

Assignment–9

Module-12: Terraform Overview

Submitted by : Shaik Junaid Adil

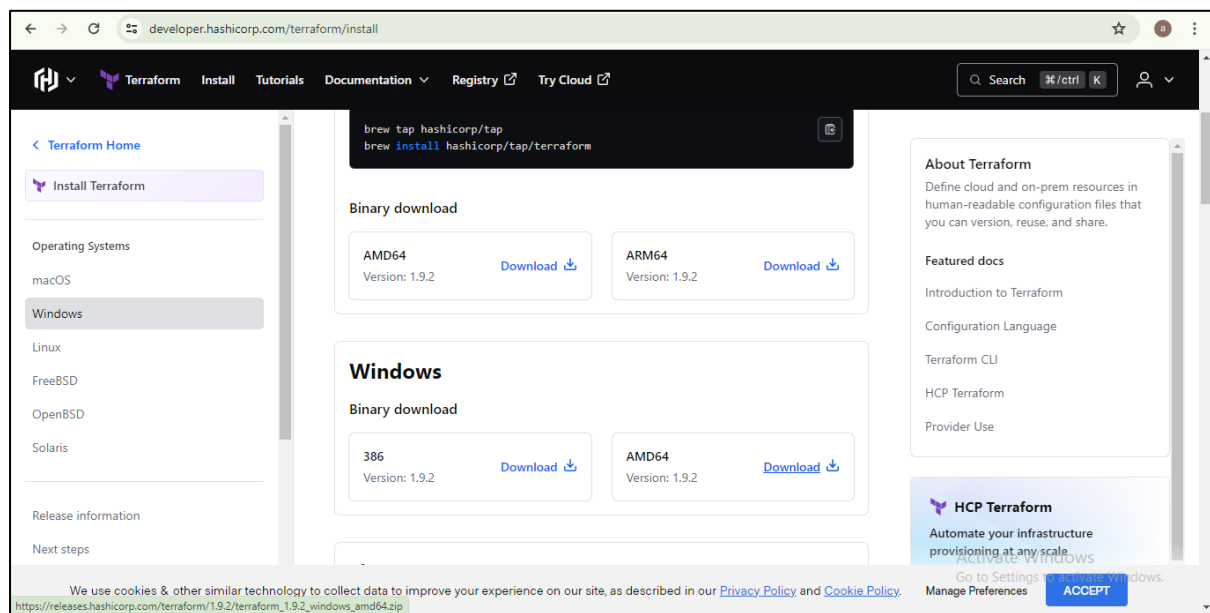
Date of Submission: 12-07-2024

Submitted to: Vikul

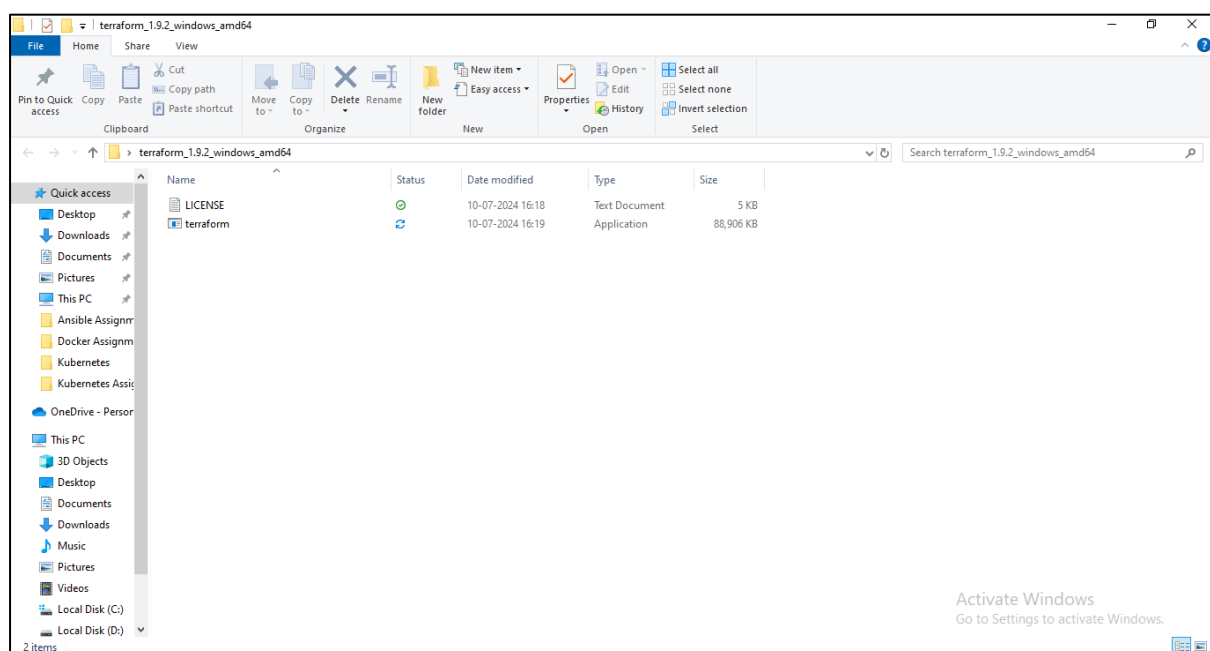
L1 - Provision AWS EC2 Instance along with VPC, Subnet, Internet Gateway, Route-Table, RouteTable Association, Security Group

Step 1: To provision AWS EC2 Instance using Terraform, install Terraform in local machine and setup the environment variable.

Using link to download: <https://developer.hashicorp.com/terraform/tutorials/aws-get-started/install-cli>

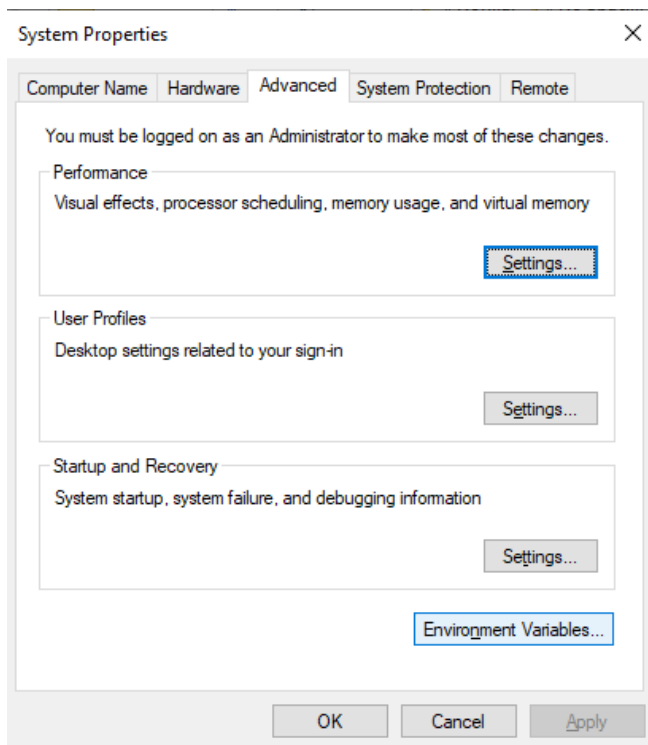


It will download a zip file. Extract the data to a separate folder.

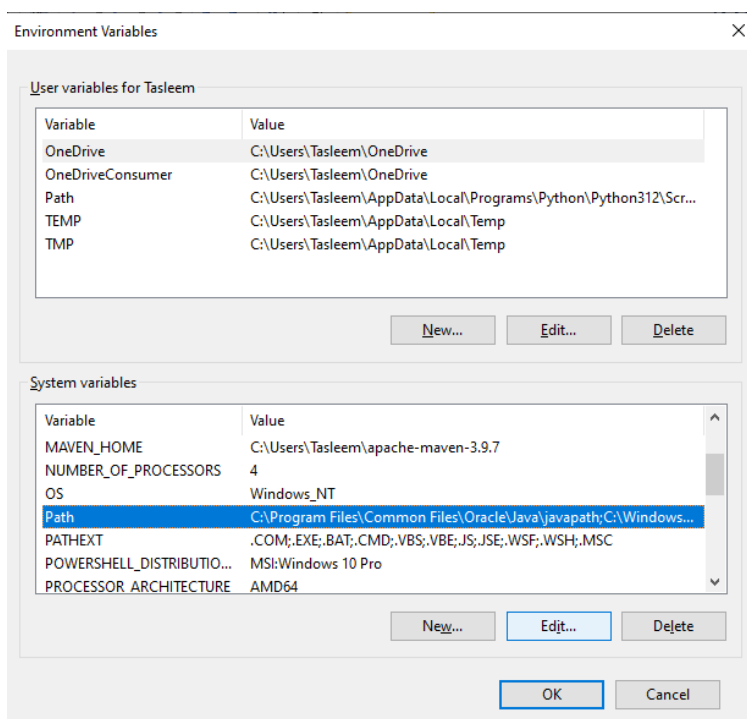


Step 2: Set the environment variable for Terraform using the exec file path

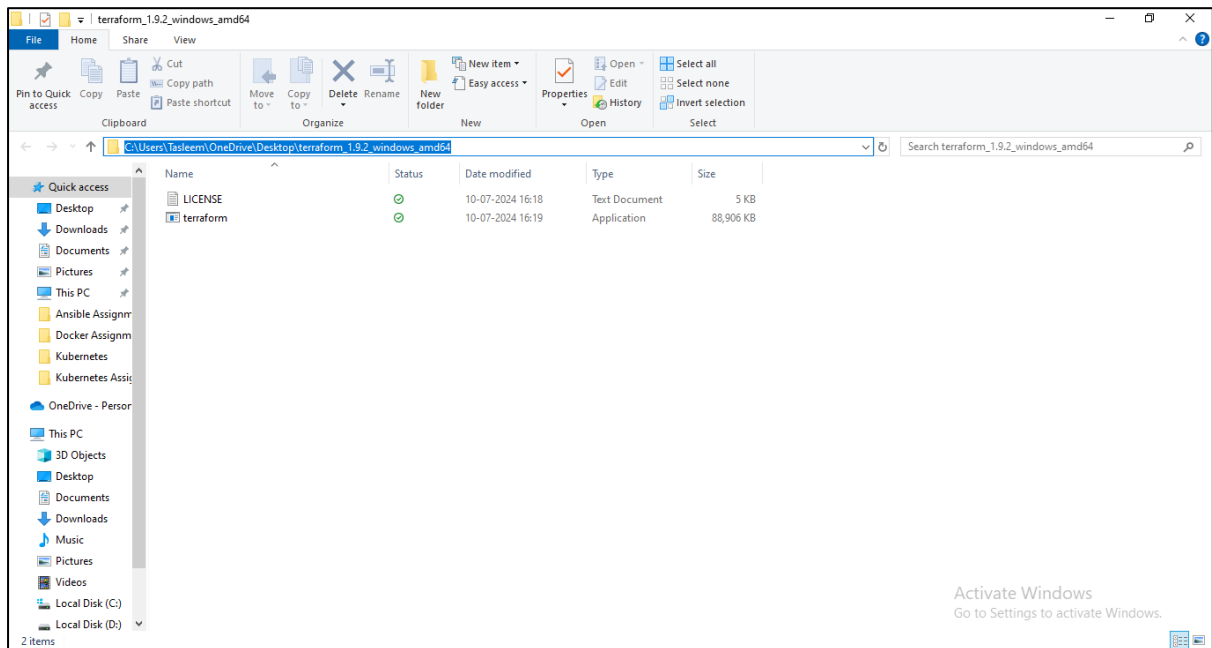
Go to edit the system environment variable → advanced → Environment Variables..



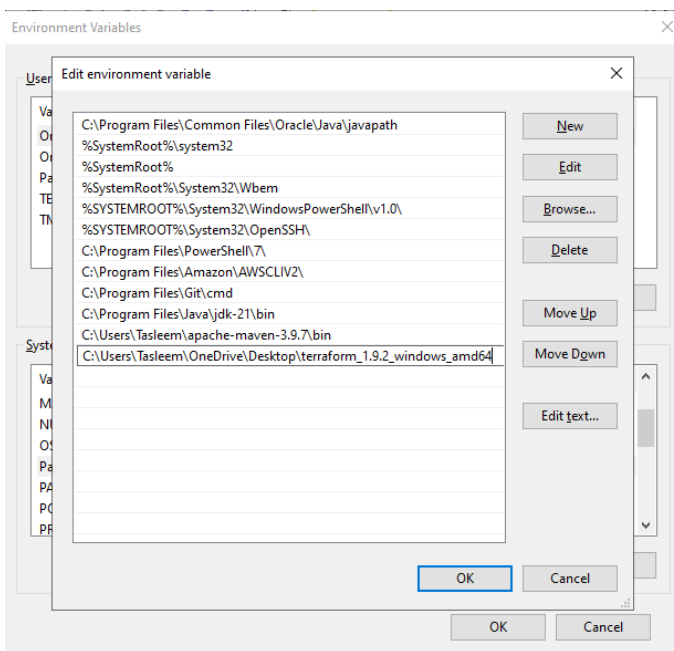
In system variables → path → edit the path →



Step 3: Now add the exec path in the system variables.. – path



Step 4: Copy the path of exec file and paste in the system variables path

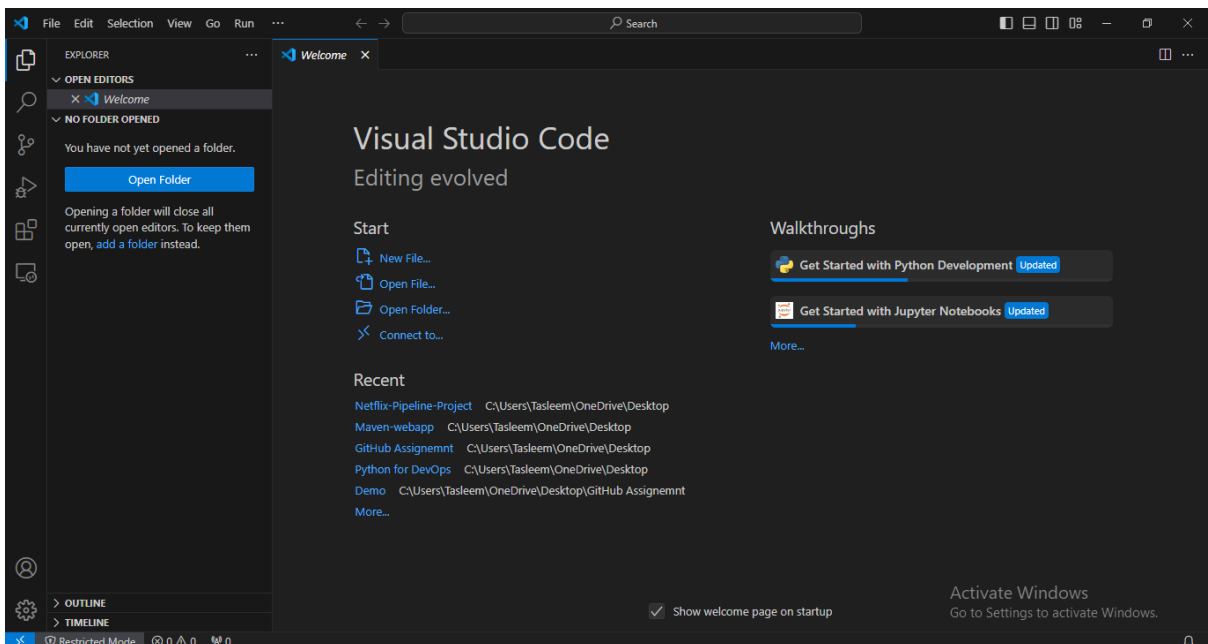
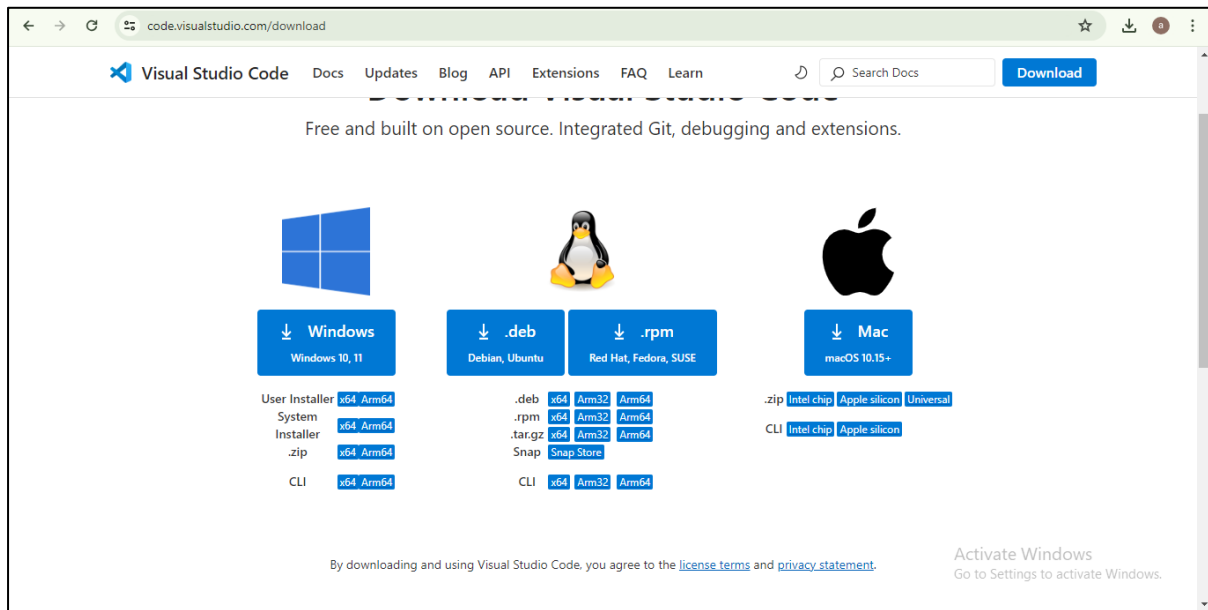


Click Ok.

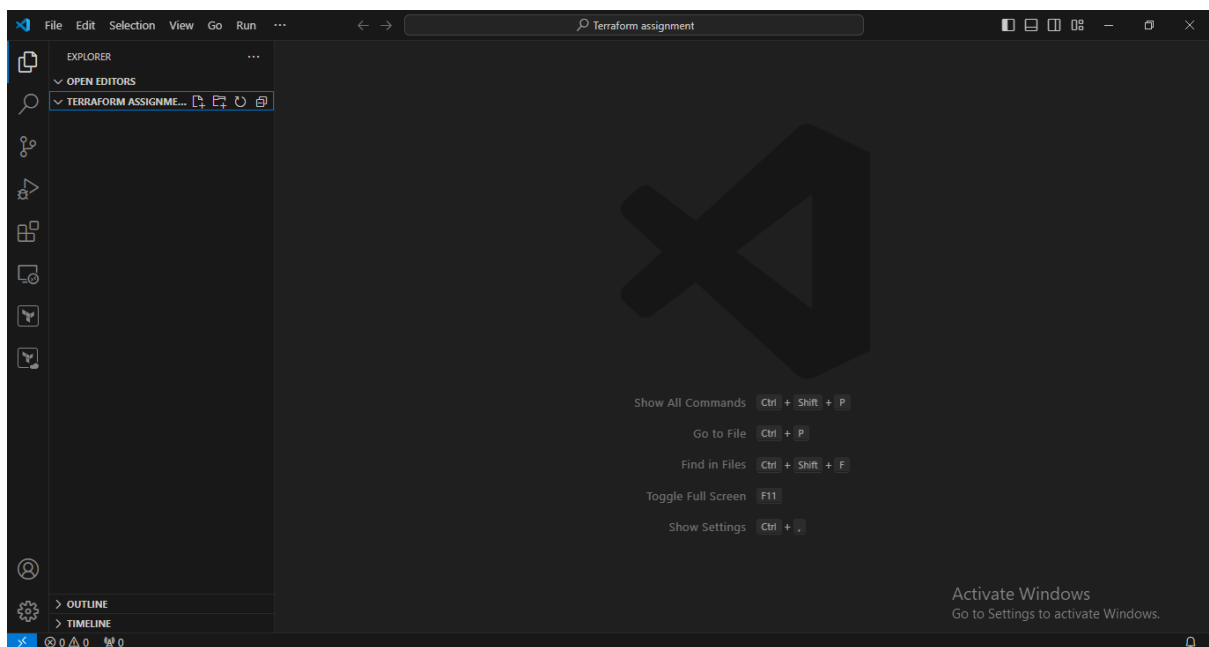
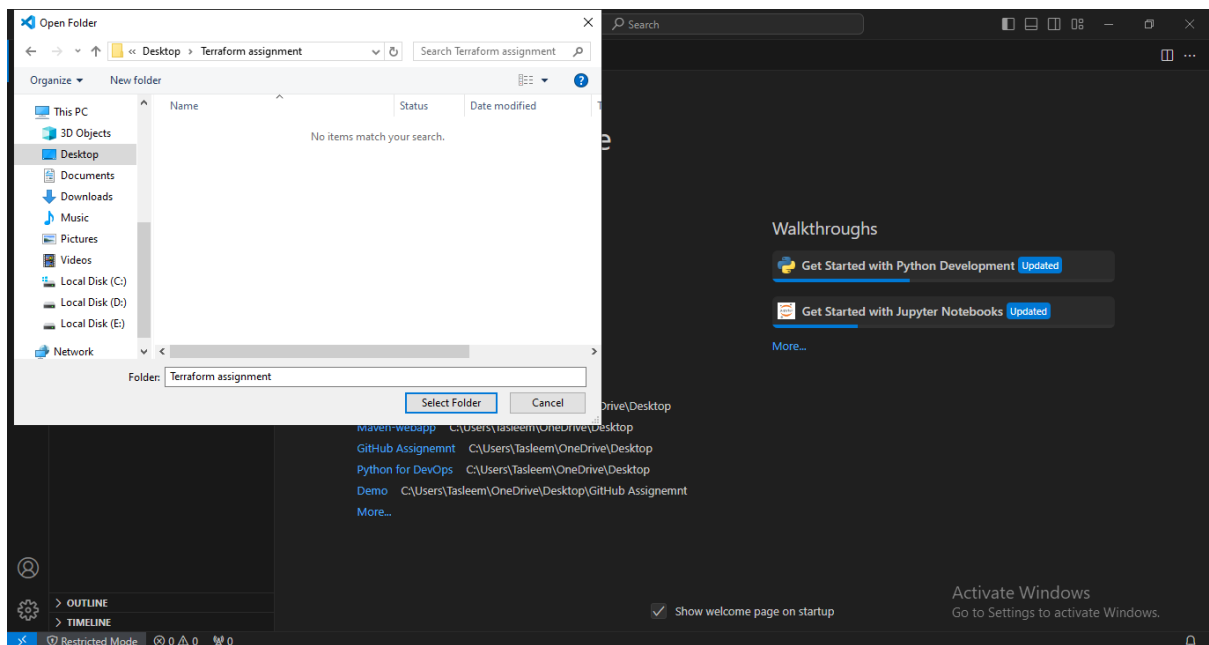
Environment variable has been setup for Terraform.

Step 5: Download and Install Visual Studio Code.

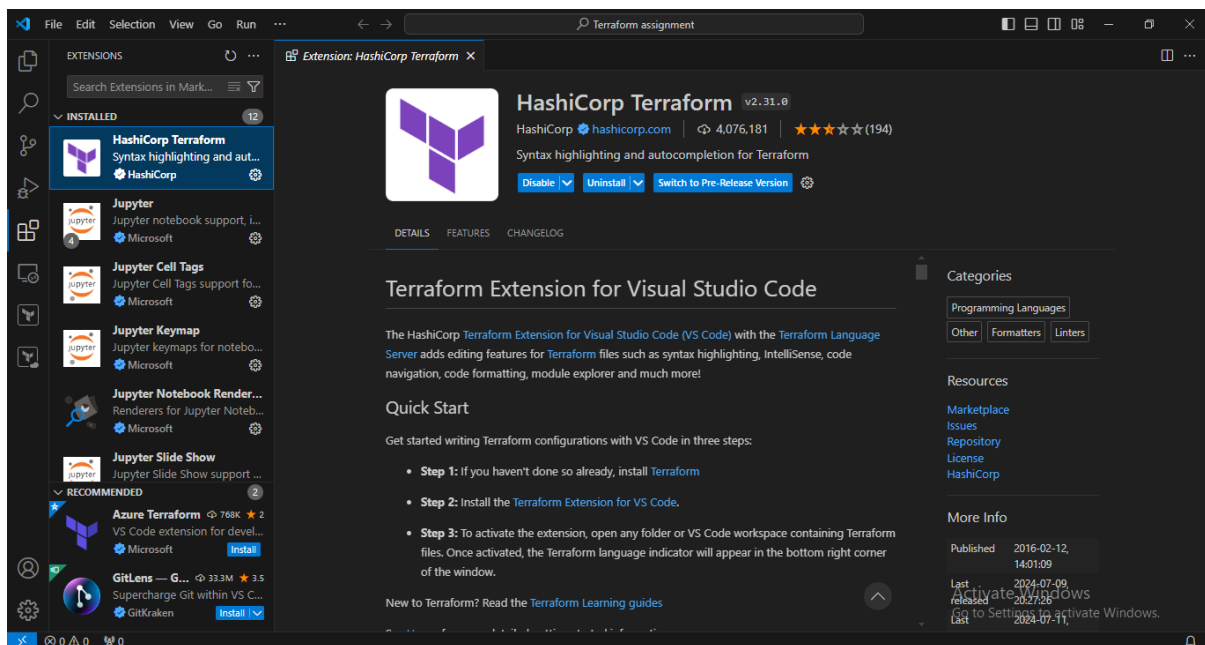
Using download link: code.visualstudio.com/download



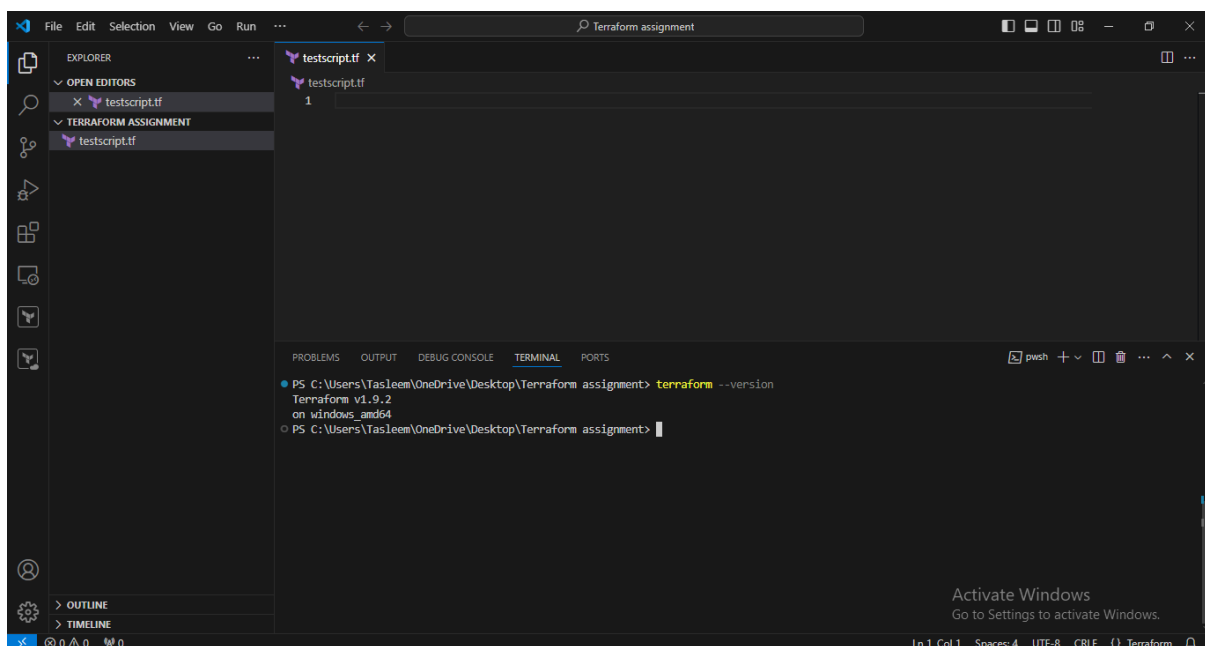
Step 6: Create a folder and open in VS Code



Step 7: Install Terraform Extension in VS Code

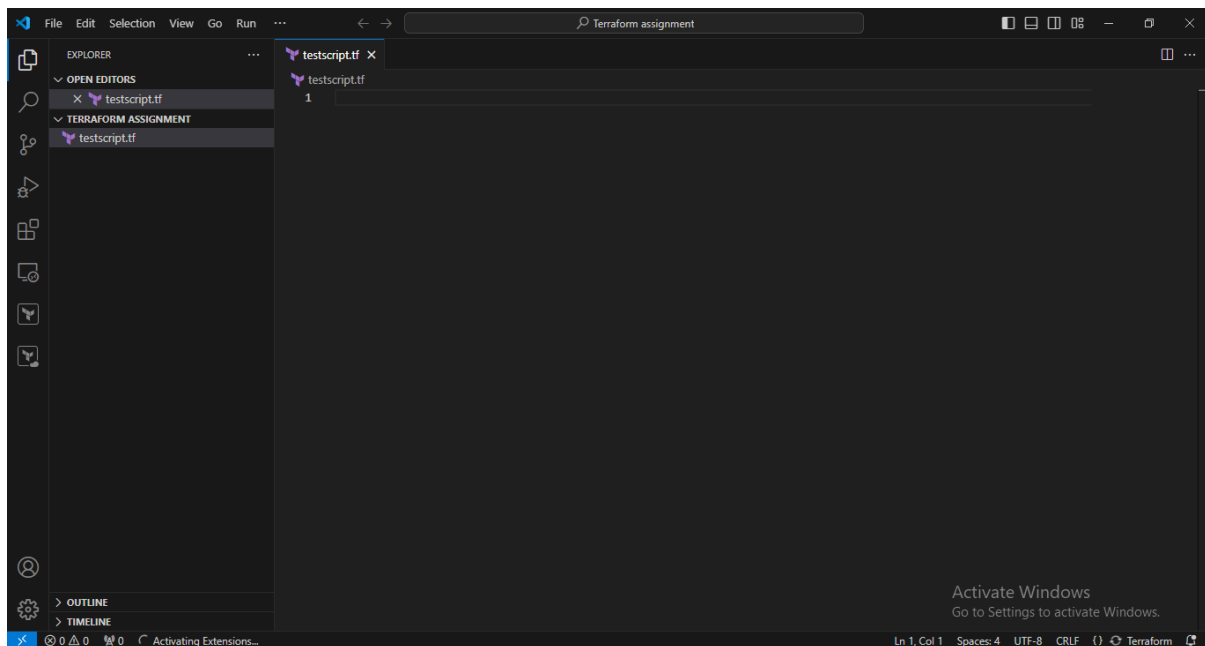


Step 8: Open the Terminal and query the Terraform version using command “terraform --version”



Terraform is successfully installed.

Step 9: Create a file to write the script to create an ec2-instance with .tf extension

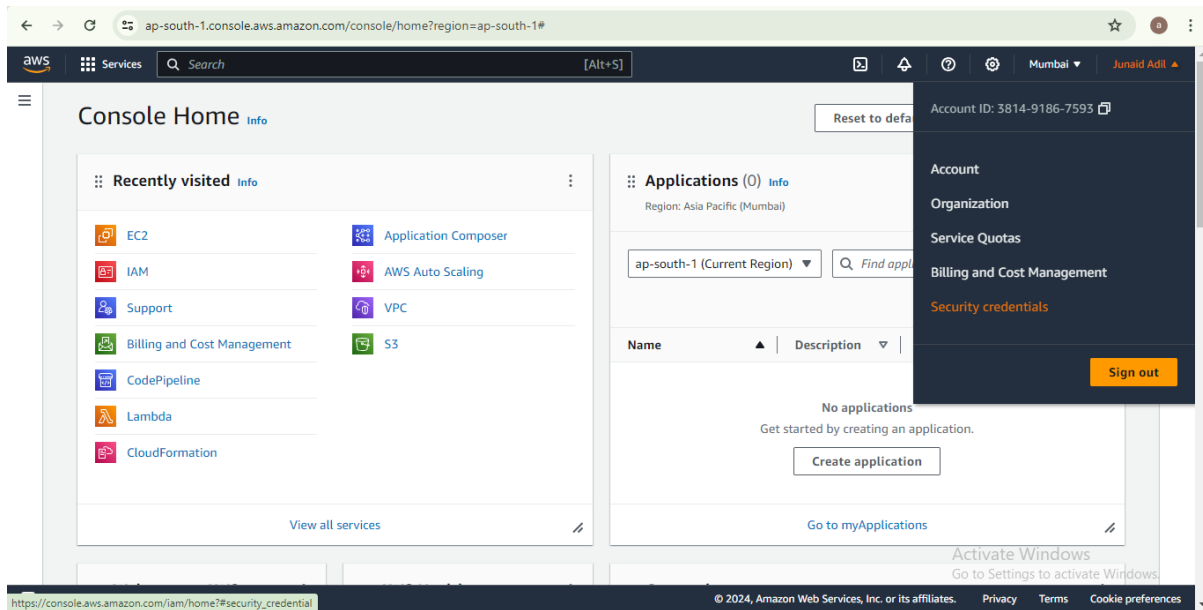


In Terraform Working Model we have 5 steps, which we follow:

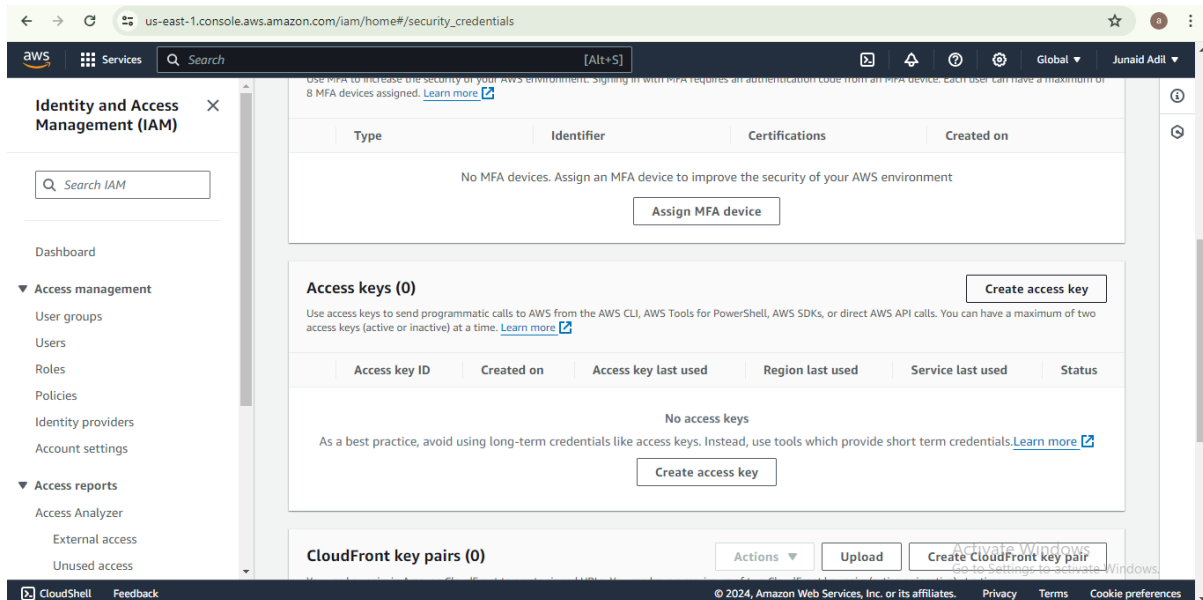
1. Scope - Identify the Infrastructure
2. Author - Write Terraform script
3. Initialize - Initialize the Terraform
4. Plan - validate the script
5. Apply - Apply the changes

Step 10: Initially create Access key in AWS Console

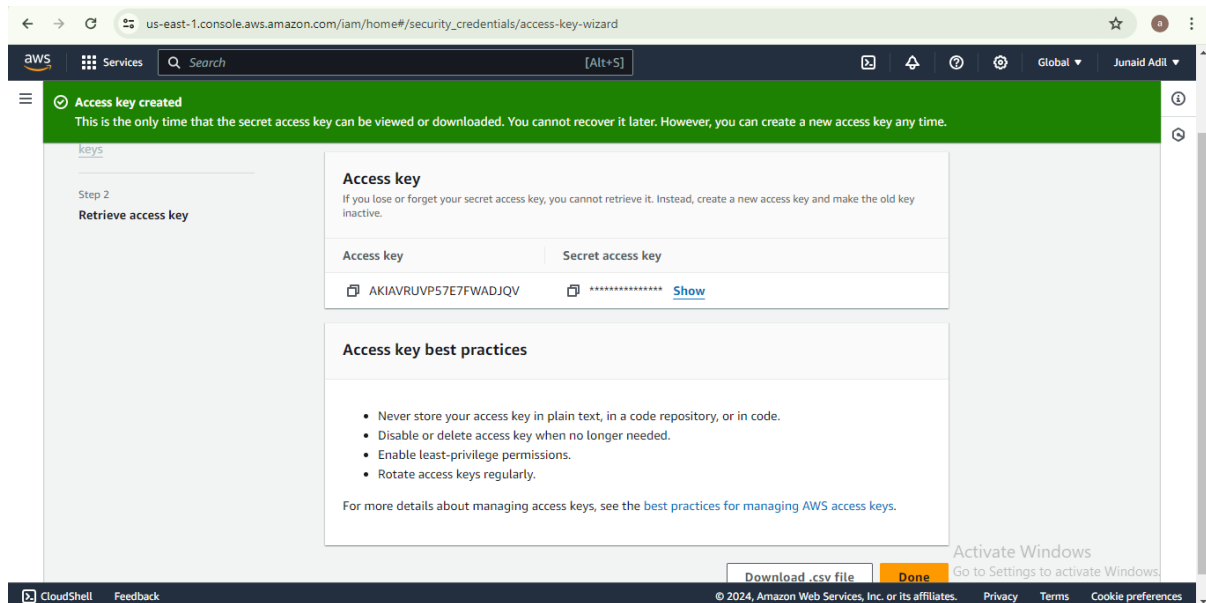
Go to AWS Console → Login → Security credentials



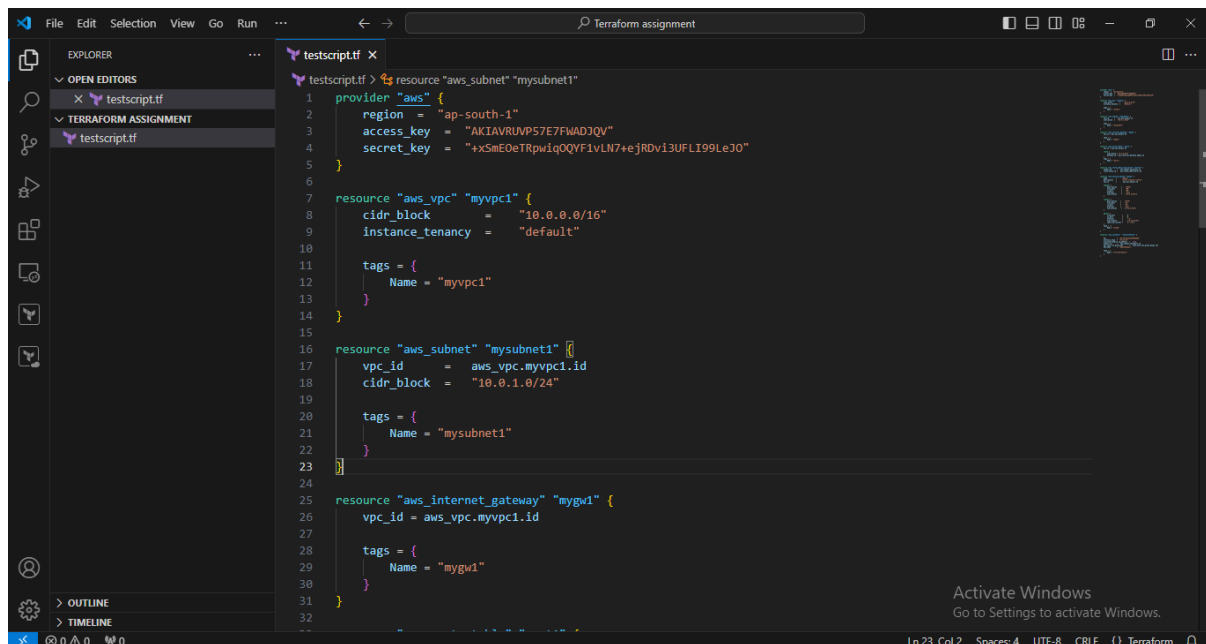
Step 11: Create access key



We have to save the Access keys and secret access key. Once we close the tab we can access only Access key. Or we can download the .csv file



Step 12: Now write the script in VS code, in file "testscript.tf"



The screenshot shows the Visual Studio Code editor with a Terraform configuration file named `testscript.tf`. The configuration defines the following resources:

- `resource "aws_subnet" "mysubnet1"`: A subnet in the `myvpc1` VPC.
- `resource "aws_internet_gateway" "mygw1"`: An internet gateway attached to the VPC.
- `resource "aws_route_table" "myrt1"`: A route table with a route to the internet gateway.
- `resource "aws_route_table_association" "myrt1a1"`: An association between the route table and the subnet.
- `resource "aws_security_group" "mysg1"`: A security group with an ingress rule for HTTP traffic.

```
25 resource "aws_subnet" "mysubnet1" {
26   resource "aws_internet_gateway" "mygw1" {
31   }
32 }
33 resource "aws_route_table" "myrt1" {
34   vpc_id = aws_vpc.myvpc1.id
35
36   route {
37     cidr_block = "0.0.0.0/0"
38     gateway_id = aws_internet_gateway.mygw1.id
39   }
40   tags = {
41     Name = "myrt1"
42   }
43 }
44
45 resource "aws_route_table_association" "myrt1a1" {
46   subnet_id = aws_subnet.mysubnet1.id
47   route_table_id = aws_route_table.myrt1.id
48 }
49
50 resource "aws_security_group" "mysg1" {
51   name = "mysg1"
52   description = "Allow inbound traffic"
53   vpc_id = aws_vpc.myvpc1.id
54
55   ingress {
56     description = "HTTP"
57     from_port = "80"
58     to_port = "80"
59     protocol = "tcp"
60     cidr_blocks = ["0.0.0.0/0"]
61   }
62 }
```

The status bar at the bottom indicates the file is at line 16, column 36, using UTF-8 encoding and CRLF line endings.

The screenshot shows the Visual Studio Code editor with a Terraform configuration file named `testscript.tf`. The configuration defines the following resources:

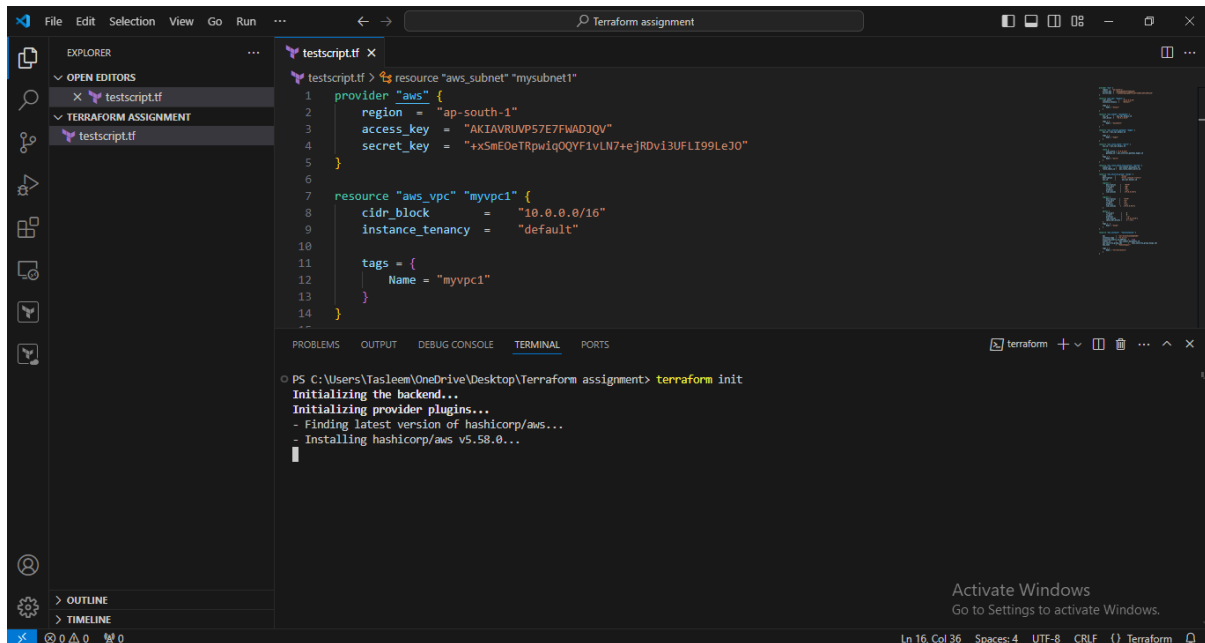
- `resource "aws_security_group" "mysg1"`: A security group with both ingress and egress rules.
- `resource "aws_instance" "testinstance1"`: An EC2 instance using the `mysg1` security group.

```
50 resource "aws_security_group" "mysg1" {
51   ingress {
52     description = "HTTP"
53     from_port = "22"
54     to_port = "22"
55     protocol = "tcp"
56     cidr_blocks = ["0.0.0.0/0"]
57   }
58
59   egress {
60     from_port = 0
61     to_port = 0
62     protocol = "-1"
63     cidr_blocks = ["0.0.0.0/0"]
64     ipv6_cidr_blocks = [ ":::/0" ]
65   }
66   tags = {
67     Name = "mysg1"
68   }
69 }
70
71 resource "aws_instance" "testinstance1" {
72   ami = "ami-0c22af51e265bd5e0e"
73   instance_type = "t2.micro"
74   associate_public_ip_address = true
75   subnet_id = aws_subnet.mysubnet1.id
76   vpc_security_group_ids = [aws_security_group.mysg1.id]
77   key_name = "Demo1keypair"
78
79   tags = {
80     Name = "Terraformtest1"
81   }
82 }
```

The status bar at the bottom indicates the file is at line 16, column 36, using UTF-8 encoding and CRLF line endings.

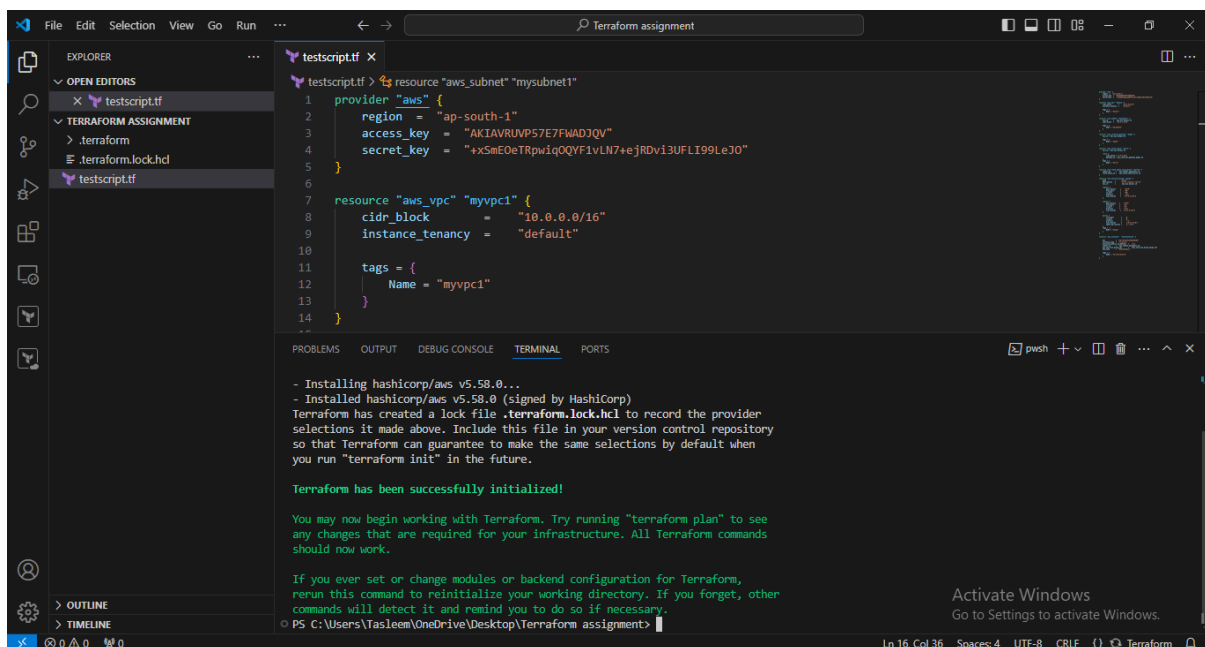
Step 13: Open new Terminal and initialize Terraform using command: “terraform init”.

It creates a hidden directory and within that it maintains the latest version of terraform provider for aws.



```
testscript.tf X
1 provider "aws" {
2   region = "ap-south-1"
3   access_key = "AKIAVRUVP57E7FWADJQV"
4   secret_key = "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"
5 }
6
7 resource "aws_vpc" "myvpc1" {
8   cidr_block = "10.0.0.0/16"
9   instance_tenancy = "default"
10
11   tags = {
12     Name = "myvpc1"
13   }
14 }
```

```
PS C:\Users\Tasleem\OneDrive\Desktop\Terraform assignment> terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v5.58.0...
```



```
testscript.tf X
1 provider "aws" {
2   region = "ap-south-1"
3   access_key = "AKIAVRUVP57E7FWADJQV"
4   secret_key = "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"
5 }
6
7 resource "aws_vpc" "myvpc1" {
8   cidr_block = "10.0.0.0/16"
9   instance_tenancy = "default"
10
11   tags = {
12     Name = "myvpc1"
13   }
14 }
```

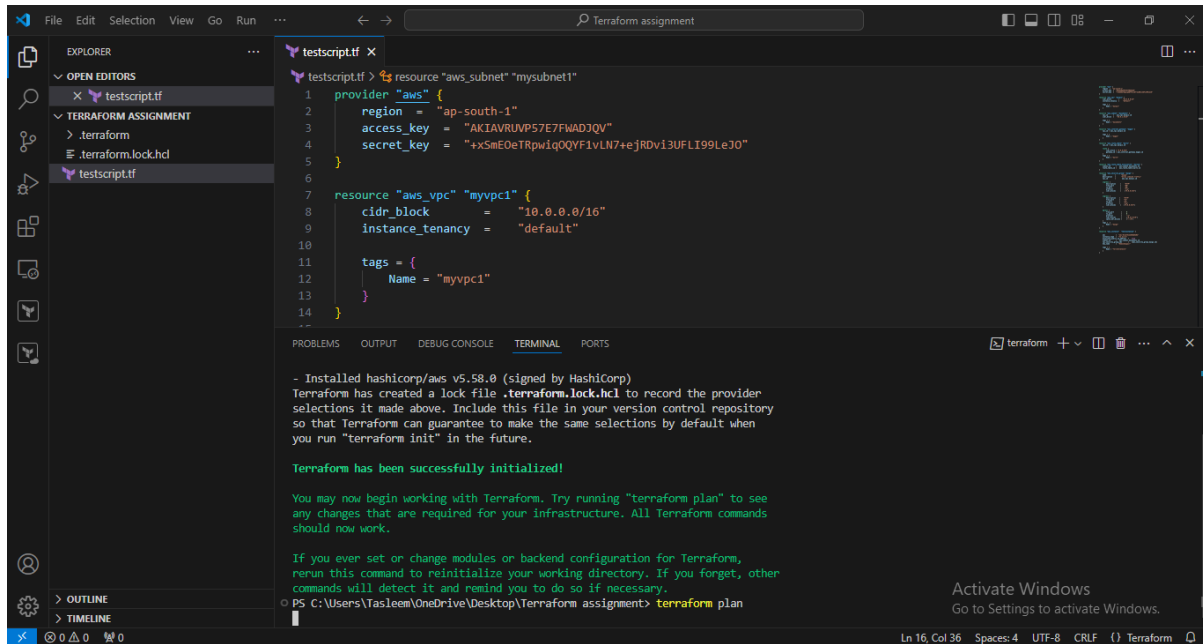
```
- Installing hashicorp/aws v5.58.0...
- Installed hashicorp/aws v5.58.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

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

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
PS C:\Users\Tasleem\OneDrive\Desktop\Terraform assignment>
```

Step 14: Execute “terraform plan” to see the changes that are required for infrastructure as per the script. It identifies the resource to be created.



```
testscript.tf X
1 provider "aws" {
2   region = "ap-south-1"
3   access_key = "AKIAVRUVP57E7FWADJQV"
4   secret_key = "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"
5 }
6
7 resource "aws_vpc" "myvpc1" {
8   cidr_block = "10.0.0.0/16"
9   instance_tenancy = "default"
10
11   tags = {
12     Name = "myvpc1"
13   }
14 }
15
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

- Installed hashicorp/aws v5.59.0 (signed by HashiCorp)
Terraform has created a lock file `.terraform.lock.hcl` to record the provider selections it made above. Include this file in your version control repository so that Terraform can guarantee to make the same selections by default when you run "terraform init" in the future.

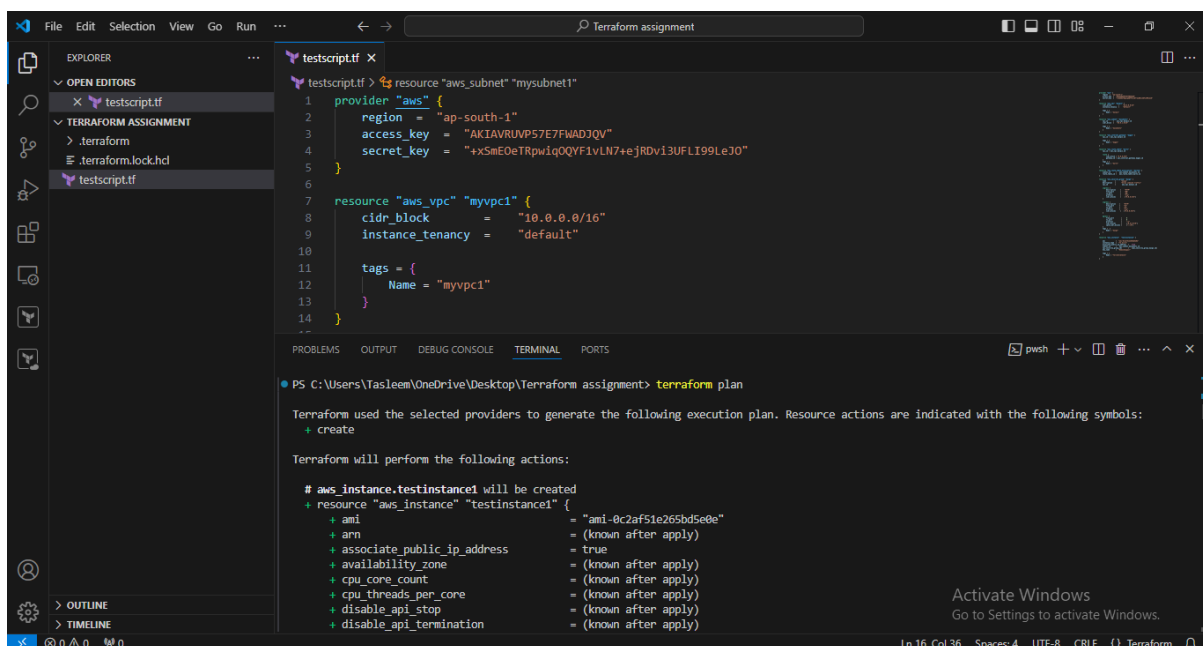
Terraform has been successfully initialized!

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

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

PS C:\Users\Tasleem\OneDrive\Desktop\Terraform assignment> terraform plan

Activate Windows
Go to Settings to activate Windows.



```
testscript.tf X
1 provider "aws" {
2   region = "ap-south-1"
3   access_key = "AKIAVRUVP57E7FWADJQV"
4   secret_key = "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"
5 }
6
7 resource "aws_vpc" "myvpc1" {
8   cidr_block = "10.0.0.0/16"
9   instance_tenancy = "default"
10
11   tags = {
12     Name = "myvpc1"
13   }
14 }
15
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

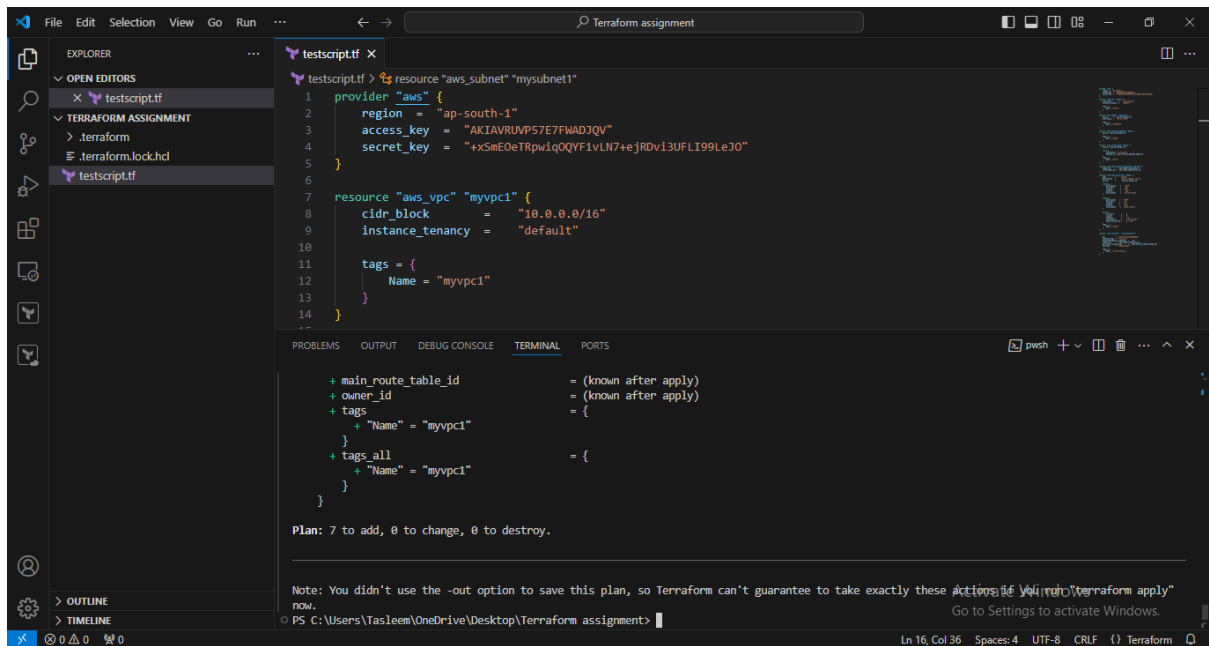
PS C:\Users\Tasleem\OneDrive\Desktop\Terraform assignment> terraform plan

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

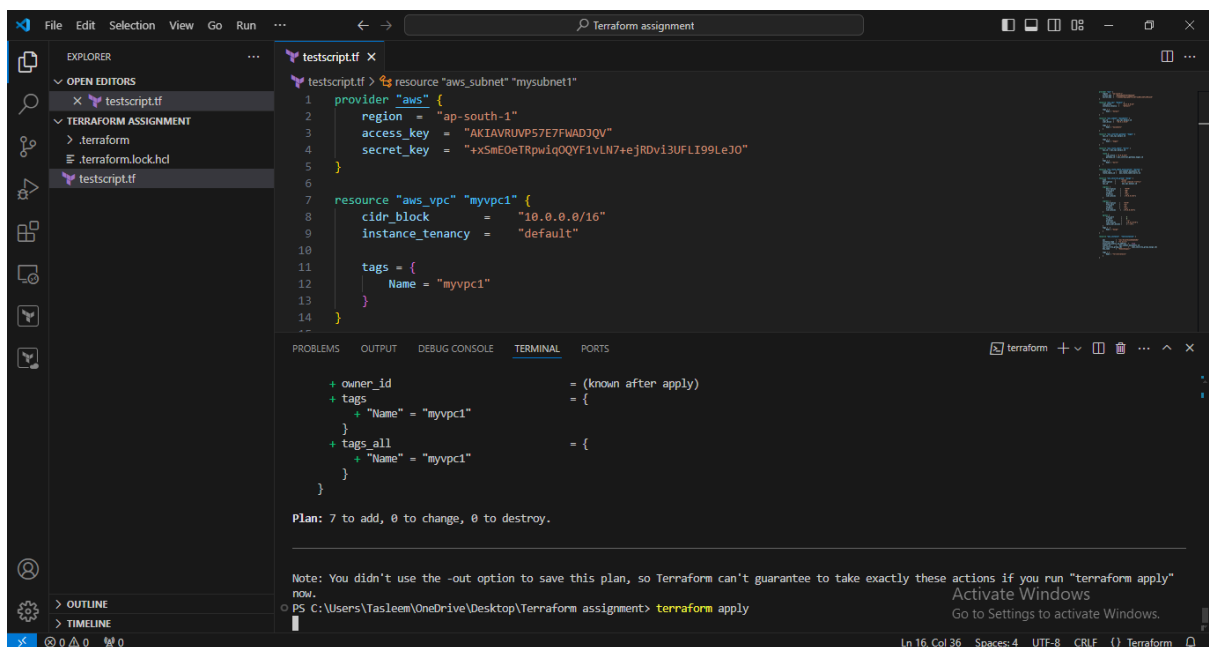
Terraform will perform the following actions:

```
# aws_instance.testinstance1 will be created
+ resource "aws_instance" "testinstance1" {
+   ami              = "ami-0e2af51e265bd5e0e"
+   arm              = (known after apply)
+   associate_public_ip_address = true
+   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)
```

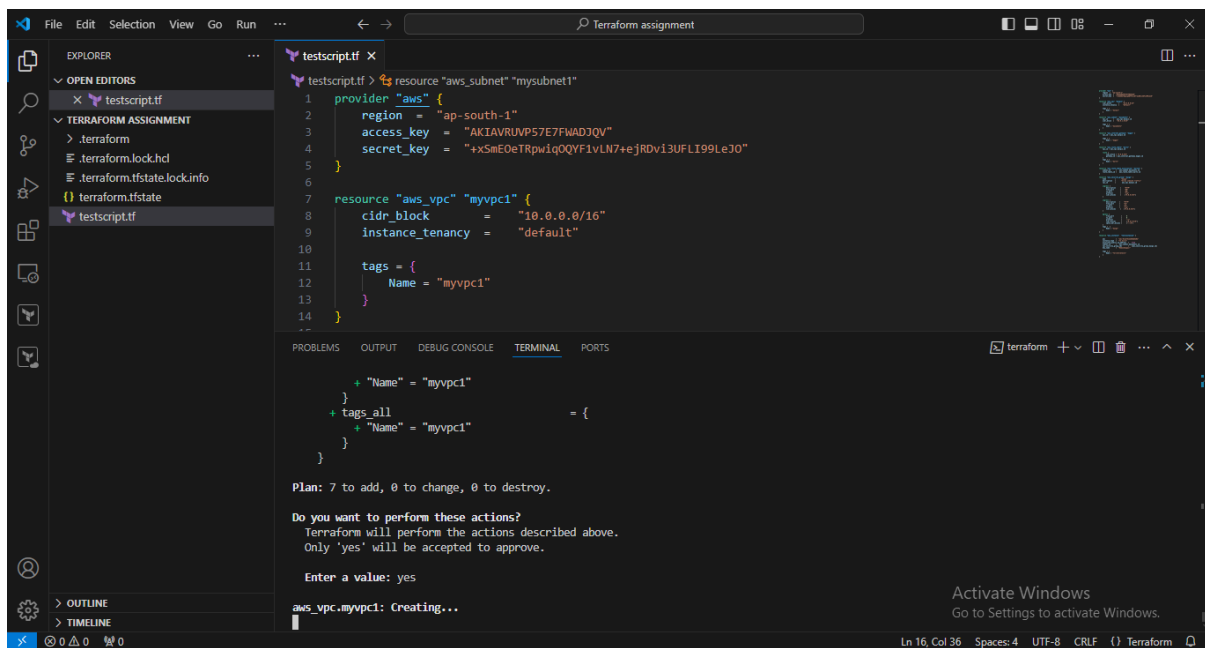
Activate Windows
Go to Settings to activate Windows.



Step 15: Now to apply the changes, execute command: "terraform apply"



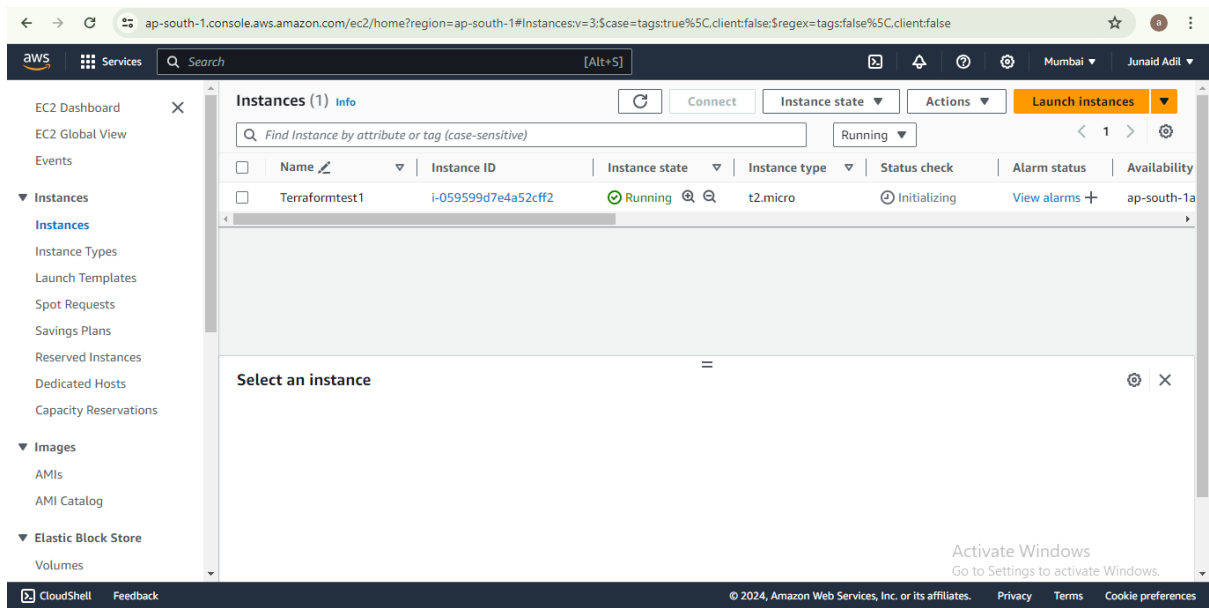
Step 16: It will ask to verify if we want to make the changes. Enter “yes”



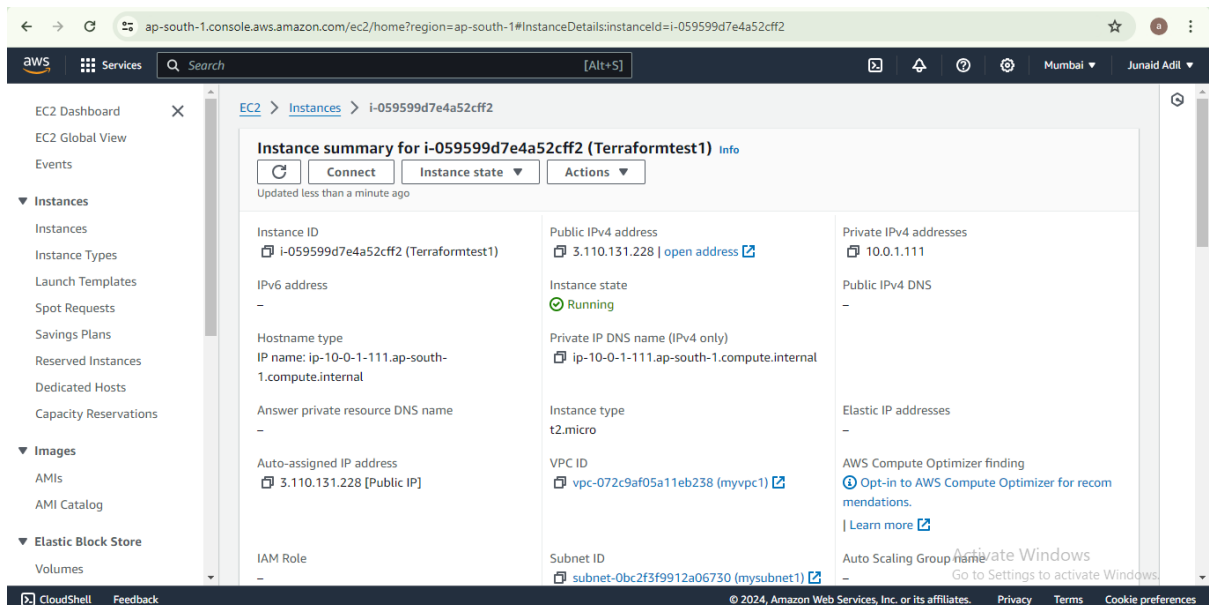
The screenshot shows the Visual Studio Code interface with a Terraform configuration file open. The terminal window displays the output of a Terraform plan command. The plan shows that a new VPC resource will be added. The user is prompted to confirm the actions.

```
testscript.tf X
testscript.tf > resource "aws_subnet" "mysubnet1"
1 provider "aws" {
2   region = "ap-south-1"
3   access_key = "AKIAVRUVP57E7FWADJQV"
4   secret_key = "xSmEOeTRpwiQOQVF1vLN7+ejRDvI3UFLI99LeJ0"
5 }
6
7 resource "aws_vpc" "myvpc1" {
8   cidr_block = "10.0.0.0/16"
9   instance_tenancy = "default"
10
11   tags = {
12     Name = "myvpc1"
13   }
14 }
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Step 17: Now go to the AWS Console → EC2 Instance and query the Instance.



We can see an instance has been created “terraformtest1”.



“myvpc1” VPC has been created

The screenshot displays the AWS Management Console interface for the 'ap-south-1' region. The main content area is titled 'Your VPCs (1)' and shows a single VPC named 'myvpc1' with ID 'vpc-072c9af05a11eb238'. The VPC is in an 'Available' state and has an IPv4 CIDR of '10.0.0.0/16'. The left sidebar lists various VPC-related services, with 'Your VPCs' currently selected. The top navigation bar includes the AWS logo, a search bar, and the user's name 'Junaid Adil'.

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR
myvpc1	vpc-072c9af05a11eb238	Available	10.0.0.0/16	-

“mysubnet1” subnet has been created.

The screenshot displays the AWS Management Console interface for the 'ap-south-1' region, specifically the 'Subnets' page. A single subnet named 'mysubnet1' with ID 'subnet-0bc2f3f9912a06730' is listed as 'Available' with an IPv4 CIDR of '10.0.1.0/24'. The left sidebar shows the 'Virtual private cloud' section with 'Subnets' selected. The top navigation bar includes the AWS logo, a search bar, and the user's name 'Junaid Adil'.

Name	Subnet ID	State	VPC	IPv4 CIDR
mysubnet1	subnet-0bc2f3f9912a06730	Available	vpc-072c9af05a11eb238 myv...	10.0.1.0/24

Security group is created with inbound rules for port range: 22 and 80 as mentioned in the script.

