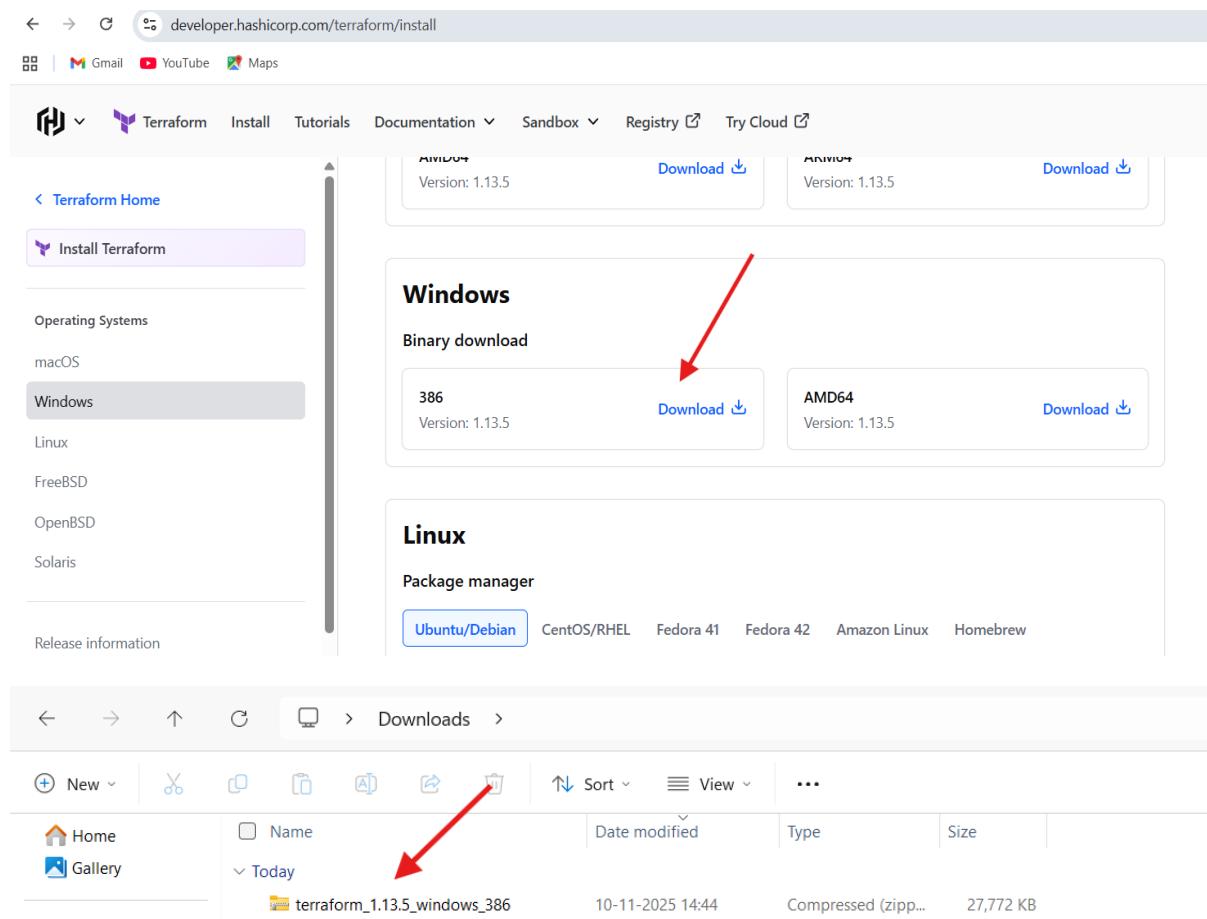
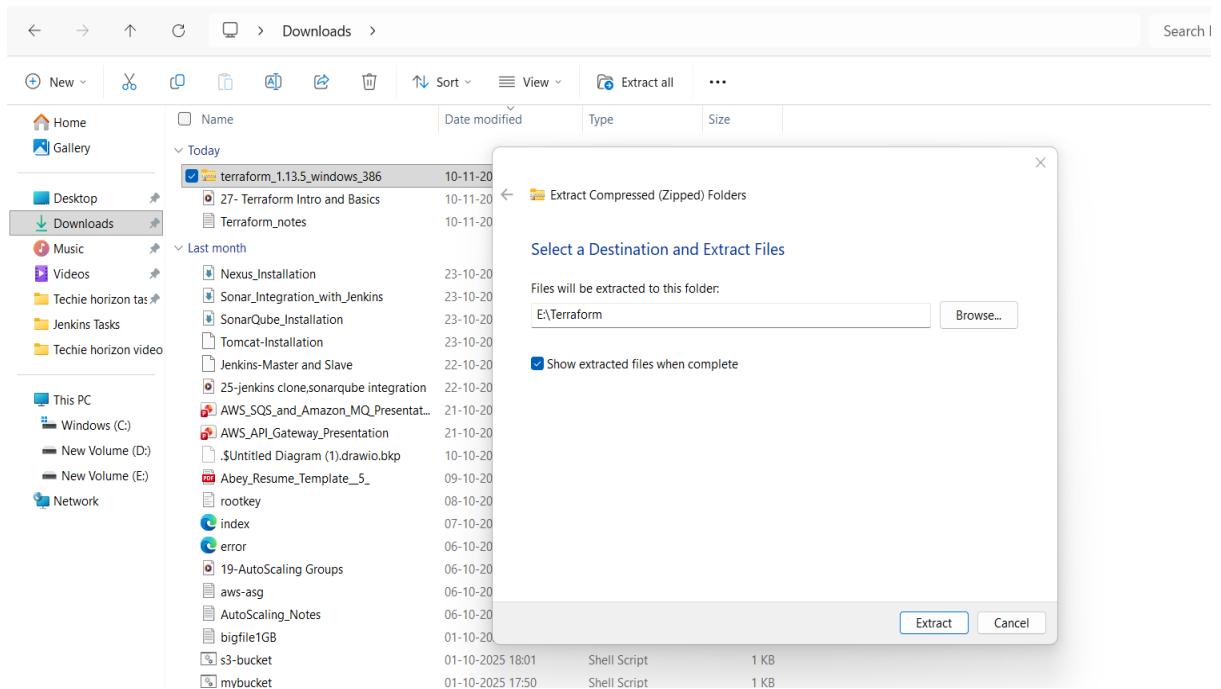


1. Install Terraform on your PC

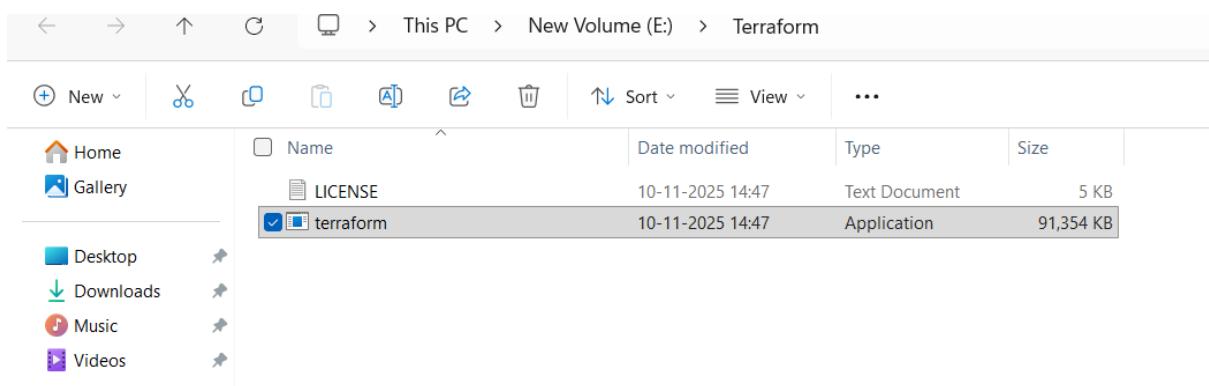
Go to browser search as terraform download for windows and check for windows option and click on download.



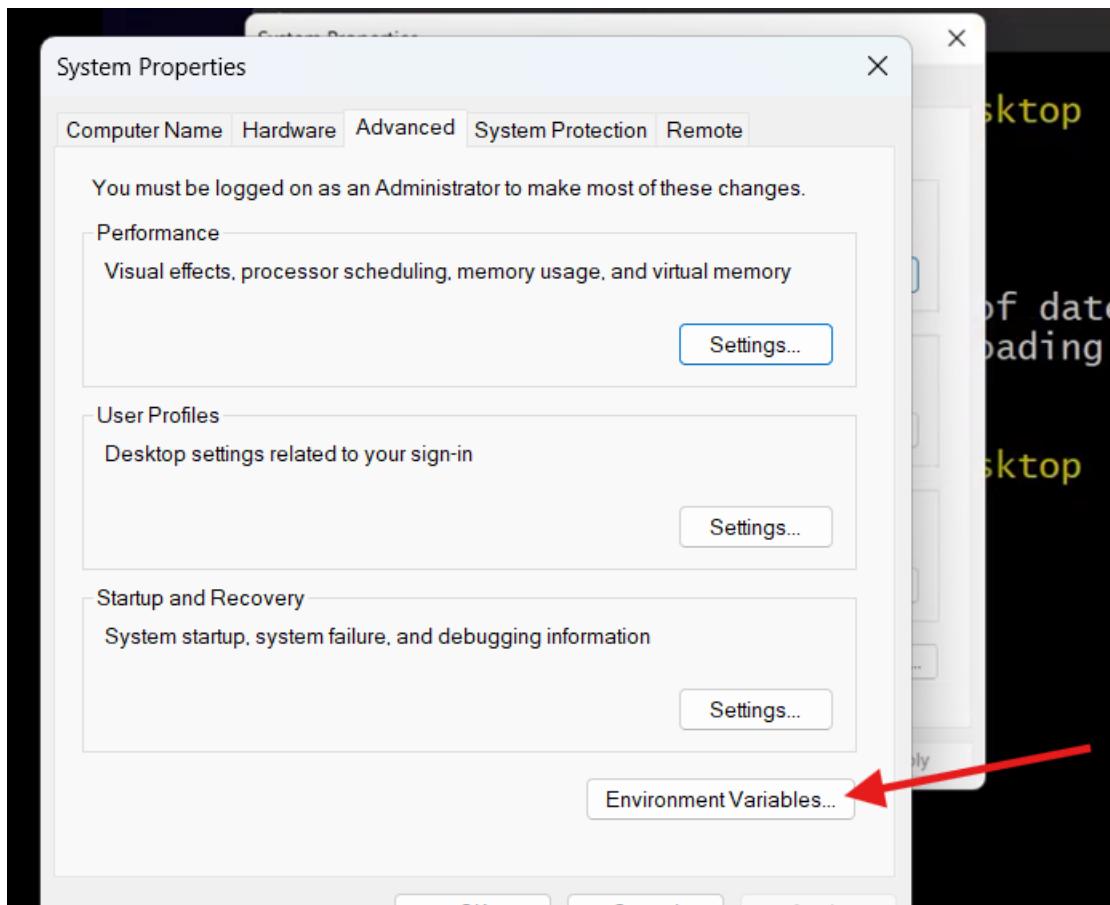
Give a right click on that select extract all and give your location.



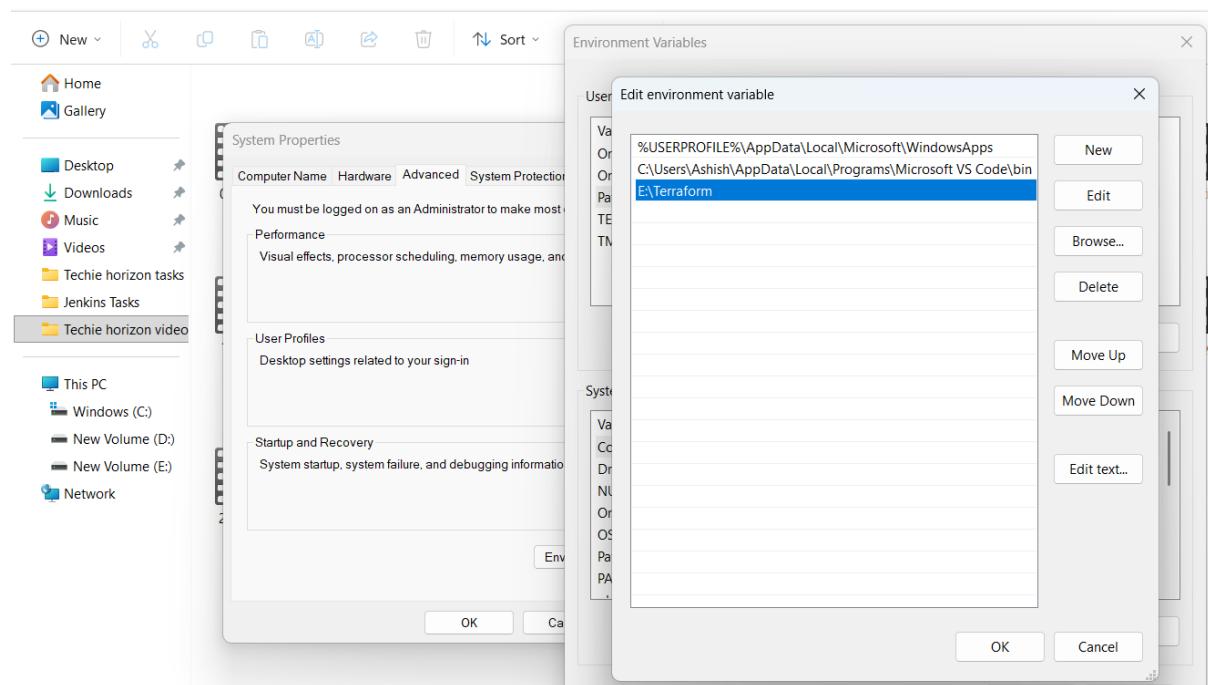
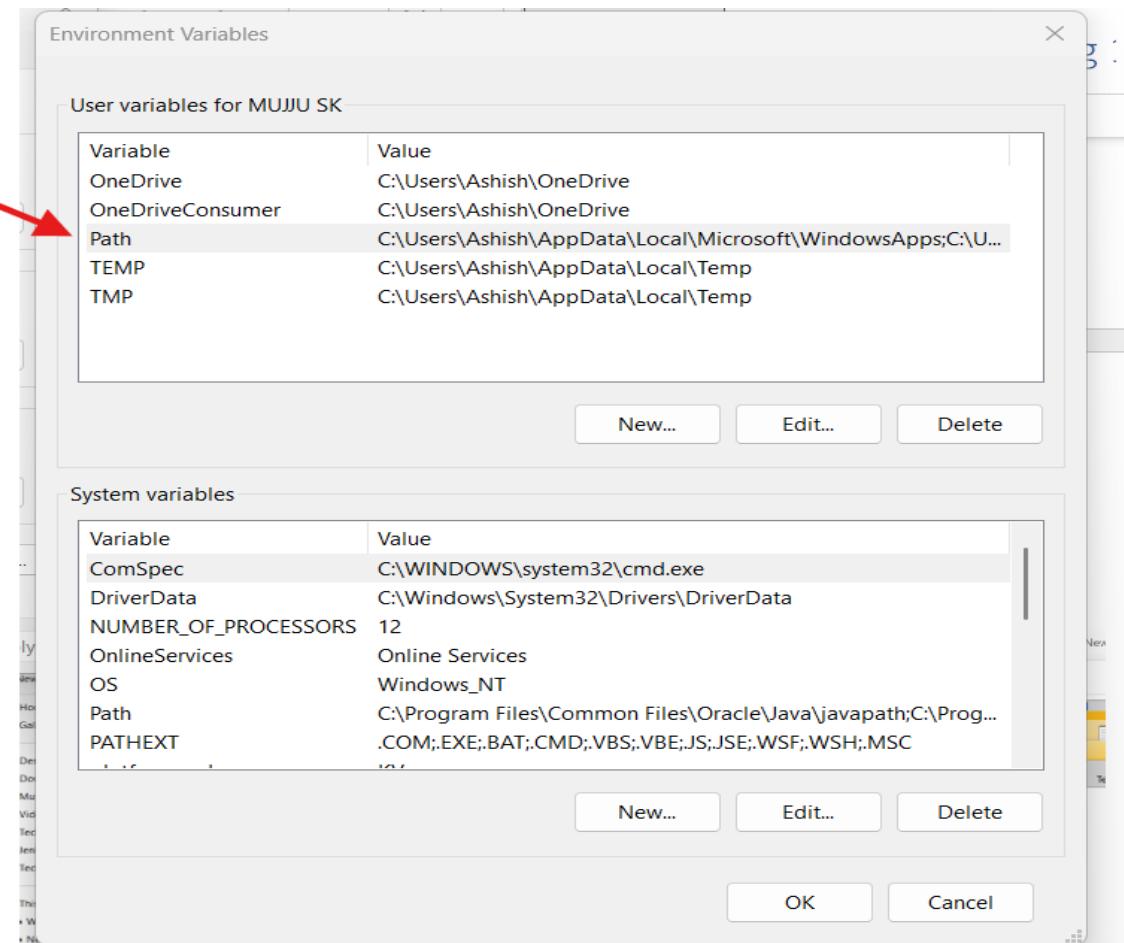
You will see an exe file.



- Search in your pc as system variables select environmental variables.



- In that first table click on path and click on edit give your extracted directory path and click on save.

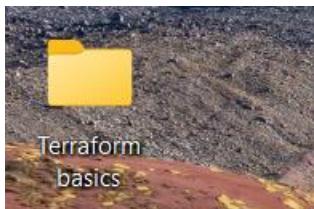


Check the version.

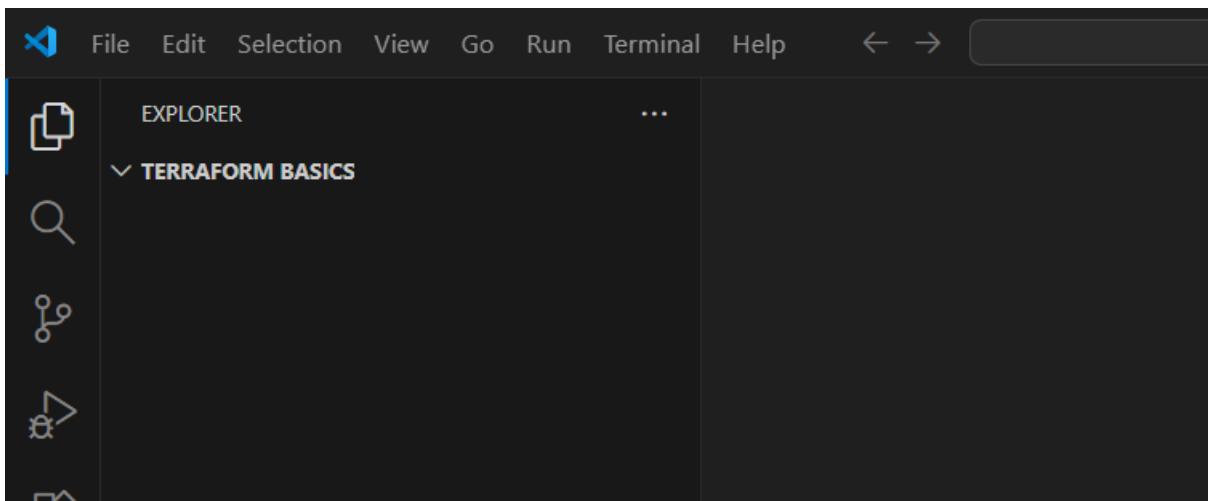
```
MUJJU SK@DESKTOP-LU541U4 MINGW64 ~
$ terraform -v
Terraform v1.13.5
on windows_386
```

```
MUJJU SK@DESKTOP-LU541U4 MINGW64 ~
$
```

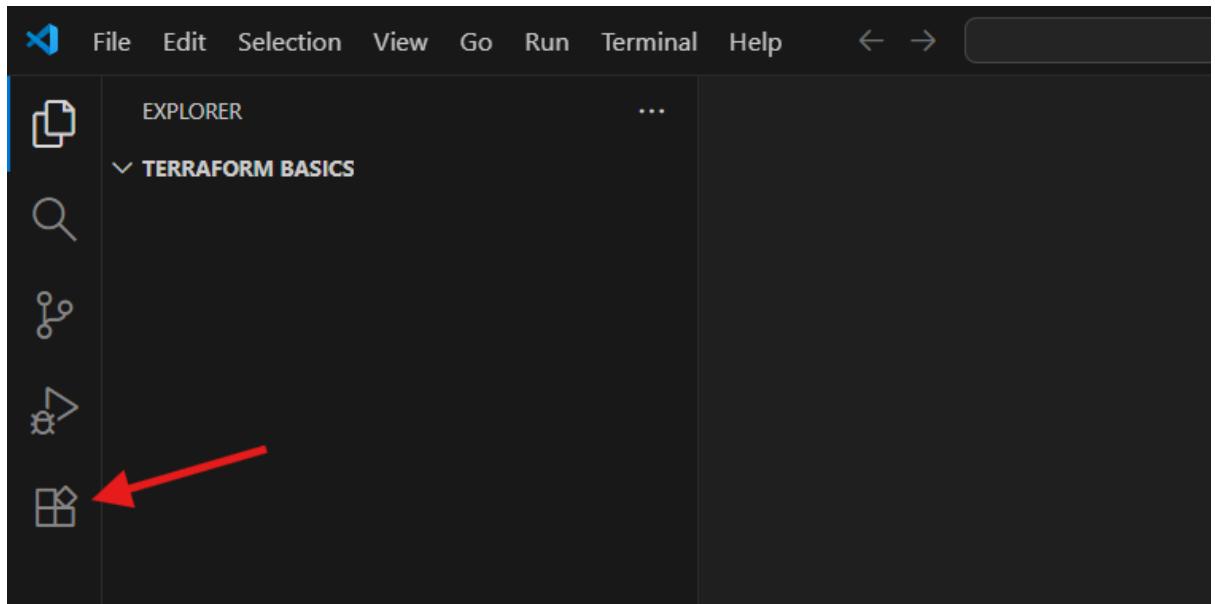
- Create a folder in the desktop as terraform basics.



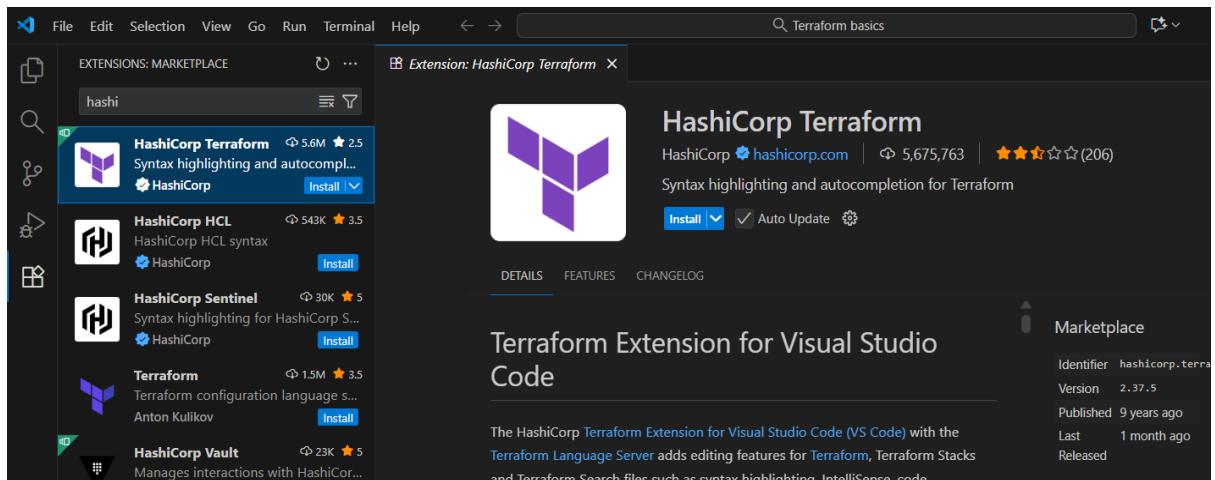
Open visual studio app and click on file, click on open folder and select that you created as terraform basics in desktop.



Click on extensions.

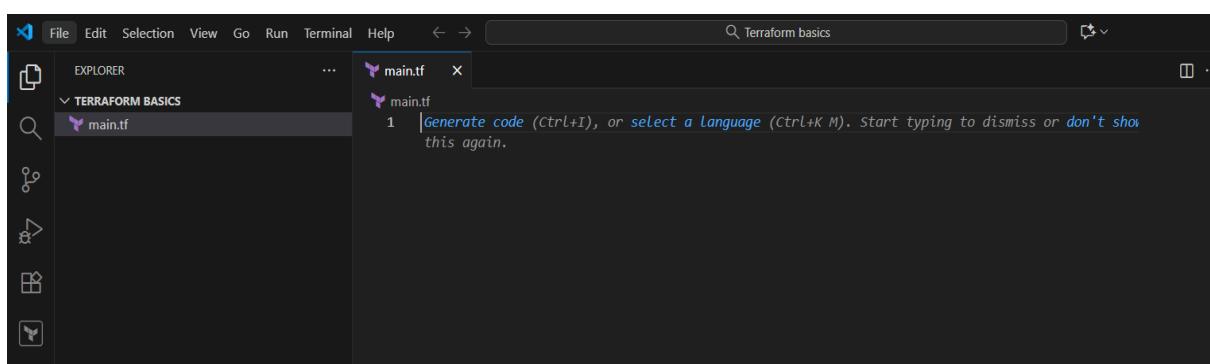
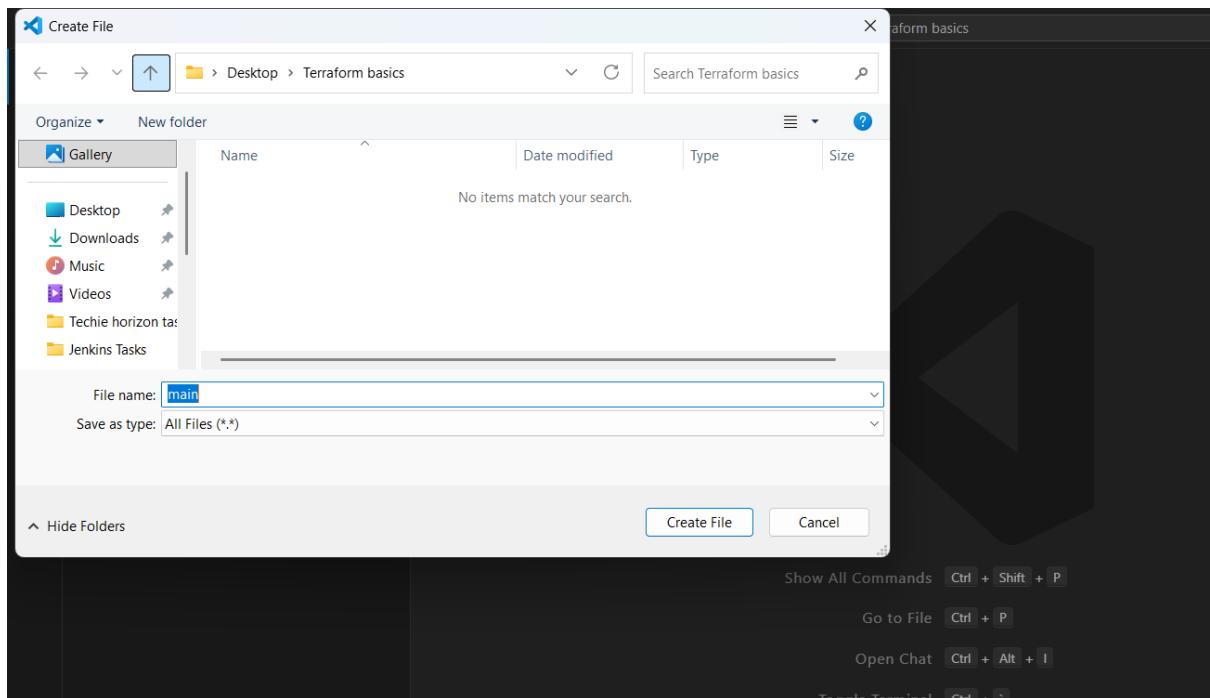


Search in vs studio as hashocrop terraform and install that plugin.



2. Execute all the templates shown in video.

Click on add new file and name it as main.tf and save it in the terraformbasics folder.



Give this code.

```
resource "local_file" "my_pet" {  
    filename = "pets.txt"  
    content = "i love pets!"  
}
```

A screenshot of the Visual Studio Code interface. The left sidebar shows the 'EXPLORER' view with a file icon and the path 'TERRAFORM BASICS'. Below it is a search bar with the text 'Terraform basics'. The main editor area displays the 'main.tf' file:

```
main.tf
1 resource "local_file" "my_pet" {
2   filename = "pets.txt"
3   content = "i love pets!"
4 }
```

To execute this code click on terminal and select new terminal.

A screenshot of the Visual Studio Code interface. A red arrow points to the 'TERMINAL' tab in the bottom navigation bar. The main editor area shows the same 'main.tf' file as before:

```
main.tf
1 resource "local_file" "my_pet" {
2   filename = "pets.txt"
3   content = "i love pets!"
4 }
```

A screenshot of the Visual Studio Code interface. The 'TERMINAL' tab is active, showing the command 'ls' being run in the directory 'C:\Users\Ashish\Desktop\Terraform basics'. The output shows a single file named 'main.tf'.

```
PS C:\Users\Ashish\Desktop\Terraform basics> ls
Directory: C:\Users\Ashish\Desktop\Terraform basics

Mode                LastWriteTime         Length Name
----                <-----           <-----  --
-a---  10-11-2025 15:53                 0  main.tf
```

- **terraform init**

A screenshot of the Visual Studio Code interface. The left sidebar shows the file structure with '.terraform' and 'main.tf'. The main area is a terminal window titled 'powershell'. It displays the command 'terraform init' being run, followed by the provider plugin initialization process. A message at the bottom states 'Terraform has been successfully initialized!'.

```
PS C:\Users\Ashish\Desktop\Terraform basics> terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/local...
- Installing hashicorp/local v2.5.3...
- Installed hashicorp/local v2.5.3 (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\Ashish\Desktop\Terraform basics>
```

- **terraform plan**

A screenshot of the Visual Studio Code interface, similar to the previous one but with a different terminal content. It shows the command 'terraform plan' being run. The output indicates that one resource ('my_pet') will be created, listing its various attributes and their values. A summary at the bottom says 'Plan: 1 to add, 0 to change, 0 to destroy.'

```
PS C:\Users\Ashish\Desktop\Terraform basics> 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:

# local_file.my_pet will be created
+ resource "local_file" "my_pet" {
    + content          = "i love pets!"
    + content_base64sha256 = (known after apply)
    + content_base64sha512 = (known after apply)
    + content_md5      = (known after apply)
    + content_sha1     = (known after apply)
    + content_sha256   = (known after apply)
    + content_sha512   = (known after apply)
    + directory_permission = "0777"
    + file_permission   = "0777"
    + filename          = "pets.txt"
    + id                = (known after apply)
}

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

- **terraform apply**

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

# local_file.my_pet will be created
+ resource "local_file" "my_pet" {
    + content          = "i love pets!"
    + content_base64sha256 = (known after apply)
    + content_base64sha512 = (known after apply)
    + content_md5       = (known after apply)
    + content_sha1       = (known after apply)
    + content_sha256      = (known after apply)
    + content_sha512      = (known after apply)
    + directory_permission = "0777"
    + file_permission     = "0777"
    + filename            = "pets.txt"
    + id                  = (known after apply)
}

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

local_file.my_pet: Creating...
local_file.my_pet: Creation complete after 0s [id=6915bac2a8e7b1dc89d1a8fb4a51409cb4bcb4ac]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
PS C:\Users\Ashish\Desktop\Terraform basics>
```

If I change the content love to hate.

```
main.tf
main.tf > resource "local_file" "my_pet" > content
1   resource "local_file" "my_pet" {
2     filename = "pets.txt"
3     content = "i hate pets!"
4 }
```

- terraform plan

```

PS C:\Users\Ashish\Desktop\Terraform basics> terraform plan
local_file.my_pet: Refreshing state... [id=6915bac2a8e7b1dc89d1a8fb4a51409cb4bcb4ac]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
-/+ destroy and then create replacement

Terraform will perform the following actions:

# local_file.my_pet must be replaced
-/+ resource "local_file" "my_pet" {
    ~ content          = "i love pets!" -> "i hate pets!" # forces replacement
    ~ content_base64sha256 = "BCHQ9YJEtR065rP0q+VNZ8ZTRx0k+LTxcVH/Kzty=" -> (known after apply)
    ~ content_base64sha512 = "x//sAXw7xM56+SG5sqgCr2bl/EHMxWg/UxtZICohBk7dtcLtdpV7LFVxwl8o94NXWpbhrlzawC5+mxuOrbkZhW==" -> (known after apply)
    ~ content_md5      = "336f960d34073778ab954f8fcbb4bcb4ac" -> (known after apply)
    ~ content_sha1     = "6915bac2a8e7b1dc89d1a8fb4a51409cb4bcb4ac" -> (known after apply)
    ~ content_sha256   = "0421d02bd60912d6d13bae6b3ceabe54d5d9f194d1c682be2d3c5c547fcaced6" -> (known after apply)
    ~ content_sha512   = "c7ffec017c3bc4ce7af921b9b2a802af66cbfc41cc5d61bf5314d9202a21064eddb5c2ed76957b2c5571c25f28f783575a96e1ae5cdac0
" -> (known after apply)
    ~ id               = "6915bac2a8e7b1dc89d1a8fb4a51409cb4bcb4ac" -> (known after apply)
    # (3 unchanged attributes hidden)
}

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

```

● terraform apply

```

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS
-/+ resource "local_file" "my_pet" {
    ~ content          = "i love pets!" -> "i hate pets!" # forces replacement
    ~ content_base64sha256 = "BCHQ9YJEtR065rP0q+VNZ8ZTRx0k+LTxcVH/Kzty=" -> (known after apply)
    ~ content_base64sha512 = "x//sAXw7xM56+SG5sqgCr2bl/EHMxWg/UxtZICohBk7dtcLtdpV7LFVxwl8o94NXWpbhrlzawC5+mxuOrbkZhW==" -> (known after apply)
    ~ content_md5      = "336f960d34073778ab954f8fcbb4bcb4ac" -> (known after apply)
    ~ content_sha1     = "6915bac2a8e7b1dc89d1a8fb4a51409cb4bcb4ac" -> (known after apply)
    ~ content_sha256   = "0421d02bd60912d6d13bae6b3ceabe54d5d9f194d1c682be2d3c5c547fcaced6" -> (known after apply)
    ~ content_sha512   = "c7ffec017c3bc4ce7af921b9b2a802af66cbfc41cc5d61bf5314d9202a21064eddb5c2ed76957b2c5571c25f2
" -> (known after apply)
    ~ id               = "6915bac2a8e7b1dc89d1a8fb4a51409cb4bcb4ac" -> (known after apply)
    # (3 unchanged attributes hidden)
}

Plan: 1 to add, 0 to change, 1 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

local_file.my_pet: Destroying... [id=6915bac2a8e7b1dc89d1a8fb4a51409cb4bcb4ac]
local_file.my_pet: Destruction complete after 0s
local_file.my_pet: Creating...
local_file.my_pet: Creation complete after 0s [id=148b9b1012deaf7e6c345dd6c814fb2dec687bb8]

Apply complete! Resources: 1 added, 0 changed, 1 destroyed.
PS C:\Users\Ashish\Desktop\Terraform basics>

```

● terraform destroy

it will delete the pets.txt file.

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```

- resource "local_file" "my_pet" {
    - content           = "i hate pets!" -> null
    - content_base64sha256 = "tewxqf790WnwXye1hgPXPtEUc0lhz15U9ICPR2LZDbc=" -> null
    - content_base64sha512 = "8fy+ONqvkh7JxsDgsX4B6nS41Vbxr57SMKI9Lbh/giQLVa56XNttoA3SKvy/+x5rI1rn4EbvWlyUG1Im
    - content_md5        = "d1dbf3d232df4eb76903009ebcc80ebe" -> null
    - content_sha1       = "148b9b1012deaf7e6c345dd6c814fb2dec687bb8" -> null
    - content_sha256     = "b5ec31a9febdd169f05f27b58603d7a44502d02961675e54f4808f4762d90db7" -> null
    - content_sha512     = "f1fcbe38daaf907ec95ec0e0b17e01ea74b89556d7af9ed2300288f4b6e1fe08902d56b9e9736db68
  " -> null
    - directory_permission = "0777" -> null
    - file_permission      = "0777" -> null
    - filename             = "pets.txt" -> null
    - id                   = "148b9b1012deaf7e6c345dd6c814fb2dec687bb8" -> 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

local_file.my_pet: Destroying... [id=148b9b1012deaf7e6c345dd6c814fb2dec687bb8]
local_file.my_pet: Destruction complete after 0s

Destroy complete! Resources: 1 destroyed.
PS C:\Users\Ashish\Desktop\Terraform basics>

```

Add random.pet file to the code

main.tf

```

main.tf > ↗ resource "random_pet" "my_pet" > ↗ length
1   resource "local_file" "my_pet" {
2     filename = "pets.txt"
3     content = "i hate pets!"
4   }
5   resource "random_pet" "my_pet" {
6     prefix = "MR"
7     separator = "."
8     length = "1"
9   }

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\Ashish\Desktop\Terraform basics> **terraform apply**

Error: Inconsistent dependency lock file

The following dependency selections recorded in the lock file are inconsistent with the current configuration:
- provider registry.terraform.io/hashicorp/random: required by this configuration but no version was specified

To update the locked dependency selections to match a changed configuration, run:
terraform init -upgrade

PS C:\Users\Ashish\Desktop\Terraform basics>

This time error found then we need to do terraform init and terraform add.

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

+ resource "local_file" "my_pet" {
+   content          = "i hate pets!"
+   content_base64sha256 = (known after apply)
+   content_base64sha512 = (known after apply)
+   content_md5      = (known after apply)
+   content_sha1     = (known after apply)
+   content_sha256   = (known after apply)
+   content_sha512   = (known after apply)
+   directory_permission = "0777"
+   file_permission   = "0777"
+   filename         = "pets.txt"
+   id               = (known after apply)
}

# random_pet.my_pet will be created
+ resource "random_pet" "my_pet" {
+   id      = (known after apply)
+   length  = 1
+   prefix  = "MR"
+   separator = "."
}

Plan: 2 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

PS C:\Users\Ashish\Desktop\Terraform basics> █

```
+ file_permission      = "0777"
+ filename            = "pets.txt"
+ id                  = (known after apply)
}

# random_pet.my_pet will be created
+ resource "random_pet" "my_pet" {
    + id      = (known after apply)
    + length = 1
    + prefix = "MR"
    + separator = "."
}

Plan: 2 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

random_pet.my_pet: Creating...
random_pet.my_pet: Creation complete after 0s [id=MR.bobcat]
local_file.my_pet: Creating...
local_file.my_pet: Creation complete after 0s [id=148b9b1012deaf7e6c345dd6c814fb2dec687bb8]

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.
PS C:\Users\Ashish\Desktop\Terraform basics> 
```

3. Note down below points Terraform Init ,Terraform Plan, Terraform Apply, Terraform Provider.

Terraform init:

The command **terraform init** is used to **initialize** a Terraform working directory before you can use Terraform commands like plan, apply, or destroy.

- It prepares your folder (with .tf files) so Terraform knows how to run there.

Terraform plan:

The command **terraform plan** is used to **preview** what Terraform will do before actually making any changes to your infrastructure.

- Which **resources will be created**
- Which **will be modified**
- Which **will be destroyed**
- Any **errors or conflicts** before applying

Terraform apply:

The command **terraform apply** is used to **create or modify real infrastructure** as defined in your Terraform configuration files (.tf).

- **Builds** new infrastructure
- **Updates** existing infrastructure
- **Destroys** resources that are no longer in your config
- Saves the new **state** to your backend.

Terraform provider:

The **terraform provider** concept refers to the **plugins** that Terraform uses to interact with different **clouds, services, and APIs** — such as AWS, Azure, Google Cloud, Kubernetes, GitHub, etc.

How terraform uses providers:

1. You define a provider in your .tf files.
2. `terraform init` downloads the necessary provider binaries into `.terraform/providers/`.

3. terraform plan and terraform apply use that provider to communicate with the cloud API.

4. Integrate a sample Terraform template in Jenkins.

Create a repository in github and add necessary documents into that like jenkinsfile,main.tf.

<https://github.com/mujaheed00/jenkinsdemo.git>

The screenshot shows a GitHub repository page for 'jenkinsdemo'. The repository is public and was forked from 'Devendra-419/jenkinsdemo'. The main branch is 'main'. A recent commit by 'Devendra-419' changed the AWS region and VPC name in the Terraform config. The repository has 20 commits in total. The 'About' section includes a 'Readme' link. The 'Releases' section indicates no releases have been published. The 'Packages' section also indicates no packages have been published.

Git clone in Jenkins server

```
[root@ip-172-31-100-181 ~]# git clone https://github.com/mujaheed00/terraform-basics.git
Cloning into 'terraform-basics'...
remote: Enumerating objects: 40, done.
remote: Counting objects: 100% (40/40), done.
remote: Compressing objects: 100% (31/31), done.
remote: Total 40 (delta 12), reused 29 (delta 6), pack-reused 0 (from 0)
Receiving objects: 100% (40/40), 6.08 KiB | 6.08 MiB/s, done.
Resolving deltas: 100% (12/12), done.
[root@ip-172-31-100-181 ~]# ls
terraform-basics
[root@ip-172-31-100-181 ~]# cd terraform-basics/
[root@ip-172-31-100-181 terraform-basics]# ls
Jenkinsfile README.md deployment scripts
[root@ip-172-31-100-181 terraform-basics]# |
```

Create an IAM role

The screenshot shows the 'Create role' wizard in the AWS IAM console. The current step is 'Step 1: Select trusted entity'. The 'Trusted entity type' section contains four options: 'AWS service' (selected), 'AWS account', 'Web identity', and 'SAML 2.0 federation'. Below this, the 'Use case' section shows 'EC2' selected in a dropdown. A note says 'Choose a use case for the specified service.'

Select administrator access and save.

The screenshot shows the 'Create role' wizard in the AWS IAM console. The current step is 'Step 2: Add permissions'. The 'Permissions policies' section lists 'AdministratorAccess' as the selected policy. Other policies shown include 'AdministratorAccess-Amplify', 'AdministratorAccess-AWSElasticBeanstalk', 'AIOpsAssistantIncidentReportPolicy', 'AIOpsAssistantPolicy', and 'AIOpsConsoleAdminPolicy'. The 'AdministratorAccess' policy is highlighted with a checkmark.

Give name as jenkinsadmin and click on create role.

Name, review, and create

Role details

Role name
Enter a meaningful name to identify this role.
jenkinsadmin

Maximum 64 characters. Use alphanumeric and '+,-,@,_-' characters.

Description
Add a short explanation for this role.
Allows EC2 instances to call AWS services on your behalf.

Maximum 1000 characters. Use letters (A-Z and a-z), numbers (0-9), tabs, new lines, or any of the following characters: '_+=.,@-/[\{\}]#\\$%^*;~`^`'

Step 1: Select trusted entities

Trust policy

```

1 "Version": "2012-10-17",
2 "Statement": [
3

```

Identity and Access Management (IAM)

Roles (1/8) Info

An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.

Role name	Trusted entities	Last activity
HelloLambda-role-0zvonybz	AWS Service: lambda	-
HelloLambda-role-jp13jz4c	AWS Service: lambda	13 days ago
jenkinsadmin	AWS Service: ec2	-

Roles Anywhere

Authenticate your non AWS workloads and securely provide access to AWS services.

Go to your Jenkins ec2 instance and click on actions, click on security,click on modify IAM role.

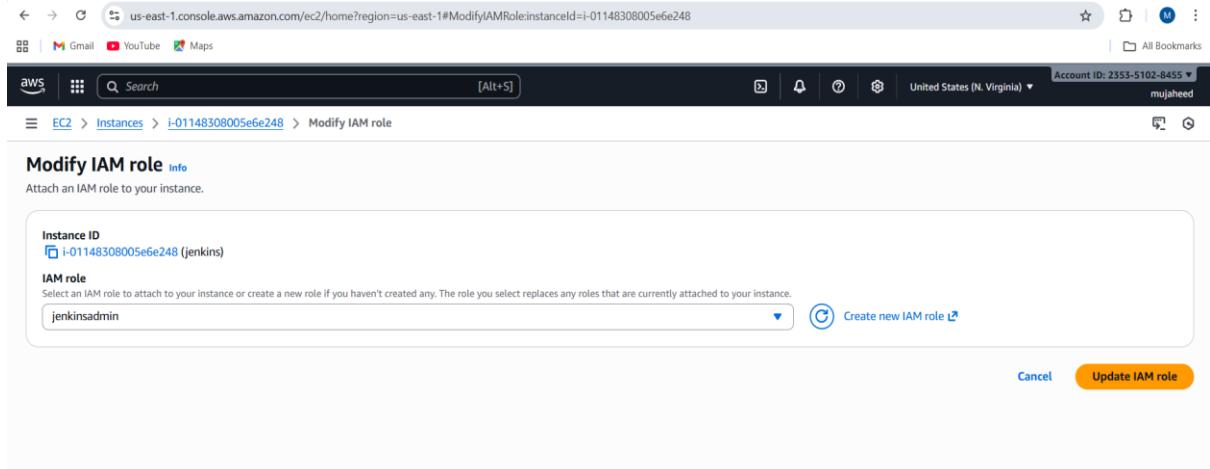
Instances (1/1) Info

Actions

- Instance diagnostics
- Instance settings
- Networking
- Security**
- Image and templates
- Storage
- Monitor and troubleshoot

Modify IAM role

Select your created IAM role.



```
main.tf variable:
[root@ip-172-31-77-84 deployment]# cat main.tf
provider "aws" {
  region = "us-east-1"
}

data "aws_vpc" "selected" {
  filter {
    name   = "tag:Name"
    values = ["default"]
  }
}

data "aws_subnets" "selected" {
  filter {
    name   = "vpc-id"
    values = [data.aws_vpc.selected.id]
  }
}

data "aws_ami" "amazon_linux_2" {
  most_recent = true
  filter {
    name   = "name"
    values = ["amzn2-ami-hvm-*-x86_64-gp2"]
  }

  filter {
    name   = "virtualization-type"
    values = ["hvm"]
  }
}
```

Create a item with name `terraform-pipeline` and select pipeline as type.

← → ⌛ Not secure 98.92.0.72:8080/newJob

Gmail YouTube Maps

 Jenkins / New Item

New Item

Enter an item name

Select an item type

-  Freestyle project
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
-  Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.
-  Multi-configuration project
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.
-  Folder
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

OK

Select as pipeline script from SCM and select git option enter your repo url and branch as main.

← → ⌛ Not secure 98.92.0.72:8080/job/Terraform-pipeline/configure

Gmail YouTube Maps

 Jenkins / Terraform-pipeline / Configuration

Configure

Definition

Pipeline script from SCM

SCM

Git

Repositories

Repository URL

https://github.com/mujaheed00/jenkinsdemo.git

Credentials

- none -

+ Add

Advanced

The screenshot shows the Jenkins Pipeline configuration page for a job named 'Terraform-pipeline'. The left sidebar has tabs for General, Triggers, Pipeline (which is selected), and Advanced. The main area shows 'Branches to build' with a 'Branch Specifier' set to '*/*main'. There's also a 'Repository browser' set to '(Auto)'. A 'Script Paths' section is at the bottom with 'Save' and 'Apply' buttons.

To to your cloned repository and edit sudoers file

- vi /etc/sudoers

```
root@ip-172-31-100-181 terraform-basics]# vi /etc/sudoers
root@ip-172-31-100-181 terraform-basics]#
```

Type this line.

```

#
# Adding HOME to env_keep may enable a user to run unrestricted
# commands via sudo.
#
# Defaults    env_keep += "HOME"

Defaults    secure_path = /usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/var/

## Next comes the main part: which users can run what software on
## which machines (the sudoers file can be shared between multiple
## systems).
## Syntax:
##
##     user      MACHINE=COMMANDS
##
## The COMMANDS section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)        ALL
jenkins ALL=(ALL) NOPASSWD:ALL ←
## Allows members of the 'sys' group to run networking, software,
## service management apps and more.
# %sys ALL = NETWORKING, SOFTWARE, SERVICES, STORAGE, DELEGATING, PROCESSES, LOCATE, DRIVERS
## Allows people in group wheel to run all commands
%wheel  ALL=(ALL)        ALL

## Same thing without a password
# %wheel      ALL=(ALL)        NOPASSWD: ALL

## Allows members of the users group to mount and umount the
## cdrom as root
# %users    ALL=/sbin/mount /mnt/cdrom, /sbin/umount /mnt/cdrom
## Allows members of the users group to shutdown this system
# %users    localhost=/sbin/shutdown -h now

## Read drop-in files from /etc/sudoers.d (the # here does not mean a comment)
#includedir /etc/sudoers.d
-- INSERT -- W10: Warning: Changing a readonly file

```

Go to job click on build now

Declarative: Checkout SCM	Checkout Code	Install Terraform	Terraform Deployment
251ms	242ms	1s	30s
Nov 12 12:54 No Changes			
Nov 12 12:51 No Changes			

Permalinks

- Last build (#2), 1 min 52 sec ago
- Last stable build (#2), 1 min 52 sec ago
- Last successful build (#2), 1 min 52 sec ago

It will automatically create an instance with the name terraform.

The screenshot shows the AWS EC2 Instances page with the following details:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4
jenkins	i-050a0b8cdee076c0f	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1a	ec2-3-85-72
jenkins	i-01d2798f58baaa6727	Terminated	t3.micro	-	View alarms +	us-east-1a	-
Terraform	i-09ee202498de60e42	Running	t3.micro	3/3 checks passed	View alarms +	us-east-1a	ec2-54-227

2 instances selected

Monitoring