Assignment 1: Automated Instance Management Using AWS Lambda and Boto3

Launch EC2 Instances

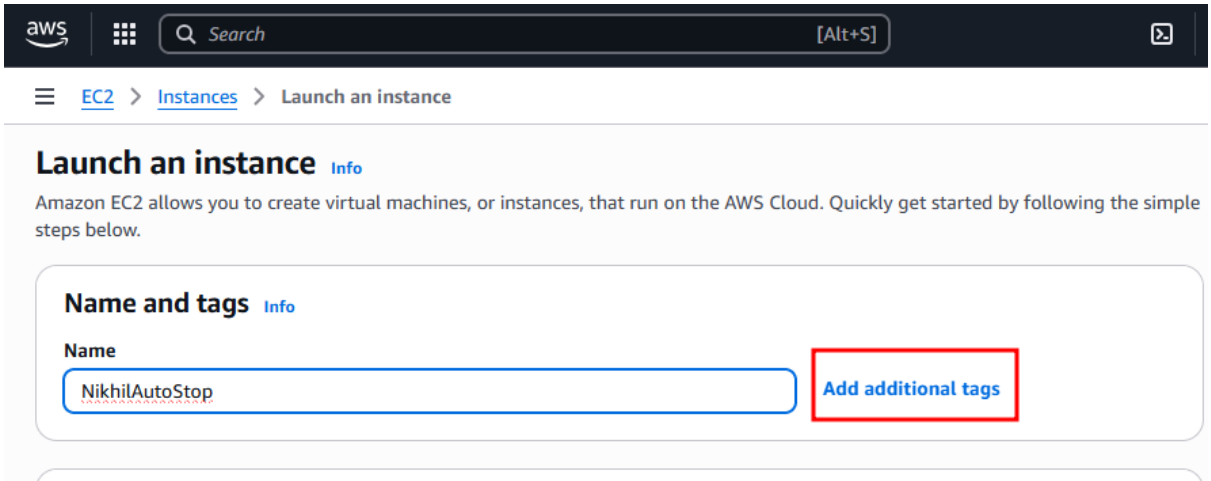
1. **In the AWS Console, search for EC2 in the search bar and click EC2.**
2. **Click Launch instances.**

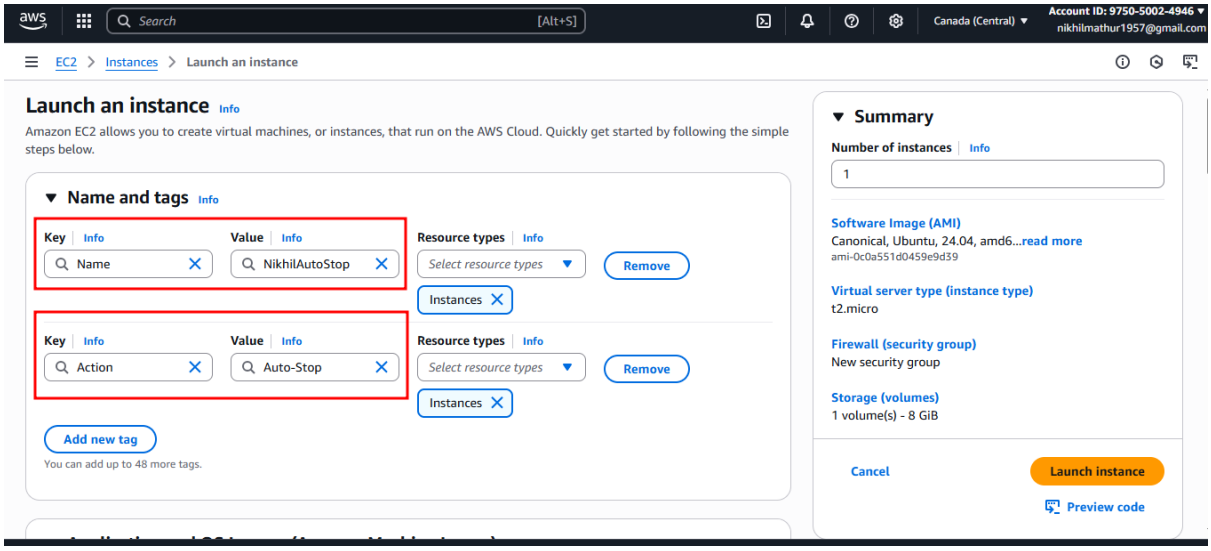
Name: NikhilAutoStop
Tag:
Key: Action
Value: Auto-Stop

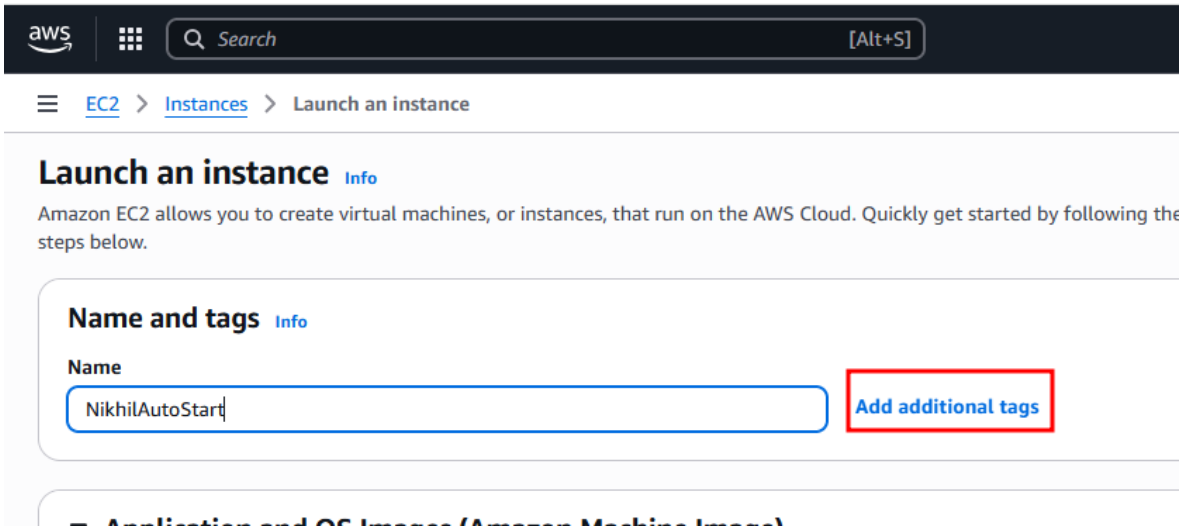
Name: NikhilAutoStart
Tag:
Key: Action
Value: Auto-Start

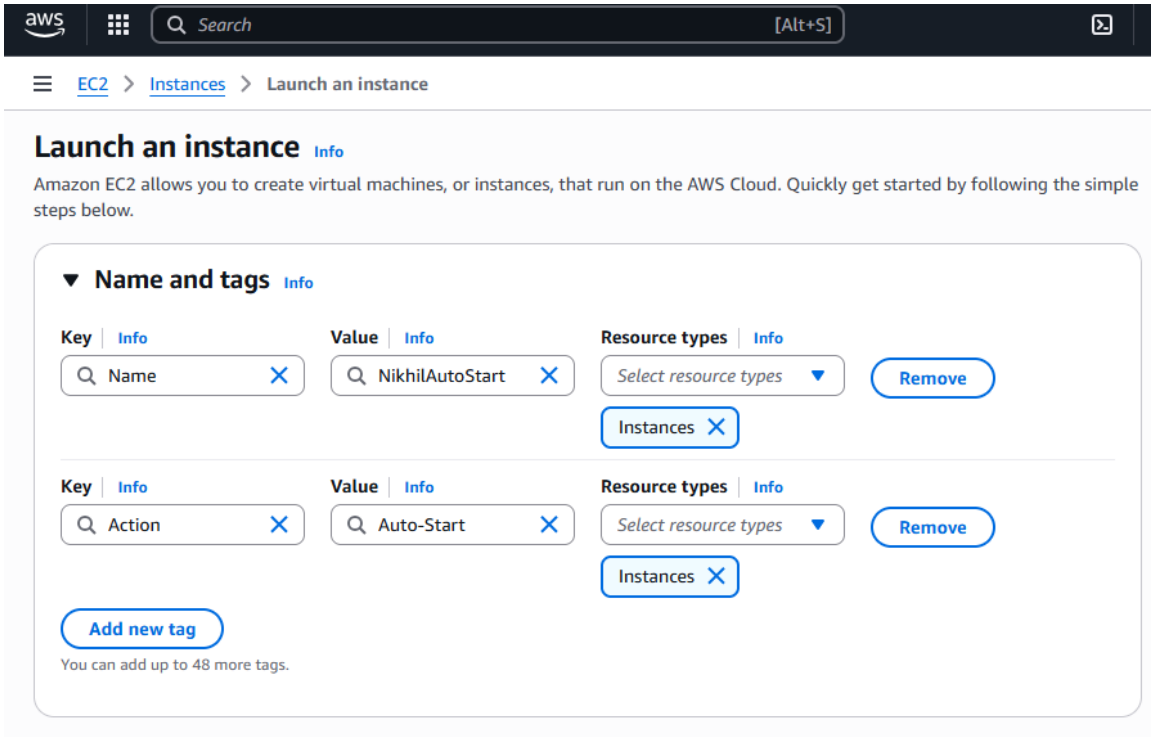
AMI : Ubuntu
Instance Type : t2.micro
Key pair (login):
Network settings:
Allow SSH (port 22) from My IP.
Allow HTTP (port 80)

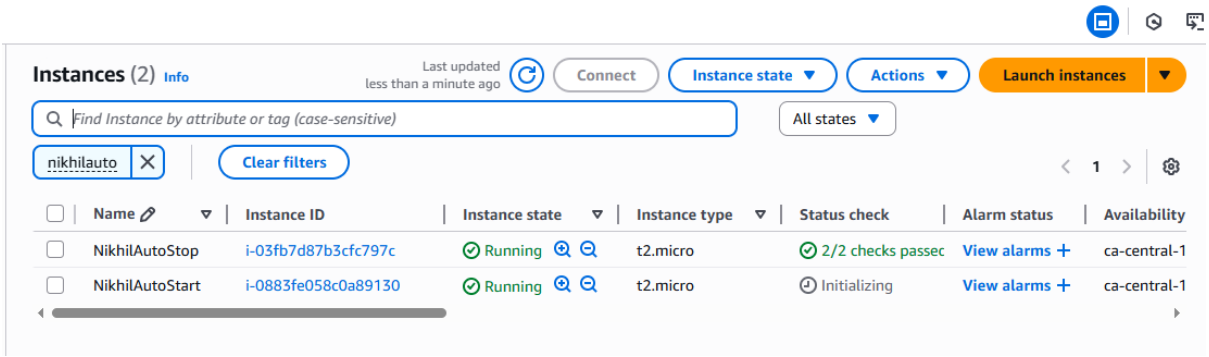
Click Launch instance




aws
Search
[Alt+S]
Canada (Central)
Account ID: 9750-5002-4946
nikhilmathur1957@gmail.com
EC2 > Instances > Launch an instance
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.
Name and tags Info
Key Info
Name
Value Info
NikhilAutoStop
Resource types Info
Select resource types
Remove
Instances
Key Info
Action
Value Info
Auto-Stop
Resource types Info
Select resource types
Remove
Instances
Add new tag
You can add up to 48 more tags.
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-0c0a551d0459e9d39
Virtual server type (instance type)
t2.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code

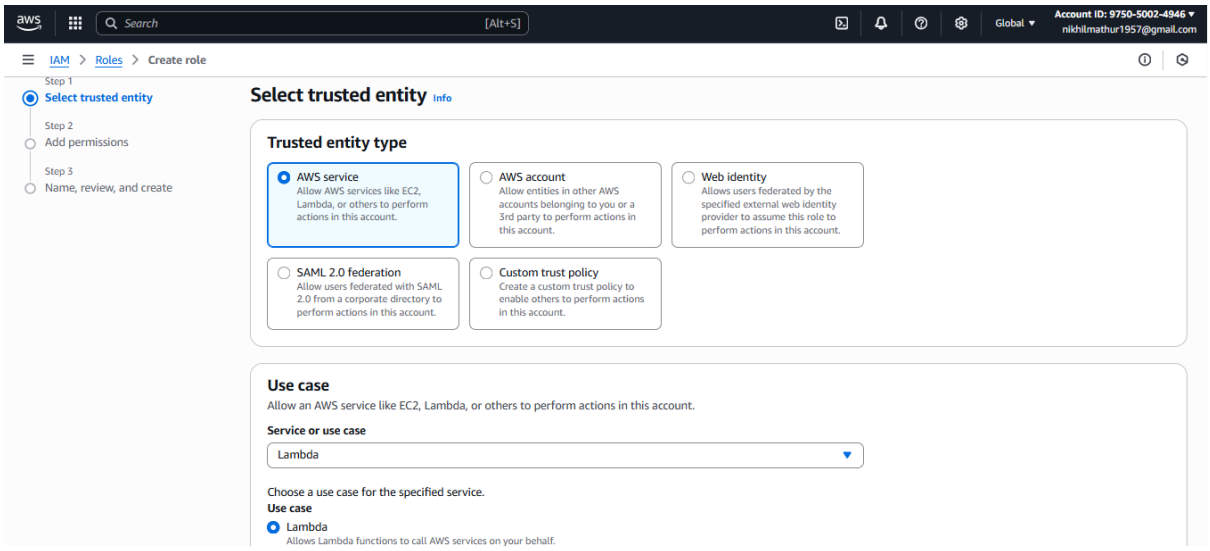

aws
Search
[Alt+S]
EC2 > Instances > Launch an instance
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the steps below.
Name and tags Info
Name
NikhilAutoStart
Add additional tags


aws
Search
[Alt+S]
EC2 > Instances > Launch an instance
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.
Name and tags Info
Key Info
Name
Value Info
NikhilAutoStart
Resource types Info
Select resource types
Instances
Remove
Key Info
Action
Value Info
Auto-Start
Resource types Info
Select resource types
Instances
Remove
Add new tag
You can add up to 48 more tags.

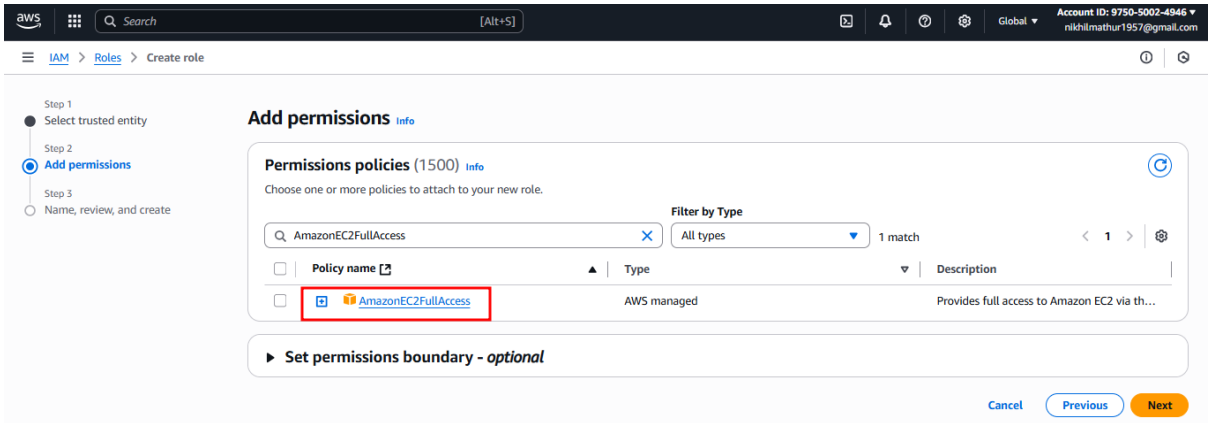

Instances (2) Info
Last updated
less than a minute ago
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
All states
nikhilauto
Clear filters
1
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability
NikhilAutoStop
i-03fb7d87b3cfc797c
Running
t2.micro
2/2 checks passed
View alarms +
ca-central-1
NikhilAutoStart
i-0883fe058c0a89130
Running
t2.micro
Initializing
View alarms +
ca-central-1

Lambda Function Creation:

1. **Create an IAM Role for Lambda**
   - AWS Console => IAM =>Roles => Create role.
   - Trusted Entity type: AWS Services
   - Use Case: Lambda
   - Click Next

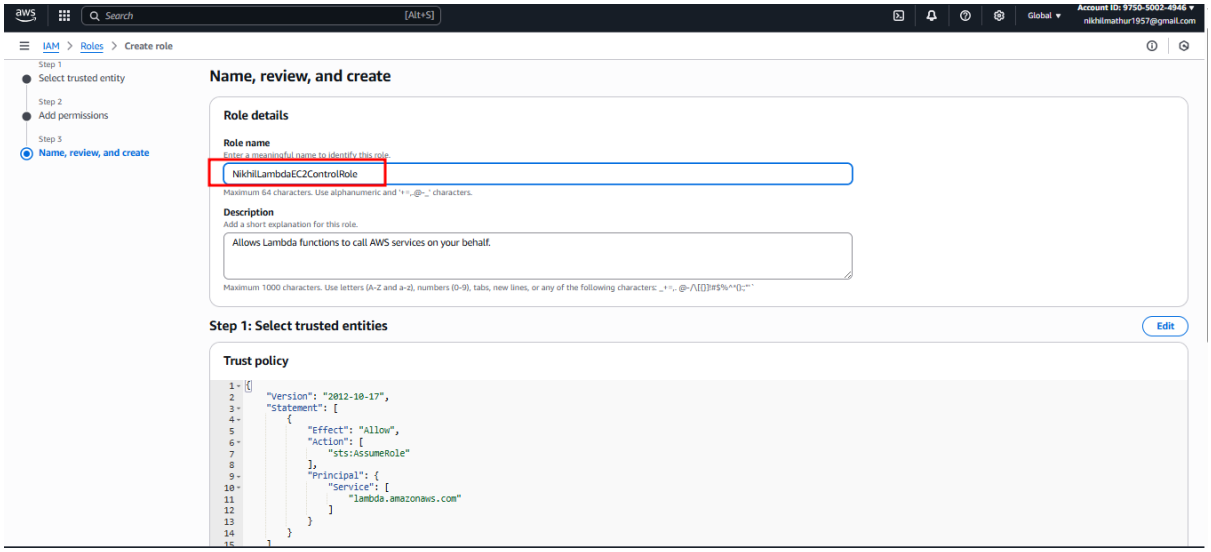


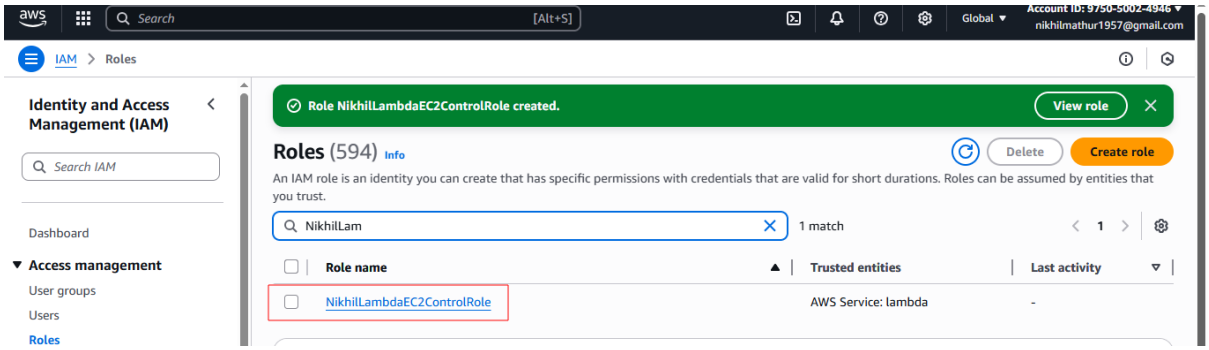
Permissions policies: AmazonEC2FullAccess



Role name: NikhilLambdaEC2ControlRole

Click Create role.





2. **Create the Lambda Function**

   Go to AWS Console => Lambda.

   Click Create function.

   Select Author from scratch

   Function name: **NikhilEC2TagBasedControl**

   Runtime: Python 3.12 (or latest).

   Permissions:

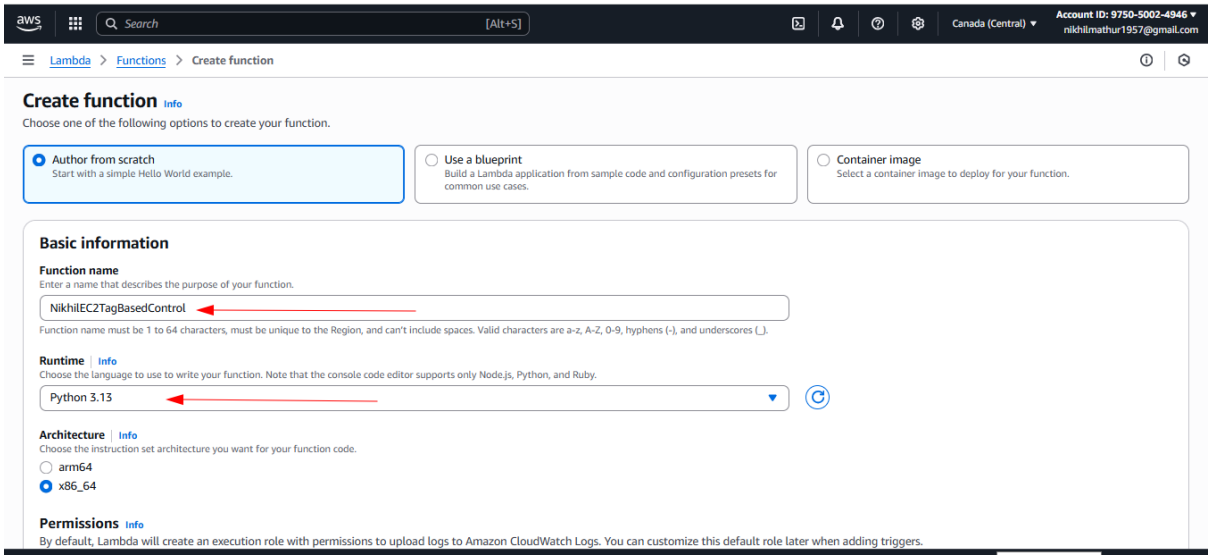
   Expand Change default execution role.

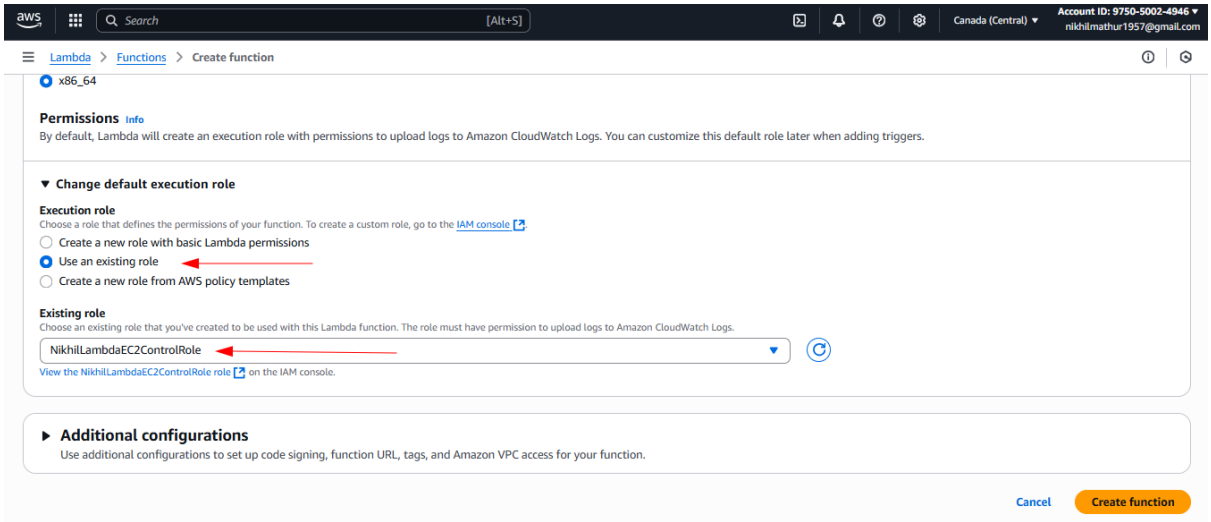
   Select Use an existing role.

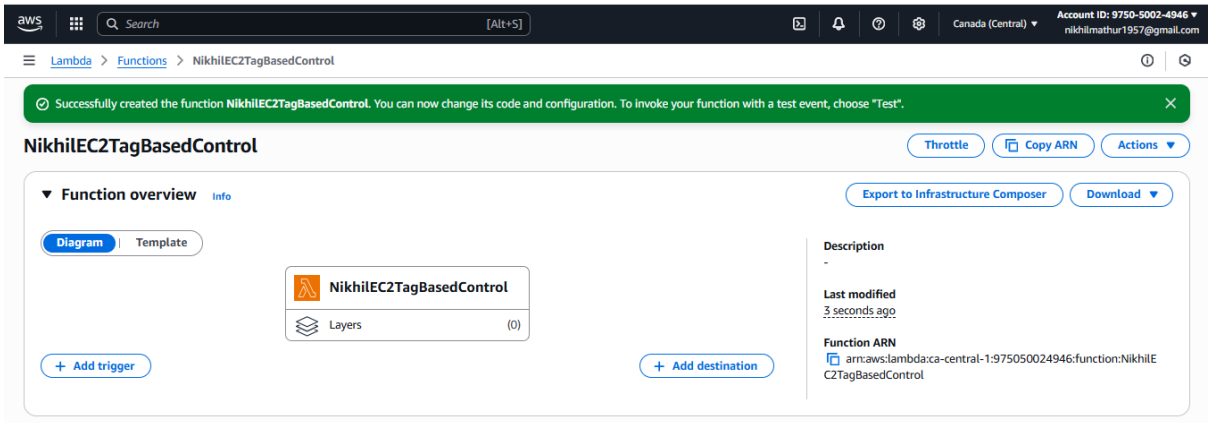
   Choose **NikhilLambdaEC2ControlRole** from the dropdown.

   Note => I choose the role **prashantb12-role-9p53470y** for permission access to run the code.

   Click Create function.


Search [Alt+S]
Canada (Central)
Account ID: 9750-5002-4946
nikhilmathur1957@gmail.com
Lambda > Functions > Create function
Create function Info
Choose one of the following options to create your function.
Author from scratch
Start with a simple Hello World example.
Use a blueprint
Build a Lambda application from sample code and configuration presets for common use cases.
Container image
Select a container image to deploy for your function.
Basic information
Function name
Enter a name that describes the purpose of your function.
NikhilEC2TagBasedControl
Function name must be 1 to 64 characters, must be unique to the Region, and can't include spaces. Valid characters are a-z, A-Z, 0-9, hyphens (-), and underscores (_).
Runtime Info
Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.
Python 3.13
Architecture Info
Choose the instruction set architecture you want for your function code.
arm64
x86_64
Permissions Info
By default, Lambda will create an execution role with permissions to upload logs to Amazon CloudWatch Logs. You can customize this default role later when adding triggers.


Search [Alt+S]
Canada (Central)
Account ID: 9750-5002-4946
nikhilmathur1957@gmail.com
Lambda > Functions > Create function
x86_64
Permissions Info
By default, Lambda will create an execution role with permissions to upload logs to Amazon CloudWatch Logs. You can customize this default role later when adding triggers.
Change default execution role
Execution role
Choose a role that defines the permissions of your function. To create a custom role, go to the IAM console.
Create a new role with basic Lambda permissions
Use an existing role
Create a new role from AWS policy templates
Existing role
Choose an existing role that you've created to be used with this Lambda function. The role must have permission to upload logs to Amazon CloudWatch Logs.
NikhilLambdaEC2ControlRole
View the NikhilLambdaEC2ControlRole role on the IAM console.
Additional configurations
Use additional configurations to set up code signing, function URL, tags, and Amazon VPC access for your function.
Cancel
Create function


Search [Alt+S]
Canada (Central)
Account ID: 9750-5002-4946
nikhilmathur1957@gmail.com
Lambda > Functions > NikhilEC2TagBasedControl
Successfully created the function NikhilEC2TagBasedControl. You can now change its code and configuration. To invoke your function with a test event, choose "Test".
NikhilEC2TagBasedControl
Throttle
Copy ARN
Actions
Function overview Info
Export to Infrastructure Composer
Download
Diagram
Template
NikhilEC2TagBasedControl
Layers (0)
Add trigger
Add destination
Description
-
Last modified
3 seconds ago
Function ARN
arn:aws:lambda:ca-central-1:975050024946:function:NikhilEC2TagBasedControl

3. **Add Python Code to Control EC2**
   - **prints instance IDs** with a given tag:
   - **Code to print instances with Auto-Stop (testing code)**

Assignment1.py > ...

```python


import boto3

def lambda_handler(event, context):
    ec2 = boto3.client('ec2')

    # Find instances with Action=Auto-Stop
    response = ec2.describe_instances(
        Filters=[
            {'Name': 'tag:Action', 'Values': ['Auto-Stop']}
        ]
    )

    print(response['Reservations'])

    instances = []
    for reservation in response['Reservations']:
        for instance in reservation['Instances']:
            instances.append(instance['InstanceId'])

    print(f"Found instances with Auto-Stop tag: {instances}")
    return {"instances": instances}

```

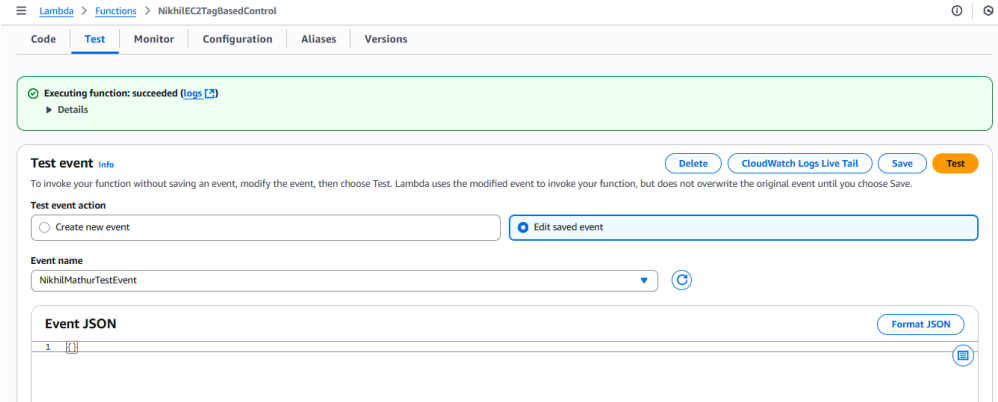
   - **Full Code**

Assignment1.py > lambda_handler

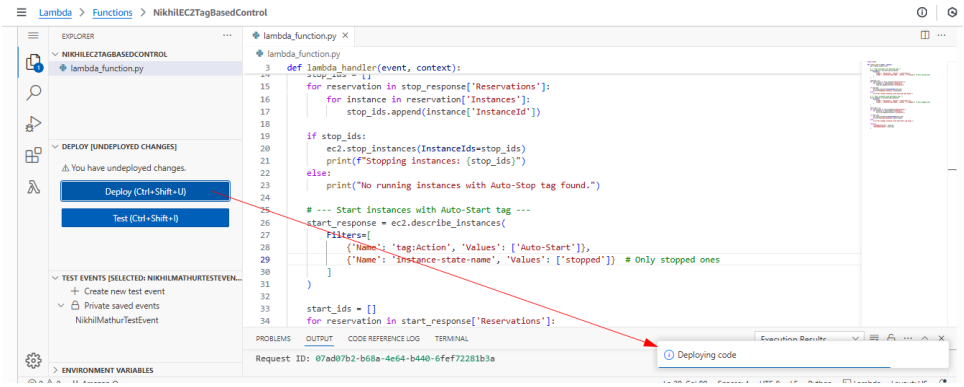
```python
import boto3

def lambda_handler(event, context):
    ec2 = boto3.client('ec2')

    # --- Stop instances with Auto-Stop tag ---
    stop_response = ec2.describe_instances(
        Filters=[
            {'Name': 'tag:Action', 'Values': ['Auto-Stop']},
            {'Name': 'instance-state-name', 'Values': ['running']}  # Only running ones
        ]
    )

    stop_ids = []
    for reservation in stop_response['Reservations']:
        for instance in reservation['Instances']:
            stop_ids.append(instance['InstanceId'])

    if stop_ids:
        ec2.stop_instances(InstanceIds=stop_ids)
        print(f"Stopping instances: {stop_ids}")
    else:
        print("No running instances with Auto-Stop tag found.")

    # --- Start instances with Auto-Start tag ---
    start_response = ec2.describe_instances(
        Filters=[
            {'Name': 'tag:Action', 'Values': ['Auto-Start']},
            {'Name': 'instance-state-name', 'Values': ['stopped']}  # Only stopped ones
        ]
    )

```

```
Assignment1.py > lambda_handler
        ]
    )

    start_ids = []
    for reservation in start_response['Reservations']:
        for instance in reservation['Instances']:
            start_ids.append(instance['InstanceId'])

    if start_ids:
        ec2.start_instances(InstanceIds=start_ids)
        print(f"Starting instances: {start_ids}")
    else:
        print("No stopped instances with Auto-Start tag found.")

    return {
        "StoppedInstances": stop_ids,
        "StartedInstances": start_ids
    }

```

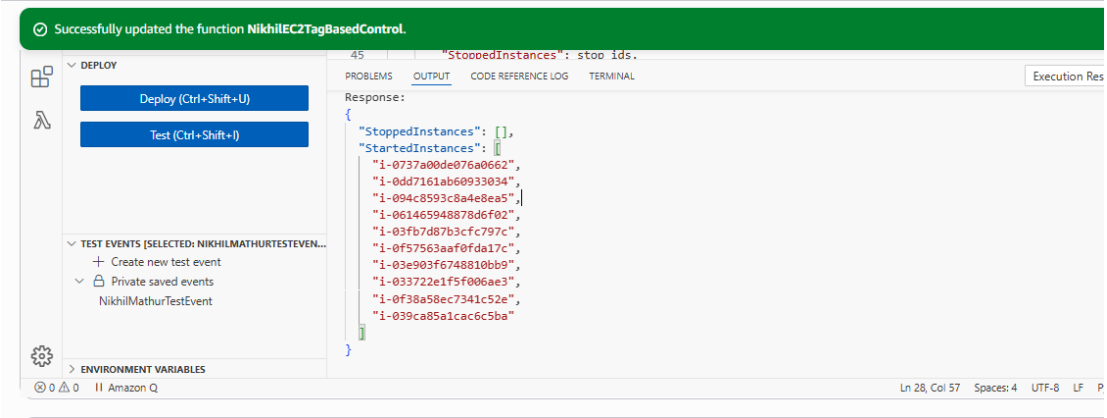
Create the test case



Click for deploy the code



Click on test for Output



Verification