

St. Francis Institute of Technology, Mumbai-400 103
Department Of Information Technology

A.Y. 2024-2025
Class: TE-ITA/B, Semester: V

Subject: **Advanced DevOps Lab**

Experiment – 10: To create AWS Lambda function to log “an object has been added” on adding the object to s3 bucket.

1. **Aim:** To author AWS Lambda function from scratch to automatically create and upload non empty json file over s3 bucket and print log “an object has been added” on lambda.
2. **Objectives:** Aim of this experiment is that, the students will learn:
 - Serverless cloud concept and how to create Lambda function in various languages
 - Invoke Lambda function
 - Monitoring AWS Lambda
3. **Lab objective mapped : ITL504.6:** To demonstrate a composition of nano services using AWS Lambda and Create Functions with the Serverless Framework.
4. **Prerequisite:** Knowledge of Python/Java/Node.js , AWS console.
5. **Requirements:** AWS account, browser, Personal Computer, Windows operating system, Internet Connection, Google Doc.
6. **Pre-Experiment Exercise:**

Answer the following (write in hand)

1. Explain Serverless concept?
2. Discuss one application of AWS Lambda in your word?

Sample application -Consider a mobile gaming app that writes to a GamesScores table. Whenever the top score of the GameScores table is updated, a corresponding stream record is written to the table’s stream. This event could then trigger a Lambda function that posts a Congratulatory message on a Social media network handle.

Brief Theory:

AWS Lambda is a zero-administration compute platform for back-end web developers that runs your code for you on the AWS Cloud and provides you with a fine-grained pricing structure. AWS Lambda runs your back-end code on its own AWS compute fleet of Amazon

EC2 instances across multiple Availability Zones in a region, which provides the high availability, security, performance, and scalability of the AWS infrastructure.

7. Laboratory Exercise

A. Procedure:**a. Perform following steps** (attach screenshots)

- Create Execution role using IAM
- policies attached to the created role
- empty s3 bucket
- create Lambda function from console
- create new event for lambda function
- lambda function script
- Invoke Lambda function and verify results
- AWS Lambda automatically monitors Lambda functions and reports metrics
- Clean up resources

8. Post-Experiments Exercise**A. Extended Theory:**(attach SS)

Create the Lambda function using Node.js

B. Questions:(write in hand)

- Select which is the use case of lambda ?
☐Image processing ☐web application ☐both ☐Neither 1st and 2nd
- Lambdas can be created _.
☐From scratch ☐From the app repository ☐Using a blueprint ☐All of these
- You want to build and deploy code functions in the AWS Cloud, but do not want to manage the infrastructure. Which of the following services can help meet this requirement?
☐AWS EC2 ☐AWS API Gateway ☐AWS Lambda ☐AWS DynamoDB
- What are your thoughts on the concept of auto-scaling in AWS lambda (draw diagram to support your answer)
- You are using lambda (with large ram allocations) to process videos uploaded to S3 and to convert from their video format to H264. However the operation fails when dealing with particularly large video files. What is the cause of this?
☐The default 5 minute time out ☐Lambda does not allow video encoding
☐S3 transfer bottlenecks ☐S3 cannot talk to Lambda
- SFIT wants to build an ERP application on the AWS Cloud. SFIT want to ensure that this ERP application follows the Microservices architecture. Which of the following services can be thought of to build this sort of architecture?
Choose 3 correct answers
☐AWS Lambda ☐AWS ECS ☐AWS API Gateway ☐AWS Config

C. Conclusion:(write in hand)

1. Write what was performed in the experiment
2. Mention few applications of what was studied.
3. Write the significance of the studied topic

D. References:

1. <https://aws.amazon.com/getting-started/hands-on>
 2. <https://www.interviewbit.com/aws-lambda-interview-questions/>
 3. <https://acloudxpert.com/lambda-quiz/9/#answer>
-

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In-Lab Exercise Screenshots:

This screenshot shows the 'Name, review, and create' step in the AWS IAM console. The left sidebar indicates 'Step 3: Name, review, and create'. The main content area displays five role creation options: 'AWS service' (selected), 'AWS account', 'Web identity', 'SAML 2.0 federation', and 'Custom trust policy'. Below these options is a 'Use case' section with a dropdown menu set to 'Lambda' and a description: 'Allows Lambda functions to call AWS services on your behalf.' At the bottom right, there are 'Cancel' and 'Next' buttons.

Step 3
Name, review, and create

☒ **AWS service**
Allow AWS services like EC2, Lambda, or others to perform actions in this account.

☐ **AWS account**
Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.

☐ **Web identity**
Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.

☐ **SAML 2.0 federation**
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.

☐ **Custom trust policy**
Create a custom trust policy to enable others to perform actions in this account.

Use case
Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

Service or use case
Lambda

Choose a use case for the specified service.
Use case
☒ **Lambda**
Allows Lambda functions to call AWS services on your behalf.

Cancel Next

This screenshot shows the 'Name, review, and create' step in the AWS IAM console, specifically the 'Role details' section. The left sidebar shows 'Step 3: Name, review, and create'. The main content area has the title 'Name, review, and create' and a 'Role details' section. The 'Role name' field contains 'Exp10Role' with a note: 'Maximum 64 characters. Use alphanumeric and '+,.,@,_,-' characters.' The 'Description' field contains 'Allows Lambda functions to call AWS services on your behalf.' with a note: 'Maximum 1000 characters. Use letters (A-Z and a-z), numbers (0-9), tabs, new lines, or any of the following characters: _+=,.,@-/\[\]\#\\$\%^{};~'''. Below this is a section for 'Step 1: Select trusted entities' with an 'Edit' button. At the bottom, the 'Trust policy' section is partially visible.

IAM > Roles > Create role

Step 1
[Select trusted entity](#)

Step 2
[Add permissions](#)

Step 3
Name, review, and create

Name, review, and create

Role details

Role name
Enter a meaningful name to identify this role.
Exp10Role
Maximum 64 characters. Use alphanumeric and '+,.,@,_,-' characters.

Description
Add a short explanation for this role.
Allows Lambda functions 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 Edit

Trust policy

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Buckets are containers for data stored in S3.

General configuration

AWS Region
US East (N. Virginia) us-east-1

Bucket type

Info

☒ General purpose
Recommended for most use cases and access patterns.
General purpose buckets are the original S3 bucket type.
They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.

☐ Directory - New
Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.

Bucket name

Info

anishexp10bucket

Bucket name must be unique within the global namespace and follow the bucket naming rules. [See rules for bucket naming](#)

Copy settings from existing bucket - optional

Only the bucket settings in the following configuration are copied.

Choose bucket

Format: s3://bucket/prefix

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ENG IN

14:01

22-08-2024

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aws Services Search [Alt+S] N. Virginia VishalRMahajan

Amazon S3 > Buckets > anishexp10bucket

anishexp10bucket [Info](#)

[Objects](#) [Properties](#) [Permissions](#) [Metrics](#) [Management](#) [Access Points](#)

Objects (0) [Info](#)

[Refresh](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) [Actions](#) [Create folder](#) [Upload](#)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

Name	Type	Last modified	Size	Storage class
No objects				
You don't have any objects in this bucket.				

[Upload](#)

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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.

Use only letters, numbers, hyphens, or underscores with no spaces.

Runtime [Info](#)
Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.

Architecture [Info](#)

Info

Learn how to implement common use cases in AWS Lambda.

Create a simple web app

In this tutorial you will learn how to:

- Build a simple web app, consisting of a Lambda function with a function URL that outputs a webpage
- Invoke your function through its function URL

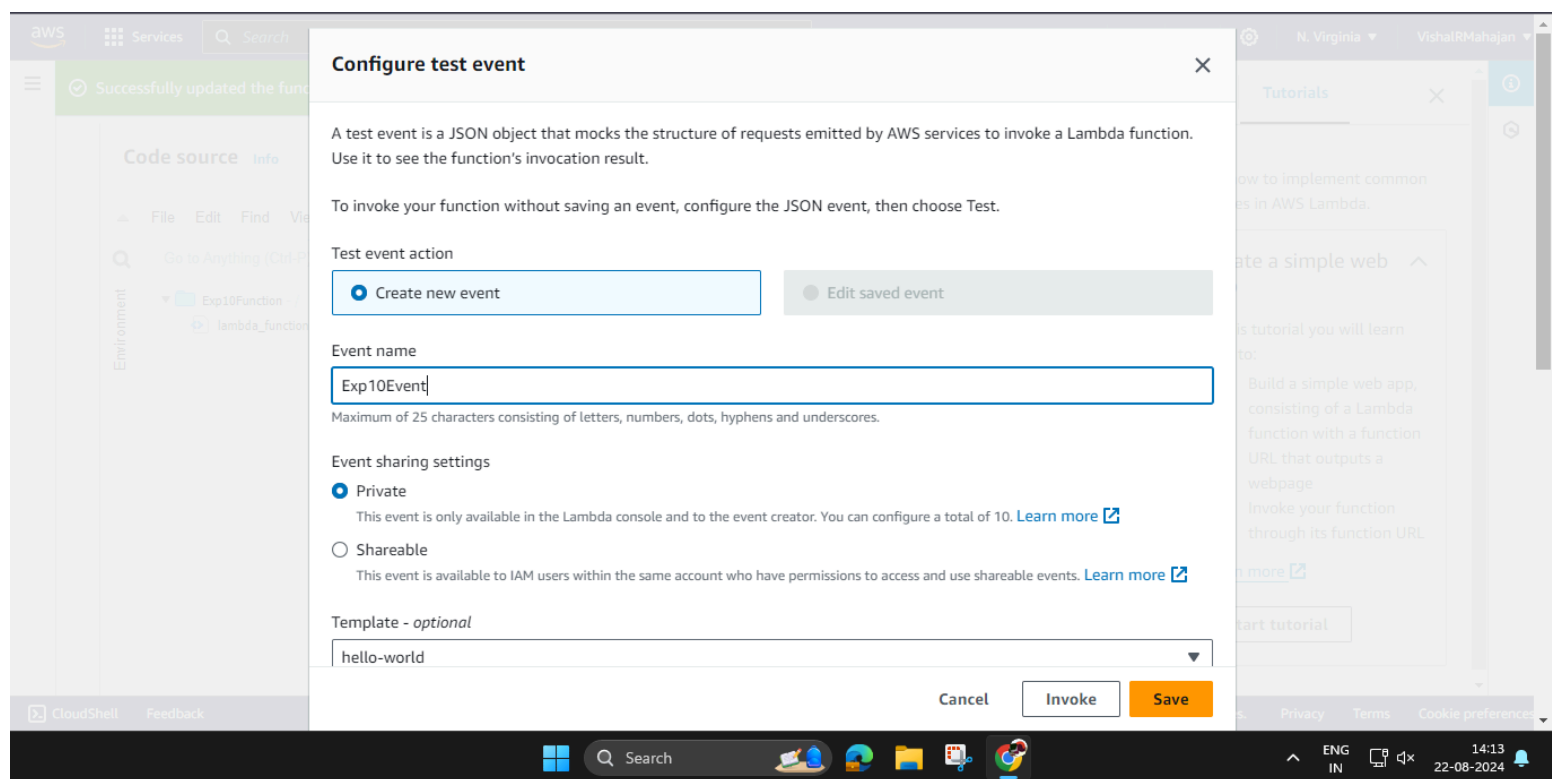
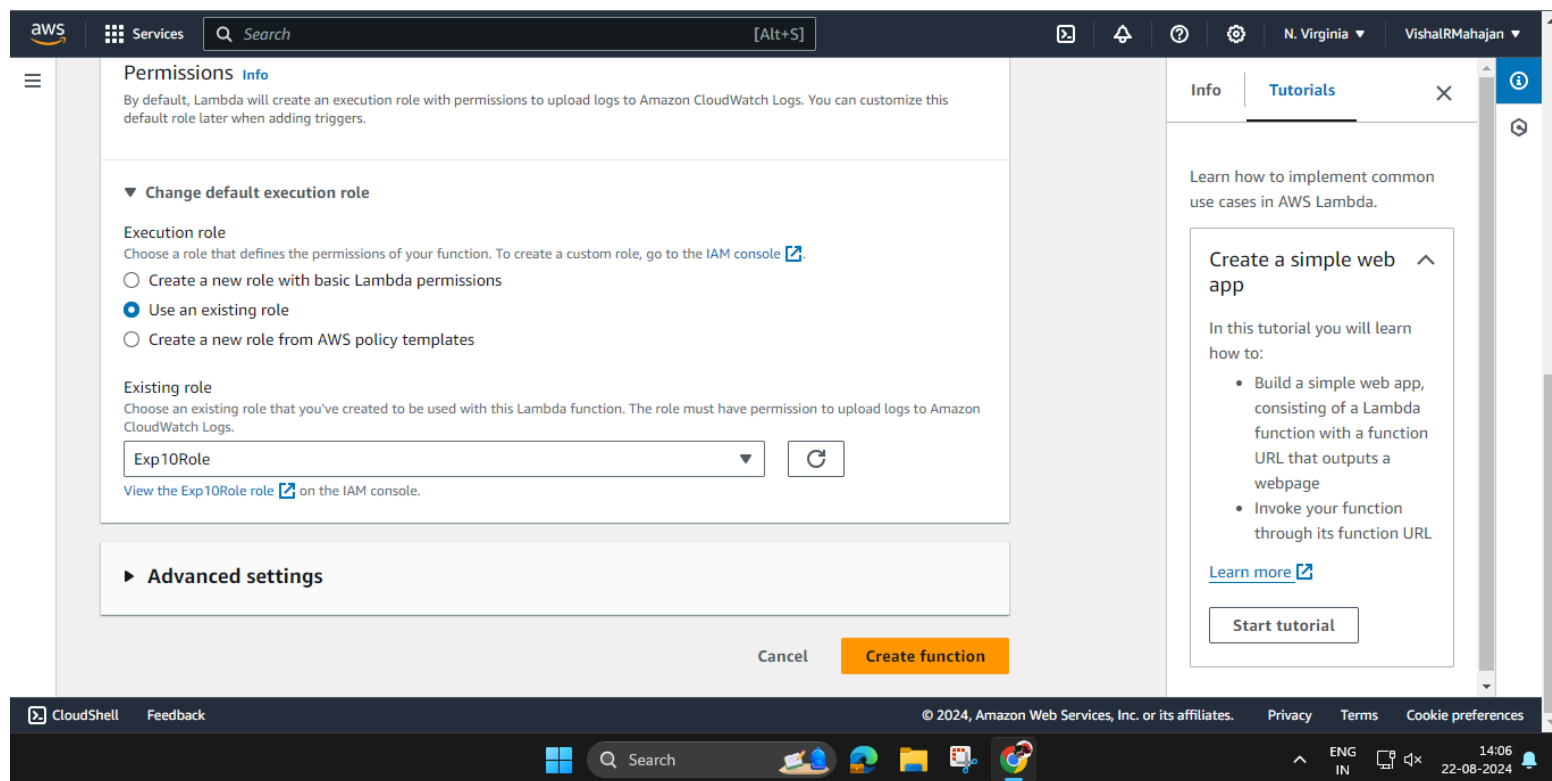
[Learn more](#)

[Start tutorial](#)

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The screenshot shows the AWS Lambda console interface. At the top, a green notification bar states: "The test event Exp10Event was successfully saved." Below this, the "Code source" tab is active, displaying the "lambda_function.py" file. The "Test" button is highlighted. To the right, the "Execution results" tab shows the status "Succeeded" with a max memory used of 80 MB and a time of 578.94 ms. The "Test Event Name" is "Exp10Event". The "Response" is "null". The "Function Logs" section shows the following details:

```
START RequestId: 982b7954-5b13-4c16-9e49-fba96140fc86 Version: $LATEST
object has been uploaded
END RequestId: 982b7954-5b13-4c16-9e49-fba96140fc86
REPORT RequestId: 982b7954-5b13-4c16-9e49-fba96140fc86 Duration: 578.94 ms Billed Duration: 579 ms
```

The "Request ID" is "982b7954-5b13-4c16-9e49-fba96140fc86". On the right side, there is a "Tutorials" panel with a section titled "Create a simple web app" and a "Start tutorial" button. The bottom of the screen shows the Windows taskbar with the search bar and system clock.

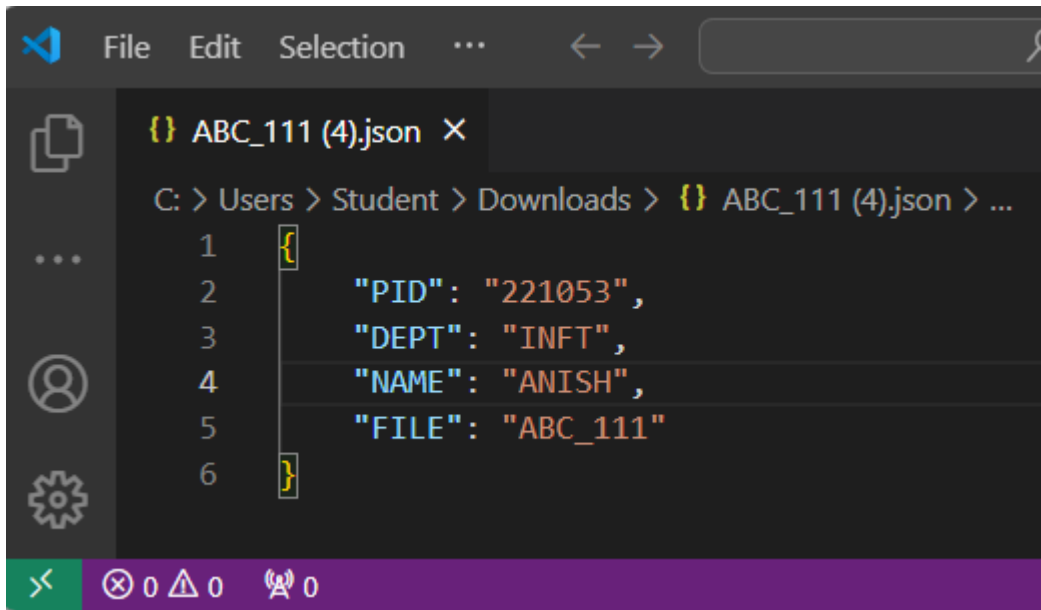
The screenshot shows the Amazon S3 console interface. The left sidebar displays the "Amazon S3" navigation menu with options like "Buckets", "Access Grants", "Access Points", "Object Lambda Access Points", "Multi-Region Access Points", "Batch Operations", "IAM Access Analyzer for S3", "Storage Lens", "Dashboards", "Storage Lens groups", and "AWS Organizations settings". The main content area shows the "anishexp10bucket" bucket. The "Objects" tab is active, displaying a list of objects. The "Create folder" and "Upload" buttons are visible. Below the buttons, there is a search bar and a table of objects:

Name	Type	Last modified	Size	Storage class
ABC_111.json	json	August 22, 2024, 14:15:53 (UTC+05:30)	69.0 B	Standard

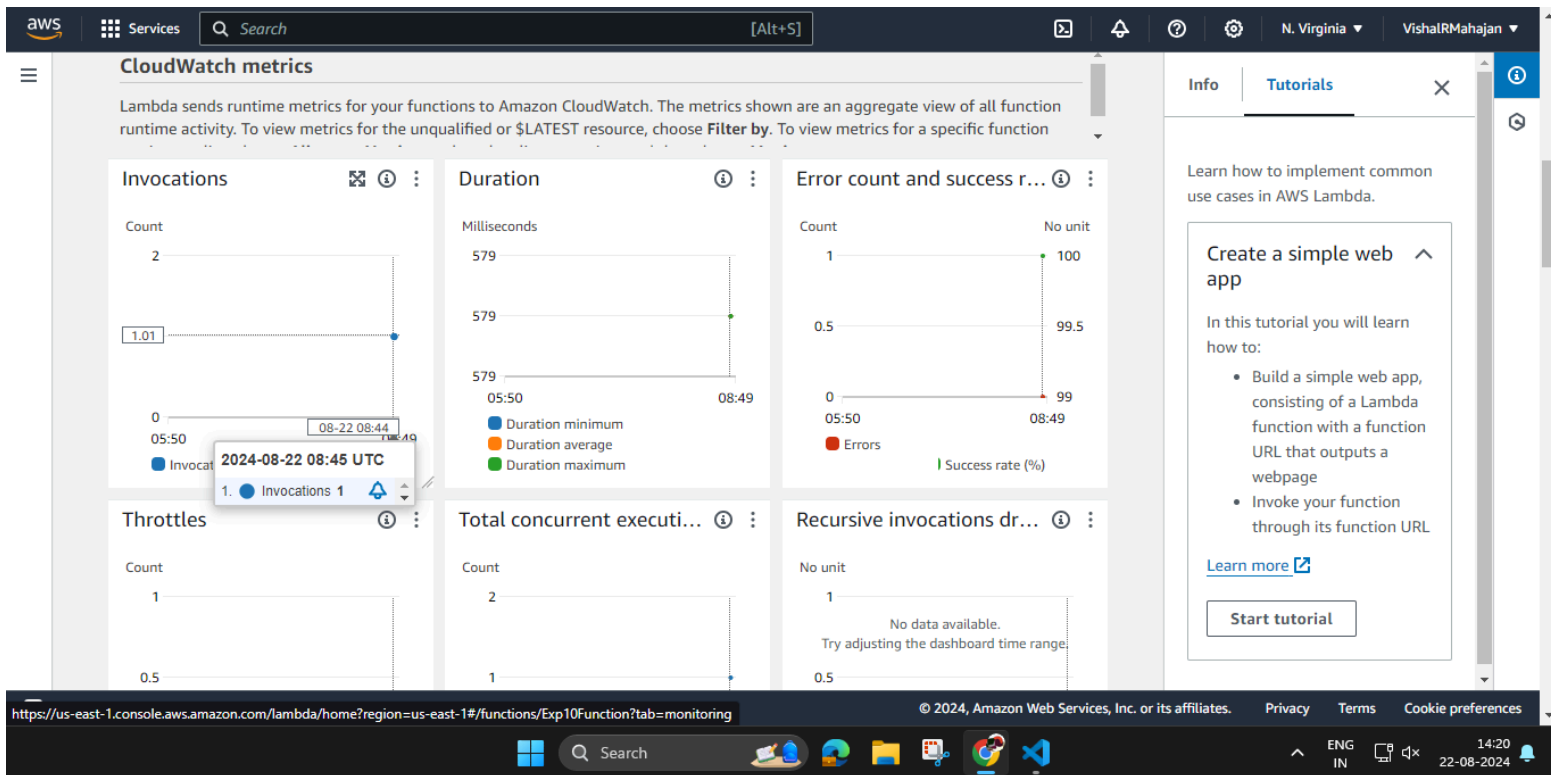
The bottom of the screen shows the Windows taskbar with the search bar and system clock.

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```
{
  "PID": "221053",
  "DEPT": "INFT",
  "NAME": "ANISH",
  "FILE": "ABC_111"
}
```



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Extended Theory

The screenshot shows the AWS Lambda 'Create function' console. The 'Use a blueprint' option is selected. The 'Basic information' section shows the blueprint name 'Hello world function', function name 'Exp10Function', and runtime 'nodejs18.x'. A sidebar on the right contains a tutorial titled 'Create a simple web app'.

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 [Info](#)

Blueprint name
Hello world function
A starter AWS Lambda function. nodejs18.x

Function name
Enter a name that describes the purpose of your function.
Exp10Function
Use only letters, numbers, hyphens, or underscores with no spaces.

Runtime

Info **Tutorials**

Learn how to implement common use cases in AWS Lambda.

Create a simple web app

In this tutorial you will learn how to:

- Build a simple web app, consisting of a Lambda function with a function URL that outputs a webpage
- Invoke your function through its function URL

[Learn more](#)

[Start tutorial](#)

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The screenshot shows the AWS IAM 'Create role' console. A notification at the top states: 'Role creation might take a few minutes. Please do not delete the role or edit the trust or permissions policies in this role.' The 'Role name' is 'exp10role'. The 'Policy templates - optional' section is empty. The 'Lambda function code' section shows a preconfigured code snippet.

Role creation might take a few minutes. Please do not delete the role or edit the trust or permissions policies in this role.

Role name
Enter a name for your new role.
exp10role
Use only letters, numbers, hyphens, or underscores with no spaces.

Policy templates - optional [Info](#)
Choose one or more policy templates.

Lambda function code
Code is preconfigured by the chosen blueprint. You can configure it after you create the function. [Learn more](#) about deploying Lambda functions.

```
1 console.log('Loading function');
2
3 export const handler = async (event, context) => {
4   //console.log('Received event:', JSON.stringify(event, null, 2));
5   console.log('value1 =', event.key1);
6   console.log('value2 =', event.key2);
7   console.log('value3 =', event.key3);
8   return event.key1; // Echo back the first key value
9   // throw new Error('Something went wrong');
```

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The screenshot shows the AWS Lambda console interface. The top navigation bar includes the AWS logo, 'Services', a search bar, and the user's name 'VishalRMahajan' in the top right. The main content area is titled 'Function overview' and includes tabs for 'Diagram' and 'Template'. The 'Diagram' tab is active, showing a visual representation of the function with a box labeled 'exp10function' and a 'Layers' section with '(0)' layers. Below the diagram are buttons for '+ Add trigger' and '+ Add destination'. To the right of the diagram, the 'Description' section provides details: 'A starter AWS Lambda function.', 'Last modified in 2 minutes', 'Function ARN: arn:aws:lambda:us-east-1:009160068278:function:exp10function', and 'Function URL: -'. At the bottom of the overview section are tabs for 'Code', 'Test', 'Monitor', 'Configuration', 'Aliases', and 'Versions'. Below these is the 'Code source' section with an 'Upload from' button. On the right side, there is a 'Tutorials' sidebar with a link to 'Create a simple web app' and a 'Start tutorial' button. The bottom status bar shows 'CloudShell', 'Feedback', and copyright information for Amazon Web Services.

This screenshot displays the 'Code source' tab within the AWS Lambda console. The top navigation bar is consistent with the previous image. The main area shows the 'Code source' section with an 'Upload from' button. Below this is a code editor window titled 'index.mjs' with a menu bar (File, Edit, Find, View, Go, Tools, Window) and a toolbar (Test, Deploy). The code in the editor is as follows:

```
1 console.log('Loading function');
2
3 export const handler = async (event, context) => {
4   //console.log('Received event:', JSON.stringify(event, null, 2));
5   console.log('value1 =', event.key1);
6   console.log('value2 =', event.key2);
7   console.log('value3 =', event.key3);
8   return event.key1; // Echo back the first key value
9   // throw new Error('Something went wrong');
10 };
11
```

The code editor also shows '1:1 JavaScript' and 'Spaces: 4'. Below the code editor is the 'Code properties' section, which includes a table with the following data:

Package size	SHA256 hash	Last modified
333 byte	v7fgAvC+Jttf4pPzxIRDOZTxv8oU6zacNtvik3TLiRM=	August 22, 2024 at 02:41 PM GMT+5:30

The right sidebar remains the same, featuring the 'Tutorials' section with the 'Create a simple web app' tutorial and a 'Start tutorial' button. The bottom status bar includes 'CloudShell', 'Feedback', and copyright information.