

## **Class – M.Sc. (Computer Science) Part II- Sem III**

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### **Cloud Computing Practical Assignment No 12**

Launch the RDS Instance (AWS) and connect.

Prepare a Screen shots file and write down the steps.

#### **Do the following tasks**

##### **1) Use Amazon RDS to create a MySQL DB Instance**

Once the database instance creation is complete and the status changes to available, you can connect to a database on the DB instance using any standard SQL client. Download MySQL Workbench, which is a popular SQL client.

connect to the database you created using MySQL Workbench.

##### **2) Launch an EC2 instance, launch an RDS instance, and connect RDS from the EC2 instance.**

**For solving** Use the links

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- <https://aws.amazon.com/getting-started/hands-on/create-mysql-db/>
  - <https://blog.saeloun.com/2023/05/08/connect-aws-rds-with-ec2/>
- 

#### **Commands to use for second task:**

to install the MySQL command line client run the following commands. Press Y when prompted

**sudo dnf update -y**

**sudo dnf install mariadb105-server**

To connect with the DB instance, copy the endpoint from the Connectivity & security tab on the DB-identifier page.

Enter the following command to connect with the MySQL instance. Replace the endpoint with the endpoint of the DB instance and enter the master password when prompted for password

**mysql -h endpoint -P 3306 -u admin -p**

After successfully connecting EC2 instance with the RDS DB instance,to verify this we can run some of the MySQL commands

**show databases**

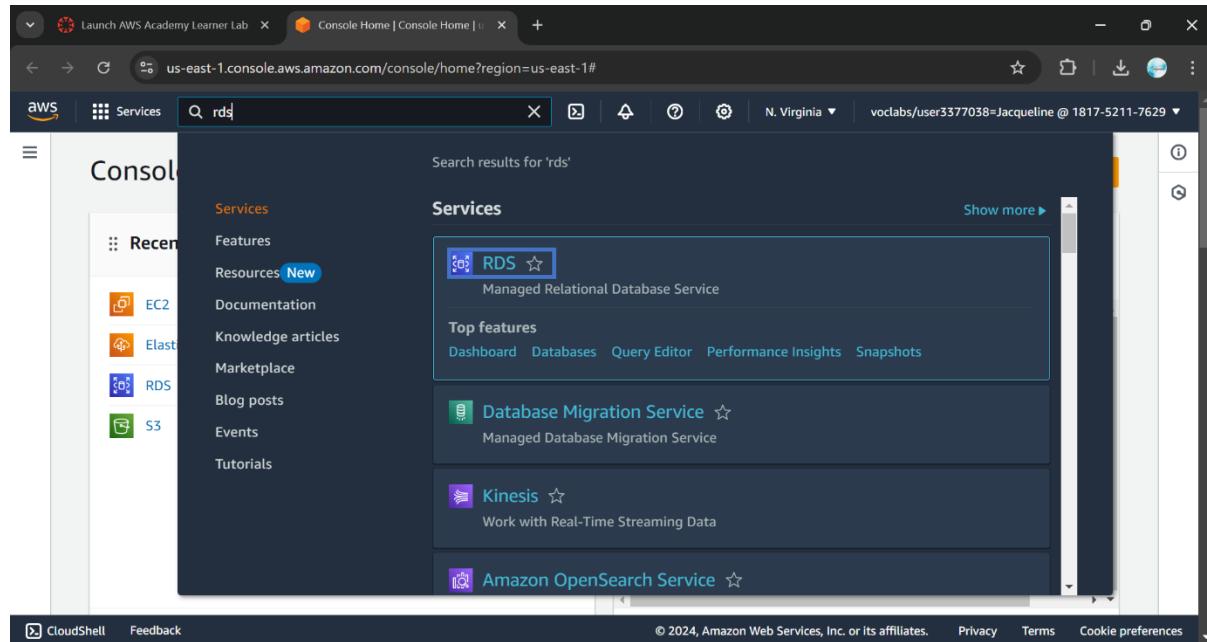
create database test;

use test

Make a single Word or PDF file.

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Step 1: Go to database menu and select RDS.



## Step 2: Now select Create databases.

The screenshot shows the Amazon RDS Dashboard. On the left, there's a sidebar with links like 'Dashboard', 'Databases', 'Query Editor', etc. The main area has a heading 'Create database'. It contains a brief description of Amazon RDS, a 'Create database' button, and a 'Restore from S3' button. Below this is a note about the launch region. To the right, there's a 'Service health' section showing 'Amazon Relational Database Service (N. Virginia)' is operating normally. A 'Recommended for you' sidebar on the right lists various AWS services and features.

## Step 3: Configure the settings as shown below:

The screenshot shows the 'Create database - RDS Management' interface. In the 'Engine options' section, 'MySQL' is selected (indicated by a blue border). Other options include 'Aurora (MySQL Compatible)', 'Aurora (PostgreSQL Compatible)', 'MariaDB', 'PostgreSQL', and 'Oracle'. To the right, a modal window titled 'MySQL' provides information about the service, including its popularity and various features like automated backups and support for up to 15 Read Replicas.

The screenshot shows the AWS RDS MySQL creation wizard. On the left, there's a sidebar with a three-line menu icon. The main content area has a title 'Edition' with 'MySQL Community' selected. Below it, 'Engine version' is set to 'MySQL 8.0.35'. There are two filter options: 'Show only versions that support the Multi-AZ DB cluster' (selected) and 'Show only versions that support the Amazon RDS Optimized Writes'. A checkbox for 'Enable RDS Extended Support' is present. On the right, a modal window titled 'MySQL' provides general information about MySQL and lists its features.

**Edition**

MySQL Community

**Engine version** [Info](#)  
View the engine versions that support the following database features.

**Show only versions that support the Multi-AZ DB cluster** [Info](#)  
Create a Multi-AZ DB cluster with one primary DB instance and two readable standby DB instances. Multi-AZ DB clusters provide up to 2x faster transaction commit latency and automatic failover in typically under 35 seconds.

**Show only versions that support the Amazon RDS Optimized Writes** [Info](#)  
Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

**Engine version**

MySQL 8.0.35

**Enable RDS Extended Support** [Info](#)  
Amazon RDS Extended Support is a [paid offering](#). By selecting this option, you consent to being charged for this offering if you are running your database major version past the RDS end of standard support date for that version. Check the end of standard support date for your major version in the [RDS for MySQL documentation](#).

**MySQL**

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read

The screenshot shows the AWS RDS MySQL creation wizard. On the left, there's a sidebar with a three-line menu icon. The main content area has a title 'Templates' with 'Choose a sample template to meet your use case.' Below it are three options: 'Production' (radio button), 'Dev/Test' (radio button), and 'Free tier' (radio button, selected). The 'Free tier' section is highlighted with a blue border. On the right, a modal window titled 'MySQL' provides general information about MySQL and lists its features.

**Templates**

Choose a sample template to meet your use case.

Production  
Use defaults for high availability and fast, consistent performance.

Dev/Test  
This instance is intended for development use outside of a production environment.

Free tier  
Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS.

**Availability and durability**

**Deployment options** [Info](#)  
The deployment options below are limited to those supported by the engine you selected above.

Multi-AZ DB Cluster  
Creates a DB cluster with a primary DB instance and two readable standby DB instances, with each DB instance in a different Availability Zone (AZ). Provides high availability, data redundancy and increases capacity to serve read workloads.

Multi-AZ DB instance (not supported for Multi-AZ DB cluster snapshot)  
Creates a primary DB instance and a standby DB instance in a different AZ. Provides high availability and data redundancy.

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Step 4: Give the settings as given below and click create database.

The screenshot shows the AWS RDS Settings page for creating a MySQL database instance. The 'DB instance identifier' field is set to 'db-instance'. The 'Master username' field is set to 'masterUsername'. The 'Self managed' option is selected for credentials management. A tooltip for 'Self managed' indicates it allows creating your own password or having RDS generate one. The right sidebar displays information about MySQL and its features.

**DB instance identifier** [Info](#)  
Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

**Credentials Settings**

**Master username** [Info](#)  
Type a login ID for the master user of your DB instance.

1 to 16 alphanumeric characters. The first character must be a letter.

**Credentials management**  
You can use AWS Secrets Manager or manage your master user credentials.

Managed in AWS Secrets Manager - most secure  
 Self managed  
Create your own password or have RDS create a password that you manage

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The screenshot shows the AWS RDS Settings page for creating a MySQL database instance. The 'Master password' field contains '\*\*\*\*\*'. The 'Password strength' is 'Neutral'. A tooltip for 'Master password' indicates it must be at least 8 printable ASCII characters and cannot contain specific symbols. The right sidebar displays information about MySQL and its features.

Auto generate password  
Amazon RDS can generate a password for you, or you can specify your own password.

**Master password** [Info](#)  
  
Password strength Neutral

Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / \ " @

**Confirm master password** [Info](#)

**Instance configuration**  
The DB instance configuration options below are limited to those supported by the engine that you selected above.

**DB instance class** [Info](#)

**Hide filters**

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The screenshot shows the 'Instance configuration' section of the AWS RDS MySQL creation wizard. The 'DB instance class' dropdown is set to 'db.t3.micro', which is highlighted with a blue border. Below the dropdown, it lists '2 vCPUs', '1 GiB RAM', and 'Network: Up to 2,085 Mbps'. To the right of the main content, a sidebar titled 'MySQL' provides a brief overview of the database and its features.

**Instance configuration**

The DB instance configuration options below are limited to those supported by the engine that you selected above.

DB instance class [Info](#)

▼ Hide filters

Show instance classes that support Amazon RDS Optimized Writes [Info](#)  
Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

Include previous generation classes

Standard classes (includes m classes)

Memory optimized classes (includes r and x classes)

Burstable classes (includes t classes)

db.t3.micro  
2 vCPUs 1 GiB RAM Network: Up to 2,085 Mbps

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The screenshot shows the 'Storage' configuration section of the AWS RDS MySQL creation wizard. The 'Storage type' dropdown is set to 'General Purpose SSD (gp2)', which is highlighted with a blue border. Below the dropdown, it says 'Baseline performance determined by volume size'. The 'Allocated storage' input field is set to '20 GiB'. A note in a callout box states: 'After you modify the storage for a DB instance, the status of the DB instance will be in storage-optimization. Your instance will remain available as the storage-optimization operation completes.' The 'MySQL' sidebar is visible on the right.

**Storage**

Storage type [Info](#)  
Provisioned IOPS SSD (io2) storage volumes are now available.

General Purpose SSD (gp2)  
Baseline performance determined by volume size

Allocated storage [Info](#)  
20 GiB  
Allocated storage value must be 20 GiB to 6,144 GiB

ⓘ After you modify the storage for a DB instance, the status of the DB instance will be in storage-optimization. Your instance will remain available as the storage-optimization operation completes.  
[Learn more](#)

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The screenshot shows the 'Create database' wizard in the AWS RDS Management console. On the left, under 'Compute resource', the 'Don't connect to an EC2 compute resource' option is selected. A note below it states: 'Don't set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.' To the right, the 'Connect to an EC2 compute resource' option is shown with the note: 'Set up a connection to an EC2 compute resource for this database.' Below this, the 'Virtual private cloud (VPC)' section is visible, showing a dropdown menu with 'Default VPC (vpc-013e626860017354c)' selected. A note says: 'Only VPCs with a corresponding DB subnet group are listed.' A callout box contains the message: 'After a database is created, you can't change its VPC.' On the right side, a sidebar titled 'MySQL' provides an overview of the MySQL database service.

The screenshot continues the 'Create database' wizard. It shows the 'Existing VPC security groups' section with a dropdown menu containing 'Choose one or more options' and 'default'. Below it, the 'Availability Zone' is set to 'us-east-1'. Under 'RDS Proxy', there is a note about its benefits and a checkbox for 'Create an RDS Proxy'. A note below explains that RDS automatically creates an IAM role and a Secrets Manager secret for the proxy. Under 'Certificate authority - optional', it notes that a server certificate provides an extra layer of security. A dropdown menu shows 'rds-ca-rsa2048-g1 (default)' with an expiry date of 'May 26, 2061'. A note at the bottom states: 'If you don't select a certificate authority, RDS chooses one for you.' The right sidebar remains the same MySQL overview.

The screenshot shows the AWS RDS Management console with the URL [us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance](https://us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance). The page is titled "Create database - RDS Management". The left sidebar shows "Services" and "CloudShell". The main content area is titled "MySQL" and contains the following sections:

- Certificate authority - optional**: A dropdown menu showing "rds-ca-rsa2048-g1 (default)" with an expiry date of "Expiry: May 26, 2061". A note states: "Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does so by checking the server certificate that is automatically installed on all databases that you provision."
- Additional configuration**: A section for "Database port" set to "Info" (TCP/IP port) with the value "3306".
- Tags - optional**: A note stating "A tag consists of a case-sensitive key-value pair." Below it says "No tags associated with the resource." with a "Add new tag" button.

The right sidebar displays the MySQL database information:

**MySQL**

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- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read

The screenshot shows the AWS RDS Management console with the same URL and title. The left sidebar shows "Services" and "CloudShell". The main content area is titled "MySQL" and contains the following sections:

- Tags**: A note stating "A tag consists of a case-sensitive key-value pair." Below it says "No tags associated with the resource." with a "Add new tag" button. A note below says "You can add up to 50 more tags."
- Database authentication**: A section for "Database authentication options" with three options:
  - Password authentication** (selected): "Authenticates using database passwords."
  - Password and IAM database authentication**: "Authenticates using the database password and user credentials through AWS IAM users and roles."
  - Password and Kerberos authentication**: "Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos Authentication."

The right sidebar displays the MySQL database information:

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- Supports up to 15 Read

The screenshot shows the 'Create database - RDS Management' wizard. In the 'Database options' section, the 'Initial database name' is set to 'amazonRDS'. Other fields include 'DB parameter group' (set to 'default:mysql8.0') and 'Option group' (set to 'default:mysql-8-0'). A note at the top states: 'Enabling Enhanced Monitoring metrics are useful when you want to see how different processes or threads use the CPU.' On the right, a sidebar titled 'MySQL' provides information about the database.

**Additional configuration**

Database options

Initial database name [Info](#)  
amazonRDS

If you do not specify a database name, Amazon RDS does not create a database.

DB parameter group [Info](#)  
default:mysql8.0

Option group [Info](#)  
default:mysql-8-0

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- Supports up to 15 Read

The screenshot shows the continuation of the 'Create database - RDS Management' wizard. It includes a note about automated backups being supported for InnoDB only. Configuration sections include 'Backup retention period' (set to 1 day), 'Backup window' (set to 'No preference'), and 'Backup replication' (unchecked). Under 'Encryption', the 'Enable encryption' checkbox is checked. A sidebar titled 'MySQL' provides information about the database.

**Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to details [here](#).**

Backup retention period [Info](#)  
The number of days (1-35) for which automatic backups are kept.  
1 day

Backup window [Info](#)  
The daily time range (in UTC) during which RDS takes automated backups.  
 Choose a window  
 No preference

Copy tags to snapshots

Backup replication [Info](#)  
 Enable replication in another AWS Region  
Enabling replication automatically creates backups of your DB instance in the selected Region, for disaster recovery, in addition to the current Region.

Encryption

Enable encryption

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- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read

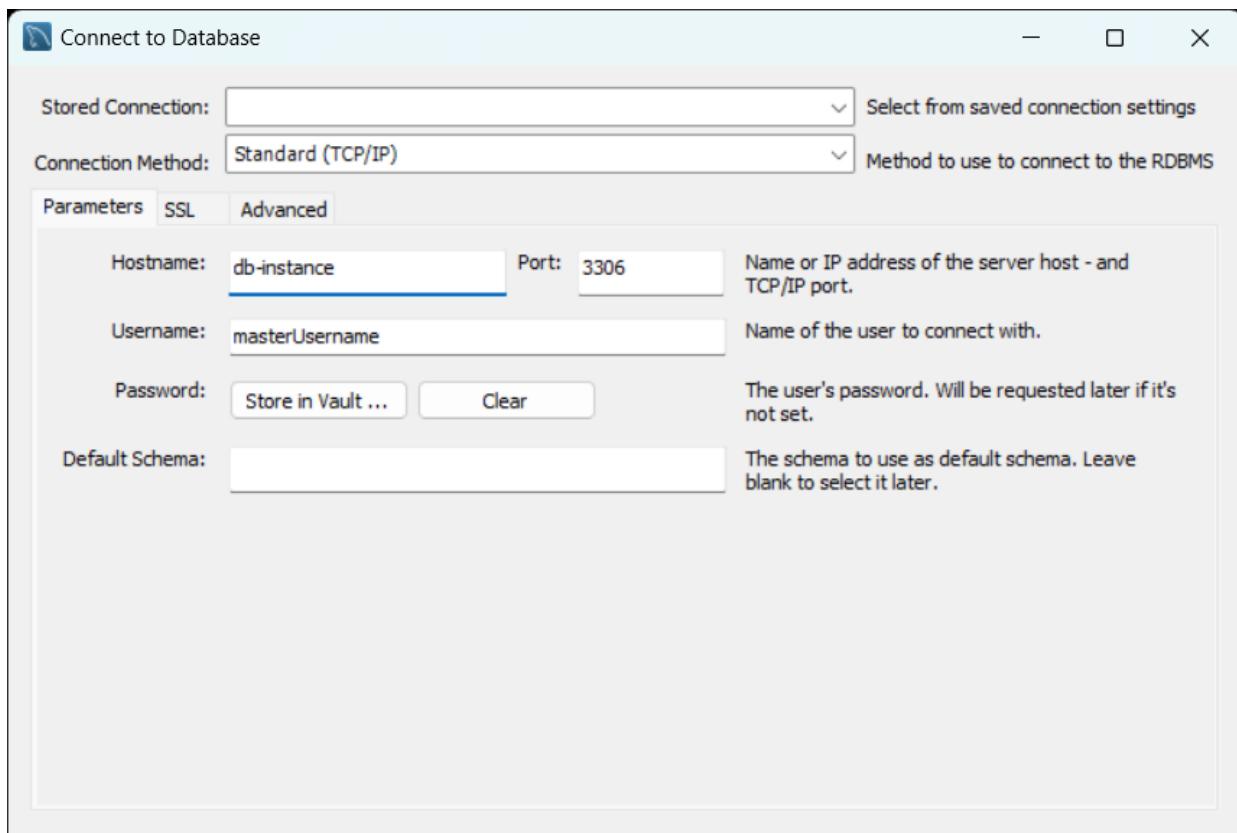
The screenshot shows the AWS RDS Management console with the URL [us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance](https://us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance). The page is titled 'Create database - RDS Management'. On the left, there's a sidebar with 'Services' and a search bar. The main content area has a title 'Maintenance' with a sub-section 'Auto minor version upgrade Info'. It includes an option to 'Enable auto minor version upgrade' with a note about automatic upgrades occurring during maintenance windows. Below this is a 'Maintenance window Info' section with two radio button options: 'Choose a window' and 'No preference', where 'No preference' is selected. There's also a 'Deletion protection' section with an unchecked checkbox for 'Enable deletion protection'. A summary section titled 'Estimated monthly costs' is shown. On the right, a modal window titled 'MySQL' provides general information about MySQL and lists several features it supports. At the bottom, there are 'CloudShell', 'Feedback', and copyright information.

This screenshot continues the 'Create database' wizard. The main content area now displays the 'Estimated monthly costs' section, which details the Amazon RDS Free Tier benefits for 12 months. It lists 750 hrs of Amazon RDS in Single-AZ db.t2.micro, db.t3.micro or db.t4g.micro instances, 20 GB of General Purpose Storage (SSD), and 20 GB for automated backup storage and DB Snapshots. It also links to the 'AWS Free Tier' documentation. A note at the bottom states: 'You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.' At the bottom right of this section are 'Cancel' and 'Create database' buttons, with 'Create database' being highlighted. The right-hand 'MySQL' modal window remains visible, providing information about MySQL features. The footer includes 'CloudShell', 'Feedback', and copyright information.

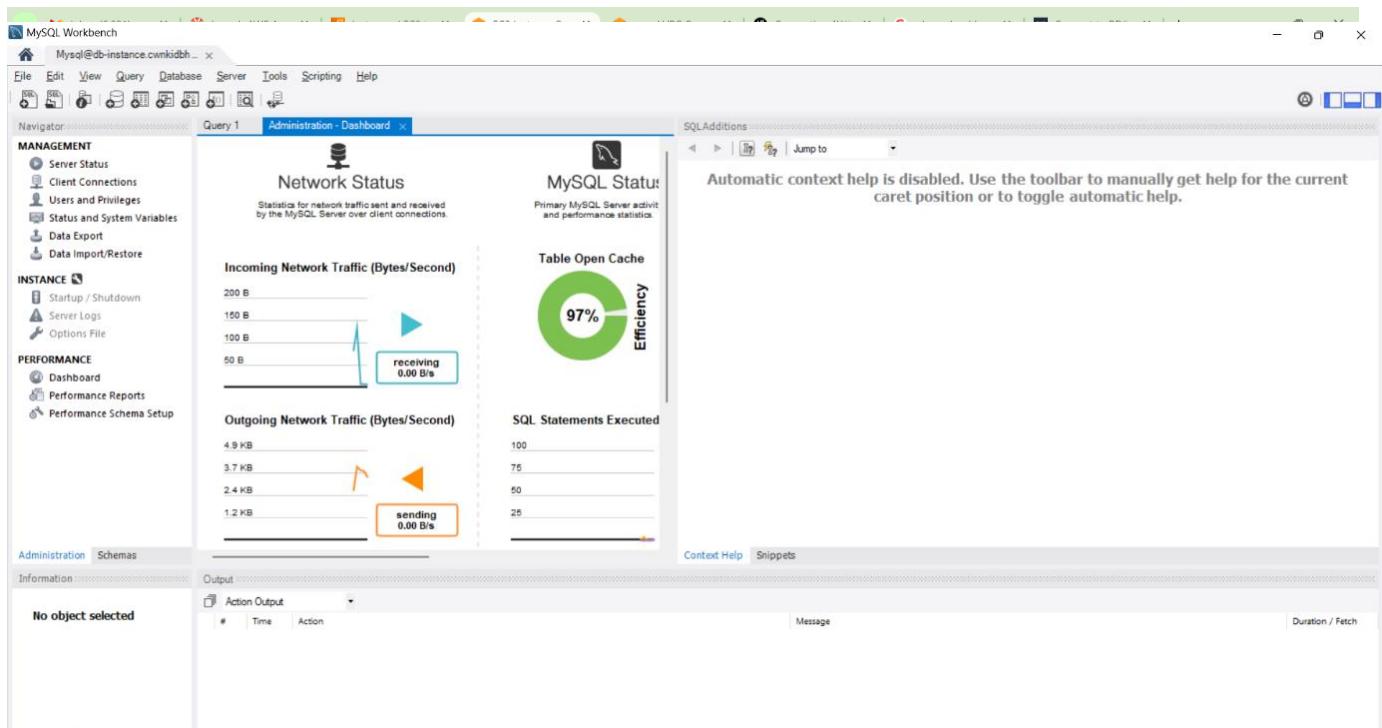
Step 5: Wait for the status to be available.

The screenshot shows the AWS RDS Management Console. On the left, there's a sidebar with options like Dashboard, Databases (which is selected), Query Editor, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, and Option groups. The main area has a blue header bar with a message: "Creating database db-instance. Your database might take a few minutes to launch. You can use settings from db-instance to simplify configuration of suggested database add-ons while we finish creating your DB for you." Below this, another message box says "Introducing Aurora I/O-Optimized". At the bottom of the main area, there's a "Databases (1)" section with a "Create database" button. The navigation bar at the top includes "Launch AWS Academy Learner Lab", "Databases - RDS Management Con...", "us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#databases:", "Services", "Search [Alt+S]", and "N. Virginia". The status bar at the bottom shows "voclabs/user3377038=Jacqueline @ 1817-5211-7629".

Step 6: Now go to MySQL workbench and connect to DB



Step 7: This screen will appear



Step 8: Now create instance and connect using following commands.

```

[ec2-user@ip-172-31-93-198 ~]$ sudo dnf update -y
Last metadata expiration check: 0:00:19 ago on Tue Oct 1 13:23:53 2024.
Dependencies resolved.
Nothing to do.
Complete!
[ec2-user@ip-172-31-93-198 ~]$ sudo dnf install mariadb105-server
Last metadata expiration check: 0:00:45 ago on Tue Oct 1 13:23:53 2024.
Dependencies resolved.

      Package           Architecture   Version          Repository
Installing:
  mariadb105-server      x86_64        3:10.5.25-1.amzn2023.0.1    amazonlinux
Installing dependencies:
  mariadb-connector-c      x86_64        3.1.13-1.amzn2023.0.3    amazonlinux
  mariadb-connector-c-config  noarch      3.1.13-1.amzn2023.0.3    amazonlinux
  mariadb105                x86_64        3:10.5.25-1.amzn2023.0.1    amazonlinux
  mariadb105-common       x86_64        3:10.5.25-1.amzn2023.0.1    amazonlinux

i-05e9fd9c430ca0fc8 (webserver)

```

Step 9: The connected database screen will appear.

```

Complete!
[ec2-user@ip-172-31-90-34 ~]$ mysql -h rds-mysql-10mintutorial.ckk8qwy8hym.us-east-1.rds.amazonaws.com -P 3306 -u masterUsername -pashutosh_96
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 28
Server version: 8.0.35 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]> show databases;
+-----+
| Database      |
+-----+
| amazonRDS    |
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
5 rows in set (0.003 sec)

MySQL [(none)]> [REDACTED]

i-06c48a79005dc6082 (myserver)
PublicIPs: 18.205.161.230 PrivateIPs: 172.31.90.34

CloudShell Feedback © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

```

## Step 10: Now delete the instance and databases.

The screenshot shows the AWS CloudShell interface. At the top, there is a terminal window displaying a MySQL session connected to a database named 'myserver'. The session shows the following output:

```

Complete!
[ec2-user@ip-172-31-90-34 ~]$ mysql -h rds-mysql-10mintutorial.ckk8qwy8hym.us-east-1.rds.amazonaws.com -P 3306 -u masterUsername -pashutosh_96
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 28
Server version: 8.0.35 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]> show databases;
+-----+
| Database      |
+-----+
| amazonRDS    |
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
5 rows in set (0.003 sec)

MySQL [(none)]> [REDACTED]

i-06c48a79005dc6082 (myserver)
PublicIPs: 18.205.161.230 PrivateIPs: 172.31.90.34

```

Below the terminal, there is a message box containing the instance details: 'i-06c48a79005dc6082 (myserver)' and 'PublicIPs: 18.205.161.230 PrivateIPs: 172.31.90.34'.

The main content area of the CloudShell shows the AWS CloudShell interface with tabs for 'CloudShell' and 'Feedback'. At the bottom, there is a footer with links to 'Privacy', 'Terms', and 'Cookie preferences'.

Below the CloudShell, the AWS Management Console is shown. The URL is 'us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:v=3;\$case-tags:true%5Cclient:false;\$regex-tags:false%5...'. The left sidebar shows the 'Instances' section under 'Services'. The main pane displays the 'Instances (1/2) info' table. One instance, 'demo1' (i-0fd1d52ac99039be7), is selected and has a blue border around its row. An 'Actions' dropdown menu is open over this instance, with the 'Terminate (delete) instance' option highlighted. The table also lists other instances like 'Jack' (i-09be13).

The screenshot shows the AWS RDS Management Console. On the left, the navigation pane includes options like Dashboard, Databases (which is selected), Query Editor, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, and Parameter groups. The main area displays a table titled 'Databases (1)' with one entry: 'db-instance'. To the right of the table is a 'Quick Actions - New' menu with options like 'Convert to Multi-AZ deployment', 'Stop temporarily', 'Reboot', 'Delete', 'Set up EC2 connection', 'Set up Lambda connection', 'Create read replica', and 'Create Aurora read replica'. A sub-menu for 'Delete' is shown, containing the text: 'Delete', 'Schedule downtime', and 'Size your downtime changes to production'. At the bottom of the screen, there are links for CloudShell, Feedback, and a footer with copyright information.

This screenshot shows the 'Delete' confirmation dialog for the database 'db-instance'. The dialog includes the following fields and instructions:

- Create final snapshot**: A checkbox labeled 'Create final snapshot' with the sub-instruction "Determines whether a final DB Snapshot is created before the DB instance is deleted."
- Final snapshot name**: A text input field containing 'db-instance-snapshot'.
- Retain automated backups**: A checkbox labeled 'Retain automated backups' with the sub-instruction "Determines whether retaining automated backups for 1 day after deletion."
- Billing information**: A note stating "You will be billed for retained backup storage at the rate described as 'Additional backup storage' found in [Backup Storage](#)".
- Consent**: A note "To avoid accidental deletion provide additional written consent." followed by a text input field containing 'delete me'.
- Buttons**: 'Cancel' and 'Delete' (highlighted in yellow).

Step 10: Sign out and end lab.

The screenshot shows the Amazon RDS Management Console. The left sidebar is titled "Amazon RDS" and includes links for Dashboard, Databases (which is selected), Query Editor, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, and Parameter groups. The main content area has a banner for "Introducing Aurora I/O-Optimized". Below it is a note about Blue/Green Deployments. The "Databases" section shows a table with one row, indicating 0 databases. The table has columns for DB identifier, Status, Role, Engine, and Region. A "Create database" button is visible. The top right corner shows account information: Account ID: 1817-5211-7629, Federated user: voclabs/user3377038=Jacqueline @ 1817-5211-7629. The bottom right corner shows "Switch role" and "Sign out".

The screenshot shows the "Launch AWS Academy Learner Lab" page. The left sidebar includes links for Account, Dashboard, Courses, Calendar, Inbox, History, and Help. The main content area shows a "Learner Lab" interface with a timer at 03:08. A confirmation dialog box is centered, asking "Are you sure you want to end the lab?", with "Yes" and "No" buttons. To the right of the dialog, there is a "Learner Lab" section with links to Environment Overview, Environment Navigation, Access the AWS Management Console, Region restriction, and Service usage and other.