

Terraform AWS Sample: IAM

By Ronald Stewart Lim

Terraform AWS pre-requisites:

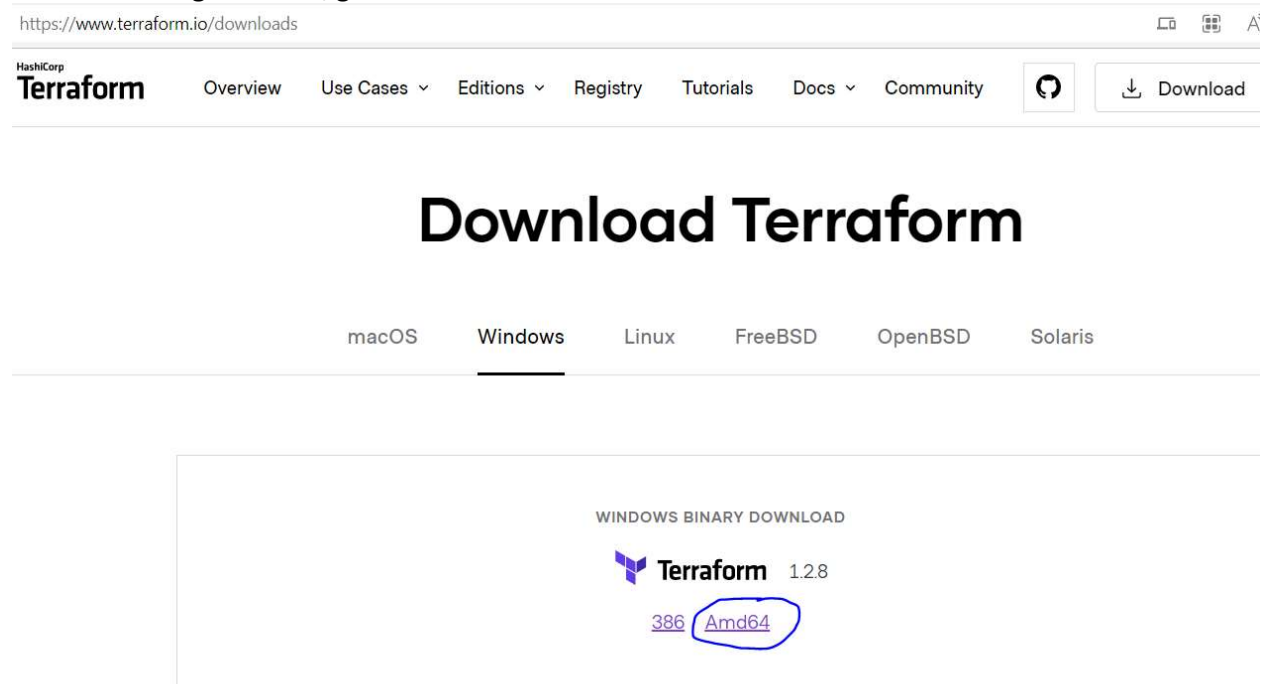
- Install Terraform and define in Windows environment path if it is in Windows OS
- Install AWS CLI
- Generate Access Key

Pre-requisite: Install Terraform (no admin rights)

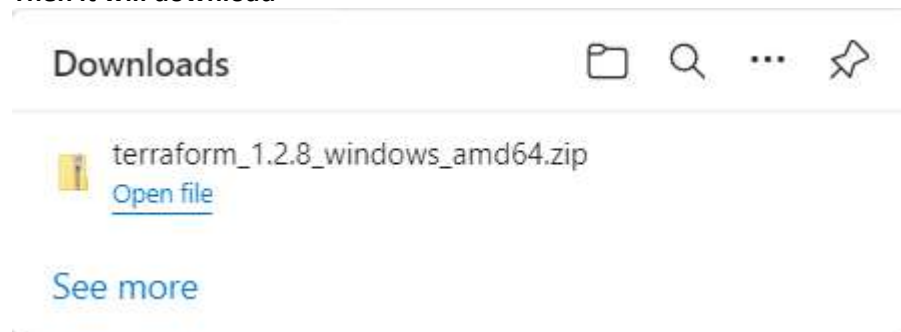
Download terraform exe file in terraform site:

<https://www.terraform.io/downloads>

Since I am using windows, go to windows tab and click Amd64



Then it will download



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Then extract file you can see terraform executable file

> This PC > DATA (D:) > edge downloads > terraform_1.2.8_windows_amd64

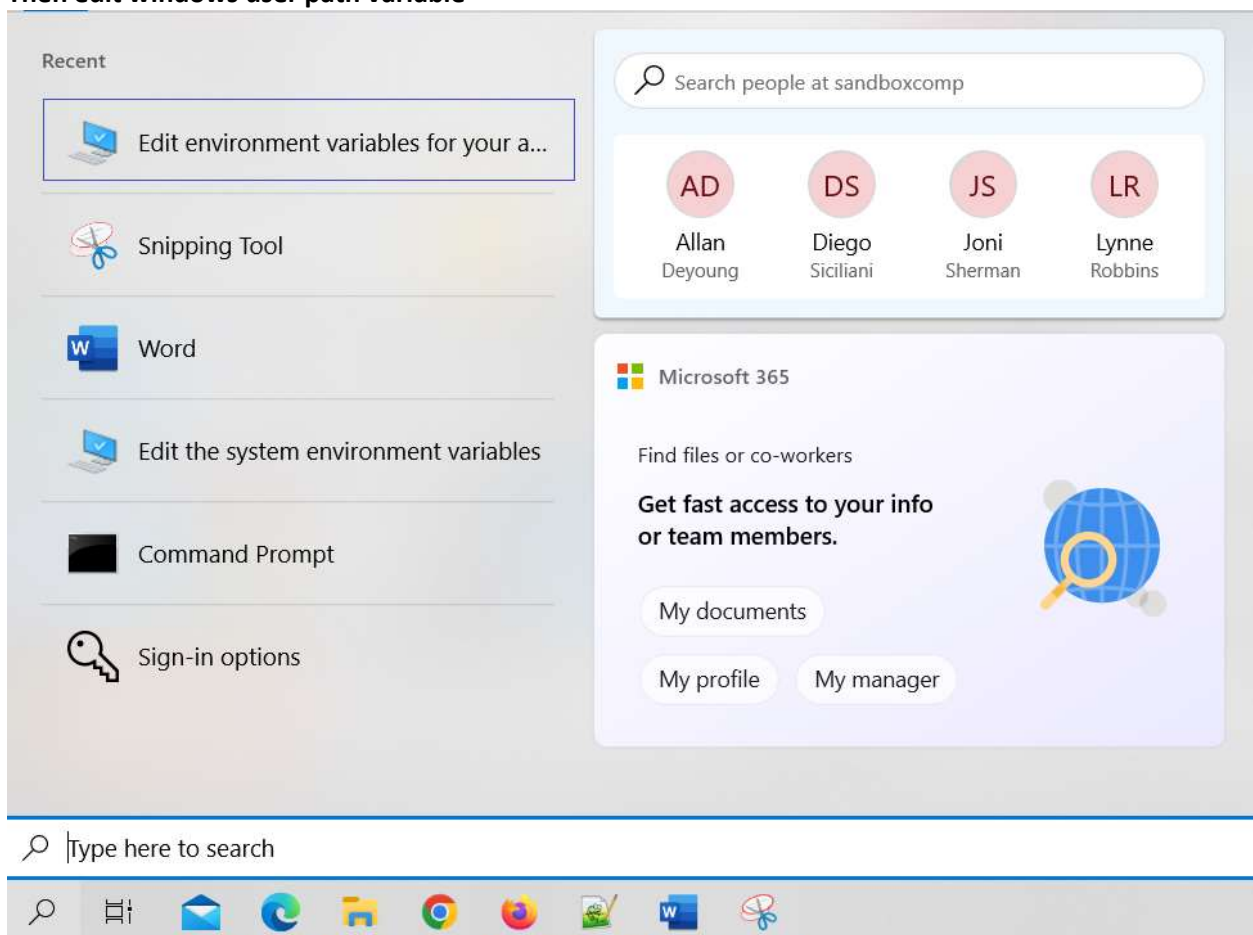
Name	Date modified	Type	Size
terraform	30/08/2022 4:05 am	Application	62,195 KB

Then create a directory and copy the file

> This PC > DATA (D:) > Terraform > bin

Name	Date modified	Type	Size
terraform	30/08/2022 4:05 am	Application	62,195 KB

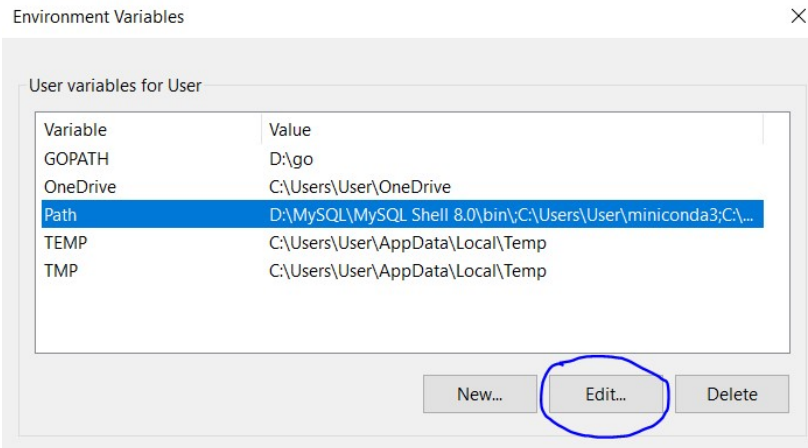
Then edit windows user path variable



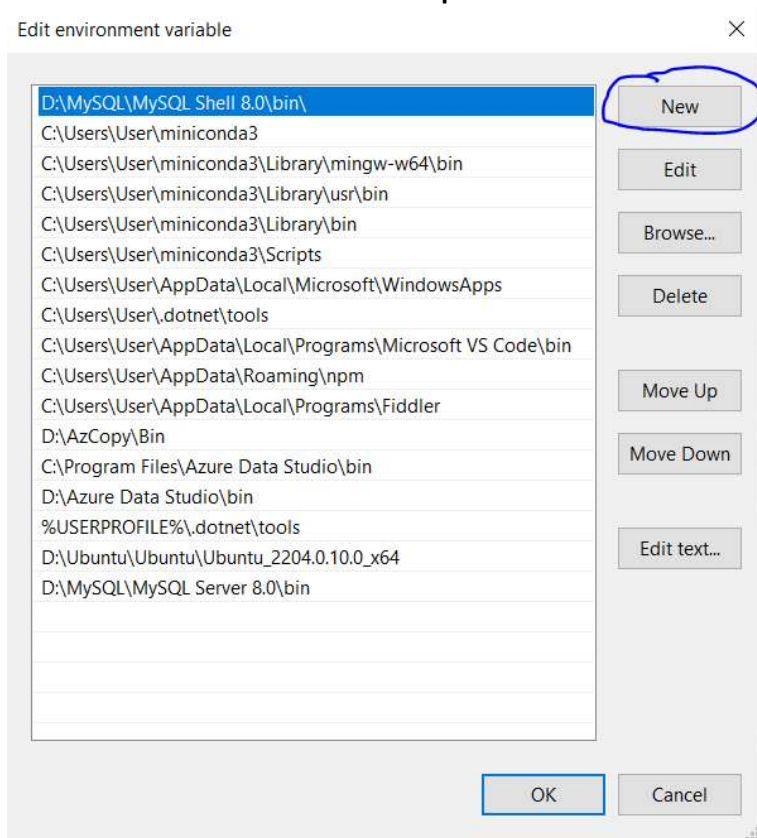
Go to Path variable and click Edit... button

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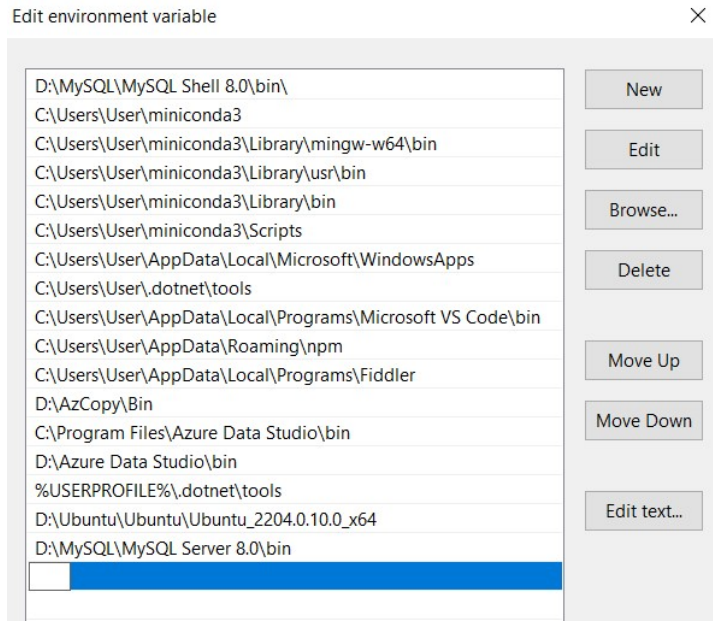


Click New button to Add Terraform path

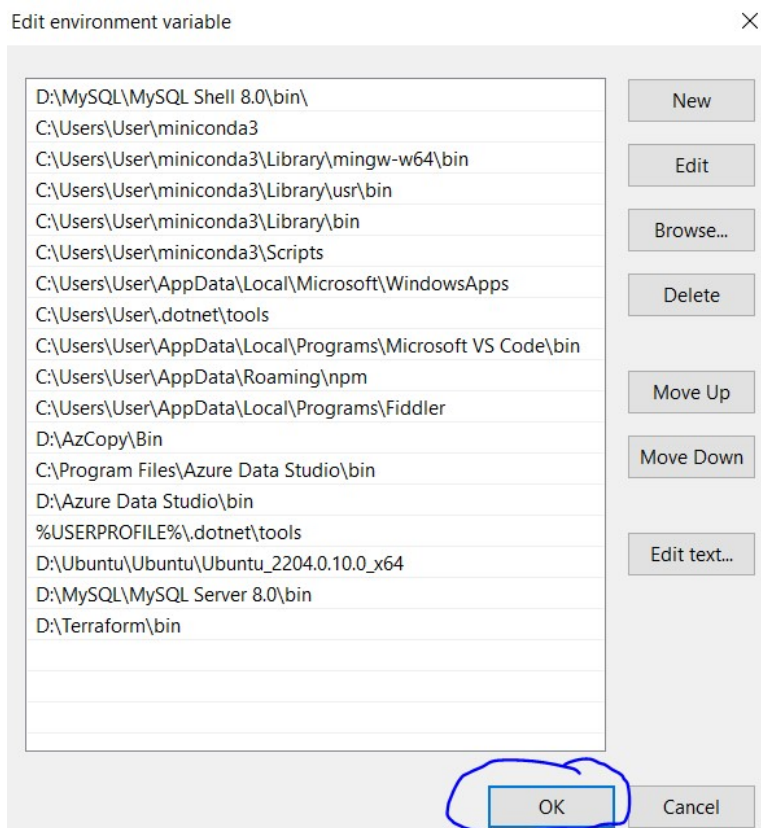


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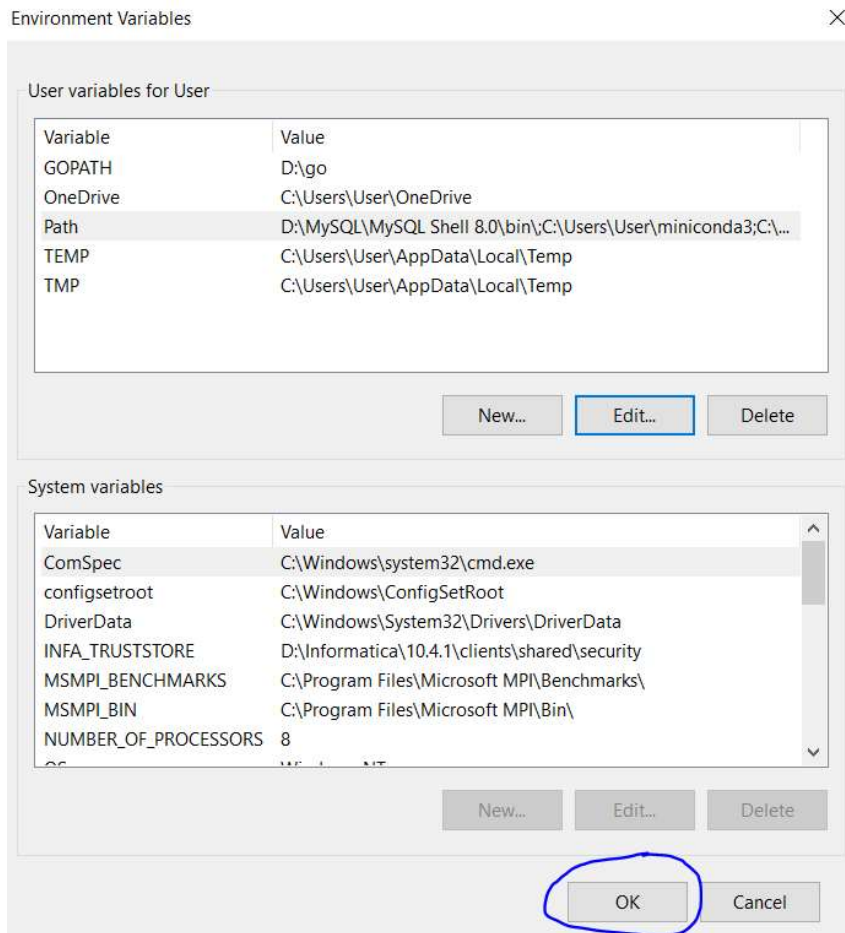
Click OK Button after specifying the path



Click OK Button again

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Open cmd and try to check if terraform is already accessible in any directory by typing:
terraform --version

```
Microsoft Windows [Version 10.0.19043.1889]
(c) Microsoft Corporation. All rights reserved.

C:\Users\User>terraform --version
Terraform v1.2.8
on windows_amd64

C:\Users\User>
```

Pre-requisite: Install AWS CLI

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Now that Terraform environment is ready, please install aws cli and follow instructions by using the link below:

<https://docs.aws.amazon.com/cli/latest/userguide/getting-started-install.html>

▼ Windows

Installation requirements

- We support the AWS CLI on Microsoft-supported versions of 64-bit Windows.
- Admin rights to install software

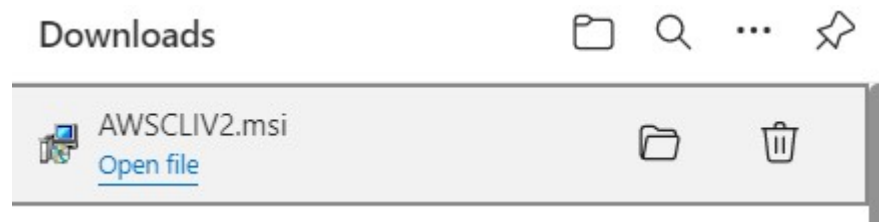
Install or update the AWS CLI

To update your current installation of AWS CLI on Windows, download a new installer each time you update to overwrite previous versions. AWS CLI is updated regularly. To see when the latest version was released, see the [AWS CLI changelog](#) on *GitHub*.

1. Download and run the AWS CLI MSI installer for Windows (64-bit):

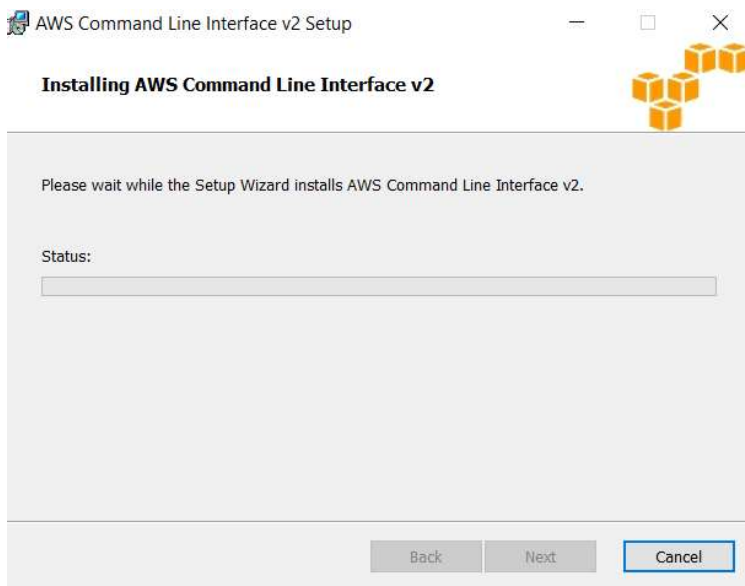
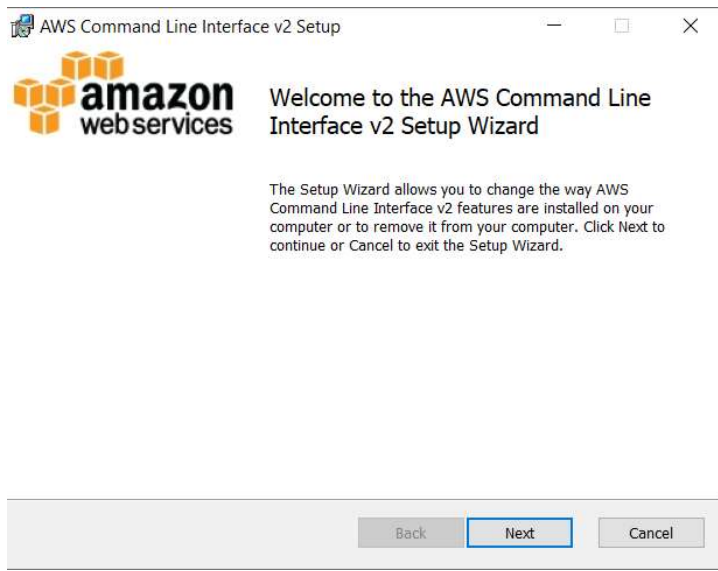
<https://awscli.amazonaws.com/AWSCLIV2.msi>

Alternatively, you can run the `msiexec` command to run the MSI installer.



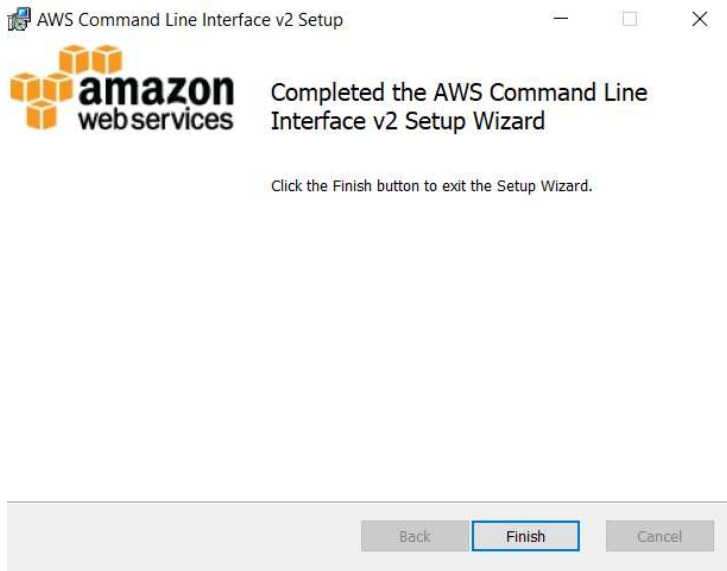
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```
Microsoft Windows [Version 10.0.19043.1889]
(c) Microsoft Corporation. All rights reserved.

C:\Users\User>aws --version
aws-cli/2.7.27 Python/3.9.11 Windows/10 exe/AMD64 prompt/off

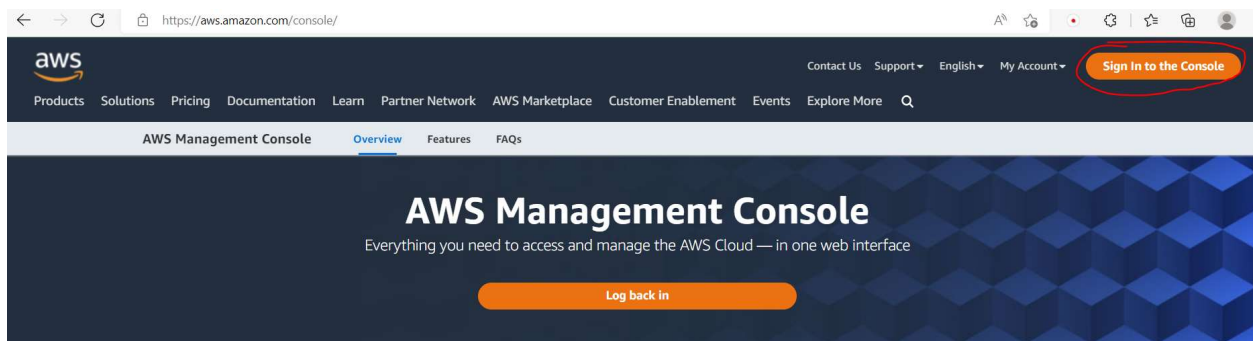
C:\Users\User>
```

Pre-requisite: Generate Access Key

Now both Terraform and AWS CLI environment are ready. We will prepare the AWS accesses required for executing Terraform scripts

Sign in to AWS Console as root user

Link: <https://aws.amazon.com/console/>



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Sign in

☒ **Root user**

Account owner that performs tasks requiring unrestricted access. [Learn more](#)

☐ **IAM user**

User within an account that performs daily tasks. [Learn more](#)

Root user email address

ron_s_lim@yahoo.com

Next

By continuing, you agree to the [AWS Customer Agreement](#) or other agreement for AWS services, and the [Privacy Notice](#). This site uses essential cookies. See our [Cookie Notice](#) for more information.

————— New to AWS? —————

Create a new AWS account



Root user sign in ⓘ

Email: ron_s_lim@yahoo.com

Password

[Forgot password?](#)

.....|

Sign in

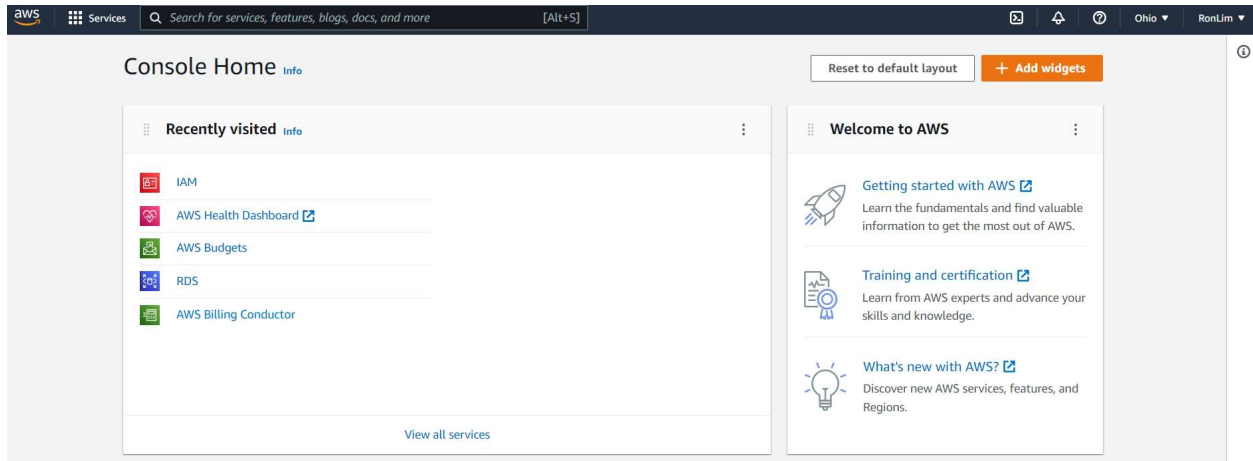
[Sign in to a different account](#)

[Create a new AWS account](#)

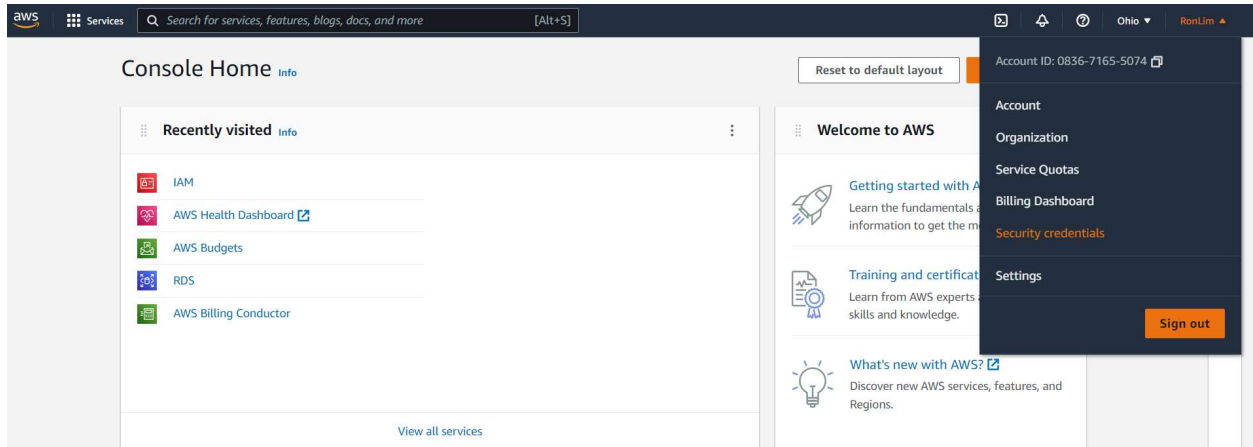
After signing in, you will go to your console home

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Click username or dropdown button to access Security credentials



Expand Access keys and click Create New Access Key button

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Your Security Credentials

Use this page to manage the credentials for your AWS account. To manage credentials for AWS Identity and Access Management (IAM) users, use the [IAM Console](#).

To learn more about the types of AWS credentials and how they're used, see [AWS Security Credentials](#) in AWS General Reference.

▲ Password

▲ Multi-factor authentication (MFA)

▼ Access keys (access key ID and secret access key)

Use access keys to make programmatic calls to AWS from the AWS CLI, Tools for PowerShell, AWS SDKs, or direct AWS API calls. You can have a maximum of two access keys (active or inactive) at a time.

For your protection, you should never share your secret keys with anyone. As a best practice, we recommend frequent key rotation.

If you lose or forget your secret key, you cannot retrieve it. Instead, create a new access key and make the old key inactive. [Learn more](#)

Created	Access Key ID	Last Used	Last Used Region	Last Used Service	Status	Actions
<div>Create New Access Key</div>						

Root user access keys provide unrestricted access to your entire AWS account. If you need long-term access keys, we recommend creating a new IAM user with limited permissions and generating access keys for that user instead. [Learn more](#)

▲ CloudFront key pairs

▲ X.509 certificate

▲ Account identifiers

After that, Access Key was created. You can either expand the Access Key or download the Key File by clicking Download Key File button.

Create Access Key

✔ Your access key (access key ID and secret access key) has been created successfully.

Download your key file now, which contains your new access key ID and secret access key. If you do not download the key file now, you will not be able to retrieve your secret access key again.

To help protect your security, store your secret access key securely and do not share it.

► Show Access Key

Download Key FileClose

Using Show Access Key (Secret Access Key was not shown in screenshot):

Create Access Key

✔ Your access key (access key ID and secret access key) has been created successfully.

Download your key file now, which contains your new access key ID and secret access key. If you do not download the key file now, you will not be able to retrieve your secret access key again.

To help protect your security, store your secret access key securely and do not share it.

▼ Hide Access Key

Access Key ID: AKIARG6ZYEKROT5746RW

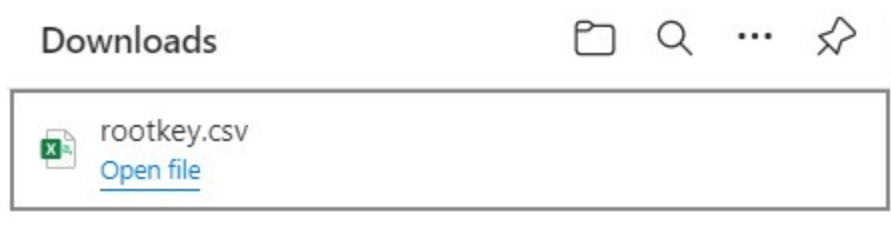
Secret Access Key:

Download Key FileClose

Or By Downloading csv Access Key File by clicking Download Key File button:

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Terraform Implementation

Now we are ready for implementing Terraform AWS. For the succeeding steps, we will setup the IAM Users and Group and associate the users to the group.

Open cmd and configure the region and AWS Access Keys using command below:
aws configure

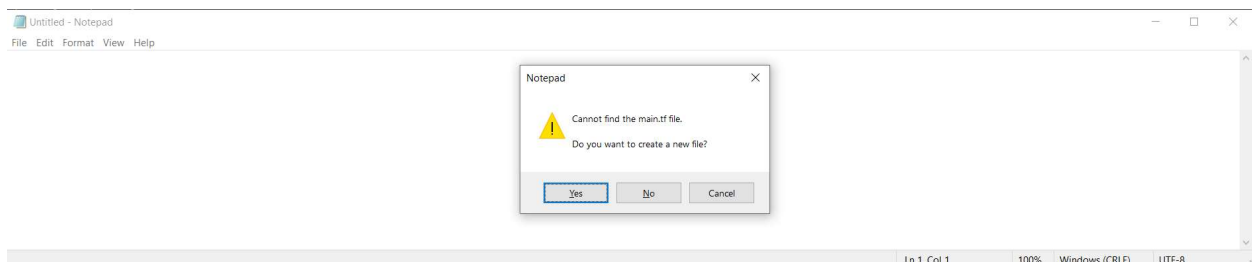
```
C:\Users\User>aws configure
AWS Access Key ID [*****UJVT]: AKIARG6ZYEKROT5746RW
AWS Secret Access Key [*****HhVv]: 
Default region name [us-east-1]:
Default output format [None]:

C:\Users\User>
```

Then go to the path where you will plan to execute Terraform and edit the main.tf. If file does not exists then create the file

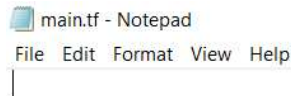
```
D:\Terraform\terraform_aws\IAM\Basics>notepad main.tf

D:\Terraform\terraform_aws\IAM\Basics>
```



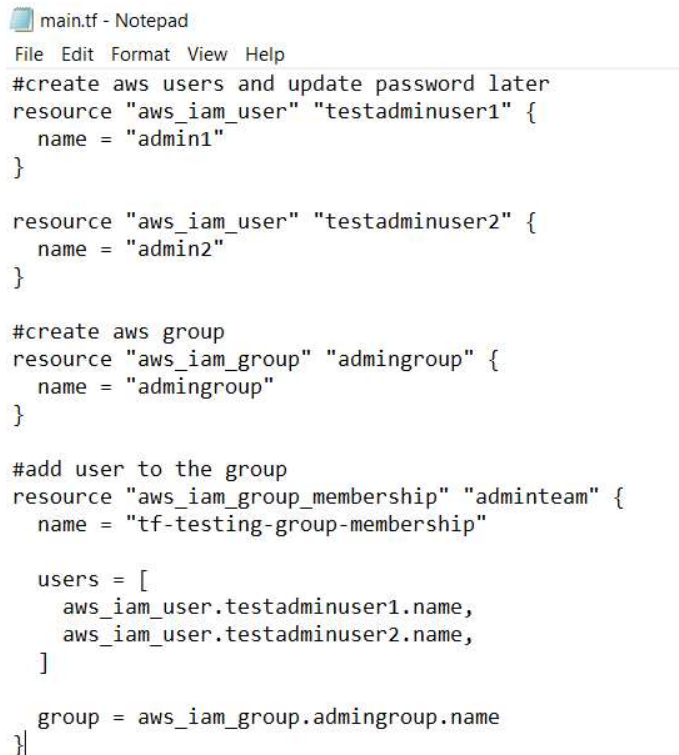
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Then edit main.tf with the Terraform-based language or code and save changes. The main.tf file contains the terraform code that will create 2 admin users and create admin group and associate the admin users to admin group.

Reference: <https://registry.terraform.io/providers/hashicorp/aws/latest/docs>



After that close the file and initialize the Terraform using command below:
terraform init

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```
D:\Terraform\terraform_aws\IAM\Basics>terraform init

Initializing the backend...

Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v4.28.0...
- Installed hashicorp/aws v4.28.0 (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.

D:\Terraform\terraform_aws\IAM\Basics>
```

(Optional) You can change the main.tf file into terraform-based format by command below:
terraform fmt

If no output means that the main.tf file is already in terraform format

```
D:\Terraform\terraform_aws\IAM\Basics>terraform fmt

D:\Terraform\terraform_aws\IAM\Basics>
```

If there is an output, the output mentions the file that was converted to terraform format

```
D:\Terraform\terraform_aws\IAM\Basics>terraform fmt
main.tf

D:\Terraform\terraform_aws\IAM\Basics>
```

To check and validate the terraform-based codes, execute the command below:
terraform validate

If the validation found no errors, then it will output the success message

```
D:\Terraform\terraform_aws\IAM\Basics>terraform validate
Success! The configuration is valid.

D:\Terraform\terraform_aws\IAM\Basics>
```


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(Optional) Check the Terraform execution plan by using the command below:

terraform plan

Sample output below:

```
D:\Terraform\terraform_aws\IAM\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:

# aws_iam_group.admingroup will be created
+ resource "aws_iam_group" "admingroup" {
+   arn      = (known after apply)
+   id       = (known after apply)
+   name     = "admingroup"
+   path     = "/"
+   unique_id = (known after apply)
}

# aws_iam_group_membership.adminteam will be created
+ resource "aws_iam_group_membership" "adminteam" {
+   group = "admingroup"
+   id    = (known after apply)
+   name  = "tf-testing-group-membership"
+   users = [
+     "admin1",
+     "admin2",
+   ]
}

# aws_iam_user.testadminuser1 will be created
+ resource "aws_iam_user" "testadminuser1" {
+   arn            = (known after apply)
+   force_destroy = false
+   id             = (known after apply)
+   name           = "admin1"
+   path           = "/"
+   tags_all       = (known after apply)
+   unique_id      = (known after apply)
}

# aws_iam_user.testadminuser2 will be created
+ resource "aws_iam_user" "testadminuser2" {
+   arn            = (known after apply)
+   force_destroy = false
+   id             = (known after apply)
+   name           = "admin2"
+   path           = "/"
+   tags_all       = (known after apply)
+   unique_id      = (known after apply)
}

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

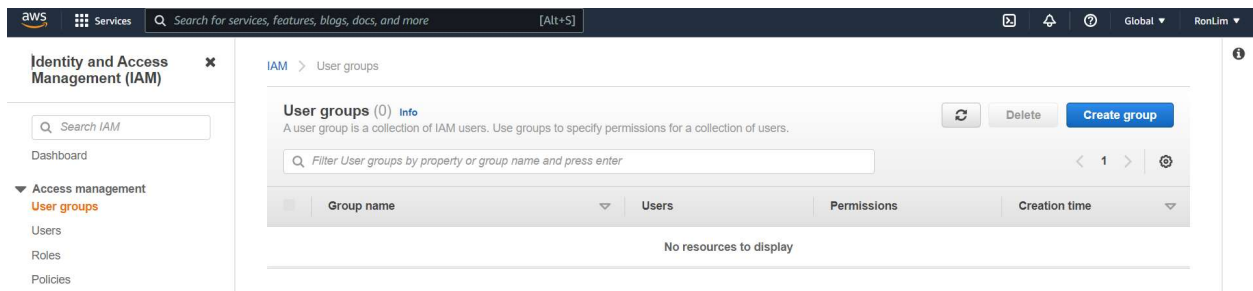
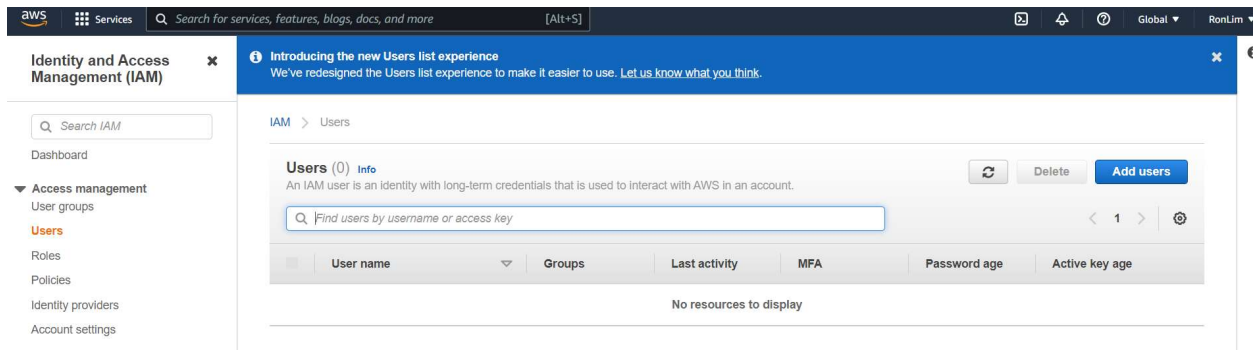
Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you run "terraform apply" now.

D:\Terraform\terraform_aws\IAM\Basics>
```

Before applying changes, check the before state of the IAM user and group by going to AWS -> IAM -> user and AWS -> IAM -> group. Notice that the users and group do not exist yet

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Execute the command below and confirm changes to create users and groups in AWS:
terraform apply

Note: terraform apply command already contains terraform plan so no need to execute terraform plan
terraform apply = terraform plan + confirmation to apply changes

sample output:

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```
D:\Terraform\terraform_aws\IAM\Basics>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_group.admingroup will be created
+ resource "aws_iam_group" "admingroup" {
  + arn      = (known after apply)
  + id       = (known after apply)
  + name     = "admingroup"
  + path     = "/"
  + unique_id = (known after apply)
}

# aws_iam_group_membership.adminteam will be created
+ resource "aws_iam_group_membership" "adminteam" {
  + group = "admingroup"
  + id    = (known after apply)
  + name  = "tf-testing-group-membership"
  + users = [
    + "admin1",
    + "admin2",
  ]
}

# aws_iam_user.testadminuser1 will be created
+ resource "aws_iam_user" "testadminuser1" {
  + arn            = (known after apply)
  + force_destroy = false
  + id             = (known after apply)
  + name          = "admin1"
  + path          = "/"
  + tags_all      = (known after apply)
  + unique_id     = (known after apply)
}
```

```
# aws_iam_user.testadminuser2 will be created
+ resource "aws_iam_user" "testadminuser2" {
  + arn            = (known after apply)
  + force_destroy = false
  + id             = (known after apply)
  + name          = "admin2"
  + path          = "/"
  + tags_all      = (known after apply)
  + unique_id     = (known after apply)
}
```

Plan: 4 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_iam_user.testadminuser2: Creating...
aws_iam_group.admingroup: Creating...
aws_iam_user.testadminuser1: Creating...
aws_iam_user.testadminuser1: Creation complete after 1s [id=admin1]
aws_iam_group.admingroup: Creation complete after 1s [id=admingroup]
aws_iam_user.testadminuser2: Creation complete after 1s [id=admin2]
aws_iam_group_membership.adminteam: Creating...
aws_iam_group_membership.adminteam: Creation complete after 1s [id=tf-testing-group-membership]
```

Apply complete! Resources: 4 added, 0 changed, 0 destroyed.

```
D:\Terraform\terraform_aws\IAM\Basics>
```

After applying changes, refresh the page and check again the state of the IAM user by going to AWS -> IAM -> user and AWS -> IAM -> group. Notice that the users and group now exist

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IAM > Users

Users (2) [Info](#)

An IAM user is an identity with long-term credentials that is used to interact with AWS in an account.

< 1 > ⚙

<input type="checkbox"/>	User name	Groups	Last activity	MFA	Password age	Active key age
<input type="checkbox"/>	admin1	admingroup	Never	None	None	-
<input type="checkbox"/>	admin2	admingroup	Never	None	None	-

IAM > User groups

User groups (1) [Info](#)

A user group is a collection of IAM users. Use groups to specify permissions for a collection of users.

< 1 > ⚙

<input type="checkbox"/>	Group name	Users	Permissions	Creation time
<input type="checkbox"/>	admingroup	2	⚠ Not defined	5 minutes ago

Then let us try to destroy what we created for learning purposes using command below and confirm:
terraform destroy

sample output:

```
D:\Terraform\terraform_aws\IAM\Basics>terraform destroy
aws_iam_user.testadminuser1: Refreshing state... [id=admin1]
aws_iam_user.testadminuser2: Refreshing state... [id=admin2]
aws_iam_group.admingroup: Refreshing state... [id=admingroup]
aws_iam_group_membership.adminteam: Refreshing state... [id=tf-testing-group-membership]

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_group.admingroup will be destroyed
- resource "aws_iam_group" "admingroup" {
  - arn      = "arn:aws:iam::083671655074:group/admingroup" -> null
  - id      = "admingroup" -> null
  - name    = "admingroup" -> null
  - path    = "/" -> null
  - unique_id = "AGPARG6ZYEKRE72B46VR0" -> null
}

# aws_iam_group_membership.adminteam will be destroyed
- resource "aws_iam_group_membership" "adminteam" {
  - group = "admingroup" -> null
  - id    = "tf-testing-group-membership" -> null
  - name  = "tf-testing-group-membership" -> null
  - users = [
    - "admin1",
    - "admin2",
  ] -> null
}

# aws_iam_user.testadminuser1 will be destroyed
- resource "aws_iam_user" "testadminuser1" {
  - arn          = "arn:aws:iam::083671655074:user/admin1" -> null
  - force_destroy = false -> null
  - id          = "admin1" -> null
  - name        = "admin1" -> null
  - path        = "/" -> null
  - tags        = {} -> null
  - tags_all    = {} -> null
  - unique_id    = "AIDARG6ZYEKRD7PN6APMX" -> null
}
```

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```
# aws_iam_user.testadminuser2 will be destroyed
- resource "aws_iam_user" "testadminuser2" {
  - arn          = "arn:aws:iam::083671655074:user/admin2" -> null
  - force_destroy = false -> null
  - id           = "admin2" -> null
  - name         = "admin2" -> null
  - path         = "/" -> null
  - tags         = {} -> null
  - tags_all     = {} -> null
  - unique_id    = "AIDARG6ZYKRCHDAMHVYE" -> 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_group_membership.adminteam: Destroying... [id=tf-testing-group-membership]
aws_iam_group_membership.adminteam: Destruction complete after 2s
aws_iam_group.admingroup: Destroying... [id=admingroup]
aws_iam_user.testadminuser2: Destroying... [id=admin2]
aws_iam_user.testadminuser1: Destroying... [id=admin1]
aws_iam_group.admingroup: Destruction complete after 0s
aws_iam_user.testadminuser2: Destruction complete after 1s
aws_iam_user.testadminuser1: Destruction complete after 1s

Destroy complete! Resources: 4 destroyed.

D:\Terraform\terraform_aws\IAM\Basics>

After destroying changes, refresh the page and check again the state of the IAM user by going to AWS -> IAM -> user and AWS -> IAM -> group. Notice that the users and group created earlier no longer exist

