Assignment 1

Create a file called main.tf.
Create a docker image resource and call it nginx_image.
Set the name of the image to nginx:latest.
Save and exit the file.

Initialize Terraform.
Plan the deploy and output a terraform plan called tf_image_plan.
Apply the plan using tf_image_plan.

Code:

```
terraform {
  required_providers {
    docker = {
      source  = "kreuzwerker/docker"
      version = "2.12.0"
    }
  }
}

provider "docker" {
  host = "npipe:////.//pipe//docker_engine"
}


resource "docker_image" "nginx_image" {
  name = "nginx:latest"
}
```

Command:
terraform init
terraform plan -out tf_image_plan
terraform apply "tf_image_plan"

Assignment-2

Create a new Terraform file called main.tf.
Create three variables.
The first variable, called image_name, needs to be set to ghost:latest.
The second variable is called container_name with a default of ghost_blog.
The final variable is called ext_port and set the default to port 80.

Create a Docker image resource called ghost_image that uses the image_name variable.

Create a Docker container resource called ghost_container.
The name will use the container_name variable.
The image will use the ghost_image resource.
The internal port will be set to 2368.
The external port will use ext_port variable.

Initialize Terraform.

Create a Terraform plan that uses the following variables:

container_name = ghost_blog1
image_name = ghost:alpine
ext_port = 8080
Output the plan to a file called tfplan.

Then apply the plan using tfplan and make sure that the apply doesn't prompt for input.

```
variable "image_name" {
  default = "ghost:latest"
}

variable "container_name" {
  default = "ghost_blog"
}

variable "ext_port" {
  default = "80"
}

terraform {
  required_providers {
    docker = {
      source  = "kreuzwerker/docker"
      version = "2.12.0"
    }
  }
}

provider "docker" {
  host = "npipe:////.//pipe//docker_engine"
}
```

```
resource "docker_container" "ghost_container" {
  name  = var.container_name
  image = docker_image.ghost_image.latest

  ports {
    internal = "2368"
    external = var.ext_port
  }
}


resource "docker_image" "ghost_image" {
  name = var.image_name
}
```

Commands:
terraform init
terraform plan -var 'container_name=ghost_blog1' -out tfplan
terraform plan -var 'image_name=ghost:alpine' -out tfplan
terraform plan -var 'ext_port=8080' -out tfplan
terraform apply "tfplan"

Assignment-3

Adding Maps and Lookups in your Terraform files
The lab files can be found @ https://github.com/satyensingh/terraform-assignment-resources.git
In the repo you will find main.tf, outputs.tf, and variables.tf.
Add a new variable called env. Set a description to “env: dev or prod”.
Convert the type from image_name to map.

Change the default to use key/value pairs. Set dev to ghost:latest and prod to ghost:alpine.

Convert container_name to a map. Change the default to use key/value pairs. Set dev to blog_dev and prod to blog_prod.

Convert ext_port to a map. Change the default to use key/value pairs. Set dev to 8080 and prod to 80.

Now initialize Terraform.

Setup the Development environment
Create a workspace called dev.

Generate a Terraform plan. Output the plan and call it tfdev_plan. Pass in a variable called env and set it to dev.
Apply tfdev_plan.

Setup the Production environment
Create a workspace called prod.
Generate a Terraform plan. Output the plan and call it tfprod_plan. Pass in a variable called env and set it to prod.
Apply tfprod_plan.

Verify both environments work
Open a browser and navigate to the public IP. This should pull up the production environment.
Open a browser tab and navigate to the public IP on port 8080. This should pull up the development environment.

Main.tf

```
terraform {
  required_providers {
    docker = {
      source  = "kreuzwerker/docker"
      version = "2.12.0"
    }
  }
}

provider "docker" {
    host = "npipe:////.//pipe//docker_engine"
}

# Download the latest Ghost Image
resource "docker_image" "image_id" {
  name = "${lookup(var.image_name,var.env)}"
}

# Start the Container
resource "docker_container" "container_id" {
  name  = "${lookup(var.container_name,var.env)}"
  image = "${docker_image.image_id.latest}"
  ports {
    internal = "2368"
    external = "${lookup(var.ext_port,var.env)}"
```

```
  }
}
```

Variable.tf

```
variable "env" {
  description = "env: dev or prod"
  default = "dev"
}

variable "image_name" {
  description = "Image for container."
  type = map(string)
  default = {
      dev : "ghost:latest"
      prod : "ghost:alpine"
  }
}

variable "container_name" {
  description = "Name of the container."
  type = map(string)
  default = {
    dev : "blog_dev"
    prod : "blog_prod"
  }
}

variable "ext_port" {
  description = "External port for container."
  type = map(string)
  default = {
    dev : 8080
    prod : 80
  }
}
```

Output.tf

```
#Output the IP Address of the Container
```

```
output "ip_address" {
  value       = "${docker_container.container_id.ip_address}"
  description = "The IP for the container."
}

output "container_name" {
  value       = "${docker_container.container_id.name}"
  description = "The name of the container."
}
```

Commands:

terraform init
terraform workspace new dev
terraform plan -var ‘env=dev’ -out tfdev_plan
terraform apply “tfdev_plan”

terraform workspace new prod
terraform plan -var ‘env=prod’ -out tfprod_plan
terraform apply “tfprod_plan”

terraform workspace list
docker ps

Assignment-4

Create Ghost module
Create a directory called ghost.
Your modules will be made up of three files: main.tf, variables.tf and outputs.tf.

main.tf
In main.tf you will deploy out two resources docker_image and docker_container. The docker_image resource name will be ghost_image.
The name will use th image_name variable.
The docker_container resource name will be ghost_container.
The name will be set using a varialbe called container_name. The image will be set usingdocker_image.ghost_image.latest. Set the external port to use the ext_port variable.

main.tf

ghost > main.tf

```
terraform {
  required_providers {
    docker = {
      source  = "kreuzwerker/docker"
      version = "2.12.0"
    }
  }
}

provider "docker" {
  host = "npipe:////.//pipe//docker_engine"
}

resource "docker_container" "ghost_container" {
  name  = var.container_name
  image = docker_image.ghost_image.latest

  ports {
    internal = "2368"
    external = var.ext_port
  }
}

resource "docker_image" "ghost_image" {
  name = var.image_name
}
```

variables.tf

In variables.tf create three varialbes: image_name, container_name and ext_port.

main.tf variable.tf

ghost > variable.tf

```
variable "image_name" {
  //default = "ghost:latest"
}

variable "container_name" {
  //default = "ghost_blog"
}

variable "ext_port" {
  //default = "80"
}
```

outputs.tf

In outputs.tf create two outputs: ip and container_name. The ip output the ghost_container's ip_address attribute.

The container_name output the ghost_container's name attribute.

main.tf outputs.tf

ghost > outputs.tf

```
#Output the IP Address of the Container
output "ip_address" {
  value       = docker_container.ghost_container.ip_address
  description = "The IP for the container."
}

output "container_name" {
  value       = docker_container.ghost_container.name
  description = "The name of the container."
}
```

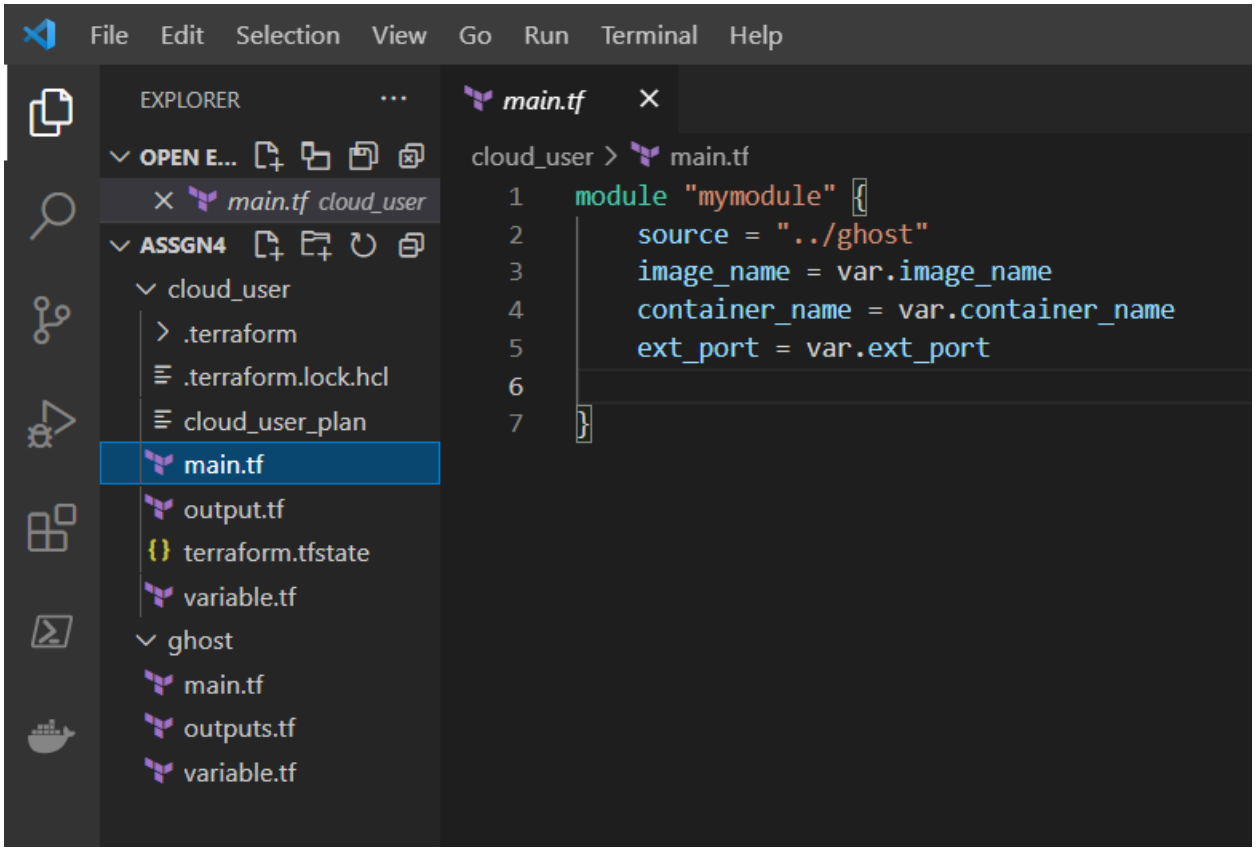
Create root module

main.tf

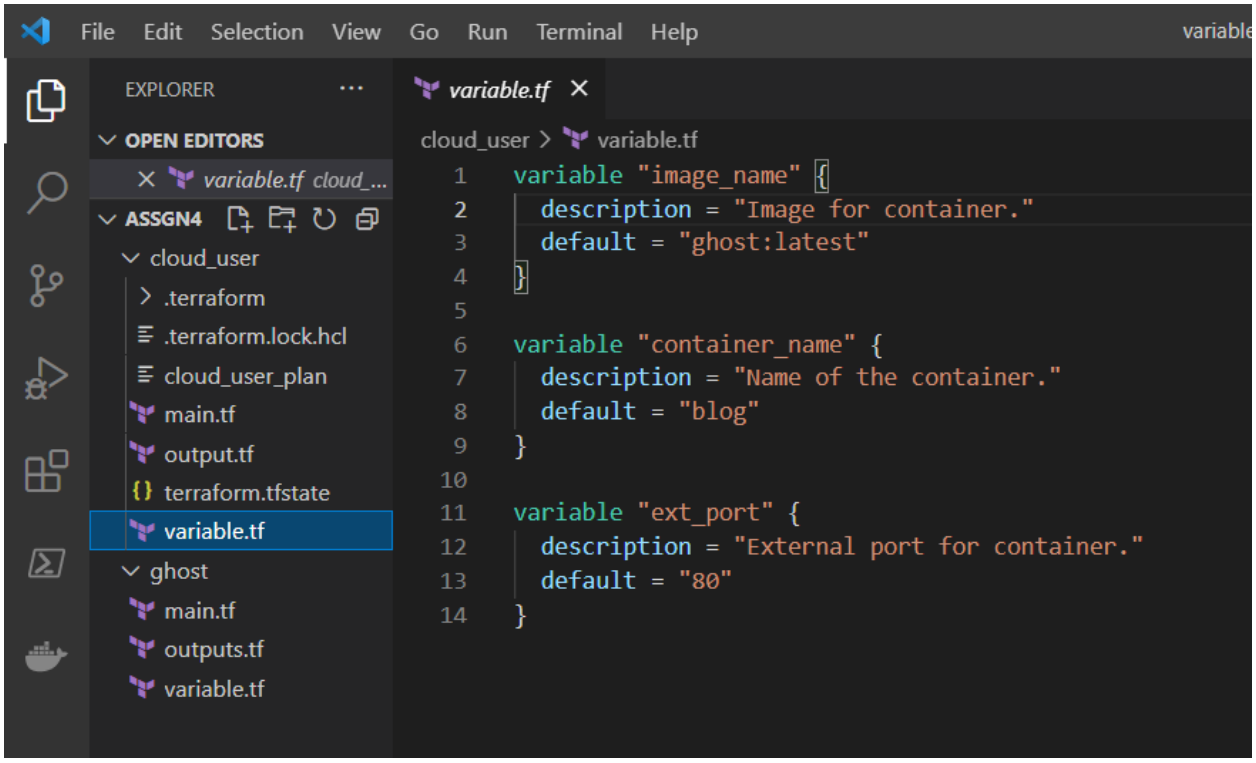
In cloud_user directory create main.tf, variables.tf and outputs.tf. In main.tf will use the ghost module.

Set image_name using a variable called image_name.

Set container_name using a variable called container_name.
Set ext_port using a variable called ext_port.
In variables.tf create three image_name, container_name and ext_port.



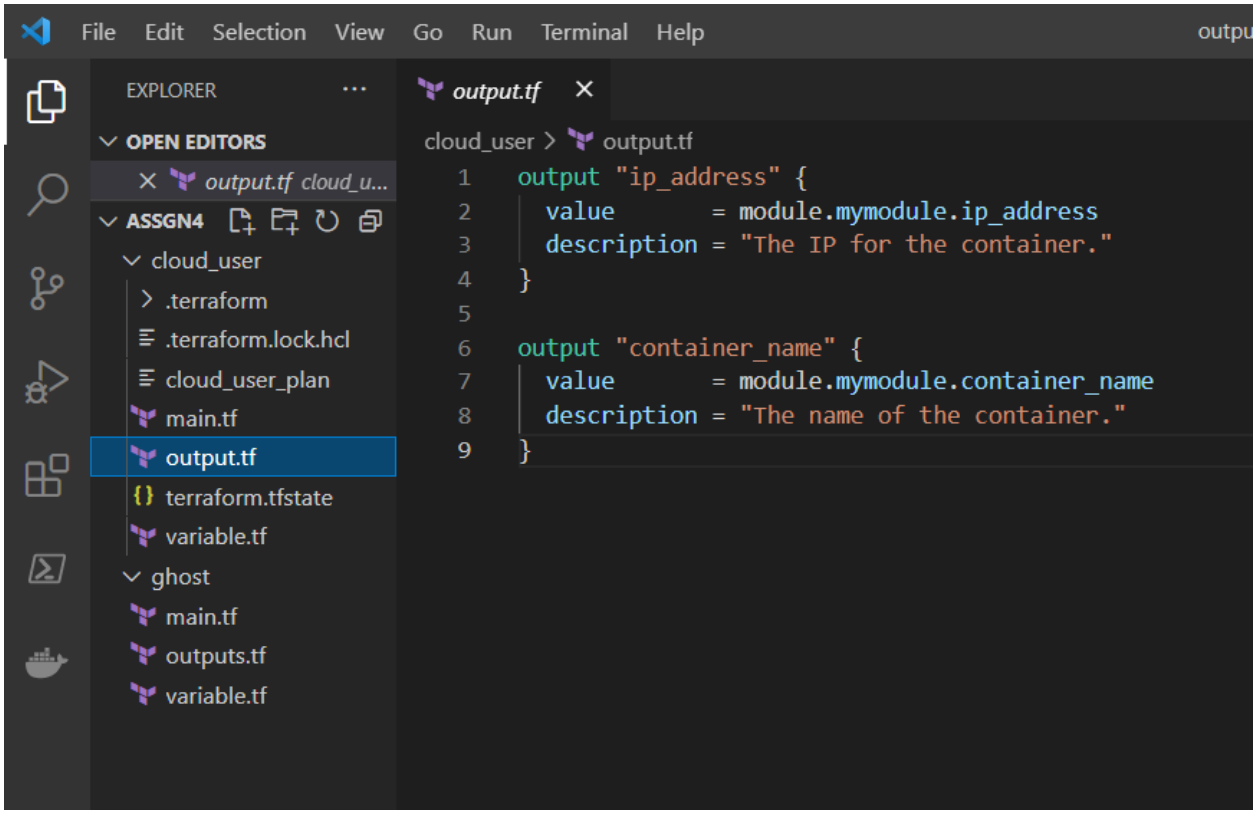
variables.tf
The image_name will have a default value of ghost:latest with a description of Image for container.
The container_name will have a default value of blogwith a description ofName of the container.
Theext_portwill have adefaultvalue of 80 with a description of External port for container.



outputs.tf

In outputs.tf create two outputs: ip and container_name. The ip output the ghost_container's ip_address attribute.

The container_name output the ghost_container's name attribute.



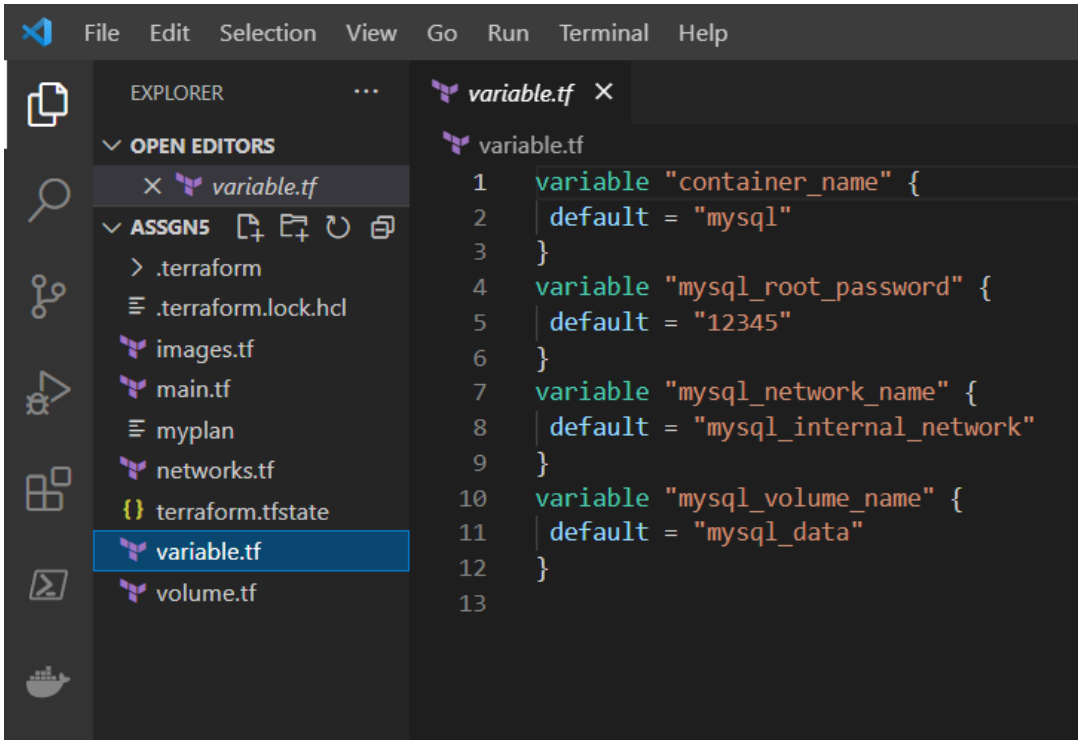
Deploy the infrastructure
Initialize Terraform.
Generate a Terraform plan and output a plan file.
Deploy the infrastructure using the plan file.

Commands:
cd cloud_user
terraform init
terraform plan -out cloud_user_plan
terraform apply "cloud_user_plan"

Assignment-5

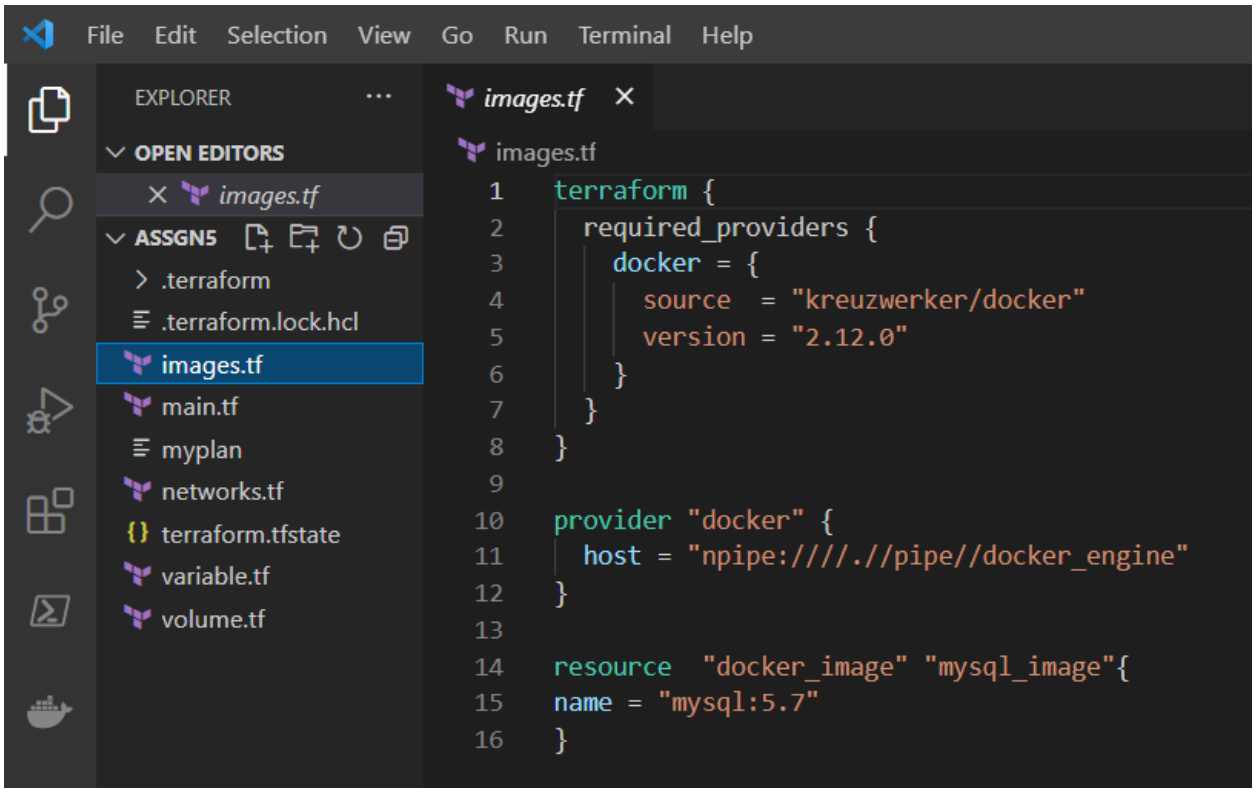
Create the variables file (variables.tf) and add four variables with these default values:

1. container_name: mysql.
2. mysql_root_password: P4sSw0rd0!.
3. mysql_network_name: mysql_internal_network.
4. mysql_volume_name: mysql_data.



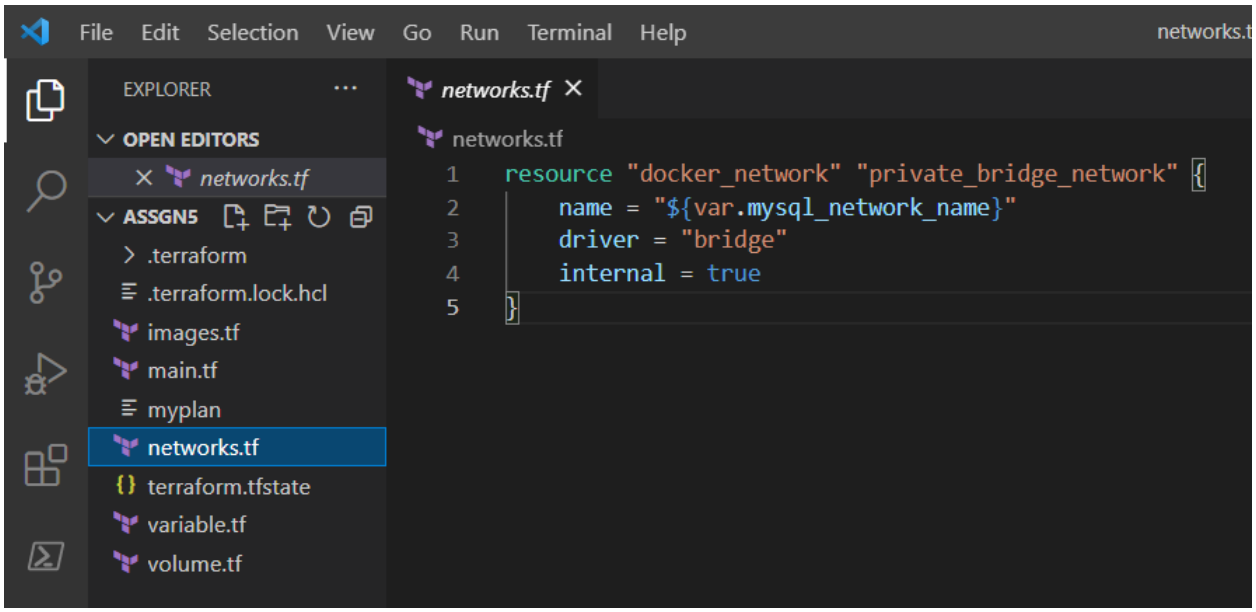
Create the images file (images.tf)

1. Add the docker_image resource and call it mysql_image.
2. Set the name to mysql:5.7.



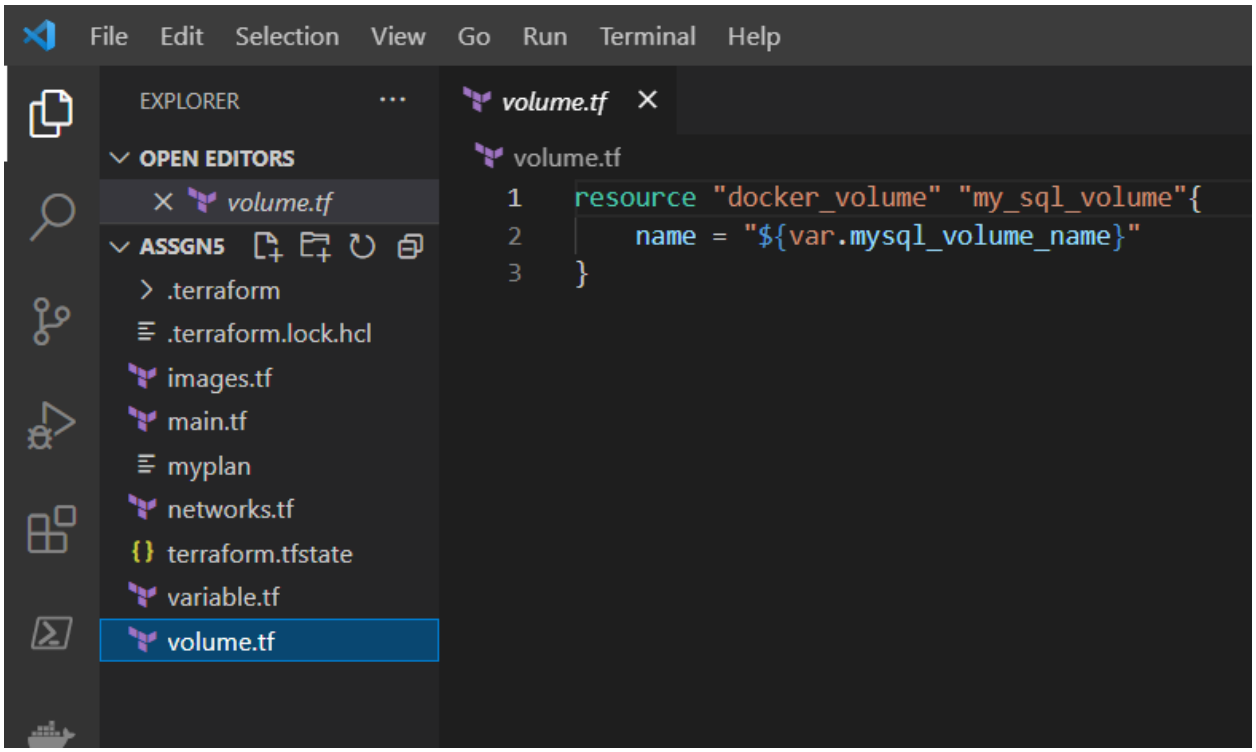
Create the networks file (networks.tf):-

1. Add the docker_network resource and call it private_bridge_network.
2. Set the name to use the mysql_network_name variable.
3. Set the driver to bridge.
4. Set internal to true.



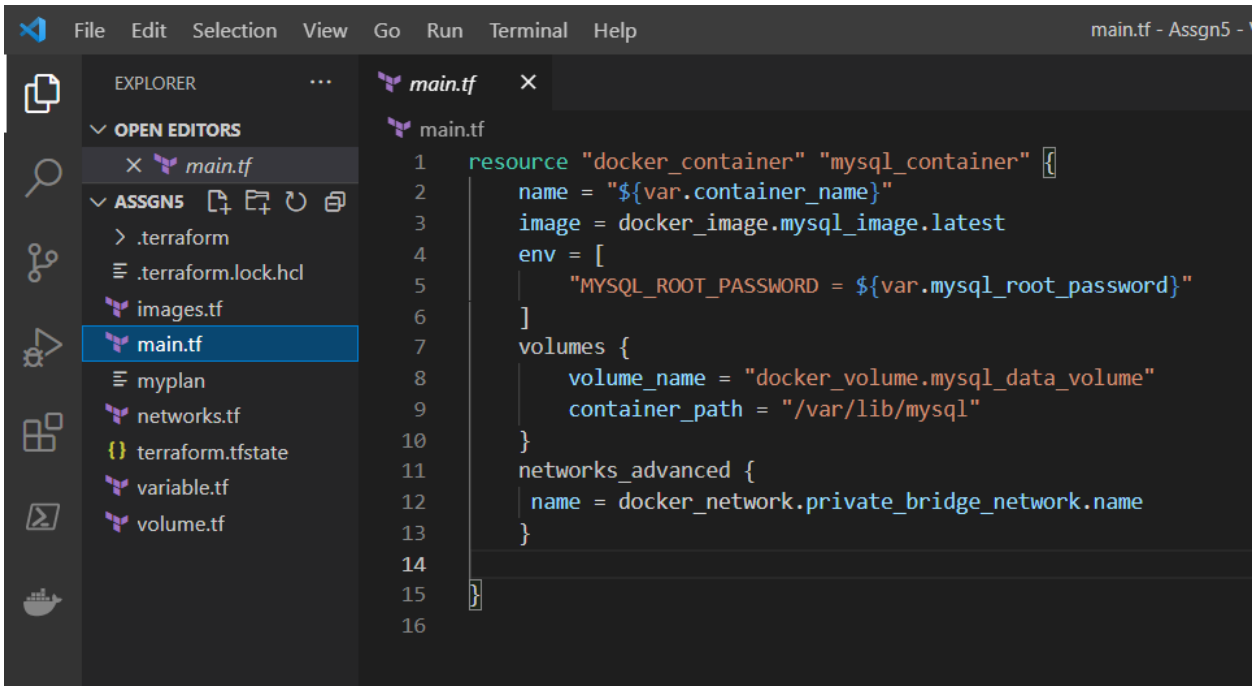
Create the volumes file (volume.tf):-

1. In volumes.tf add the docker_volume resource and call it mysql_data_volume.
2. Set the name to use the mysql_volume_name variable.



Create the main file (main.tf):-

1. In main.tf add the docker_container resource and call it mysql_container.
2. Set the name to use the container_name variable.
3. Set the image to use the name of the image coming from docker_image.
4. Create an environment variable for MYSQL_ROOT_PASSWORD and set it to the mysql_root_password variable.
5. Configure the container volume to use the volume created by docker_volume, and make sure the container_path is set to /var/lib/mysql.
7. The container needs to use the network created by docker_network.



Deploy the infrastructure

1. Initialize Terraform.
2. Validate the files.
3. Generate a Terraform plan.
4. Deploy the infrastructure using the plan file.

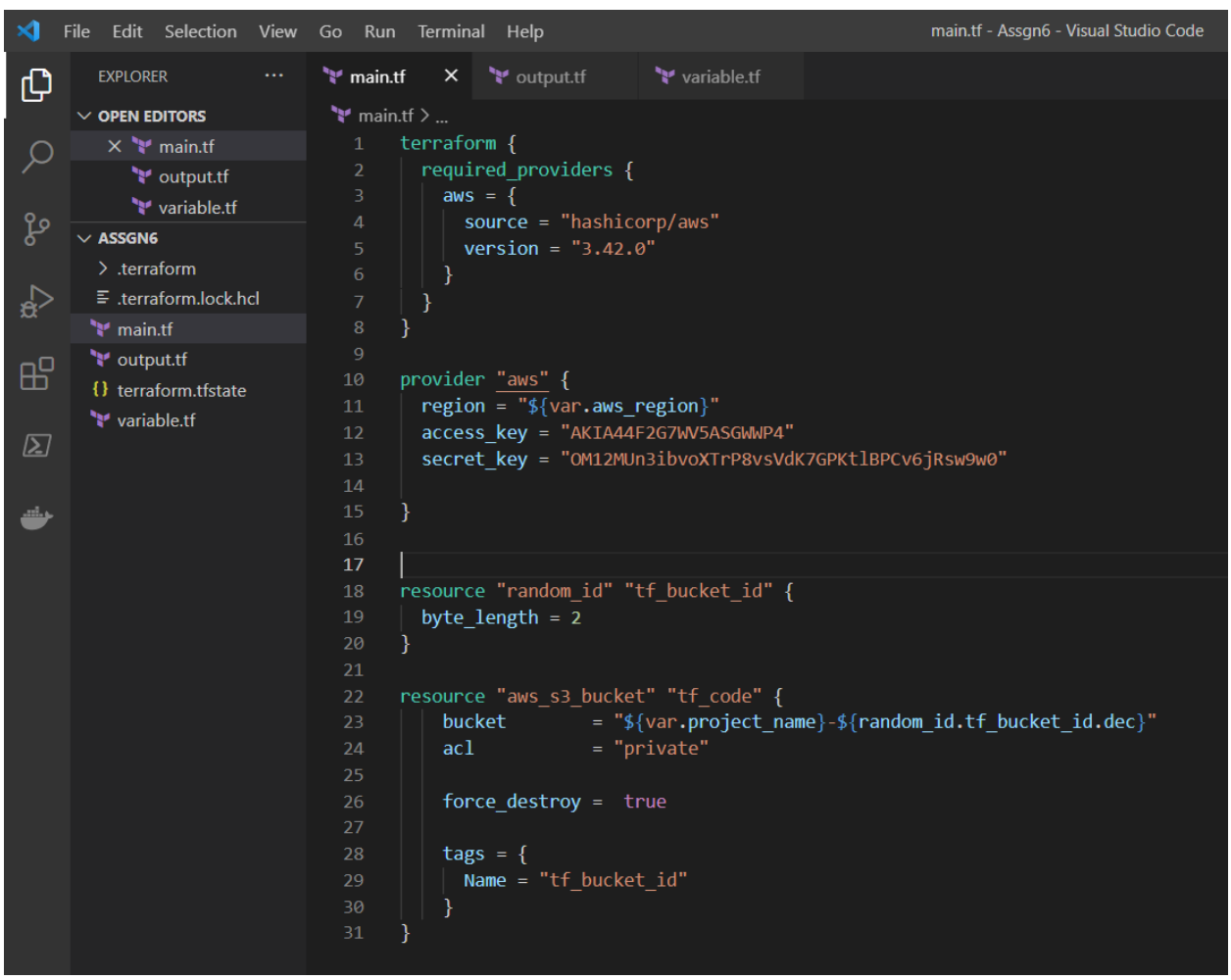
--Commands:
terraform init
terraform validate
terraform plan -out=myplan
terraform apply "myplan"
(used following commands to see network and volume is created)
Docker images
docker ps
docker network ls
docker volume ls

Assignment-6

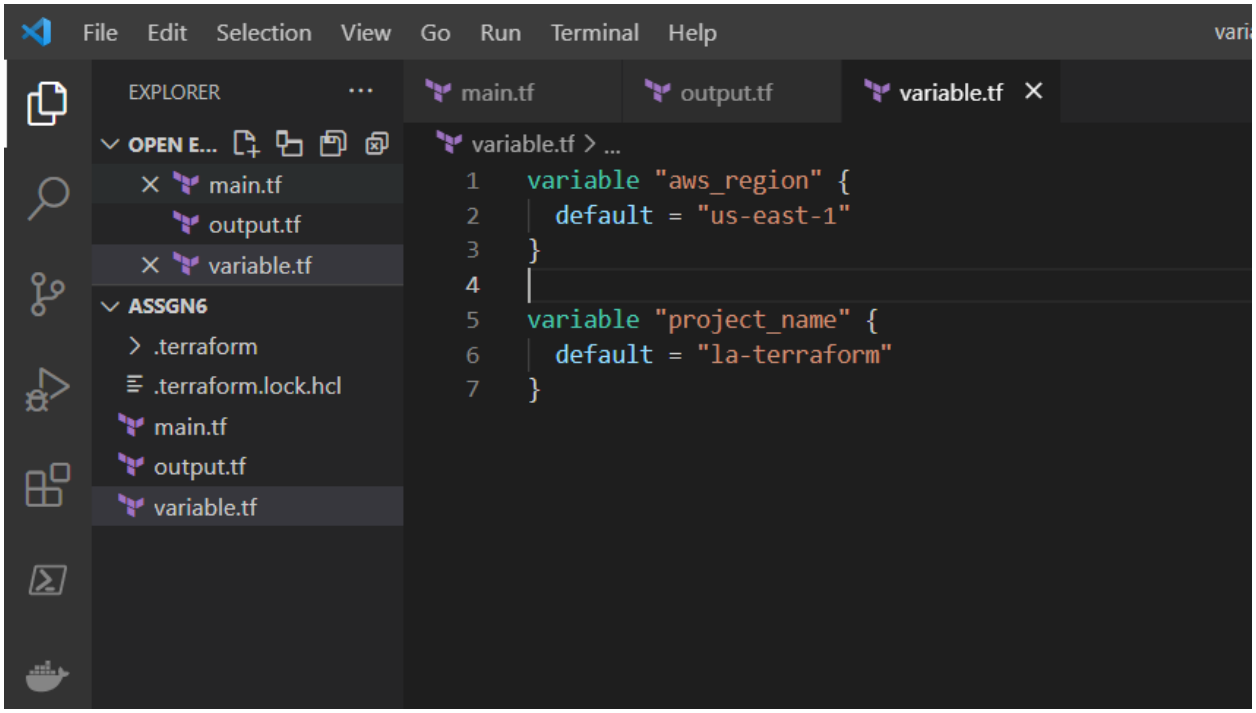
Using Terraform to Create a RandomID and S3 Buckets

Create the Main file:-
Create the main.tf Terraform file.
Add a provider, aws.
Set the region to use a variable called aws_region.
Add a random_id resource and name it tf_bucket_id.
Set the byte_length to 2.

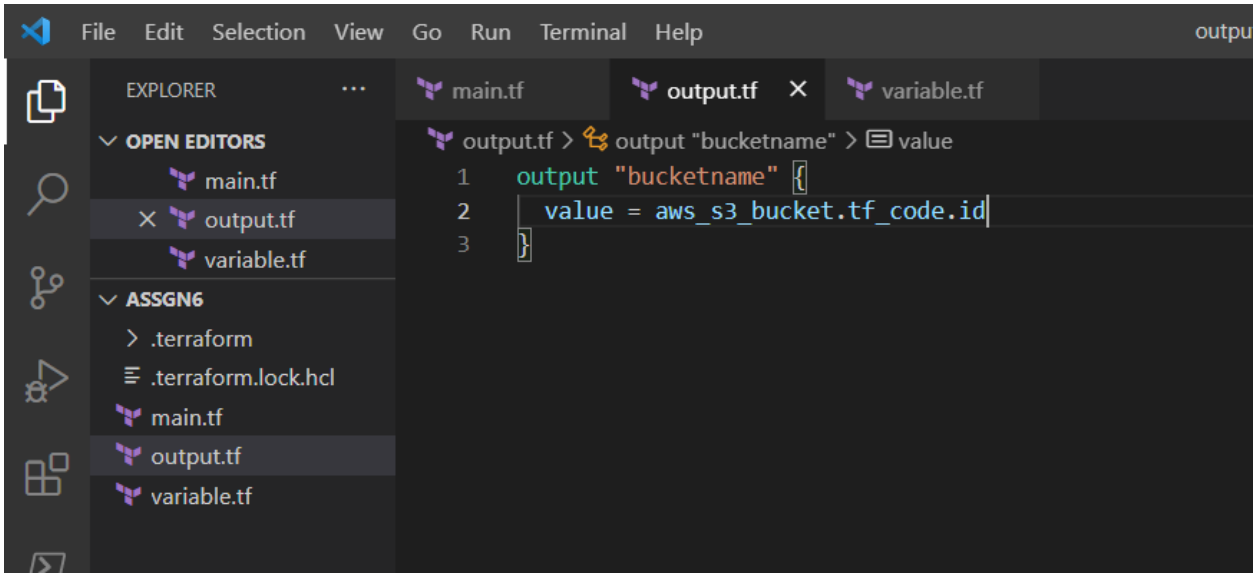
Add a resource, aws_s3_bucket, and name it tf_code.
The bucket name will be set using a variable called project_name, followed by a -, and will use the dec attribute from tf_bucket_id.
Set the acl to private.
Set force_destroy to true.
Create a tag with a name to tf_bucket.



Create the Variables File:-
Create the variables.tf Terraform file.
Add a variable called aws_region.
Set the default to us-east-1. Add a variable called project_name.
Set the default to la-terraform.



Create the outputs file:-
Create the outputs.tf Terraform file.
Add a output called bucketname.
The value should be set to id, coming from tf_code.

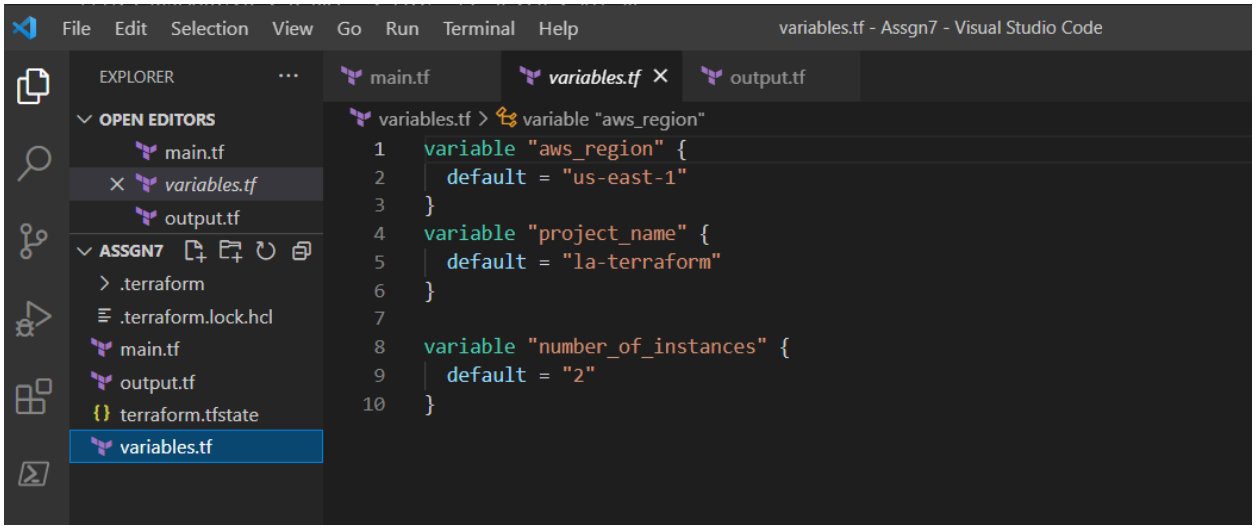


Deploy the infrastructure:-
Initialize Terraform.
Validate the files.
Deploy the S3 bucket.

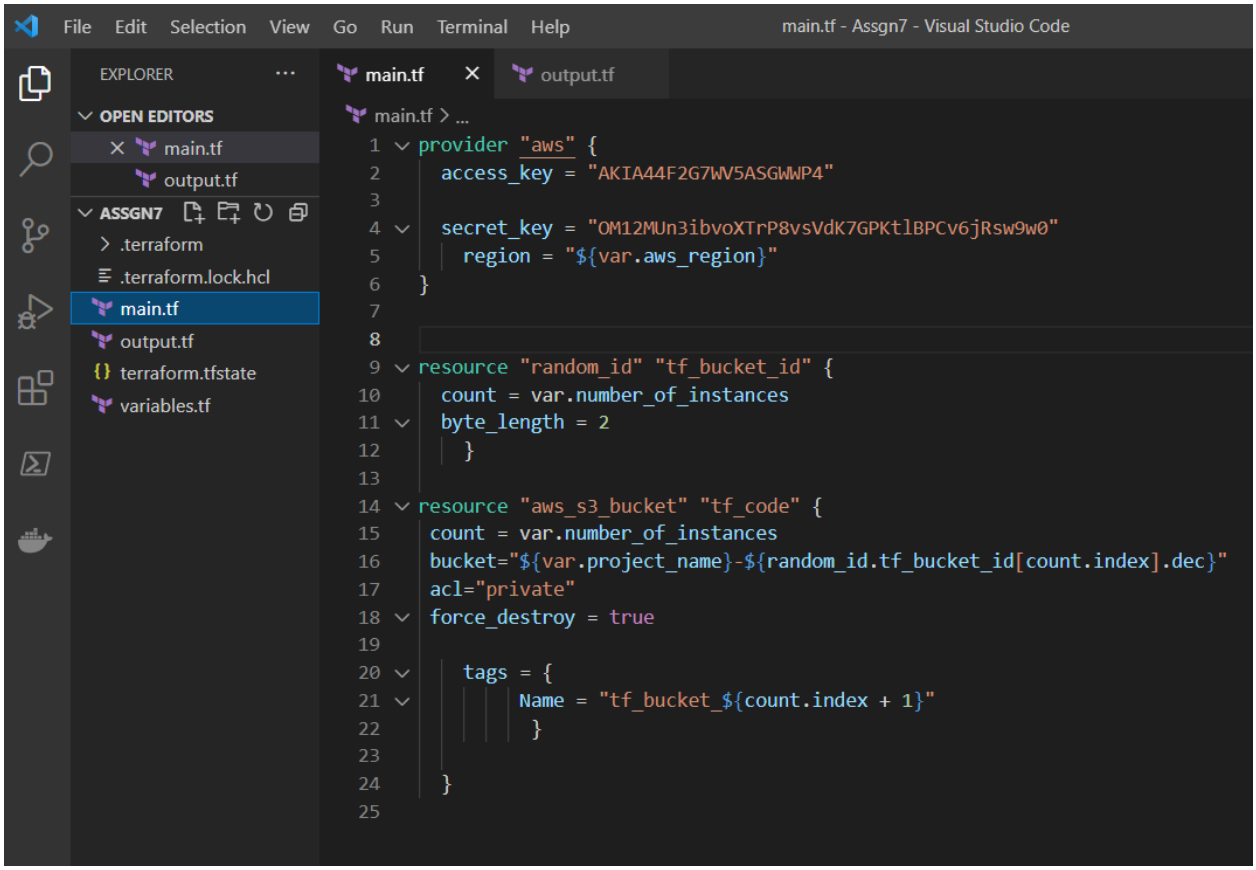
terraform init
terraform validate
terraform plan
terrraform apply

Assignment-7

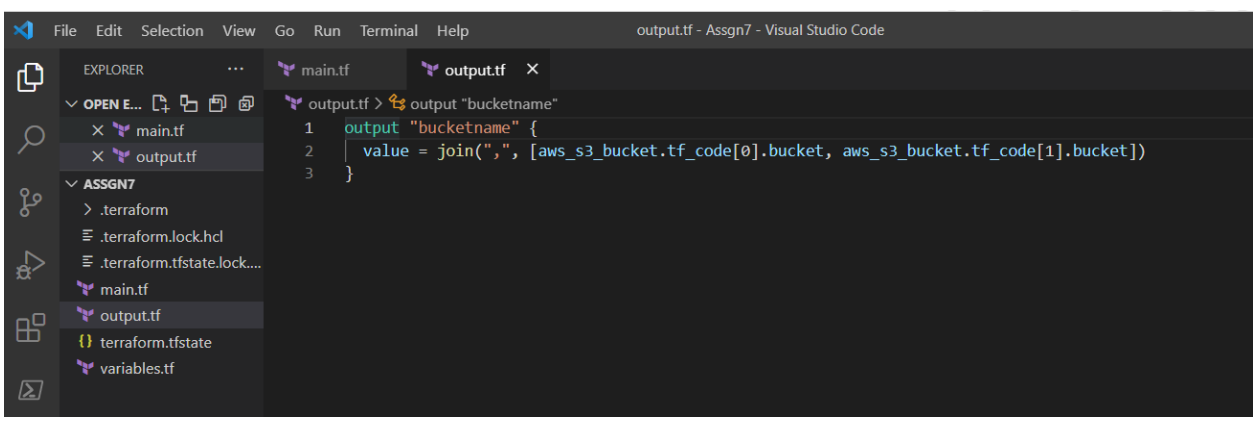
Update the Variables File:-
Edit variables.tf.
Add a new variable number_of_instances.
Set the the default to 2.



Update the Main File:-
Update random_id and add a count.
Set the value count to use the number_of_instances variable.
Update aws_s3_bucket and add a count.
Update random_id.tf_bucket_id.dec so it iterates through the count. Update the Name tag so that tf_bucket is appended with the count index plus one.



Update the Outputs File:-
Update the bucketname output value to use the join function so that it returns a comma delimited list of bucket names.



Deploy the Infrastructure:-
Initialize Terraform.
Validate the files.
Deploy the S3 buckets.

Commands:

Terraform init
Terraform validate
Terraform apply