NAME: SANA TARIQ
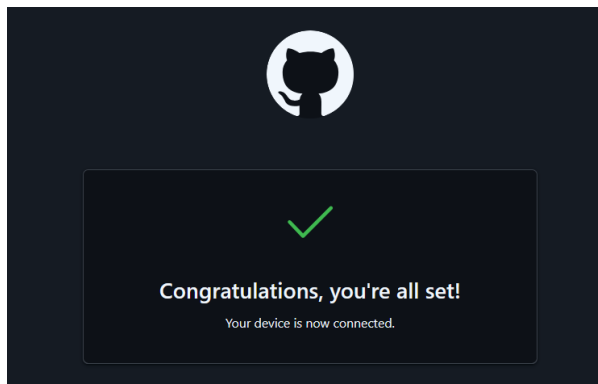**CLASS: BSE 5B**
REG.NO: 058
SUBJECT: CLOUD COMPUTING

LAB#10

```
PS C:\Windows\system32> winget install --id GitHub.cli
Found an existing package already installed. Trying to upgrade the installed package...
No available upgrade found.
No newer package versions are available from the configured sources.
PS C:\Windows\system32>
```

```
 Authentication complete.
- gh config set -h github.com git_protocol https
 Configured git protocol
 Logged in as SanaTariq205
! You were already logged in to this account
PS C:\Windows\system32>
```


Congratulations, you're all set!
Your device is now connected.

```
PS C:\Windows\system32> gh codespace ssh -c opulent-space-fiesta-wrq7qxqwrvxrf7x9
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.

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

@SanaTariq205  /workspaces/cc_sanatariq_058 (main) $
```

```
  inflating: aws/dist/wheel-0.45.1.dist-info/LICENSE.txt
  inflating: aws/dist/wheel-0.45.1.dist-info/INSTALLER
  inflating: aws/dist/wheel-0.45.1.dist-info/RECORD
  inflating: aws/dist/wheel-0.45.1.dist-info/entry_points.txt
  inflating: aws/dist/wheel-0.45.1.dist-info/WHEEL
  inflating: aws/dist/wheel-0.45.1.dist-info/METADATA
  inflating: aws/dist/wheel-0.45.1.dist-info/REQUESTED
  inflating: aws/dist/wheel-0.45.1.dist-info/direct_url.json
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ sudo ./aws/install
You can now run: /usr/local/bin/aws --version
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ aws --version
aws-cli/2.32.26 Python/3.13.11 Linux/6.8.0-1030-azure exe/x86_64.ubuntu.24
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $
```

```
Default region name [None]: us-east-1
Default output format [None]: json
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $
```

```
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ cat ~/.aws/config
[default]
region = us-east-1
output = json
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $
```

```
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ wget -O - https://apt.releases.hashicorp.com/gpg | sudo gpg --dear
mor -o /usr/share/keyrings/hashicorp-archive-keyring.gpg
ings/hashicorp-archive-keyring.gpg] https://apt.releases.hashicorp.com $(grep -oP '(?<=UBUNTU_CODENAME=).*' /etc/os-rele
ase || lsb_release -cs) main" | sudo tee /etc/apt/sources.list.d/hashicorp.list
sudo apt update
sudo apt install terraform -y--2026-01-02 13:45:17--  https://apt.releases.hashicorp.com/gpg
Resolving apt.releases.hashicorp.com (apt.releases.hashicorp.com)... 18.172.78.30, 18.172.78.65, 18.172.78.12, ...
Connecting to apt.releases.hashicorp.com (apt.releases.hashicorp.com)|18.172.78.30|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3980 (3.9K) [binary/octet-stream]
Saving to: 'STDOUT'

-                    100%[===================================================>]   3.89K  --.-KB/s    in 0s

2026-01-02 13:45:17 (770 MB/s) - written to stdout [3980/3980]

@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ echo "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/
keyrings/hashicorp-archive-keyring.gpg] https://apt.releases.hashicorp.com $(grep -oP '(?<=UBUNTU_CODENAME=).*' /etc/os-
```

```
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ sudo apt install terraform
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  terraform
0 upgraded, 1 newly installed, 0 to remove and 51 not upgraded.
Need to get 30.6 MB of archives.
After this operation, 101 MB of additional disk space will be used.
Get:1 https://apt.releases.hashicorp.com noble/main amd64 terraform amd64 1.14.3-1 [30.6 MB]
Fetched 30.6 MB in 0s (123 MB/s)
Selecting previously unselected package terraform.
(Reading database ... 58629 files and directories currently installed.)
Preparing to unpack .../terraform_1.14.3-1_amd64.deb ...
Unpacking terraform (1.14.3-1) ...
Setting up terraform (1.14.3-1) ...
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ terraform --version
Terraform v1.14.3
on linux_amd64
```

```
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}
```

```
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v6.27.0...
- Installed hashicorp/aws v6.27.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
```

```
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ cat .terraform.lock.hcl
# This file is maintained automatically by "terraform init".
# Manual edits may be lost in future updates.

provider "registry.terraform.io/hashicorp/aws" {
  version = "6.27.0"
  hashes = [
    "h1:bixp2PSsP5ZGBczGCxcbSDn61F5QFlUXlNroq9cdab4=",
    "zh:177a24b806c72e8484b5cabc93b2b38e3d770ae6f745a998b54d6619fd0e8129",
    "zh:4ac4a85c14fb868a3306b542e6a56c10bd6c6d5a67bc0c9b8f6a9060cf5f3be7",
    "zh:552652185bc85c8ba1da1d65dea47c454728a5c6839c458b6dcd3ce71c19ccfc",
    "zh:60284b8172d09aee91eae0856f09855eaf040ce3a58d6933602ae17c53f8ed04",
    "zh:6be38d156756ca61fb8e7c752cc5d769cd709686700ac4b230f40a6e95b5dbc9",
    "zh:7a409138fae4ef42e3a637e37cb9efedf96459e28a3c764fc4e855e8db9a7485",
    "zh:8070cf5224ed1ed3a3e9a59f7c30ff88bf071c7567165275d477c1738a56c064",
    "zh:894439ef340a9a79f69cd759e27ad11c7826adeca27be1b1ca82b3c9702fa300",
    "zh:89d035eebf08a97c89374ff06040955ddc09f275ecca609d0c9d58d149bef5cf",
    "zh:985b1145d724fc1f38369099e4a5087141885740fd6c0b1dbc492171e73c2e49",
    "zh:9b12af85486a96aedd8d7984b0ff811a4b42e3d88dad1a3fb4c0b580d04fa425",
    "zh:a80b47ae8d1475201c86bd94a5dcb9dd4da5e8b73102a90820b68b66b76d50fd",
    "zh:d3395be1556210f82199b9166a6b2e677cee9c4b67e96e63f6c3a98325ad7ab0",
    "zh:db0b869d09657f6f1e4110b56093c5fcdf9dbdd97c020db1e577b239c0adcbce",
    "zh:ffc72e680370ae7c21f9bd3082c6317730df805c6797427839a6b6b7e9a26a01",
  ]
}
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ ls .terraform/
providers
```

```
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}


resource "aws_vpc" "development_vpc" {
  cidr_block = "10.0.0.0/16"
}

resource "aws_subnet" "dev_subnet_1" {
  vpc_id            = aws_vpc.development_vpc.id
  cidr_block        = "10.0.10.0/24"
  availability_zone = "me-central-1a"
}
@SanaTariq205 ▯ /workspaces/cc_sanatariq_058 (main) $
```

```
aws_subnet.dev_subnet_1: Creating...
aws_subnet.dev_subnet_1: Creation complete after 2s [id=sub

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
@SanaTariq205  /workspaces/cc_sanatariq_058 (main) $
```

```
@SanaTariq205  /workspaces/cc_sanatariq_058 (main) $ aws ec2 describe-subnets --filter "Name=su
bba25036add9859"
{
    "Subnets": [
        {
            "AvailabilityZoneId": "use1-az1",
            "MapCustomerOwnedIpOnLaunch": false,
            "OwnerId": "623705168110",
            "AssignIpv6AddressOnCreation": false,
            "Ipv6CidrBlockAssociationSet": [],
            "SubnetArn": "arn:aws:ec2:us-east-1:623705168110:subnet/subnet-0dbba25036add9859",
            "EnableDns64": false,
            "Ipv6Native": false,
            "PrivateDnsNameOptionsOnLaunch": {
                "HostnameType": "ip-name",
                "EnableResourceNameDnsARecord": false,
                "EnableResourceNameDnsAAAARecord": false
```

```
@SanaTariq205  /workspaces/cc_sanatariq_058 (main) $ aws ec2 describe-vpcs --filter "Name=vpc-id,Values
012753"
{
    "Vpcs": [
        {
            "OwnerId": "623705168110",
            "InstanceTenancy": "default",
            "CidrBlockAssociationSet": [
                {
                    "AssociationId": "vpc-cidr-assoc-0c910514093b38224",
                    "CidrBlock": "10.0.0.0/16",
                    "CidrBlockState": {
                        "State": "associated"
                    }
                }
```

```
Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: yes

aws_subnet.dev_subnet_1_existing: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 1s [id=subnet-0d56a65d6d5c20ac2]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
```

```
aws_subnet.dev_subnet_1_existing: Destruction complete after 1s

  Warning: Applied changes may be incomplete

  The plan was created with the -target option in effect, so some
  ignored and the output values may not be fully updated. Run the
  pending:
      terraform plan

  Note that the -target option is not suitable for routine use, a
  recovering from errors or mistakes, or when Terraform specifica


Destroy complete! Resources: 1 destroyed.
```

```
@SanaTariq205  /workspaces/cc_sanatariq_058 (main) $ terraform refresh
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-03b640d8e17012753]
data.aws_vpc.existing_vpc: Read complete after 2s [id=vpc-0a9005120b91c
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-0dbba25036add98
```

```
aws_subnet.dev_subnet_1_existing: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 2:

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
```

```
   Enter a value: yes

aws_subnet.dev_subnet_1_existing: Destroying.
aws_subnet.dev_subnet_1: Destroying... [id=su
aws_subnet.dev_subnet_1: Destruction complete
aws_vpc.development_vpc: Destroying... [id=vp
aws_subnet.dev_subnet_1_existing: Destruction
aws_vpc.development_vpc: Destruction complete

Destroy complete! Resources: 3 destroyed.
```

```
   Enter a value: yes

aws_vpc.development_vpc: Creating...
aws_subnet.dev_subnet_1_existing: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 2s
aws_vpc.development_vpc: Creation complete after 3s [id=vpc-0
aws_subnet.dev_subnet_1: Creating...
aws_subnet.dev_subnet_1: Creation complete after 1s [id=subne

Apply complete! Resources: 3 added, 0 changed, 0 destroyed.
```

```
@SanaTariq205   /workspace/in_sanatariq_868 (main) $ cat main.tf
provider "aws" {
  shared_config_files      = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}

resource "aws_vpc" "development_vpc" {
  cidr_block = "10.0.0.0/16"
  tags = {
    Name    = "development"
    vpc_env = "dev"
  }
}

resource "aws_subnet" "dev_subnet_1" {
  vpc_id            = aws_vpc.development_vpc.id
  cidr_block        = "10.0.10.0/24"
  availability_zone = "us-east-1a"
  tags = {
    Name = "subnet-1-dev"
  }
}

data "aws_vpc" "existing_vpc" {
  default = true
}

resource "aws_subnet" "dev_subnet_1_existing" {
  vpc_id            = data.aws_vpc.existing_vpc.id
  cidr_block        = "172.31.240.0/24"
  availability_zone = "us-east-1a"
  tags = {
    Name = "subnet-1-default"
  }
}
```

```
Plan: 2 to add, 0 to change, 0 to destroy.
aws_subnet.dev_subnet_1_existing: Creating...
aws_subnet.dev_subnet_1: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 2s
aws_subnet.dev_subnet_1: Creation complete after 2s [id=subn

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.
```

```
@SanaTariq205 ⬢ /workspaces/cc_sanatariq_058 (main) $ terraform plan
data.aws_vpc.existing_vpc: Reading...
aws_vpc.development_vpc: Refreshing state... [id=vpc-0786a140267f2fecd]
data.aws_vpc.existing_vpc: Read complete after 2s [id=vpc-0a9005120b91ce98c]
aws_subnet.dev_subnet_1_existing: Refreshing state... [id=subnet-082b951856ab9407e]
aws_subnet.dev_subnet_1: Refreshing state... [id=subnet-0d1333f4eab5286a0]

Terraform used the selected providers to generate the following execution plan. Resou
following symbols:
  ~ update in-place

Terraform will perform the following actions:

  # aws_vpc.development_vpc will be updated in-place
  ~ resource "aws_vpc" "development_vpc" {
        id                                    = "vpc-0786a140267f2fecd"
      ~ tags                                  = {
            "Name"      = "development"
          - "vpc_env" = "dev" -> null
        }
      ~ tags_all                              = {
          - "vpc_env" = "dev" -> null
            # (1 unchanged element hidden)
        }
        # (19 unchanged attributes hidden)
    }

Plan: 0 to add, 1 to change, 0 to destroy.
```

```
Plan: 0 to add, 1 to change, 0 to destroy.
aws_vpc.development_vpc: Modifying... [id=vpc-0786a140267f2f
aws_vpc.development_vpc: Modifications complete after 3s [id

Apply complete! Resources: 0 added, 1 changed, 0 destroyed.
```

```
aws_subnet.dev_subnet_1: Destroying... [id=
aws_subnet.dev_subnet_1_existing: Destroyin
aws_subnet.dev_subnet_1_existing: Destructi
aws_subnet.dev_subnet_1: Destruction comple
aws_vpc.development_vpc: Destroying... [id=
aws_vpc.development_vpc: Destruction comple

Destroy complete! Resources: 3 destroyed.
```

```
@SanaTariq205 ⬢ /workspaces/cc_sanatariq_058 (main) $ cat terraform.tfstate
{
  "version": 4,
  "terraform_version": "1.14.3",
  "serial": 37,
  "lineage": "b4cad875-1ab7-d043-6a8a-b646b92414c9",
  "outputs": {},
  "resources": [],
  "check_results": null
}
```

```
@SanaTariq205 ⧉ /workspaces/cc_sanatariq_058 (main) $ cat terraform.tfstate.backup
{
  "version": 4,
  "terraform_version": "1.14.3",
  "serial": 32,
  "lineage": "b4cad875-1ab7-d043-6a8a-b646b92414c9",
  "outputs": {},
  "resources": [
    {
      "mode": "data",
      "type": "aws_vpc",
      "name": "existing_vpc",
      "provider": "provider[\"registry.terraform.io/hashicorp/aws\"]",
      "instances": [
        {
          "schema_version": 0,
          "attributes": {
```

```
aws_vpc.development_vpc: Creating...
aws_subnet.dev_subnet_1_existing: Creating...
aws_subnet.dev_subnet_1_existing: Creation complete after 2s
aws_vpc.development_vpc: Creation complete after 4s [id=vpc-
aws_subnet.dev_subnet_1: Creating...
aws_subnet.dev_subnet_1: Creation complete after 1s [id=subn

Apply complete! Resources: 3 added, 0 changed, 0 destroyed.
```

```
@SanaTariq205 ⧉ /workspaces/cc_sanatariq_058 (main) $ cat terraform.tfstate.backup
{
  "version": 4,
  "terraform_version": "1.14.3",
  "serial": 37,
  "lineage": "b4cad875-1ab7-d043-6a8a-b646b92414c9",
  "outputs": {},
  "resources": [],
  "check_results": null
}
```

```
@SanaTariq205 ⧉ /workspaces/cc_sanatariq_058 (main) $ terraform state list
data.aws_vpc.existing_vpc
aws_subnet.dev_subnet_1
aws_subnet.dev_subnet_1_existing
aws_vpc.development_vpc
```

```
@SanaTariq205 ⧉ /workspaces/cc_sanatariq_058 (main) $ terraform state show aws_vpc.development_vpc
# aws_vpc.development_vpc:
resource "aws_vpc" "development_vpc" {
    arn                                  = "arn:aws:ec2:us-east-1:623705168110:vpc/vpc-0ba5b5d4eaf680adf"
    assign_generated_ipv6_cidr_block     = false
    cidr_block                           = "10.0.0.0/16"
    default_network_acl_id               = "acl-0c22015c15d2c170c"
    default_route_table_id               = "rtb-049ad6ee9092bc316"
    default_security_group_id            = "sg-087c45fc0297c35bf"
    dhcp_options_id                      = "dopt-027511ed96e18e969"
    enable_dns_hostnames                 = false
    enable_dns_support                   = true
    enable_network_address_usage_metrics = false
    id                                   = "vpc-0ba5b5d4eaf680adf"
    instance_tenancy                     = "default"
    ipv6_association_id                  = null
    ipv6_cidr_block                      = null
    ipv6_cidr_block_network_border_group = null
    ipv6_ipam_pool_id                    = null
    ipv6_netmask_length                  = 0
    main_route_table_id                  = "rtb-049ad6ee9092bc316"
    owner_id                             = "623705168110"
    region                               = "us-east-1"
    tags                                 = {
        "Name" = "development"
    }
    tags_all                             = {
        "Name" = "development"
    }
}
```

```
Apply complete! Resources: 0 added, 0 changed, 0 destroyed.

Outputs:

dev-subnet-arn = "arn:aws:ec2:us-east-1:623705168110:subnet/
dev-subnet-id = "subnet-0726b897438644920"
dev-vpc-arn = "arn:aws:ec2:us-east-1:623705168110:vpc/vpc-0b
dev-vpc-id = "vpc-0ba5b5d4eaf680adf"
```

```
aws_subnet.dev_subnet_1_existing: Destroyi
aws_subnet.dev_subnet_1: Destroying... [id
aws_subnet.dev_subnet_1: Destruction compl
aws_vpc.development_vpc: Destroying... [id
aws_subnet.dev_subnet_1_existing: Destruct
aws_vpc.development_vpc: Destruction compl

Destroy complete! Resources: 3 destroyed.
```

```
@SanaTariq205 ▨ /workspaces/cc_sanatariq_058 (main) $ cat terraform.tfstate
{
  "version": 4,
  "terraform_version": "1.14.3",
  "serial": 47,
  "lineage": "b4cad875-1ab7-d043-6a8a-b646b92414c9",
  "outputs": {},
  "resources": [],
  "check_results": null
}
```

```
@SanaTariq205 ▨ /workspaces/cc_sanatariq_058 (main) $ cat terraform.tfstate.backup
{
  "version": 4,
  "terraform_version": "1.14.3",
  "serial": 42,
  "lineage": "b4cad875-1ab7-d043-6a8a-b646b92414c9",
  "outputs": {
    "dev-subnet-arn": {
      "value": "arn:aws:ec2:us-east-1:623705168110:subnet/subnet-0726b897438644920",
      "type": "string"
    },
    "dev-subnet-id": {
```