LAB MANUAL
ELECTIVE-II
CLOUD COMPUTING (310254(C))
TE (AI&DS) 2020 COURSE

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DEPARTMENT OF
ARTIFICIAL INTELLIGENCE & DATA SCIENCE

Department of Artificial Intelligence & Data Science

Vision:

Imparting quality education in the field of Artificial Intelligence and Data Science

Mission:

- To include the culture of R and D to meet the future challenges in AI and DS.
- To develop technical skills among students for building intelligent systems to solve problems.
- To develop entrepreneurship skills in various areas among the students.
- To include moral, social and ethical values to make students best citizens of country.

Program Educational Outcomes:

1. To prepare globally competent graduates having strong fundamentals, domain knowledge, updated with modern technology to provide the effective solutions for engineering problems.

2. To prepare the graduates to work as a committed professional with strong professional ethics and values, sense of responsibilities, understanding of legal, safety, health, societal, cultural and environmental issues.

3. To prepare committed and motivated graduates with research attitude, lifelong learning, investigative approach, and multidisciplinary thinking.

4. To prepare the graduates with strong managerial and communication skills to work effectively as individuals as well as in teams.

Program Specific Outcomes:

1. Professional Skills- The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, networking, artificial intelligence and data science for efficient design of computer-based systems of varying complexities.

2. Problem-Solving Skills- The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

3. Successful Career and Entrepreneurship- The ability to employ modern computer languages, environments and platforms in creating innovative career paths to be an entrepreneur and to have a zest for higher studies.

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1. Guidelines to manual usage

This manual assumes that the facilitators are aware of collaborative learning methodologies.

This manual will provide a tool to facilitate the session on Digital Communication modules in collaborative learning environment.

The facilitator is expected to refer this manual before the session.

Icon of Graduate Attributes

K	A	D	I
Applying Knowledge	Problem Analysis	Design & Development	Investigation of problems
M	E	E	T
Modern Tool Usage	Engineer & Society	Environment Sustainability	Ethics
T	O	M	I
Individual & Team work	Communication	Project Management & Finance	Life-Long Learning

Disk Approach- Digital Blooms Taxonomy

1: Remembering / Knowledge

2: Comprehension / Understanding

3: Applying

4: Analyzing

5: Evaluating

6: Creating / Design

Program Outcomes:

1. **Engineering knowledge:** An ability to apply knowledge of mathematics, including discrete mathematics, statistics, science, computer science and engineering fundamentals to model the software application.
2. **Problem analysis:** An ability to design and conduct an experiment as well as interpret data, analyze complex algorithms, to produce meaningful conclusions and recommendations.
3. **Design/development of solutions**: An ability to design and development of software system, component, or process to meet desired needs, within realistic constraints such as economic, environmental, social, political, health & safety, manufacturability, and sustainability.
4. **Conduct investigations of complex problems**: An ability to use research based knowledge including analysis, design and development of algorithms for the solution of complex problems interpretation of data and synthesis of information to provide valid conclusion.
5. **Modern tool usage:** An ability to adapt current technologies and use modern IT tools, to design, formulate, implement and evaluate computer based system, process, by considering the computing needs, limits and constraints.
6. **The engineer and society:** An ability of reasoning about the contextual knowledge of the societal, health, safety, legal and cultural issues, consequent responsibilities relevant to IT practices.
7. **Environment and sustainability:** An ability to understand the impact of engineering solutions in a societal context and demonstrate knowledge of and the need for sustainable development.
8. **Ethics:** An ability to understand and commit to professional ethics and responsibilities and norms of IT practice.
9. **Individual and team work: An** ability to apply managerial skills by working effectively as an individual, as a member of a team, or as a leader of a team in multidisciplinary projects.
10. **Communication:** An ability to communicate effectively technical information in speech, presentation, and in written form
11. **Project management and finance:** An ability to apply the knowledge of Information Technology and management principles and techniques to estimate time and resources needed to complete engineering project.
12. **Life-long learning:** An ability to recognize the need for, and have the ability to engage in independent and life-long learning.

Course Name: Elective II – Cloud Computing

Course Code: 310254(C)

Course Outcomes

CO1: Understanding of AWS environment.

CO2: Understand Amazon RDS

CO3: Understand and use of AWS Lightsail

CO to PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	3	-	3	-	-	-	-	-	-	1
CO2	1	1	3	-	3	-	-	-	-	-	-	1
CO3	1	1	2	1	2	-	-	-	-	-	-	1

CO to PSO Mapping:

	PSO1	PSO2	PSO3
CO1	2	1	1
CO2	2	2	1
CO2	1	2	1

2. **Laboratory Objective**
   - To Learn AWS environment.
   - To Learn Amazon RDS.
   - To design and develop different applications using Amazon Services.

3. **Laboratory Equipment/Software**
   1. Amazon Web Services CLI
   2. RDS
   3. LightSail

4. List of Assignments

Sr. No	Title
	List of Assignments
1	Setting up AWS Environment: Create a new AWS account, Secure the root user, Create an IAM user to use in the account Set up the AWS CLI, Set up a Cloud9 environment.
2	Setup, Create and visualize data in an Amazon Relational Database (Amazon RDS) MS SQL Express server using Amazon Quick Sight.
3	Setup, Create and connect your Word Press site to an object storage bucket using Lightsail service

Experiment No. 1

Problem Statement:

Setting up AWS Environment: Create a new AWS account, Secure the root user, Create an IAM user to use in the account Set up the AWS CLI, Set up a Cloud9 environment.

Introduction:

Amazon web services are a cloud-based platform that offers a wide range of services for computing storage database, analytics and more. Amazon Web Services give programmatic entry to Amazon's ready-to-use computing infrastructure. The robust computing podium that was assembled and enhanced by Amazon is now obtainable by anyone who has entry to the internet.

Amazon gives numerous web services, building-blocks that fulfill some of the quintessence wants of most systems: storage, computing, messaging and datasets. Amazon Web Services can aid us to architect scalable procedures by providing:

● Reliability: The services run in Amazon's battle-tested, highly obtainable datacenters that run Amazon's own business.

● Security: Basic security and authentication methods are obtainable out of the packing box and customers can enhance them as wanted by layering his/her application-specific security on apex of the services. Cost benefits: No fastened charges or support costs.

● Ease of development: Simple APIs allow us to harness the full power of this virtual infrastructure and libraries, obtainable in most extensively employed programming languages.

● Elasticity: Scale the computing supplies based on demand.

● Cohesiveness: The four quintessence building-blocks using which services (storage, computing, messaging and datasets) are created from scratch currently work well and give a whole result through a large type of request for paid job domains.

● Community: Tap into the vibrant and dynamic customer community that is propelling the extensive adoption of these web services and is bringing ahead sole requests for paid jobs assembled on this infrastructure.

Create a new AWS Account.

    a. Go to http://aws.amazon.com/and click on create an Aws Account".
    b. Follow the prompts to enter your information and payment details.
    c. You will also need to provide a valid phone number and credit card information to verify your identity.

Secure the root user.

    a. Once you have created your Aws account sign in to the Aws Management Console.
    b. Locate the "security credentials' page in the console and click on it.
    c. Create a strong, unique password for your root user amount.

d.   Enable multi-factor authentication (MFA) for your root user account.

IAM (Identity Access Management)

AWS Identity and Access Management (IAM) is a web service that helps you securely control access to AWS resources. With IAM, you can centrally manage permissions that control which AWS resources users can access. You use IAM to control who is authenticated (signed in) and authorized (has permissions) to use resources.

IAM gives you the following features:

- Shared access to your AWS account
- Granular permissions
- Secure access to AWS resources for applications that run on Amazon EC2
- Multi-factor authentication (MFA)
- Identity federation

You can work with AWS Identity and Access Management in any of the following ways.

AWS Management Console

The console is a browser-based interface to manage IAM and AWS resources.

AWS Command Line Tools

You can use the AWS command line tools to issue commands at your system's command line to perform IAM and AWS tasks. Using the command line can be faster and more convenient than the console.

Create an I AM user to use in the account.

a. In the Aws Management Console, navigate to the IAM dashboard.

b. Click on "Users in the left hand navigation pane.

c. Click on Add User to create a new user.

d. Provide a username and select "Programmatic overs" for the access type.

e. creates an access key and secret access key for the user.

AWS CLI (Command Line Interface)

The AWS Command Line Interface (AWS CLI) is a unified tool to manage your AWS services. With just one tool to download and configure, you can control multiple AWS services from the command line and automate them through scripts.

Set up the AWS CLI

a. Install the AWS CLI on your local machine.

b. opens a terminal or command prompt and enter.

c. the following command: Aws configure Enter the access key and secret access key for the IAM user you created in step 3.

d. Enter the default output format for your commands.

Cloud9

What is AWS Cloud9?

AWS Cloud9 is a cloud-based integrated development environment (IDE) that lets you write, run, and debug your code with just a browser. It includes a code editor, debugger, and terminal. Cloud9 comes prepackaged with essential tools for popular programming languages, including JavaScript, Python, PHP, and more, so you don't need to install files or configure your development machine to start new projects. Since your Cloud9 IDE is cloud-based, you can work on your projects from your office, home, or anywhere using an internet-connected machine. Cloud9 also provides a seamless experience for developing server less applications enabling you to easily define resources, debug, and switch between local and remote execution of server less applications. With Cloud9, you can quickly share your development environment with your team, enabling you to pair program and track each other's inputs in real time.

Setup a cloud9 environment

    a. In the AWS Management Console navigate the clouds.

    b. Click on "Create environment" to create a new cloud9 environment.

    c. Choose a platform and instance type for your environment.

    d. Click "create environment" to create your cloud9 environment.

Conclusion:

Hence we have successfully created a new AWS account, secure the root user, created an IAM user to use in the account, set up the AWS CLI, Set up a Cloud9 environment.

Questions:

1. What is AWS IAM? Give its features.
2. What IS difference between Authentication and Authorization?
3. What is the AWS CLI on your local machine?
4. How do you configure the AWS CLI?
5. What is AWS Cloud9?
6. What are the AWS Cloud9 supported programming languages?
7. What is MFA?

Experiment No. 2

Aim:

Setup, create and visualize in an Amazon Relational Database MS SQL Express server using amazon quick sight.

Objective:

To study:

1. Create and visualize in an Amazon RDS express server using Amazon quick sight.

Theory:

Introduction:

Amazon RDS

Amazon Relational Database Service (Amazon RDS) is a worldwide well-known web service. It makes relational database to set up, function and scale in the cloud much simpler. It presents cost-efficient, resizable capability for multiple industry-standard relational databases and organizes widespread database management tasks.

Amazon RDS guides the users to get access to the capabilities of a well-renowned MySQL or Oracle database server. Amazon RDS mechanically backs up the database and sustains the database programs that force the DB Instance. Amazon RDS is flexible

Set up an Amazon RDS MS SQL Express server.

a. In the AWS Management Console navigate to the Amazon RDS dashboard.

b. Click on "create database" to create a new database.

c. Select Microsoft SQL Server Express" as engine type.

d. Choose the version of SQL server Express that you want.

e. Review the setting and click "create database" to create your RDS instance.

Create a Sample Table in the RDS database.

a. Connect to the RDS database instance using a SQL server Management tool, such as SQL server management Studio.

b. Create a sample table in the database, such as table with columns for customer names, orders, and order dates.

c. Insert sample data into the table.

Create an Amazon Quick sight Account.

a. In the AWS management console, navigate to Amazon Quick Sight.

b. Select "SQL server" as the data source type.

c. Choose the database and table that you want to use for your Quick Sight analysis.

d. Review and edit the SQL query to retrieve the data you want.

Create visualization in Amazon Quick sight.

Amazon QuickSight connects to your data in the cloud and combines data from many different sources. In a single data dashboard, QuickSight can include AWS data, third-party data, big data, spreadsheet data, SaaS data, B2B data, and more

a. In the Amazon Quick sight dashboard, click on "New analysis" to create a new visualization.

b. Choose the data source that you created in step 4.

c. Select the columns that you want to include in your visualization.

d. Choose the type of visualization that you want to use such as bar chart or line chart.

e. Save and share the visualization with other Quick sight users.

Conclusion:

With these steps, you should be able to set up, create and visualize data in an Amazon RDS MS SQL Express Server using Amazon quick sight.

Outcome:

Upon completion of this experiment, students will be able to:

Experiment level outcome (ELO3): Create and visualize data in an Amazon RDS MS SQL Express Server using Amazon quick sight.

Questions

1. What is Amazon RDS?
2. What is Amazon quick sight?
3. What is Amazon RDS SQL server?

Assignment-3

Problem Statement:

Setup, create and connect your Word Press site to an object storage bucket using LightSail service

Introduction:

Amazon LightSail - is a powerful virtual server that is built for reliability & performance. It offers virtual servers, storage, databases, and networking, plus a cost-effective, monthly plan.

Here are the steps to set up, create and connect your WordPress site an object storage bucket using light tail service.

AWS LightSail features:
- **Quick and simple setup:** Setting up AWS Lightsail instance is a fairly simple task as compared to running an ECS or EC2 service.
  - Can be provisioned from AWS console.
  - Can be directly set up from AWS LightSail.
  - Can be managed and set-up from AWS CLI.
- **Cheaper:** AWS Lightsail is cheaper as compared to EC2 and ECS service. Implying that it won't offer as many features and as much configuration freedom as an EC2 instance.
- **Multiple Instances:** You can run multiple instances of AWS Lightsail and have them communicate with each other to make a fairly complex use case.
- **Connection to other services:** AWS Lightsail can connect to other AWS Resources much like any other EC2 instance.

Create a Lightsail instance.

a. In the Aws Management Console navigate to the Lightsail dashboard.

b. Click on "Create instance" to create a new Lightsail instance.

c. Choose a location for your instance and select the WordPress blueprint.

d. Click "Create" to launch your instance

Connect to your WordPress site.

a. Wait for your light sail instance to be created and launched.

b. In the Lightsail dashboard, click on your instance to view the instance details.

c. Click on "Connect" to connect to your instance using the browser based SSH terminal.

d. Follow the prompts to log in to your instance.

Connect your WordPress site to the object storage Bucket.

 a. Install and activate the "WP offload media lite" plugin on your WordPress site.

 b. In the WordPress dashboard, navigate to the "offload Media" setting page.

 c. Enter the access credentials for your s3 bucket.

 d. Choose the settings for your offloaded media files to the S3 bucket

Test the Connection.

a. Upload a new media file to your WordPress site and confirm that it is offloaded to the s3 bucket.

b. Check the S3 bucket to confirm that the media file has been stored in the bucket

Conclusion:

Hence with these steps you should be able to set up, create and connect your WordPress site to an object storage budget using Lightsail service.

Outcome:

Upon completion of this experiment, students will be able to:

Experiment level outcome (ELO3): create and connect WordPress site to an object storage bucket using LightSail service.

Questions

1. What is Amazon LightSail?
2. What are the benefits of Amazon LightSail?
3. What is Amazon S3?
4. What is bucket in WordPress?
5. What is bucket storage?