School of Computer Science

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

DEHRADUN, UTTARAKHAND

System Monitoring And Configuration Management

Lab File

(2024-2025)

for

6th Semester

Submitted To:

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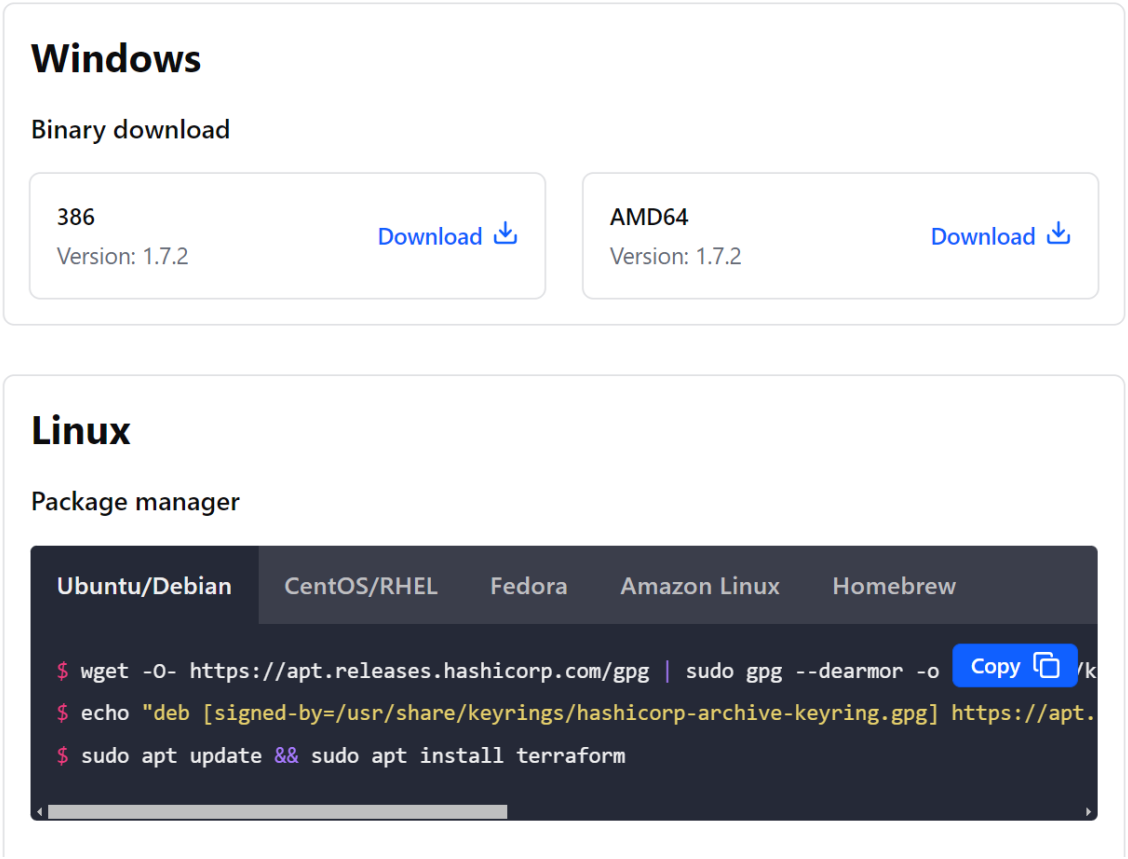
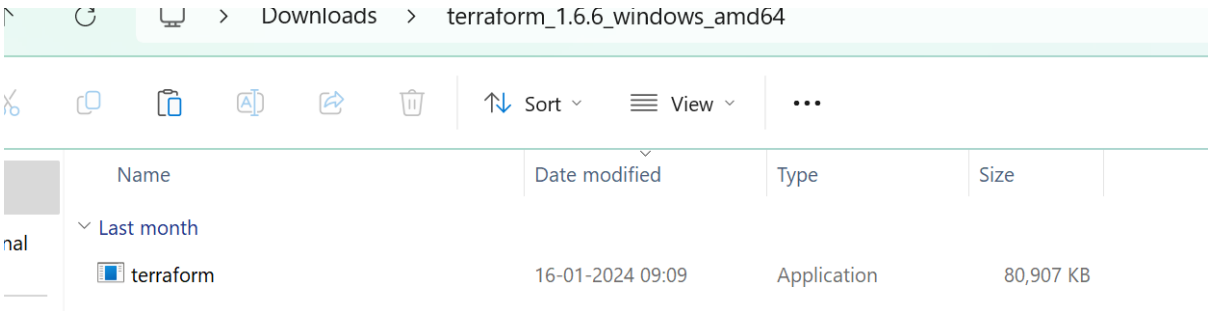
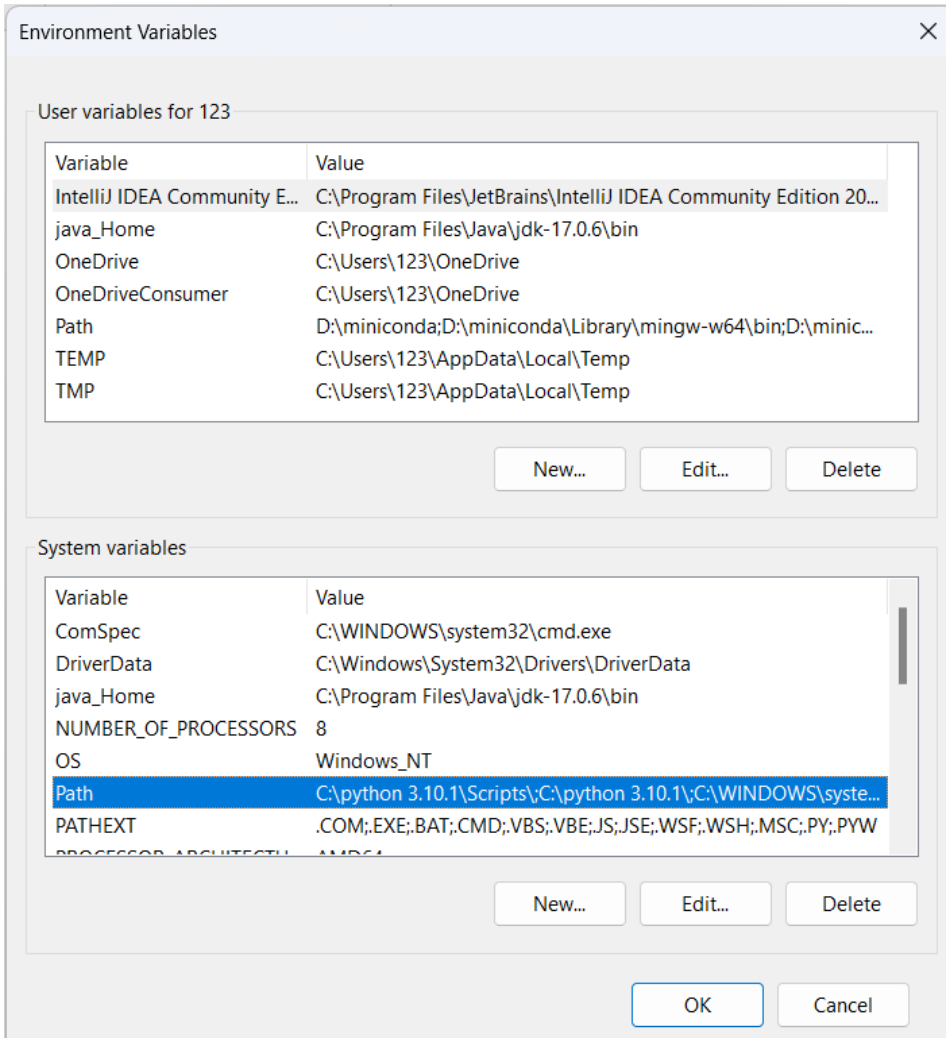
LAB EXERCISE 1

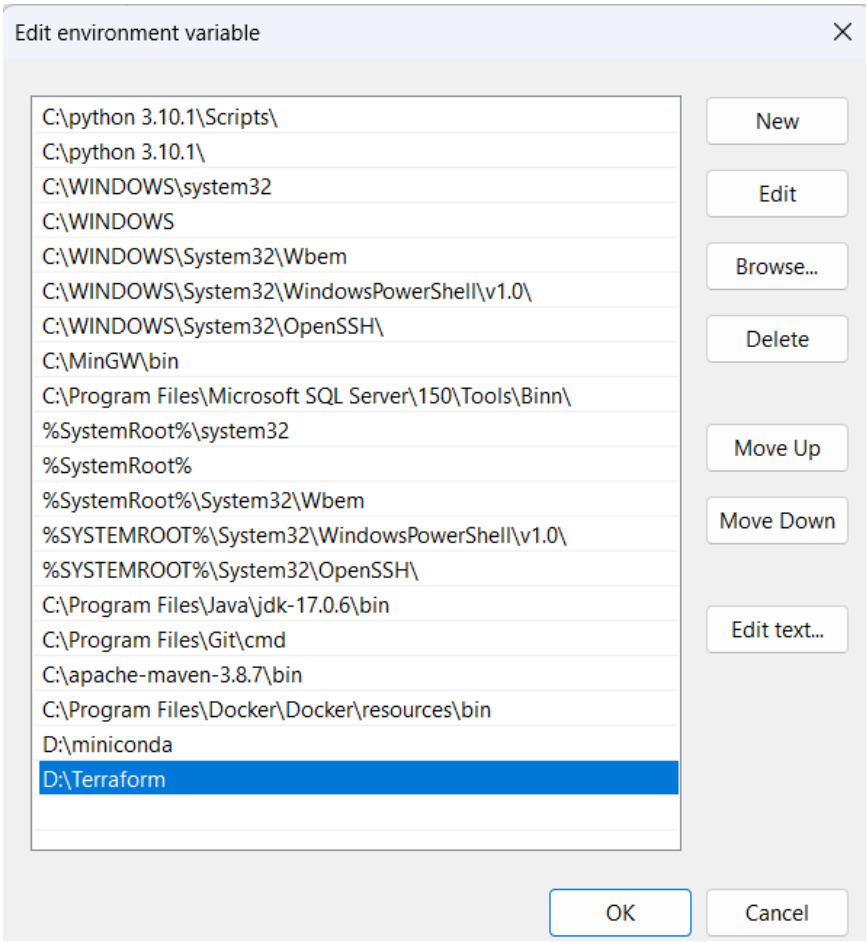
Aim: Install Terraform on Windows

Download Terraform, add it to path and verify install.






Environment Variables
User variables for 123
Variable
Value
IntelliJ IDEA Community E...
C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 20...
java_Home
C:\Program Files\Java\jdk-17.0.6\bin
OneDrive
C:\Users\123\OneDrive
OneDriveConsumer
C:\Users\123\OneDrive
Path
D:\miniconda;D:\miniconda\Library\mingw-w64\bin;D:\minic...
TEMP
C:\Users\123\AppData\Local\Temp
TMP
C:\Users\123\AppData\Local\Temp
New...
Edit...
Delete
System variables
Variable
Value
ComSpec
C:\WINDOWS\system32\cmd.exe
DriverData
C:\Windows\System32\Drivers\DriverData
java_Home
C:\Program Files\Java\jdk-17.0.6\bin
NUMBER_OF_PROCESSORS
8
OS
Windows_NT
Path
C:\python 3.10.1\Scripts\;C:\python 3.10.1\;C:\WINDOWS\syste...
PATHEXT
.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC;.PY;.PYW
New...
Edit...
Delete
OK
Cancel



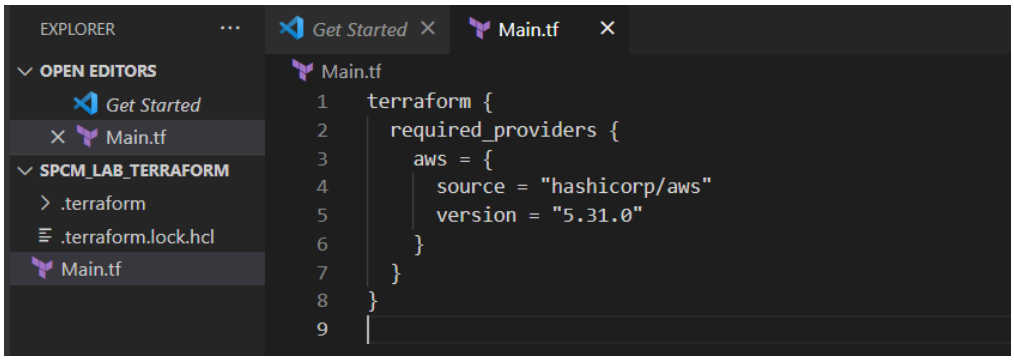
On cmd run this command for the successful installation.

```
C:\Users\parth>terraform -version
Terraform v1.6.6
on windows_amd64

Your version of Terraform is out of date! The latest version
is 1.7.2. You can update by downloading from https://www.terraform.io/downloads.html
```

LAB EXERCISE 2

Aim: Terraform AWS Provider and IAM User Setting

Step 1:Create Terraform Configuration File (main.tf)



Step 3: Initialize Terraform:

```
parth@LAPTOP-EL5DNB1S MINGW64 ~/aws-terraform-demo
$ terraform init

Initializing the backend...

Initializing provider plugins...

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.

parth@LAPTOP-EL5DNB1S MINGW64 ~/aws-terraform-demo
$
```

LAB EXERCISE 3

Aim: Provisioning an EC2 Instance on AWS

Step 1: Create Terraform Configuration File (main.tf)

main.tf

```
terraform {
required_providers {
aws = {
source = "hashicorp/aws"
version = "5.31.0"
    }
  }
}
provider "aws" {
region     = "ap-south-1"
access_key = "AKIA55IIA4K2GLUL2CMG"
secret_key = "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"
}
```

Step 2: Create Terraform Configuration File for EC2 instance (instance.tf)

main.tf | instance.tf

instance.tf

```
resource "aws_instance" "My-instance" {
instance_type = "t2.micro"
ami = "ami-0d63de463e6604d0a"
count = 1
tags = {
Name = "UPES-EC2-Instnace"
}
}
```

Step 3: Initialize Terraform:

```
parth@LAPTOP-EL5DNB1S MINGW64 ~/aws-terraform-demo
$ terraform init

Initializing the backend...

Initializing provider plugins...
- Reusing previous version of hashicorp/aws from the dependency lock file
- Using previously-installed hashicorp/aws v5.31.0

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.
```

Step 4: Apply Validate

```
parth@LAPTOP-EL5DNB1S MINGW64 ~/aws-terraform-demo
$ terraform validate
Success! The configuration is valid.
```

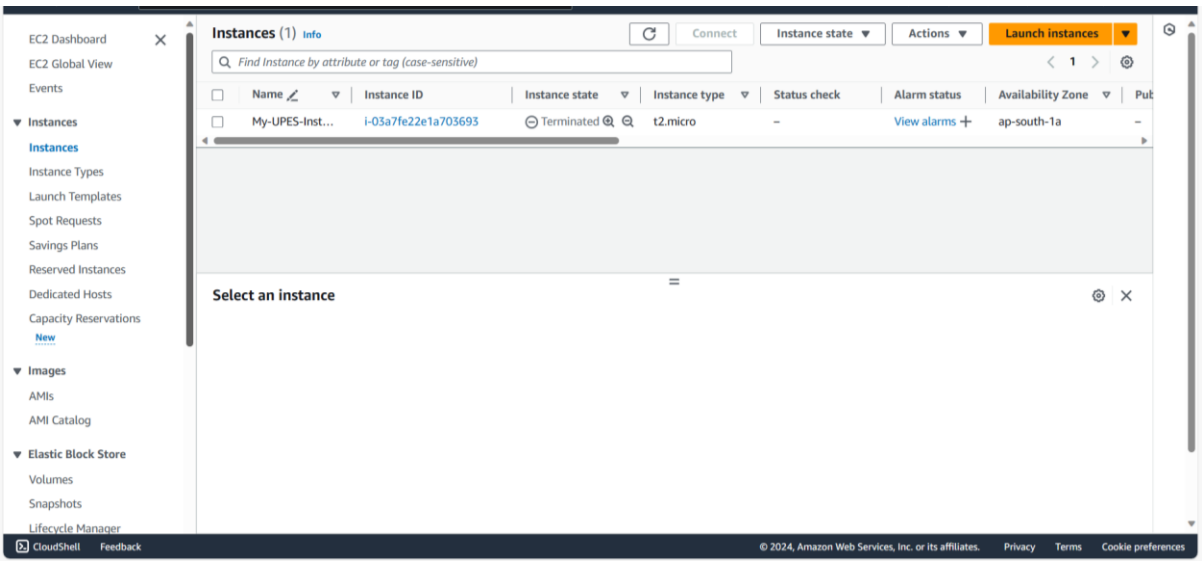
Step 5: Review Plan:

```
parth@LAPTOP-EL5DNB1S MINGW64 ~/aws-terraform-demo
$ terraform plan

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the
following symbols:
  + create

Terraform will perform the following actions:

  # aws_instance.My-instance[0] will be created
  + resource "aws_instance" "My-instance" {
      + ami                                  = "ami-0d63de463e6604d0a"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.micro"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
```

```
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
    }

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

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you
run "terraform apply" now.
```

Step 6: Apply Changes

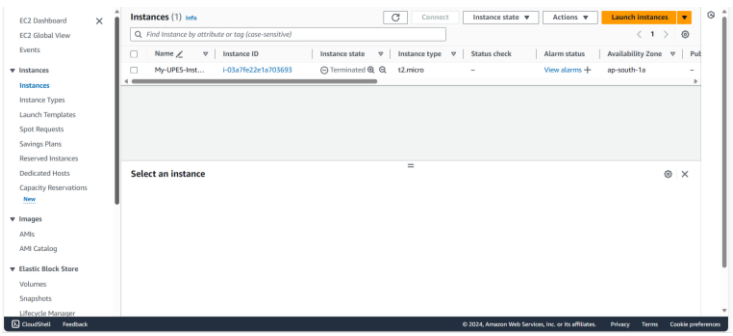
```
Plan: 1 to add, 0 to change, 0 to destroy.

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_instance.My-Instnace[0]: Creating...
aws_instance.My-Instnace[0]: Still creating... [10s elapsed]
aws_instance.My-Instnace[0]: Still creating... [20s elapsed]
aws_instance.My-Instnace[0]: Still creating... [30s elapsed]
aws_instance.My-Instnace[0]: Creation complete after 40s [id=i-03a7fe22e1a703693]

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



Step 7: Cleanup Resources

```
Terraform will perform the following actions:

  # aws_instance.My-Instnace[0] will be destroyed
  - resource "aws_instance" "My-Instnace" {
      - ami                                  = "ami-03f48787554349771f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-03a7fe22e1a703693" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1a" -> null
      - cpu_core_count                       = 1 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-03a7fe22e1a703693" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.micro" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-0ebfddd302e87b053" -> null
      - private_dns                          = "ip-172-31-35-24.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.35.24" -> null
      - public_dns                           = "ec2-43-205-114-204.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "43.205.114.204" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0fb95688eaa188f7d" -> null
      - tags                                 = {
          - "Name" = "My-UPES-Instnace"
        } -> null
      - tags_all                             = {
          - "Name" = "My-UPES-Instnace"
        } -> null
      - tenancy                              = "default" -> null
      - user_data_replace_on_change          = false -> null
      - vpc_security_group_ids               = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 1 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
```

```
      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 1 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-082d5578223000e93" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

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

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_instance.My-Instnace[0]: Destroying... [id=i-03a7fe22e1a703693]
aws_instance.My-Instnace[0]: Still destroying... [id=i-03a7fe22e1a703693, 10s elapsed]
aws_instance.My-Instnace[0]: Still destroying... [id=i-03a7fe22e1a703693, 20s elapsed]
aws_instance.My-Instnace[0]: Still destroying... [id=i-03a7fe22e1a703693, 30s elapsed]
aws_instance.My-Instnace[0]: Destruction complete after 31s
```



LAB EXERCISE 4

Aim: Terraform Variables

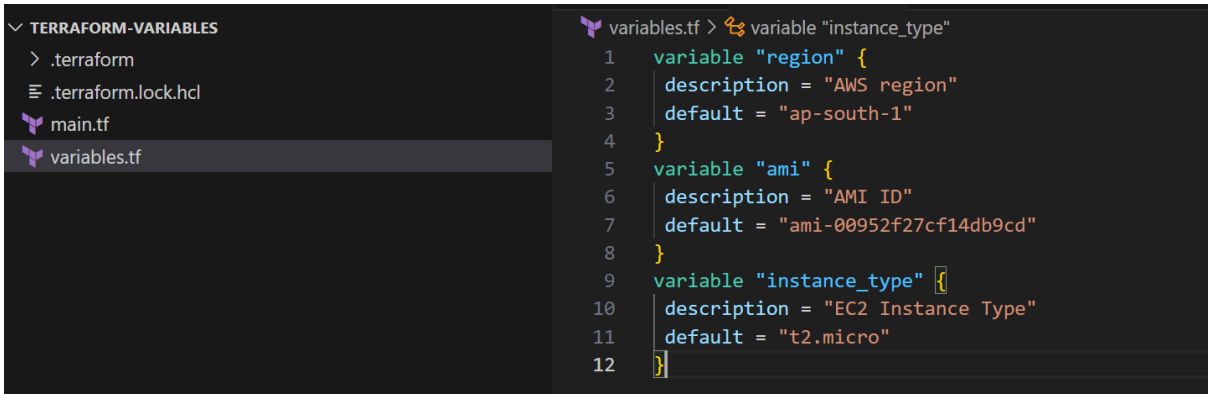
Step 1: Create a Terraform Configuration File:

main.tf variables.tf

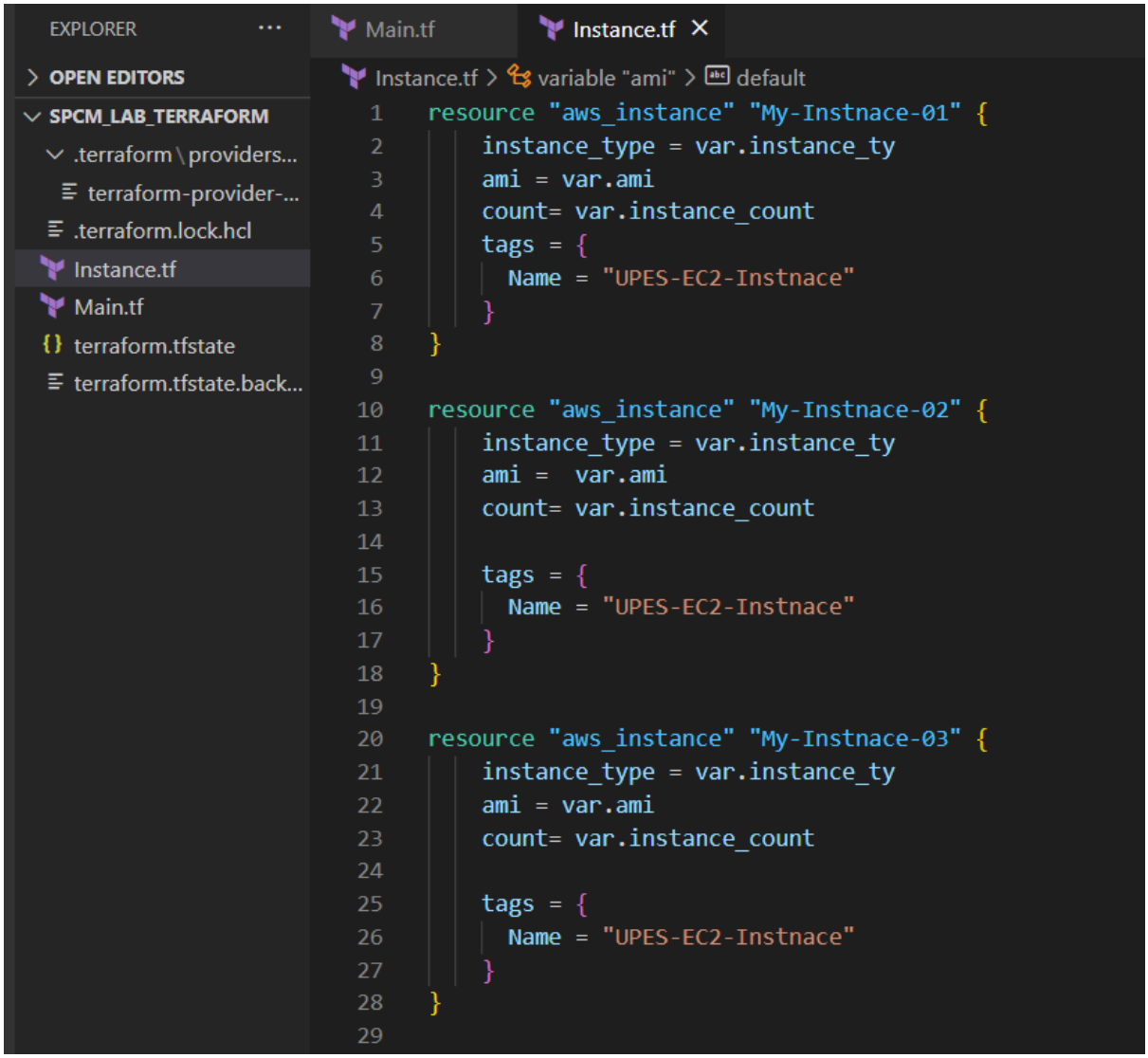
main.tf > resource "aws_instance" "example"

```
provider "aws" {
 region = "ap-south-1"
}
resource "aws_instance" "example" {
 ami = ami-00952f27cf14db9cd
 instance_type = t2.micro
}
```

Step 2: Define Variables:



Step 3: Use Variables in instance.tf file:



Step 4: Now do terraform initialize:

```
Microsoft Windows [Version 10.0.22621.3007]
(c) Microsoft Corporation. All rights reserved.

F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform validate
Success! The configuration is valid.
```

Step 5: Now perform Terraform plan:

```
Acquiring state lock. This may take a few moments...

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the
following symbols:
  + create

Terraform will perform the following actions:

  # aws_instance.My-Instnace-01[0] will be created
  + resource "aws_instance" "My-Instnace-01" {
      + ami                                  = "ami-03f4878755434977f"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.micro"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
```

```
      }
    + tenancy                              = (known after apply)
    + user_data                            = (known after apply)
    + user_data_base64                     = (known after apply)
    + user_data_replace_on_change          = false
    + vpc_security_group_ids               = (known after apply)
  }

# aws_instance.My-Instnace-02[0] will be created
+ resource "aws_instance" "My-Instnace-02" {
    + ami                                  = "ami-03f48787554349777f"
    + arn                                  = (known after apply)
    + associate_public_ip_address          = (known after apply)
    + availability_zone                    = (known after apply)
    + cpu_core_count                       = (known after apply)
    + cpu_threads_per_core                 = (known after apply)
    + disable_api_stop                     = (known after apply)
    + disable_api_termination              = (known after apply)
    + ebs_optimized                        = (known after apply)
    + get_password_data                    = false
    + host_id                              = (known after apply)
    + host_resource_group_arn              = (known after apply)
    + iam_instance_profile                 = (known after apply)
    + id                                   = (known after apply)
    + instance_initiated_shutdown_behavior = (known after apply)
    + instance_lifecycle                   = (known after apply)
    + instance_state                       = (known after apply)
    + instance_type                        = "t2.micro"
    + ipv6_address_count                   = (known after apply)
    + ipv6_addresses                       = (known after apply)
    + key_name                             = (known after apply)
    + monitoring                           = (known after apply)
    + outpost_arn                          = (known after apply)
    + password_data                        = (known after apply)
    + placement_group                      = (known after apply)
    + placement_partition_number           = (known after apply)
    + primary_network_interface_id         = (known after apply)
    + private_dns                          = (known after apply)
    + private_ip                           = (known after apply)
    + public_dns                           = (known after apply)
    + public_ip                            = (known after apply)
    + secondary_private_ips                = (known after apply)
    + security_groups                      = (known after apply)
    + source_dest_check                    = true
    + spot_instance_request_id             = (known after apply)
    + subnet_id                            = (known after apply)
    + tags                                 = {
        + "Name" = "UPES-EC2-Instnace"
      }
    + tags_all                             = {
        + "Name" = "UPES-EC2-Instnace"
      }
    + tenancy                              = (known after apply)
    + user_data                            = (known after apply)
    + user_data_base64                     = (known after apply)
    + user_data_replace_on_change          = false
```

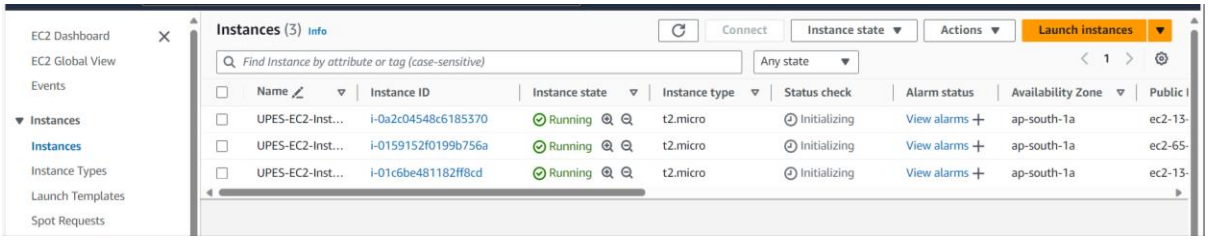
```
      + "Name" = "UPES-EC2-Instnace"
    }
  + tags_all                              = {
      + "Name" = "UPES-EC2-Instnace"
    }
  + tenancy                               = (known after apply)
  + user_data                             = (known after apply)
  + user_data_base64                      = (known after apply)
  + user_data_replace_on_change           = false
  + vpc_security_group_ids                = (known after apply)
}

# aws_instance.My-Instnace-03[0] will be created
+ resource "aws_instance" "My-Instnace-03" {
  + ami                                   = "ami-03f4878755434977f"
  + arn                                   = (known after apply)
  + associate_public_ip_address           = (known after apply)
  + availability_zone                     = (known after apply)
  + cpu_core_count                        = (known after apply)
  + cpu_threads_per_core                  = (known after apply)
  + disable_api_stop                      = (known after apply)
  + disable_api_termination               = (known after apply)
  + ebs_optimized                         = (known after apply)
  + get_password_data                     = false
  + host_id                               = (known after apply)
  + host_resource_group_arn               = (known after apply)
  + iam_instance_profile                  = (known after apply)
  + id                                    = (known after apply)
  + instance_initiated_shutdown_behavior = (known after apply)
  + instance_lifecycle                    = (known after apply)
  + instance_state                        = (known after apply)
  + instance_type                         = "t2.micro"
  + ipv6_address_count                    = (known after apply)
  + ipv6_addresses                        = (known after apply)
  + key_name                              = (known after apply)
  + monitoring                            = (known after apply)
  + outpost_arn                           = (known after apply)
  + password_data                         = (known after apply)
  + placement_group                       = (known after apply)
  + placement_partition_number            = (known after apply)
  + primary_network_interface_id          = (known after apply)
  + private_dns                           = (known after apply)
  + private_ip                            = (known after apply)
  + public_dns                            = (known after apply)
  + public_ip                             = (known after apply)
  + secondary_private_ips                 = (known after apply)
  + security_groups                       = (known after apply)
  + source_dest_check                     = true
  + spot_instance_request_id              = (known after apply)
  + subnet_id                             = (known after apply)
  + tags                                  = {
      + "Name" = "UPES-EC2-Instnace"
    }
  + tags_all                              = {
      + "Name" = "UPES-EC2-Instnace"
    }
```

```
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols
  + create

Terraform will perform the following actions:

  # aws_instance.My-Instnace-01[0] will be created
  + resource "aws_instance" "My-Instnace-01" {
      + ami                                  = "ami-03f4878755434977f"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.micro"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
```

```
      + tags_all                              = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                               = (known after apply)
      + user_data                             = (known after apply)
      + user_data_base64                      = (known after apply)
      + user_data_replace_on_change           = false
      + vpc_security_group_ids                = (known after apply)
    }

  # aws_instance.My-Instnace-02[0] will be created
  + resource "aws_instance" "My-Instnace-02" {
      + ami                                   = "ami-03f48787554349777f"
      + arn                                   = (known after apply)
      + associate_public_ip_address           = (known after apply)
      + availability_zone                     = (known after apply)
      + cpu_core_count                        = (known after apply)
      + cpu_threads_per_core                  = (known after apply)
      + disable_api_stop                      = (known after apply)
      + disable_api_termination               = (known after apply)
      + ebs_optimized                         = (known after apply)
      + get_password_data                     = false
      + host_id                               = (known after apply)
      + host_resource_group_arn               = (known after apply)
      + iam_instance_profile                  = (known after apply)
      + id                                    = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                    = (known after apply)
      + instance_state                        = (known after apply)
      + instance_type                         = "t2.micro"
      + ipv6_address_count                    = (known after apply)
      + ipv6_addresses                        = (known after apply)
      + key_name                              = (known after apply)
      + monitoring                            = (known after apply)
      + outpost_arn                           = (known after apply)
      + password_data                         = (known after apply)
      + placement_group                       = (known after apply)
      + placement_partition_number            = (known after apply)
      + primary_network_interface_id          = (known after apply)
      + private_dns                           = (known after apply)
      + private_ip                            = (known after apply)
      + public_dns                            = (known after apply)
      + public_ip                             = (known after apply)
      + secondary_private_ips                 = (known after apply)
      + security_groups                       = (known after apply)
      + source_dest_check                     = true
      + spot_instance_request_id              = (known after apply)
      + subnet_id                             = (known after apply)
      + tags                                  = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                              = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                               = (known after apply)
      + user_data                             = (known after apply)
```

```
      + vpc_security_group_ids               = (known after apply)
    }

  # aws_instance.My-Instnace-03[0] will be created
  + resource "aws_instance" "My-Instnace-03" {
      + ami                                  = "ami-03f4878755434977f"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.micro"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
    }

Plan: 3 to add, 0 to change, 0 to destroy.
```

```
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_instance.My-Instnace-03[0]: Creating...
aws_instance.My-Instnace-01[0]: Creating...
aws_instance.My-Instnace-02[0]: Creating...
aws_instance.My-Instnace-02[0]: Still creating... [10s elapsed]
aws_instance.My-Instnace-01[0]: Still creating... [10s elapsed]
aws_instance.My-Instnace-03[0]: Still creating... [10s elapsed]
aws_instance.My-Instnace-02[0]: Still creating... [20s elapsed]
aws_instance.My-Instnace-03[0]: Still creating... [20s elapsed]
aws_instance.My-Instnace-01[0]: Still creating... [20s elapsed]
aws_instance.My-Instnace-02[0]: Creation complete after 26s [id=i-0a2c04548c6185370]
aws_instance.My-Instnace-01[0]: Creation complete after 27s [id=i-0159152f0199b756a]
aws_instance.My-Instnace-03[0]: Still creating... [30s elapsed]
aws_instance.My-Instnace-03[0]: Creation complete after 38s [id=i-01c6be481182ff8cd]

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



Step 6: Now perform Terraform Destroy to clean up:

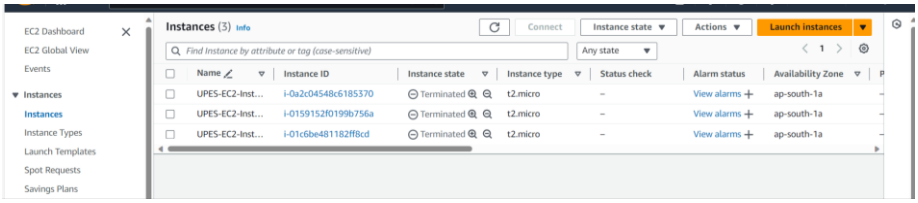
```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform destroy
aws_instance.My-Instnace-03[0]: Refreshing state... [id=i-01c6be481182ff8cd]
aws_instance.My-Instnace-01[0]: Refreshing state... [id=i-0159152f0199b756a]
aws_instance.My-Instnace-02[0]: Refreshing state... [id=i-0a2c04548c6185370]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  - destroy

Terraform will perform the following actions:

  # aws_instance.My-Instnace-01[0] will be destroyed
  - resource "aws_instance" "My-Instnace-01" {
      - ami                                  = "ami-03f4878755434977f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-0159152f0199b756a" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1a" -> null
      - cpu_core_count                       = 1 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-0159152f0199b756a" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.micro" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-09da1e69e703ba3f3" -> null
      - private_dns                          = "ip-172-31-46-118.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.46.118" -> null
      - public_dns                           = "ec2-65-0-92-98.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "65.0.92.98" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0fb95688eaa188f7d" -> null
      - tags                                 = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                             = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tenancy                              = "default" -> null
      - user_data_replace_on_change          = false -> null
      - vpc_security_group_ids               = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
```

```
      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 1 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-04d6479744095f96c" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

  # aws_instance.My-Instnace-02[0] will be destroyed
  - resource "aws_instance" "My-Instnace-02" {
      - ami                                  = "ami-03f48787554349777f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-0a2c04548c6185370" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1a" -> null
      - cpu_core_count                       = 1 -> null
```

```
      - cpu_threads_per_core                = 1 -> null
      - disable_api_stop                    = false -> null
      - disable_api_termination             = false -> null
      - ebs_optimized                       = false -> null
      - get_password_data                   = false -> null
      - hibernation                         = false -> null
      - id                                  = "i-0a2c04548c6185370" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                      = "running" -> null
      - instance_type                       = "t2.micro" -> null
      - ipv6_address_count                  = 0 -> null
      - ipv6_addresses                      = [] -> null
      - monitoring                          = false -> null
      - placement_partition_number          = 0 -> null
      - primary_network_interface_id        = "eni-098832716741787 93" -> null
      - private_dns                         = "ip-172-31-45-164.ap-south-1.compute.internal" -> null
      - private_ip                          = "172.31.45.164" -> null
      - public_dns                          = "ec2-13-234-204-23.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                           = "13.234.204.23" -> null
      - secondary_private_ips               = [] -> null
      - security_groups                     = [
          - "default",
        ] -> null
      - source_dest_check                   = true -> null
      - subnet_id                           = "subnet-0fb95688eaa188f7d" -> null
      - tags                                = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                            = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tenancy                             = "default" -> null
      - user_data_replace_on_change         = false -> null
      - vpc_security_group_ids              = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 1 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
```

```
      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-0fd47691f9f057c4c" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

  # aws_instance.My-Instnace-03[0] will be destroyed
  - resource "aws_instance" "My-Instnace-03" {
      - ami                                  = "ami-03f48787554349777f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-01c6be481182ff8cd" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1a" -> null
      - cpu_core_count                       = 1 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-01c6be481182ff8cd" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.micro" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-04af9f7a4fa3a82f4" -> null
      - private_dns                          = "ip-172-31-36-27.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.36.27" -> null
      - public_dns                           = "ec2-13-127-181-85.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "13.127.181.85" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
```

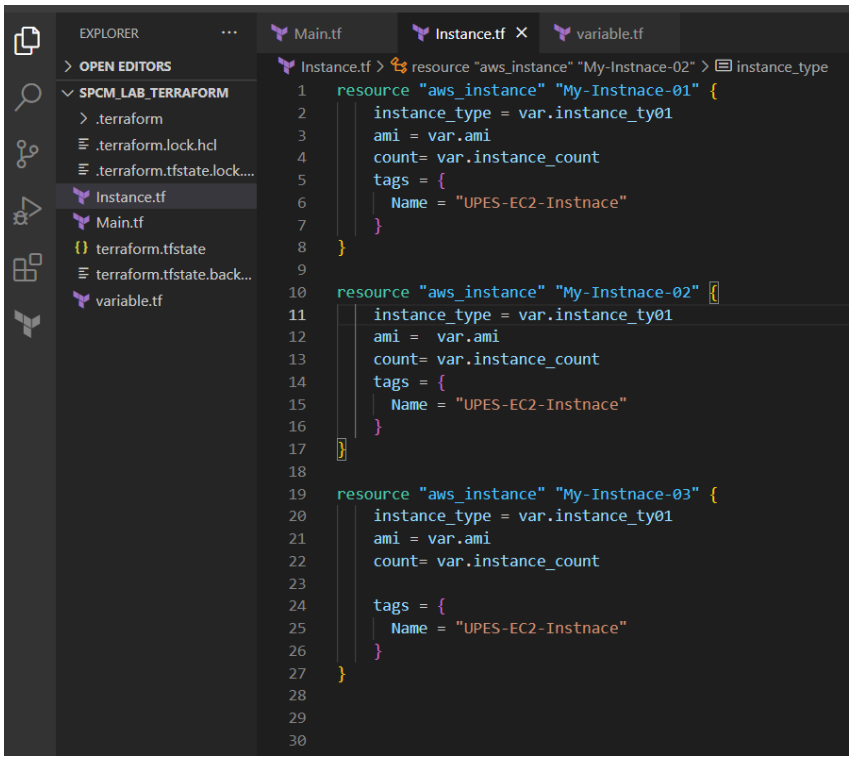
```
Plan: 0 to add, 0 to change, 3 to destroy.

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_instance.My-Instnace-03[0]: Destroying... [id=i-01c6be481182ff8cd]
aws_instance.My-Instnace-01[0]: Destroying... [id=i-0159152f0199b756a]
aws_instance.My-Instnace-02[0]: Destroying... [id=i-0a2c04548c6185370]
aws_instance.My-Instnace-03[0]: Still destroying... [id=i-01c6be481182ff8cd, 10s elapsed]
aws_instance.My-Instnace-01[0]: Still destroying... [id=i-0159152f0199b756a, 10s elapsed]
aws_instance.My-Instnace-02[0]: Still destroying... [id=i-0a2c04548c6185370, 10s elapsed]
aws_instance.My-Instnace-02[0]: Still destroying... [id=i-0a2c04548c6185370, 20s elapsed]
aws_instance.My-Instnace-03[0]: Still destroying... [id=i-01c6be481182ff8cd, 20s elapsed]
aws_instance.My-Instnace-01[0]: Still destroying... [id=i-0159152f0199b756a, 20s elapsed]
aws_instance.My-Instnace-03[0]: Still destroying... [id=i-01c6be481182ff8cd, 30s elapsed]
aws_instance.My-Instnace-02[0]: Still destroying... [id=i-0a2c04548c6185370, 30s elapsed]
aws_instance.My-Instnace-01[0]: Still destroying... [id=i-0159152f0199b756a, 30s elapsed]
aws_instance.My-Instnace-01[0]: Destruction complete after 31s
aws_instance.My-Instnace-02[0]: Still destroying... [id=i-0a2c04548c6185370, 40s elapsed]
aws_instance.My-Instnace-03[0]: Still destroying... [id=i-01c6be481182ff8cd, 40s elapsed]
aws_instance.My-Instnace-02[0]: Destruction complete after 41s
aws_instance.My-Instnace-03[0]: Destruction complete after 41s

Destroy complete! Resources: 3 destroyed.
```



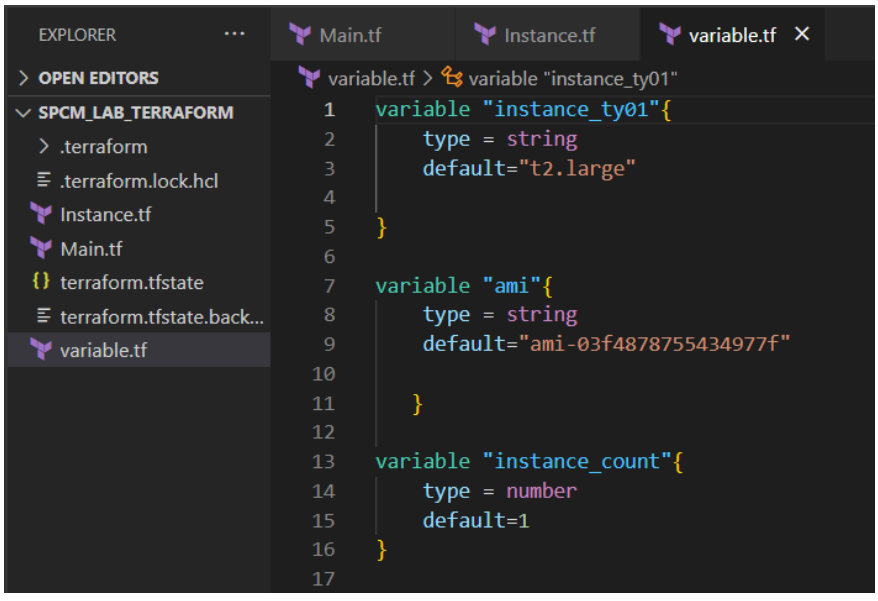
LAB EXERCISE 5

Aim: Terraform Variables with Command Line Arguments

Step 1: Create a instance.tf file:



Step 2: Create a variable.tf file



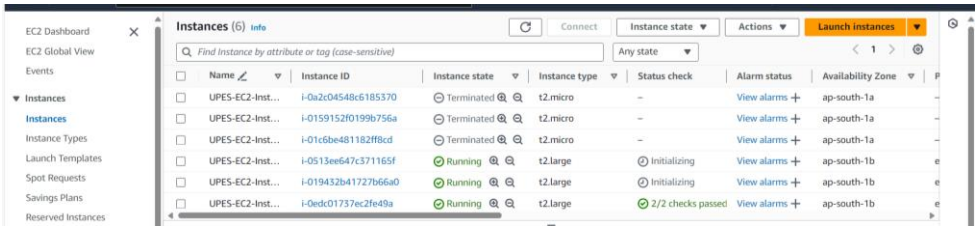
Step 3: Perform Terraform Validate And Apply

```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform validate
Success! The configuration is valid.


F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform apply
Acquiring state lock. This may take a few moments...

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # aws_instance.My-Instnace-01[0] will be created
  + resource "aws_instance" "My-Instnace-01" {
      + ami                                  = "ami-03f4878755434977f"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.large"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
```

```
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
    }

  # aws_instance.My-Instnace-02[0] will be created
  + resource "aws_instance" "My-Instnace-02" {
      + ami                                  = "ami-03f4878755434977f"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.large"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
```

```
      + key_name                                   = (known after apply)
      + monitoring                                 = (known after apply)
      + outpost_arn                                = (known after apply)
      + password_data                              = (known after apply)
      + placement_group                            = (known after apply)
      + placement_partition_number                 = (known after apply)
      + primary_network_interface_id               = (known after apply)
      + private_dns                                = (known after apply)
      + private_ip                                 = (known after apply)
      + public_dns                                 = (known after apply)
      + public_ip                                  = (known after apply)
      + secondary_private_ips                      = (known after apply)
      + security_groups                            = (known after apply)
      + source_dest_check                          = true
      + spot_instance_request_id                   = (known after apply)
      + subnet_id                                  = (known after apply)
      + tags                                       = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                                   = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                                    = (known after apply)
      + user_data                                  = (known after apply)
      + user_data_base64                           = (known after apply)
      + user_data_replace_on_change                = false
      + vpc_security_group_ids                     = (known after apply)
    }

  # aws_instance.My-Instnace-03[0] will be created
  + resource "aws_instance" "My-Instnace-03" {
      + ami                                        = "ami-03f4878755434977f"
      + arn                                        = (known after apply)
      + associate_public_ip_address                = (known after apply)
      + availability_zone                          = (known after apply)
      + cpu_core_count                             = (known after apply)
      + cpu_threads_per_core                       = (known after apply)
      + disable_api_stop                           = (known after apply)
      + disable_api_termination                    = (known after apply)
      + ebs_optimized                              = (known after apply)
      + get_password_data                          = false
      + host_id                                    = (known after apply)
      + host_resource_group_arn                    = (known after apply)
      + iam_instance_profile                       = (known after apply)
      + id                                         = (known after apply)
      + instance_initiated_shutdown_behavior       = (known after apply)
      + instance_lifecycle                         = (known after apply)
      + instance_state                             = (known after apply)
      + instance_type                              = "t2.large"
      + ipv6_address_count                         = (known after apply)
```

```
      + security_groups                            = (known after apply)
      + source_dest_check                          = true
      + spot_instance_request_id                   = (known after apply)
      + subnet_id                                  = (known after apply)
      + tags                                       = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                                   = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                                    = (known after apply)
      + user_data                                  = (known after apply)
      + user_data_base64                           = (known after apply)
      + user_data_replace_on_change                = false
      + vpc_security_group_ids                     = (known after apply)
    }

Plan: 3 to add, 0 to change, 0 to destroy.

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_instance.My-Instnace-03[0]: Creating...
aws_instance.My-Instnace-01[0]: Creating...
aws_instance.My-Instnace-02[0]: Creating...
aws_instance.My-Instnace-02[0]: Still creating... [10s elapsed]
aws_instance.My-Instnace-03[0]: Still creating... [10s elapsed]
aws_instance.My-Instnace-01[0]: Still creating... [10s elapsed]
aws_instance.My-Instnace-03[0]: Still creating... [20s elapsed]
aws_instance.My-Instnace-01[0]: Still creating... [20s elapsed]
aws_instance.My-Instnace-02[0]: Still creating... [20s elapsed]
aws_instance.My-Instnace-01[0]: Creation complete after 24s [id=i-0edc01737ec2fe49a]
aws_instance.My-Instnace-03[0]: Creation complete after 24s [id=i-019432b41727b66a0]
aws_instance.My-Instnace-02[0]: Creation complete after 24s [id=i-0513ee647c371165f]

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



Step 4: Perform Terraform Destroy:

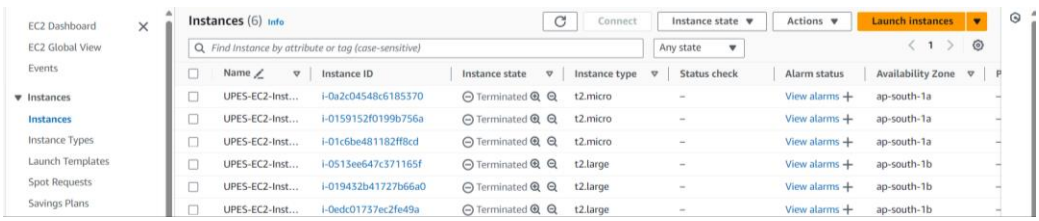
```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform destroy
aws_instance.My-Instnace-02[0]: Refreshing state... [id=i-0513ee647c371165f]
aws_instance.My-Instnace-03[0]: Refreshing state... [id=i-019432b41727b66a0]
aws_instance.My-Instnace-01[0]: Refreshing state... [id=i-0edc01737ec2fe49a]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  - destroy

Terraform will perform the following actions:

  # aws_instance.My-Instnace-01[0] will be destroyed
  - resource "aws_instance" "My-Instnace-01" {
      - ami                                  = "ami-03f4878755434977f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-0edc01737ec2fe49a" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1b" -> null
      - cpu_core_count                       = 2 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-0edc01737ec2fe49a" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.large" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-04f93e4535aa36f0b" -> null
      - private_dns                          = "ip-172-31-15-150.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.15.150" -> null
      - public_dns                           = "ec2-13-201-4-12.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "13.201.4.12" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0e5f5e3d310ebacda" -> null
      - tags                                 = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                             = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tenancy                              = "default" -> null
      - user_data_replace_on_change          = false -> null
      - vpc_security_group_ids               = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
```

```
      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 2 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-034e2e0dc0826b5c9" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

  # aws_instance.My-Instnace-02[0] will be destroyed
  - resource "aws_instance" "My-Instnace-02" {
      - ami                                  = "ami-03f4878755434977f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-0513ee647c371165f" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1b" -> null
      - cpu_core_count                       = 2 -> null
```

```
      - availability_zone                    = "ap-south-1b" -> null
      - cpu_core_count                       = 2 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-0513ee647c371165f" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.large" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-0561ad241b40cc666" -> null
      - private_dns                          = "ip-172-31-12-140.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.12.140" -> null
      - public_dns                           = "ec2-13-235-49-48.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "13.235.49.48" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0e5f5e3d310ebacda" -> null
      - tags                                 = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                             = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tenancy                              = "default" -> null
      - user_data_replace_on_change          = false -> null
      - vpc_security_group_ids               = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 2 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }
```

```
      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-0c01d690dac16551f" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

  # aws_instance.My-Instnace-03[0] will be destroyed
  - resource "aws_instance" "My-Instnace-03" {
      - ami                                  = "ami-03f4878755434977f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-019432b41727b66a0" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1b" -> null
      - cpu_core_count                       = 2 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-019432b41727b66a0" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.large" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-052e914121ce8664f2" -> null
      - private_dns                          = "ip-172-31-5-134.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.5.134" -> null
      - public_dns                           = "ec2-15-207-114-216.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "15.207.114.216" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0e5f5e3d310ebacda" -> null
      - tags                                 = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                             = {
```

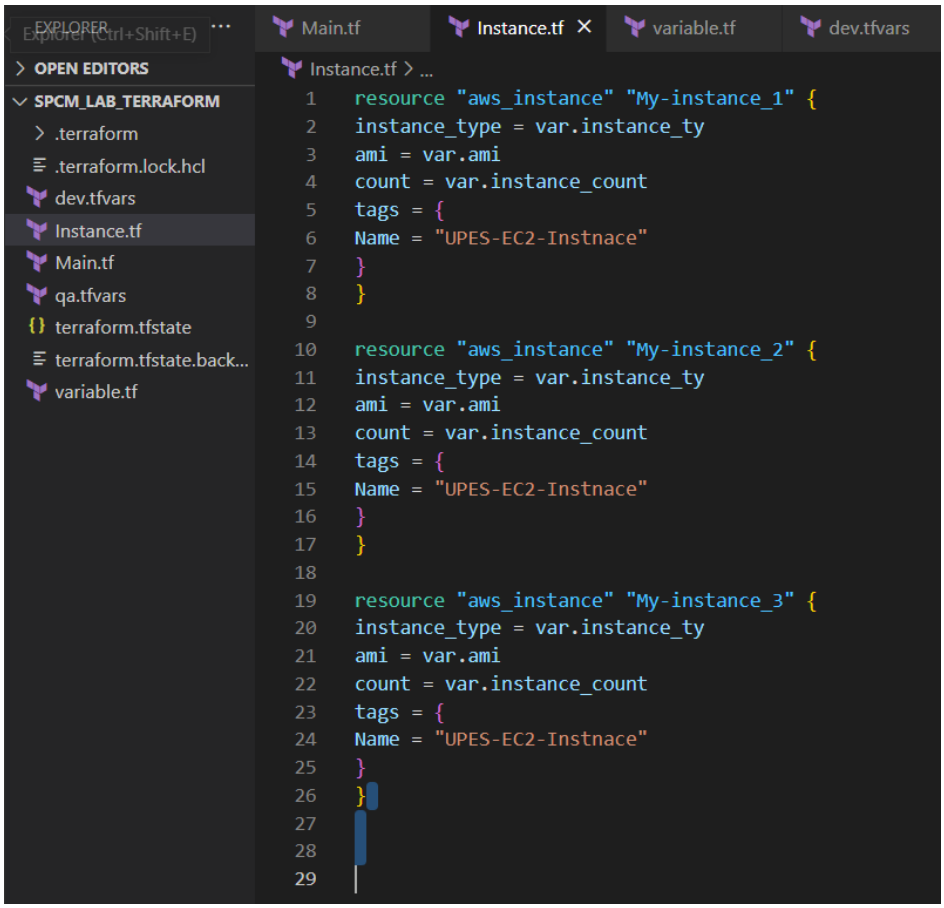
```
      - cpu_options {
          - core_count       = 2 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-093a5f5a63c87d1d5" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

Plan: 0 to add, 0 to change, 3 to destroy.

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_instance.My-Instnace-02[0]: Destroying... [id=i-0513ee647c371165f]
aws_instance.My-Instnace-03[0]: Destroying... [id=i-019432b41727b66a0]
aws_instance.My-Instnace-01[0]: Destroying... [id=i-0edc01737ec2fe49a]
```



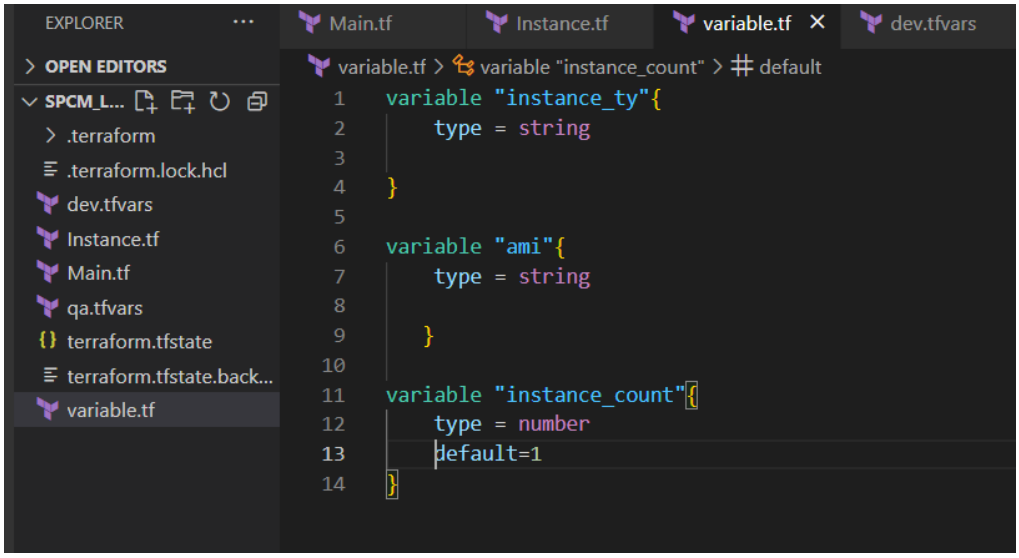
LAB EXERCISE 6

Aim: Terraform Multiple tfvars Files Objective:

Step 1: Create a instance.tf file

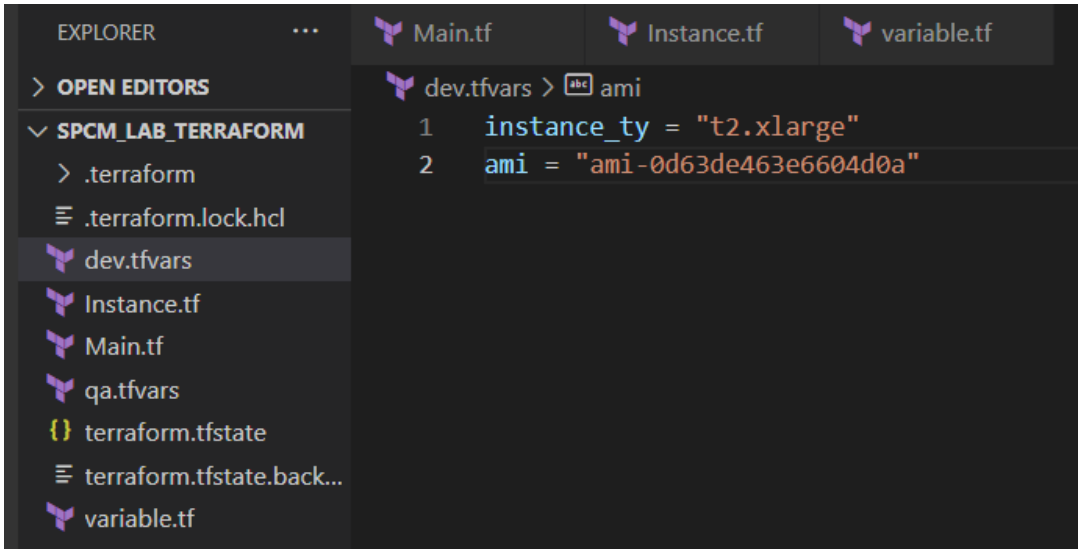


Step 2: Create a variable.tf file

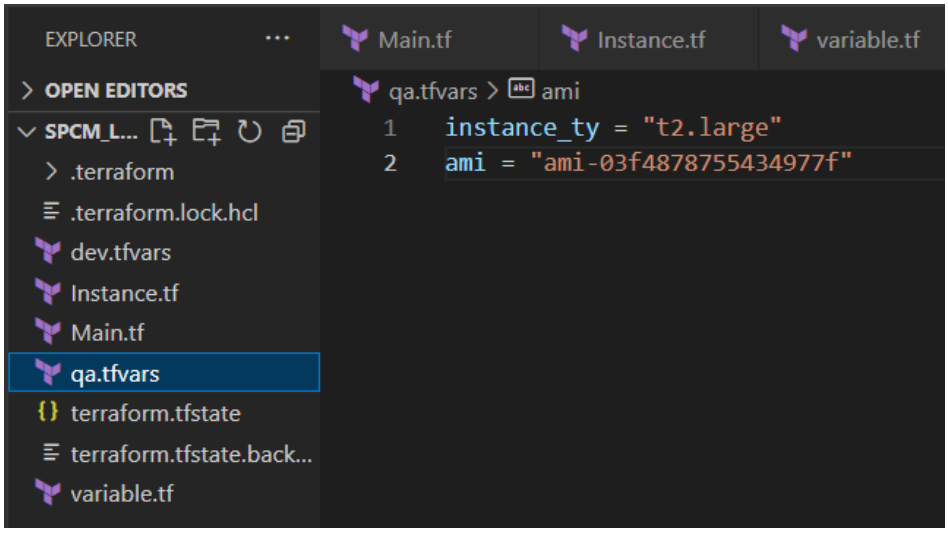


Step 3: Create Multiple tfvars Files:

dev.tfvars



qa.tfvars



Step 4: Now initializes

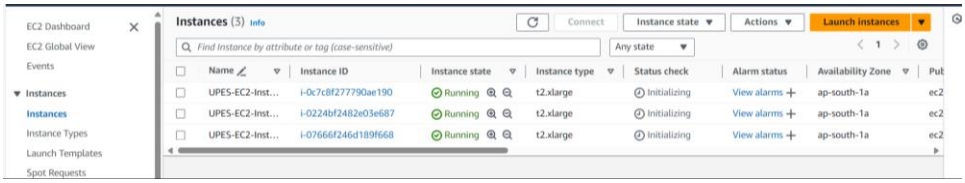
```
Initializing the backend...

Initializing provider plugins...
- Reusing previous version of hashicorp/aws from the dependency lock file
- Using previously-installed hashicorp/aws v5.31.0

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.
```

```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform validate
Success! The configuration is valid.
```

Step 5: Apply for Dev Environment

```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform apply -var-file=dev.tfvars

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # aws_instance.My-instance_1[0] will be created
  + resource "aws_instance" "My-instance_1" {
      + ami                                  = "ami-0d63de463e6604d0a"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.xlarge"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
    }

  # aws_instance.My-instance_2[0] will be created
  + resource "aws_instance" "My-instance_2" {
      + ami                                  = "ami-0d63de463e6604d0a"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.xlarge"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
    }

  # aws_instance.My-instance_3[0] will be created
  + resource "aws_instance" "My-instance_3" {
      + ami                                  = "ami-0d63de463e6604d0a"
```

```
aws_instance.My-instance_1[0]: Creating...
aws_instance.My-instance_3[0]: Creating...
aws_instance.My-instance_2[0]: Creating...
aws_instance.My-instance_3[0]: Still creating... [10s elapsed]
aws_instance.My-instance_1[0]: Still creating... [10s elapsed]
aws_instance.My-instance_2[0]: Still creating... [10s elapsed]
aws_instance.My-instance_3[0]: Creation complete after 14s [id=i-0c7c8f277790ae190]
aws_instance.My-instance_1[0]: Creation complete after 17s [id=i-07666f246d189f668]
aws_instance.My-instance_2[0]: Still creating... [20s elapsed]
aws_instance.My-instance_2[0]: Creation complete after 23s [id=i-0224bf2482e03e687]

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



Step 6: Destroy Dev Environment

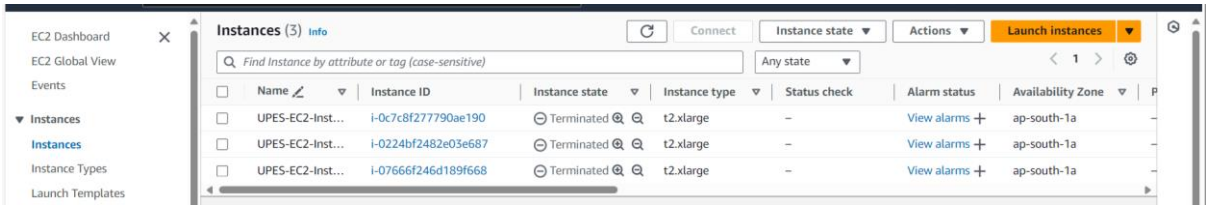
```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform destroy -var-file=dev.tfvars
aws_instance.My-instance_3[0]: Refreshing state... [id=i-0c7c8f277790ae190]
aws_instance.My-instance_1[0]: Refreshing state... [id=i-07666f246d189f668]
aws_instance.My-instance_2[0]: Refreshing state... [id=i-0224bf2482e03e687]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  - destroy

Terraform will perform the following actions:

  # aws_instance.My-instance_1[0] will be destroyed
  - resource "aws_instance" "My-instance_1" {
      - ami                                  = "ami-0d63de463e6604d0a" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-07666f246d189f668" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1a" -> null
      - cpu_core_count                       = 4 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-07666f246d189f668" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.xlarge" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-092f1b4b8b39306b9" -> null
      - private_dns                          = "ip-172-31-35-201.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.35.201" -> null
      - public_dns                           = "ec2-13-201-126-199.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "13.201.126.199" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0fb95688eaa188f7d" -> null
      - tags                                 = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                             = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tenancy                              = "default" -> null
```

```
      - user_data_replace_on_change           = false -> null
      - vpc_security_group_ids                = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 4 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 2 -> null
          - http_tokens                 = "required" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/xvda" -> null
          - encrypted             = false -> null
          - iops                  = 3000 -> null
          - tags                  = {} -> null
          - throughput            = 125 -> null
          - volume_id             = "vol-0eb890ee6d0eb8c4a" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp3" -> null
```

```
    }
  }

# aws_instance.My-instance_2[0] will be destroyed
- resource "aws_instance" "My-instance_2" {
    - ami                                  = "ami-0d63de463e6604d0a" -> null
    - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-0224bf2482e03e687" -> null
    - associate_public_ip_address          = true -> null
    - availability_zone                    = "ap-south-1a" -> null
    - cpu_core_count                       = 4 -> null
    - cpu_threads_per_core                 = 1 -> null
    - disable_api_stop                     = false -> null
    - disable_api_termination              = false -> null
    - ebs_optimized                        = false -> null
    - get_password_data                    = false -> null
    - hibernation                          = false -> null
    - id                                   = "i-0224bf2482e03e687" -> null
    - instance_initiated_shutdown_behavior = "stop" -> null
    - instance_state                       = "running" -> null
    - instance_type                        = "t2.xlarge" -> null
    - ipv6_address_count                   = 0 -> null
    - ipv6_addresses                       = [] -> null
    - monitoring                           = false -> null
    - placement_partition_number           = 0 -> null
    - primary_network_interface_id         = "eni-0092d5b00b8d6fb49" -> null
    - private_dns                          = "ip-172-31-34-41.ap-south-1.compute.internal" -> null
    - private_ip                           = "172.31.34.41" -> null
    - public_dns                           = "ec2-13-232-252-248.ap-south-1.compute.amazonaws.com" -> null
    - public_ip                            = "13.232.252.248" -> null
    - secondary_private_ips                = [] -> null
    - security_groups                      = [
        - "default",
      ] -> null
    - source_dest_check                    = true -> null
    - subnet_id                            = "subnet-0fb95688eaa188f7d" -> null
    - tags                                 = {
        - "Name" = "UPES-EC2-Instnace"
      } -> null
    - tags_all                             = {
        - "Name" = "UPES-EC2-Instnace"
      } -> null
    - tenancy                              = "default" -> null
    - user_data_replace_on_change          = false -> null
    - vpc_security_group_ids               = [
        - "sg-0c6b5aae418c53ba2",
      ] -> null

    - capacity_reservation_specification {
        - capacity_reservation_preference = "open" -> null
      }
```

```
      - core_count       = 4 -> null
      - threads_per_core = 1 -> null
    }

  - credit_specification {
      - cpu_credits = "standard" -> null
    }

  - enclave_options {
      - enabled = false -> null
    }

  - maintenance_options {
      - auto_recovery = "default" -> null
    }

  - metadata_options {
      - http_endpoint               = "enabled" -> null
      - http_protocol_ipv6          = "disabled" -> null
      - http_put_response_hop_limit = 2 -> null
      - http_tokens                 = "required" -> null
      - instance_metadata_tags      = "disabled" -> null
    }

  - private_dns_name_options {
      - enable_resource_name_dns_a_record    = false -> null
      - enable_resource_name_dns_aaaa_record = false -> null
      - hostname_type                        = "ip-name" -> null
    }

  - root_block_device {
      - delete_on_termination = true -> null
      - device_name           = "/dev/xvda" -> null
      - encrypted             = false -> null
      - iops                  = 3000 -> null
      - tags                  = {} -> null
      - throughput            = 125 -> null
      - volume_id             = "vol-094b704f3be5d5220" -> null
      - volume_size           = 8 -> null
      - volume_type           = "gp3" -> null
    }
}

Plan: 0 to add, 0 to change, 3 to destroy.

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes
```

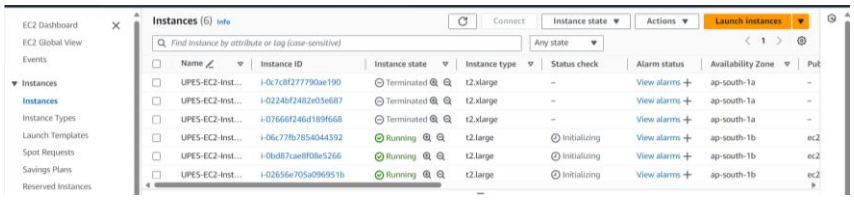
```
aws_instance.My-instance_3[0]: Destroying... [id=i-0c7c8f277790ae190]
aws_instance.My-instance_2[0]: Destroying... [id=i-0224bf2482e03e687]
aws_instance.My-instance_1[0]: Destroying... [id=i-07666f246d189f668]
aws_instance.My-instance_1[0]: Still destroying... [id=i-07666f246d189f668, 10s elapsed]
aws_instance.My-instance_2[0]: Still destroying... [id=i-0224bf2482e03e687, 10s elapsed]
aws_instance.My-instance_3[0]: Still destroying... [id=i-0c7c8f277790ae190, 10s elapsed]
aws_instance.My-instance_2[0]: Still destroying... [id=i-0224bf2482e03e687, 21s elapsed]
aws_instance.My-instance_3[0]: Still destroying... [id=i-0c7c8f277790ae190, 21s elapsed]
aws_instance.My-instance_1[0]: Still destroying... [id=i-07666f246d189f668, 21s elapsed]
aws_instance.My-instance_3[0]: Still destroying... [id=i-0c7c8f277790ae190, 31s elapsed]
aws_instance.My-instance_2[0]: Still destroying... [id=i-0224bf2482e03e687, 31s elapsed]
aws_instance.My-instance_1[0]: Still destroying... [id=i-07666f246d189f668, 31s elapsed]
aws_instance.My-instance_2[0]: Destruction complete after 32s
aws_instance.My-instance_3[0]: Destruction complete after 32s
aws_instance.My-instance_1[0]: Destruction complete after 32s

Destroy complete! Resources: 3 destroyed.
```



Step 7: Apply for Qa Environment

```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform apply -var-file=qa.tfvars

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # aws_instance.My-instance_1[0] will be created
  + resource "aws_instance" "My-instance_1" {
      + ami                                  = "ami-03f48787554349774"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.large"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
    }

  # aws_instance.My-instance_2[0] will be created
  + resource "aws_instance" "My-instance_2" {
      + ami                                  = "ami-03f48787554349774"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.large"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
```

```
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
    }

  # aws_instance.My-instance_3[0] will be created
  + resource "aws_instance" "My-instance_3" {
      + ami                                  = "ami-03f48787554349777f"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_stop                     = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + host_resource_group_arn              = (known after apply)
      + iam_instance_profile                 = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_lifecycle                   = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.large"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + spot_instance_request_id             = (known after apply)
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tags_all                             = {
          + "Name" = "UPES-EC2-Instnace"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + user_data_replace_on_change          = false
      + vpc_security_group_ids               = (known after apply)
```



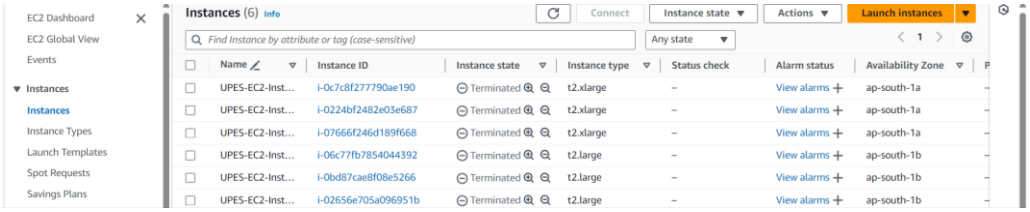
Step 8: Destroy for Qa Environment

```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform destroy -var-file=qa.tfvars
aws_instance.My-instance_3[0]: Refreshing state... [id=i-02656e705a096951b]
aws_instance.My-instance_1[0]: Refreshing state... [id=i-06c77fb7854044392]
aws_instance.My-instance_2[0]: Refreshing state... [id=i-0bd87cae8f08e5266]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  - destroy

Terraform will perform the following actions:

  # aws_instance.My-instance_1[0] will be destroyed
  - resource "aws_instance" "My-instance_1" {
      - ami                                  = "ami-03f4878755434977f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348862:instance/i-06c77fb7854044392" -> null
      - associate_public_ip_address          = true -> null
      - availability_zone                    = "ap-south-1b" -> null
      - cpu_core_count                       = 2 -> null
      - cpu_threads_per_core                 = 1 -> null
      - disable_api_stop                     = false -> null
      - disable_api_termination              = false -> null
      - ebs_optimized                        = false -> null
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-06c77fb7854044392" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.large" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-010cd9a787ae70d6b" -> null
      - private_dns                          = "ip-172-31-0-9.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.0.9" -> null
      - public_dns                           = "ec2-3-109-122-109.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "3.109.122.109" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0e5f5e3d310ebacda" -> null
      - tags                                 = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                             = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tenancy                              = "default" -> null
      - user_data_replace_on_change          = false -> null
      - vpc_security_group_ids               = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
```

```
        - tenancy                                = "default" -> null
        - user_data_replace_on_change            = false -> null
        - vpc_security_group_ids                 = [
            - "sg-0c6b5aae418c53ba2",
          ] -> null

        - capacity_reservation_specification {
            - capacity_reservation_preference = "open" -> null
          }

        - cpu_options {
            - core_count       = 2 -> null
            - threads_per_core = 1 -> null
          }

        - credit_specification {
            - cpu_credits = "standard" -> null
          }

        - enclave_options {
            - enabled = false -> null
          }

        - maintenance_options {
            - auto_recovery = "default" -> null
          }

        - metadata_options {
            - http_endpoint               = "enabled" -> null
            - http_protocol_ipv6          = "disabled" -> null
            - http_put_response_hop_limit = 1 -> null
            - http_tokens                 = "optional" -> null
            - instance_metadata_tags      = "disabled" -> null
          }

        - private_dns_name_options {
            - enable_resource_name_dns_a_record    = false -> null
            - enable_resource_name_dns_aaaa_record = false -> null
            - hostname_type                        = "ip-name" -> null
          }

        - root_block_device {
            - delete_on_termination = true -> null
            - device_name           = "/dev/sda1" -> null
            - encrypted             = false -> null
            - iops                  = 100 -> null
            - tags                  = {} -> null
            - throughput            = 0 -> null
            - volume_id             = "vol-0634da595e19b341c" -> null
            - volume_size           = 8 -> null
            - volume_type           = "gp2" -> null
          }
      }

    # aws_instance.My-instance_2[0] will be destroyed
    - resource "aws_instance" "My-instance_2" {
```

```
        - core_count       = 2 -> null
        - threads_per_core = 1 -> null
      }

    - credit_specification {
        - cpu_credits = "standard" -> null
      }

    - enclave_options {
        - enabled = false -> null
      }

    - maintenance_options {
        - auto_recovery = "default" -> null
      }

    - metadata_options {
        - http_endpoint               = "enabled" -> null
        - http_protocol_ipv6          = "disabled" -> null
        - http_put_response_hop_limit = 1 -> null
        - http_tokens                 = "optional" -> null
        - instance_metadata_tags      = "disabled" -> null
      }

    - private_dns_name_options {
        - enable_resource_name_dns_a_record    = false -> null
        - enable_resource_name_dns_aaaa_record = false -> null
        - hostname_type                        = "ip-name" -> null
      }

    - root_block_device {
        - delete_on_termination = true -> null
        - device_name           = "/dev/sda1" -> null
        - encrypted             = false -> null
        - iops                  = 100 -> null
        - tags                  = {} -> null
        - throughput            = 0 -> null
        - volume_id             = "vol-0afbbb2fbd6ece80d" -> null
        - volume_size           = 8 -> null
        - volume_type           = "gp2" -> null
      }
  }

# aws_instance.My-instance_3[0] will be destroyed
- resource "aws_instance" "My-instance_3" {
    - ami                                  = "ami-03f4878755434977f" -> null
    - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-02656e705a096951b" -> null
    - associate_public_ip_address          = true -> null
    - availability_zone                    = "ap-south-1b" -> null
    - cpu_core_count                       = 2 -> null
    - cpu_threads_per_core                 = 1 -> null
    - disable_api_stop                     = false -> null
    - disable_api_termination              = false -> null
    - ebs_optimized                        = false -> null
    - get_password_data                    = false -> null
    - hibernation                          = false -> null
```

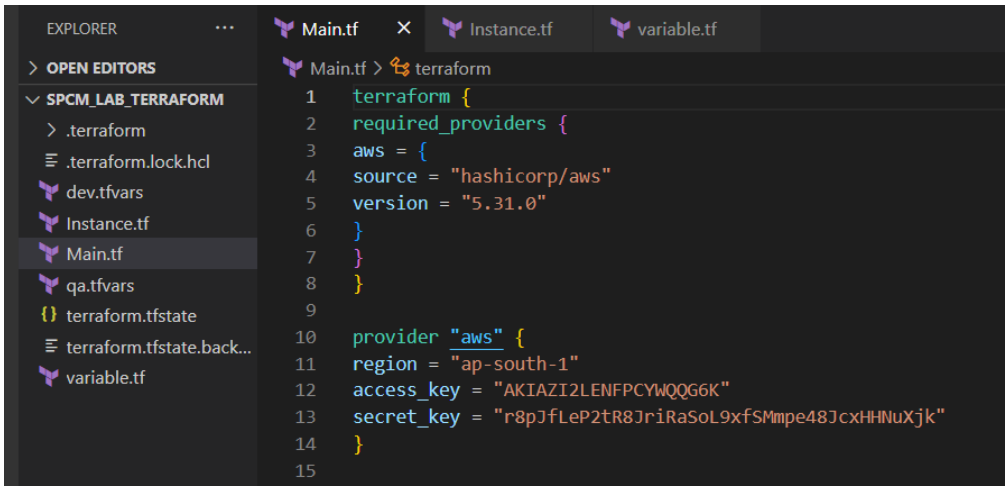
```
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-010656a1835c8dbff" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

Plan: 0 to add, 0 to change, 3 to destroy.

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_instance.My-instance_2[0]: Destroying... [id=i-0bd87cae8f08e5266]
aws_instance.My-instance_3[0]: Destroying... [id=i-02656e705a096951b]
aws_instance.My-instance_1[0]: Destroying... [id=i-06c77fb7854044392]
aws_instance.My-instance_1[0]: Still destroying... [id=i-06c77fb7854044392, 10s elapsed]
aws_instance.My-instance_3[0]: Still destroying... [id=i-02656e705a096951b, 10s elapsed]
aws_instance.My-instance_2[0]: Still destroying... [id=i-0bd87cae8f08e5266, 10s elapsed]
aws_instance.My-instance_2[0]: Still destroying... [id=i-0bd87cae8f08e5266, 20s elapsed]
aws_instance.My-instance_3[0]: Still destroying... [id=i-02656e705a096951b, 20s elapsed]
aws_instance.My-instance_1[0]: Still destroying... [id=i-06c77fb7854044392, 20s elapsed]
aws_instance.My-instance_2[0]: Still destroying... [id=i-0bd87cae8f08e5266, 30s elapsed]
aws_instance.My-instance_1[0]: Still destroying... [id=i-06c77fb7854044392, 30s elapsed]
aws_instance.My-instance_3[0]: Still destroying... [id=i-02656e705a096951b, 30s elapsed]
aws_instance.My-instance_2[0]: Destruction complete after 33s
aws_instance.My-instance_1[0]: Destruction complete after 33s
aws_instance.My-instance_3[0]: Destruction complete after 33s

Destroy complete! Resources: 3 destroyed.
```



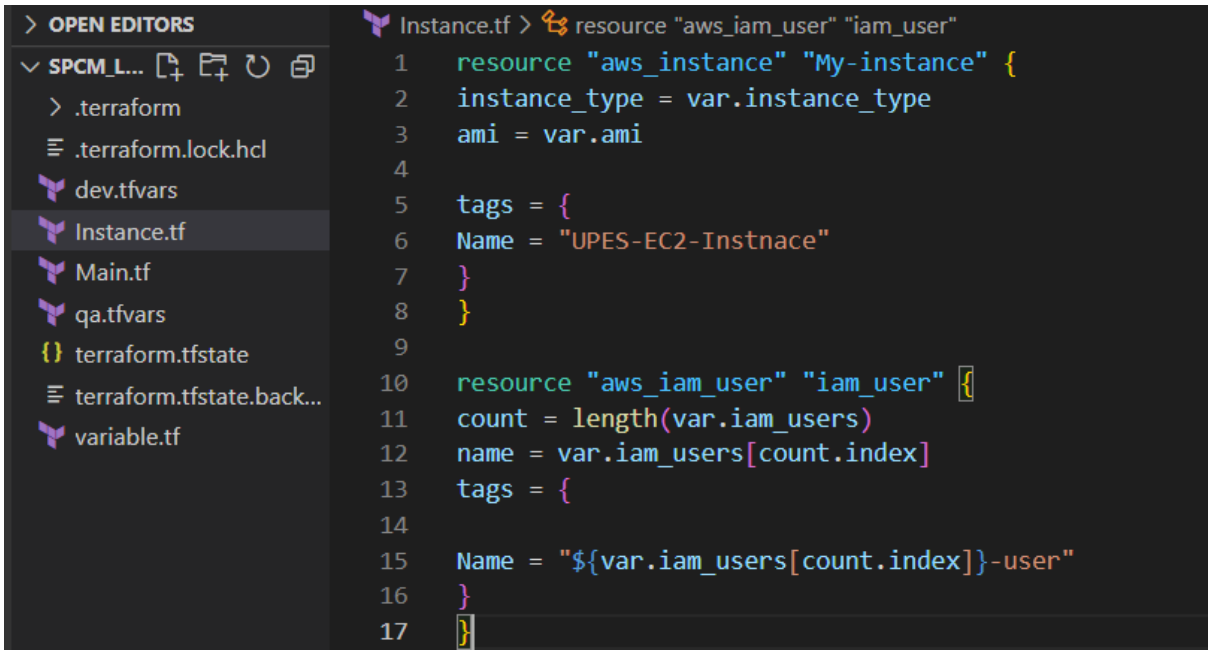
LAB EXERCISE 7

Aim: Creating Multiple IAM Users in Terraform

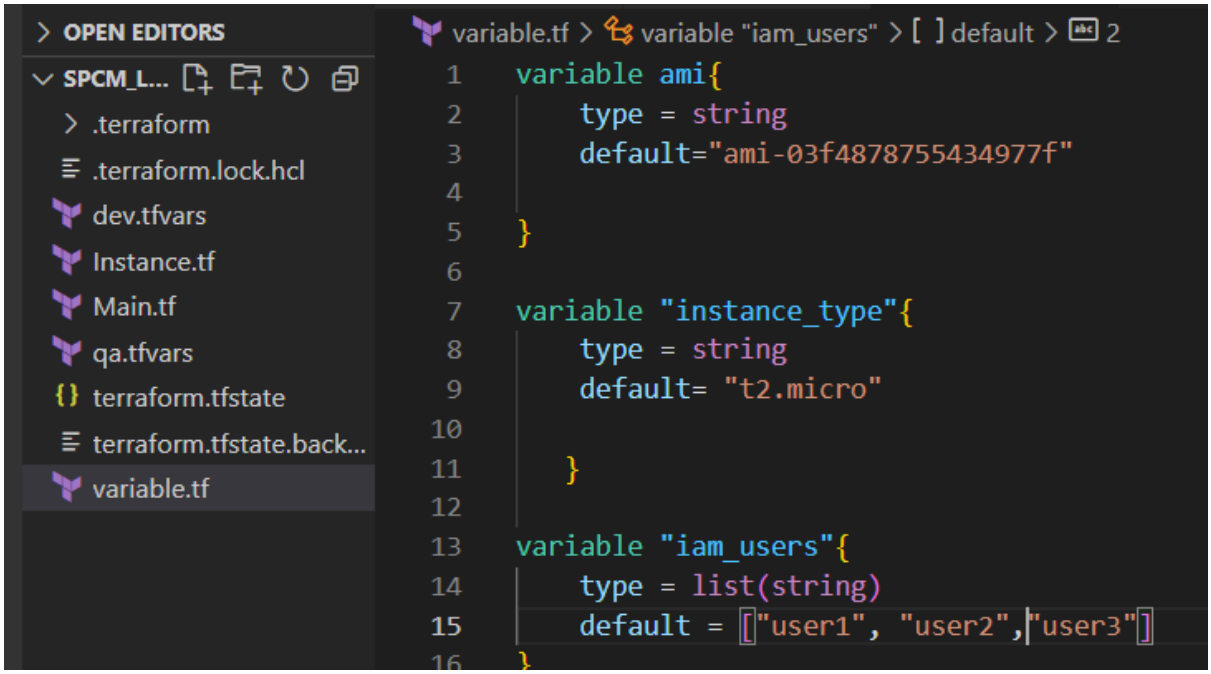
Step 1: Create a main.tf file.



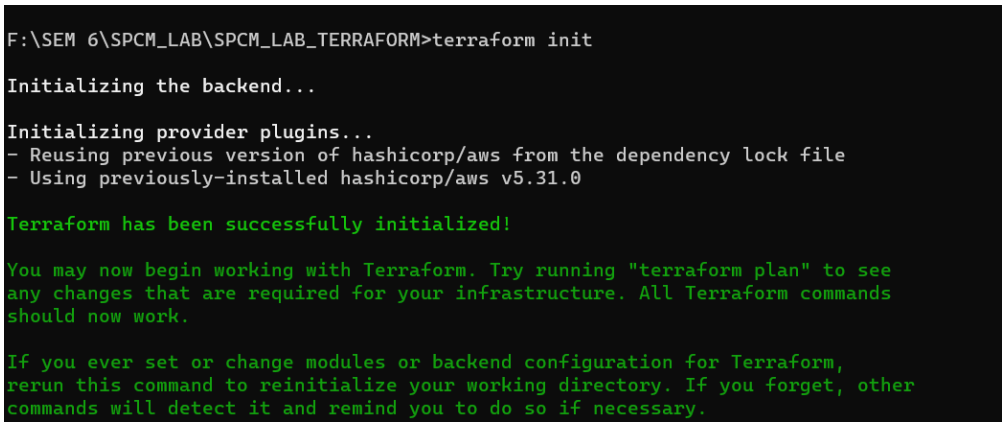
Step 2: Create a instance.tf file



Step 3: Create a variable.tf file



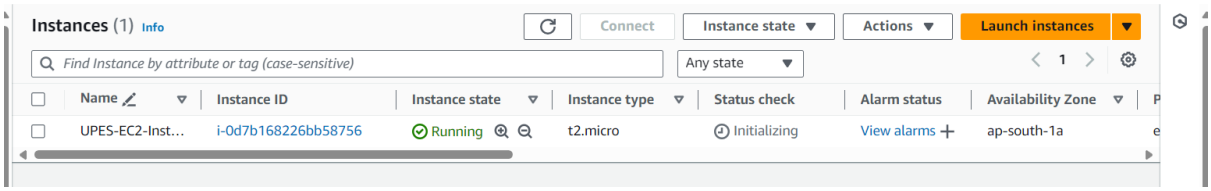
Step 4: Now initializes



Step 5: Now perform validate

Step 6: Now perform the terraform apply

```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform validate
Success! The configuration is valid.


F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform apply

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the
following symbols:
  + create

Terraform will perform the following actions:

  # aws_iam_user.iam_user[0] will be created
  + resource "aws_iam_user" "iam_user" {
      + arn           = (known after apply)
      + force_destroy = false
      + id            = (known after apply)
      + name          = "user1"
      + path          = "/"
      + tags          = {
          + "Name" = "user1-user"
        }
      + tags_all      = {
          + "Name" = "user1-user"
        }
      + unique_id     = (known after apply)
    }

  # aws_iam_user.iam_user[1] will be created
  + resource "aws_iam_user" "iam_user" {
      + arn           = (known after apply)
      + force_destroy = false
      + id            = (known after apply)
      + name          = "user2"
      + path          = "/"
      + tags          = {
          + "Name" = "user2-user"
        }
      + tags_all      = {
          + "Name" = "user2-user"
        }
      + unique_id     = (known after apply)
    }

  # aws_iam_user.iam_user[2] will be created
  + resource "aws_iam_user" "iam_user" {
      + arn           = (known after apply)
      + force_destroy = false
      + id            = (known after apply)
      + name          = "user3"
      + path          = "/"
      + tags          = {
          + "Name" = "user3-user"
        }
      + tags_all      = {
          + "Name" = "user3-user"
        }
      + unique_id     = (known after apply)
    }

  # aws_instance.My-instance will be created
  + resource "aws_instance" "My-instance" {
```



Step 7: Now perform Terraform destroy

```
F:\SEM 6\SPCM_LAB\SPCM_LAB_TERRAFORM>terraform destroy
aws_iam_user.iam_user[1]: Refreshing state... [id=user2]
aws_iam_user.iam_user[0]: Refreshing state... [id=user1]
aws_iam_user.iam_user[2]: Refreshing state... [id=user3]
aws_instance.My-instance: Refreshing state... [id=i-0d7b168226bb58756]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  - destroy

Terraform will perform the following actions:

  # aws_iam_user.iam_user[0] will be destroyed
  - resource "aws_iam_user" "iam_user" {
      - arn           = "arn:aws:iam::637423348062:user/user1" -> null
      - force_destroy = false -> null
      - id            = "user1" -> null
      - name          = "user1" -> null
      - path          = "/" -> null
      - tags          = {
          - "Name" = "user1-user"
        } -> null
      - tags_all      = {
          - "Name" = "user1-user"
        } -> null
      - unique_id     = "AIDAZI2LENFPIYHH3ENU" -> null
    }

  # aws_iam_user.iam_user[1] will be destroyed
  - resource "aws_iam_user" "iam_user" {
      - arn           = "arn:aws:iam::637423348062:user/user2" -> null
      - force_destroy = false -> null
      - id            = "user2" -> null
      - name          = "user2" -> null
      - path          = "/" -> null
      - tags          = {
          - "Name" = "user2-user"
        } -> null
      - tags_all      = {
          - "Name" = "user2-user"
        } -> null
      - unique_id     = "AIDAZI2LENFPAO87OEGPA" -> null
    }

  # aws_iam_user.iam_user[2] will be destroyed
  - resource "aws_iam_user" "iam_user" {
      - arn           = "arn:aws:iam::637423348062:user/user3" -> null
      - force_destroy = false -> null
      - id            = "user3" -> null
      - name          = "user3" -> null
      - path          = "/" -> null
      - tags          = {
          - "Name" = "user3-user"
        } -> null
      - tags_all      = {
          - "Name" = "user3-user"
        } -> null
      - unique_id     = "AIDAZI2LENFPEJ5KVHONZ" -> null
    }

  # aws_instance.My-instance will be destroyed
  - resource "aws_instance" "My-instance" {
      - ami                                  = "ami-03f4878755434977f" -> null
      - arn                                  = "arn:aws:ec2:ap-south-1:637423348062:instance/i-0d7b168226bb58756" -> null
```

```
      - get_password_data                    = false -> null
      - hibernation                          = false -> null
      - id                                   = "i-0d7b168226bb58756" -> null
      - instance_initiated_shutdown_behavior = "stop" -> null
      - instance_state                       = "running" -> null
      - instance_type                        = "t2.micro" -> null
      - ipv6_address_count                   = 0 -> null
      - ipv6_addresses                       = [] -> null
      - monitoring                           = false -> null
      - placement_partition_number           = 0 -> null
      - primary_network_interface_id         = "eni-0a1385d40dcc7f88c" -> null
      - private_dns                          = "ip-172-31-37-220.ap-south-1.compute.internal" -> null
      - private_ip                           = "172.31.37.220" -> null
      - public_dns                           = "ec2-43-205-230-157.ap-south-1.compute.amazonaws.com" -> null
      - public_ip                            = "43.205.230.157" -> null
      - secondary_private_ips                = [] -> null
      - security_groups                      = [
          - "default",
        ] -> null
      - source_dest_check                    = true -> null
      - subnet_id                            = "subnet-0fb95688eaa188f7d" -> null
      - tags                                 = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tags_all                             = {
          - "Name" = "UPES-EC2-Instnace"
        } -> null
      - tenancy                              = "default" -> null
      - user_data_replace_on_change          = false -> null
      - vpc_security_group_ids               = [
          - "sg-0c6b5aae418c53ba2",
        ] -> null

      - capacity_reservation_specification {
          - capacity_reservation_preference = "open" -> null
        }

      - cpu_options {
          - core_count       = 1 -> null
          - threads_per_core = 1 -> null
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
```

```
        }

      - credit_specification {
          - cpu_credits = "standard" -> null
        }

      - enclave_options {
          - enabled = false -> null
        }

      - maintenance_options {
          - auto_recovery = "default" -> null
        }

      - metadata_options {
          - http_endpoint               = "enabled" -> null
          - http_protocol_ipv6          = "disabled" -> null
          - http_put_response_hop_limit = 1 -> null
          - http_tokens                 = "optional" -> null
          - instance_metadata_tags      = "disabled" -> null
        }

      - private_dns_name_options {
          - enable_resource_name_dns_a_record    = false -> null
          - enable_resource_name_dns_aaaa_record = false -> null
          - hostname_type                        = "ip-name" -> null
        }

      - root_block_device {
          - delete_on_termination = true -> null
          - device_name           = "/dev/sda1" -> null
          - encrypted             = false -> null
          - iops                  = 100 -> null
          - tags                  = {} -> null
          - throughput            = 0 -> null
          - volume_id             = "vol-05fdb35ff14989557" -> null
          - volume_size           = 8 -> null
          - volume_type           = "gp2" -> null
        }
    }

Plan: 0 to add, 0 to change, 4 to destroy.

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

aws_iam_user.iam_user[0]: Destroying... [id=user1]
aws_iam_user.iam_user[1]: Destroying... [id=user2]
aws_iam_user.iam_user[2]: Destroying... [id=user3]
aws_instance.My-instance: Destroying... [id=i-0d7b168226bb58756]
aws_iam_user.iam_user[0]: Destruction complete after 2s
aws_iam_user.iam_user[1]: Destruction complete after 2s
aws_iam_user.iam_user[2]: Destruction complete after 2s
aws_instance.My-instance: Still destroying... [id=i-0d7b168226bb58756, 10s elapsed]
aws_instance.My-instance: Still destroying... [id=i-0d7b168226bb58756, 20s elapsed]
aws_instance.My-instance: Still destroying... [id=i-0d7b168226bb58756, 30s elapsed]
aws_instance.My-instance: Destruction complete after 31s

Destroy complete! Resources: 4 destroyed.
```