2.ap-northeast-1.amazonaws.com"
        },
        {
            "OptInStatus": "opted-in",
            "RegionName": "me-central-1",
            "Endpoint": "ec2.me-central-1.amazonaws.com"
        },
        {
            "OptInStatus": "opt-in-not-required",
:
```

Availability Zones

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-availability-zones
{
    "AvailabilityZones": [
        {
            "OptInStatus": "opt-in-not-required",
            "Messages": [],
            "RegionName": "me-central-1",
            "ZoneName": "me-central-1a",
            "ZoneId": "mec1-az1",
            "GroupName": "me-central-1-zg-1",
            "NetworkBorderGroup": "me-central-1",
            "ZoneType": "availability-zone",
            "GroupLongName": "Middle East (UAE) 1",
            "State": "available"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "Messages": [],
            "RegionName": "me-central-1",
            "ZoneName": "me-central-1b",
            "ZoneId": "mec1-az2",
            "GroupName": "me-central-1-zg-1",
            "NetworkBorderGroup": "me-central-1",
            "ZoneType": "availability-zone",
            "GroupLongName": "Middle East (UAE) 1",
            "State": "available"
        },
        {
            "OptInStatus": "opt-in-not-required",
            "Messages": [],
            "RegionName": "me-central-1",
            "ZoneName": "me-central-1c",
            "ZoneId": "mec1-az3",
            "GroupName": "me-central-1-zg-1",
            "NetworkBorderGroup": "me-central-1",
            "ZoneType": "availability-zone",
            "GroupLongName": "Middle East (UAE) 1",
            "State": "available"
        }
    ]
}
```

Task#06: IAM: create group, user, attach policies, create console login & keys

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam create-group --group-name MyGroupCli
{
    "Group": {
        "Path": "/",
        "GroupName": "MyGroupCli",
        "GroupId": "AGPAWVVSRLSER6KTVEF7G",
        "Arn": "arn:aws:iam::458862189705:group/MyGroupCli",
        "CreateDate": "2025-12-11T17:48:34+00:00"
    }
}
@Umber-qasim /workspaces/Lab9 (main) $ aws iam get-group --group-name MyGroupCli
{
    "Users": [],
    "Group": {
        "Path": "/",
        "GroupName": "MyGroupCli",
        "GroupId": "AGPAWVVSRLSER6KTVEF7G",
        "Arn": "arn:aws:iam::458862189705:group/MyGroupCli",
        "CreateDate": "2025-12-11T17:48:34+00:00"
    }
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam create-user --user-name MyUserCli
{
    "User": {
        "Path": "/",
        "UserName": "MyUserCli",
        "UserId": "[redacted]",
        "Arn": "arn:aws:iam::458862189705:user/MyUserCli",
        "CreateDate": "2025-12-11T17:50:36+00:00"
    }
}
@Umber-qasim /workspaces/Lab9 (main) $ aws iam get-user --user-name MyUserCli
{
    "User": {
        "Path": "/",
        "UserName": "MyUserCli",
        "UserId": "[redacted]",
        "Arn": "arn:aws:iam::458862189705:user/MyUserCli",
        "CreateDate": "2025-12-11T17:50:36+00:00"
    }
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam add-user-to-group --user-name MyUserCli --group-name MyGroupCli
@Umber-qasim /workspaces/Lab9 (main) $ aws iam get-group --group-name MyGroupCli
{
    "Users": [
        {
            "Path": "/",
            "UserName": "MyUserCli",
            "UserId": "AIDAWVVSRLSETGQZJRURK",
            "Arn": "arn:aws:iam::458862189705:user/MyUserCli",
            "CreateDate": "2025-12-11T17:50:36+00:00"
        }
    ],
    "Group": {
        "Path": "/",
        "GroupName": "MyGroupCli",
        "GroupId": "AGPAWVVSRLSER6KTVEF7G",
        "Arn": "arn:aws:iam::458862189705:group/MyGroupCli",
        "CreateDate": "2025-12-11T17:48:34+00:00"
    }
}
```

```
ec2-user@ip-172-31-20-197:~
AmazonEC2SpotFleetAutoscaleRole
AWSElasticBeanstalkCustomPlatformforEC2Role
AmazonEC2ContainerServiceEventsRole
AmazonEC2SpotFleetTaggingRole
AWSEC2SpotServiceRolePolicy
AWSServiceRoleForEC2ScheduledInstances
AWSEC2SpotFleetServiceRolePolicy
AWSApplicationAutoscalingEC2SpotFleetRequestPolicy
AWSEC2FleetServiceRolePolicy
AWSAutoScalingPlansEC2AutoScalingPolicy
EC2InstanceConnect
AmazonEC2RolePolicyForLaunchWizard
EC2InstanceProfileForImageBuilder
EC2FleetTimeShiftableServiceRolePolicy
AmazonEC2RoleforAWSCodeDeployLimited
EC2InstanceProfileForImageBuilderECRContainerBuilds
AWSApplicationMigrationEC2Access
AWSEC2CapacityReservationFleetRolePolicy
EC2FastLaunchServiceRolePolicy
AmazonSSMManagedEC2InstanceDefaultPolicy
AWSFaultInjectionSimulatorEC2Access
EC2ImageBuilderLifecycleExecutionPolicy
AWSEC2VssSnapshotPolicy
EC2FastLaunchFullAccess
AmazonEC2ContainerRegistryPullOnly
DeclarativePoliciesEC2Report
AmazonEC2ImageReferencesAccessPolicy
AWSEC2CapacityManagerServiceRolePolicy
AWSEC2SqlHaServiceRolePolicy
AWSEC2SqlHaInstancePolicy
AWSLambdaManagedEC2ResourceOperator
@Umber-qasim /workspaces/Lab9 (main) $ aws iam list-policies --query 'Policies[?PolicyName==`AmazonEC2FullAccess`].{Name:PolicyName, ARN:Arn}' --output table
-------------------------------------------------------------------
|                          ListPolicies                           |
+-----------------------------------------------+-----------------+
|                      ARN                      |      Name       |
+-----------------------------------------------+-----------------+
|  arn:aws:iam::aws:policy/AmazonEC2FullAccess  |  AmazonEC2FullAccess  |
+-----------------------------------------------+-----------------+
@Umber-qasim /workspaces/Lab9 (main) $ aws iam attach-group-policy --group-name MyGroupCli --policy-arn arn:aws:iam::aws:policy/AmazonEC2FullAccess
@Umber-qasim /workspaces/Lab9 (main) $ aws iam list-attached-group-policies --group-name MyGroupCli
{
    "AttachedPolicies": [
        {
            "PolicyName": "AmazonEC2FullAccess",
            "PolicyArn": "arn:aws:iam::aws:policy/AmazonEC2FullAccess"
        }
    ]
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam create-login-profile \
>    --user-name MyUserCli \
>    --password "[redacted]" \
>    --password-reset-required
{
    "LoginProfile": {
        "UserName": "MyUserCli",
        "CreateDate": "2025-12-11T18:05:15+00:00",
        "PasswordResetRequired": true
    }
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam attach-group-policy \
>    --group-name MyGroupCli \
>    --policy-arn arn:aws:iam::aws:policy/IAMUserChangePassword
@Umber-qasim /workspaces/Lab9 (main) $ aws iam detach-group-policy \
>    --group-name MyGroupCli \
>    --policy-arn arn:aws:iam::aws:policy/IAMUserChangePassword
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam create-access-key --user-name MyUserCli
{
    "AccessKey": {
        "UserName": "MyUserCli",
        "AccessKeyId": "[redacted]",
        "Status": "Active",
        "SecretAccessKey": "[redacted]",
        "CreateDate": "2025-12-11T18:10:50+00:00"
    }
}
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam list-access-keys --user-name MyUserCli
{
    "AccessKeyMetadata": [
        {
            "UserName": "MyUserCli",
            "AccessKeyId": "[redacted]",
            "Status": "Active",
            "CreateDate": "2025-12-11T18:10:50+00:00"
        }
    ]
}
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws iam create-access-key --user-name MyUserCli
{
    "AccessKey": {
        "UserName": "MyUserCli",
        "AccessKeyId": "[redacted]",
        "Status": "Active",
        "SecretAccessKey": "[redacted]",
        "CreateDate": "2025-12-11T18:10:50+00:00"
    }
}
@Umber-qasim /workspaces/Lab9 (main) $ aws iam list-access-keys --user-name MyUserCli
{
    "AccessKeyMetadata": [
        {
            "UserName": "MyUserCli",
            "AccessKeyId": "[redacted]",
            "Status": "Active",
            "CreateDate": "2025-12-11T18:10:50+00:00"
        }
    ]
}
```

```
@Umber-qasim /workspaces/Lab8 (main) $ aws iam create-access-key --user-name MyUserCli
{
    "AccessKey": {
        "UserName": "MyUserCli",
        "AccessKeyId": "[redacted]",
        "Status": "Active",
        "SecretAccessKey": "[redacted]",
        "CreateDate": "2025-12-11T18:10:50+00:00"
    }
}
@Umber-qasim /workspaces/Lab8 (main) $ aws iam list-access-keys --user-name MyUserCli
{
    "AccessKeyMetadata": [
        {
            "UserName": "MyUserCli",
            "AccessKeyId": "[redacted]",
            "Status": "Active",
            "CreateDate": "2025-12-11T18:10:50+00:00"
        }
    ]
}
```


```
@Umber-qasim /workspaces/Lab8 (main) $ unset AWS_ACCESS_KEY_ID
@Umber-qasim /workspaces/Lab8 (main) $ unset AWS_SECRET_ACCESS_KEY
@Umber-qasim /workspaces/Lab8 (main) $ aws iam get-user --user-name MyUserCli
{
    "User": {
        "Path": "/",
        "UserName": "MyUserCli",
        "UserId": "[redacted]",
        "Arn": "arn:aws:iam::458862189705:user/MyUserCli",
        "CreateDate": "2025-12-11T17:50:36+00:00"
    }
}
```

Task#07: Filters: query with filters to find instances and their attributes

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>    --filters "Name=tag:Name,Values=MyServer" \
>    --query "Reservations[*].Instances[*].PublicIpAddress" \
>    --output text
3.29.127.241
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>    --filters "Name=instance-type,Values=t3.micro" \
>    --query "Reservations[].Instances[].InstanceId" \
>    --output table
------------------------
|   DescribeInstances   |
+-----------------------+
|  i-0aece65665aa6e6fd  |
+-----------------------+
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>    --filters "Name=subnet-id,Values=subnet-008a6375773a6d67d" \
>    --query "Reservations[*].Instances[*].InstanceId" \
>    --output table
------------------------
|   DescribeInstances   |
+-----------------------+
|  i-0aece65665aa6e6fd  |
+-----------------------+
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>   --filters "Name=vpc-id,Values=vpc-0d2fbb78883682acc" \
>   --query "Reservations[*].Instances[*].InstanceId" \
>   --output table
------------------------
|   DescribeInstances   |
+-----------------------+
|  i-0aece65665aa6e6fd  |
+-----------------------+
```

Task#08: Use --query to format outputs for reporting

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>   --filters "Name=tag:Name,Values=MyServer" \
>   --query "Reservations[*].Instances[*].[InstanceId,PublicIpAddress,Tags[?Key=='Name'].Value|[0]]" \
>   --output table
-------------------------------------------------
|               DescribeInstances               |
+---------------------+---------------+-----------+
|  i-0aece65665aa6e6fd |  3.29.127.241  |  MyServer |
+---------------------+---------------+-----------+
@Umber-qasim /workspaces/Lab9 (main) $
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>   --query "Reservations[*].Instances[*].[InstanceId,State.Name]" \
>   --output table
-----------------------------------
|         DescribeInstances       |
+----------------------+----------+
|  i-0aece65665aa6e6fd |  running |
+----------------------+----------+
```

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-instances \
>   --query "Reservations[*].Instances[*].[InstanceId,InstanceType,Placement.AvailabilityZone]" \
>   --output table
-------------------------------------------------
|               DescribeInstances               |
+----------------------+----------+--------------+
|  i-0aece65665aa6e6fd |  t3.micro |  me-central-1b  |
+----------------------+----------+--------------+
```

Terminate EC2 Instance

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 terminate-instances --instance-ids i-0aece65665aa6e6fd
{
    "TerminatingInstances": [
        {
            "InstanceId": "i-0aece65665aa6e6fd",
            "CurrentState": {
                "Code": 32,
                "Name": "shutting-down"
            },
            "PreviousState": {
                "Code": 16,
                "Name": "running"
            }
        }
    ]
}
```

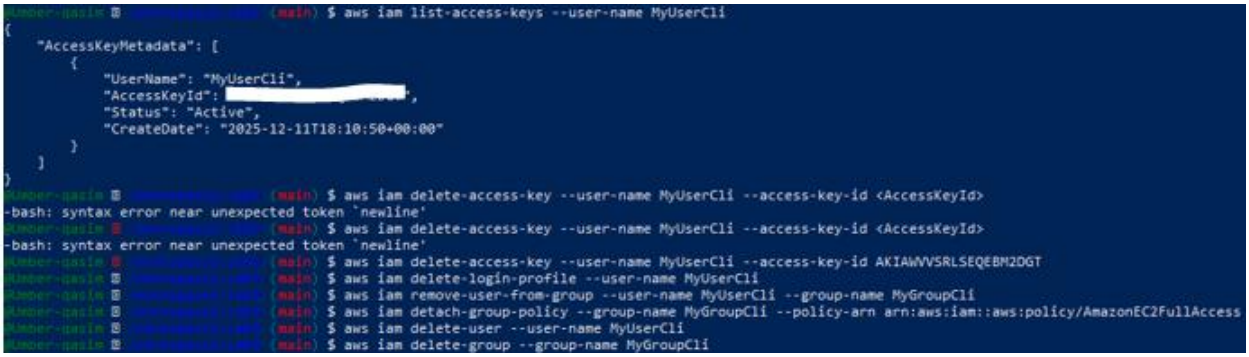
Delete Security Group

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 delete-security-group --group-id sg-0eb3714c44ea7837a
{
    "Return": true,
    "GroupId": "sg-0eb3714c44ea7837a"
}
```

Delete Key Pair

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 delete-key-pair --key-name MyED25519Key
{
    "Return": true,
    "KeyPairId": "key-04f3542aebcbd1261"
}
```

Delete IAM User's Access Key, Delete IAM Login Profile, Remove User from Group, Detach Policy from Group, Delete IAM User, Delete IAM Group



Optional: Delete any leftover EBS volumes/snapshots

```
@Umber-qasim /workspaces/Lab9 (main) $ aws ec2 describe-volumes --query "Volumes[*].VolumeId" --output text
@Umber-qasim /workspaces/Lab9 (main) $
```