

**SRM Institute of Science and Technology**

**Department of Computer Applications**

**Delhi – Meerut Road, Sikri Kalan, Ghaziabad, Uttar Pradesh – 201204**

**Circular – 2023-24**

**BCA DS 1<sup>st</sup> Sem**

**Programming Using Java (UDS23101J)**

**List of Programs**

Laboratory1: Learning to work with Java IDE and Writing Simple Conversion Programs

Laboratory 2: Operators

Laboratory 3: Arrays, Control Statements

Laboratory 4: Classes and Objects

Laboratory 5: Overloading Methods and Constructors, finalize () method

Laboratory 6: String Class, Command Line Arguments

Laboratory 7: Inheritance, Method Overriding, Abstract classes and methods

Laboratory8: Packages and Interfaces

Laboratory9: Exception Handling

Laboratory10: Multi-threading

Laboratory11: Legacy Classes and Interfaces

Laboratory 12: Utility Classes and Simple Applet Programs

Laboratory13: Event Handling

Laboratory 14: AWT Controls

Laboratory15: Layout Managers, Byte and Character Streams

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**Circular – 2023-24**

**BCA DS 1<sup>st</sup> Sem**

**Fundamentals of Data Science (UDS23102J)**

**List of Programs**

Lab 1: Write a Python script to print a statement

Lab 2: Perform Analysis on Simple Dataset for Data Science and Business Intelligence Applications

Lab 3: Write a python program for swapping two numbers

Lab 4: Write a Python script to find subset of dataset by using subset (), aggregate () functions on iris dataset

Lab 5: Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location

Lab 6: Install Python and apply all basic python functions

Lab 7: Install and perform a Numerical Array Processing using NumPy

Lab 8: Write a Python script to find basic descriptive statistics using summary, str, quartile function on mt cars& cars datasets

Lab 9: Find the correlation matrix.

Lab 10: Plot the correlation plot on dataset and visualize giving an overview of relationships among data on iris data.

Lab 11: Install and perform a simple Exploratory Data Analysis using Pandas

Lab 12: Install, Import Pandas Learn and Explore a Sample Dataset with it

Lab 13: Install, Import Scikit Learn and Explore Iris Dataset with Pandas for ML Modelling

Lab 14: Install, Import Matplotlib. Explore all the Data Visualization Graphs.

Lab 15: Find the outliers using plot.

Lab 16: Find the data distributions using box and scatter plot

Lab 17: Plot the histogram, bar chart and pie chart on sample data

Lab 18: Install, Import Matplotlib. Explore all the Data Visualization Graphs.

Lab 19: Python program for line chart

Lab20: Python program for customizing plot

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**Circular – 2023-24**

**BCA DS 3rd Sem**

**Data Engineering for Enterprise (UDS23301J)**

**List of Programs**

Lab 1: Setup a Simple Data Engineering Development Infrastructure in My SQL Opensource

Lab 2 : Create following tables with appropriate columns ● A Customer Table ● A Product Table ● A Sales Order Table Note: Check DeepSphere.AI GitHub for table structure and sample data

Lab 3: Load Data into the following tables from CSV file, TEXT File and Google G Drive ● Customer Table ● Product Table ● Sales Order Tables

Lab 4 : Validate data in the below data loaded tables ● Customer Table ● Product Table ● Sales Order Tables Check if the CustomerID, ProductID and Sales OrderID are unique and not null. ● Check if the Data type of Customer Names, Product Names are CHAR

Lab 5 : Validate data in the below data loaded tables ✓ Check if the Customer Email has a format: name@email.com ✓ Check if there are any null values ✓ Check if there are any duplicate values

Lab 6: Write a Select query with the following conditions using python ● Use INNER JOIN to merge the Customer table with the Product table on CustomerID

Lab 7: Write a Select query with the following conditions using python ● Use LEFT JOIN to merge above result with the Sales order table on ProductID ● Use RIGHT JOIN to merge the result of first conditions with the Sales order table on ProductID

Lab 8: Perform Update operation with the below logic using python ● Update Unit Price = \$40 where Product = 'Coolers' ● Update Quantity = 5 Customer = 'Alfred'

Lab 9: Perform Update operation with the below logic using python ● Calculate Revenue as = Unit Price \* Quantity ● Calculate 10% discount where Product = 'Toothpaste'

Lab 10 : Perform Data Transformation with the some logic using python ● Add the First name and the Last Name as Full Name ● Change the Customers Full Name with Upper Case to Proper Case

Lab 11: Perform Data Transformation with the some logic using python ● CHANGE the Sales Order Date Format as DDMMYYYY ● Sort the product in the higher order of Revenue

Lab 12: Perform data validation with some logic using python ● Validate for Customer Full Name without Double Spaces ● Validate for Sales Order Data with incorrect date correct (Should be MMYDD)

Lab 13: Perform data validation with some logic using python ● Validate for Incorrect Product UOM's ● Write validation results in a File in G Drive

Lab 14: Using two different files and merge the Files and then load into table using Python In Colab and use appropriate python libraries

Lab 15: Using Data from Two different Files merge the Files, remove duplicate rows and replace NULL values with ##### and then load into table using Python In Colab and use appropriate python libraries

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**Circular – 2023-24**

**BCA DS 3rd Sem**

**Data Base Management System (UDS23302J)**

**List of Programs**

- Lab 1: Design a Database and create required tables
- Lab 2: SQL Data Definition Language using student database
- Lab 3: Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables
- Lab 4: SQL Data Manipulation Language commands using employee database
- Lab 5: SQL Data Control commands
- Lab 6: Case study submission for ER Diagram
- Lab 7: SQL using Joins
- Lab 8: SQL using aggregate functions and set operations
- Lab 9: PL/SQL Conditional and Iterative Statements
- Lab 10: PL/SQL Functions and Procedures
- Lab 11: Case study submission for normalization
- Lab 12: PL/SQL cursor
- Lab 13: PL/SQL Trigger
- Lab 14: Case study submission for recovery
- Lab 15: Case study submission for database backups

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**Circular – 2023-24**

**BCA DS 3rd Sem**

**Data Wrangling (UDS23G01J )**

**List of Programs**

- Lab1: Install python, Setting up Ipython and Jupyter Notebook
- Lab 2: Using Python libraries to parse excel file.
- Lab 3: Using NumPy & Pandas to Calculate Basic Descriptive Statistics on the DataFrame
- Lab 4: Download a dataset and perform visual exploration of data
- Lab 5: Use RegEx for text format files
- Lab 6: Build a Web Scraper using Python
- Lab 7: Explore different data cleaning Tools
- Lab 8: Outlier Detection Using a Simple Statistical Test
- Lab 9: Read any tabular dataset and perform data cleaning
- Lab 10: Implement Combine and merge of data in Pandas Object
- Lab 11: Implement Reshaping and Pivoting using Pandas Object
- Lab 12: Use matplotlib to perform data visualization
- Lab 13: Perform Groupby Operations using Pandas
- Lab 14: Perform Aggregation Operation on dataframe
- Lab 15: Perform Cross Tab analysis in Python

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**Circular – 2023-24**  
**BCA DS 5th Sem**  
**Deep Learning with Keras and Tensorflow (UDS23501J )**  
**List of Programs**

- Lab 1: Learning XOR Problem
- Lab 2 : Image Classification using CNN
- Lab 3: Building a deep learning model
- Lab 4 : Data Augmentation lab
- Lab 5 : Implementation of RNN
- Lab 6: Restricted Boltzmann machine
- Lab 7: Generative Adversarial Networks
- Lab 8: variational autoencoder
- Lab 9: LSTM
- Lab 10 : Bidirectional LSTM
- Lab 11: Data Augmentation lab I
- Lab 12: Data Augmentation lab II
- Lab 13: Install, Import Tensorflow and Keras. Create a Basic Neural Network with few layers.
- Lab : 14 Install, Import Tensorflow and Keras. Create a Basic Neural Network with few layers
- Lab 15: Neural Networks using Keras

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**Circular – 2023-24**  
**BCA DS 5th Sem**  
**Big Data Analytics with Applications (UDS23502J )**  
**List of Programs**

Lab 1: Install Apache Hadoop

Lab 2: Develop a MapReduce program to calculate the frequency of a given word in a given file.

Lab 3: Develop a MapReduce program to find the maximum temperature in each year.

Lab 4: Develop a MapReduce program to find the grades of students.

Lab 5: Develop a MapReduce program to implement Matrix Multiplication

Lab 6: Develop a MapReduce to find the maximum electrical consumption in each year  
given electrical consumption for each month in each year.

Lab 7: Develop a MapReduce to analyze weather data set and print whether the day is sunny or cool  
day.

Lab 8: Develop a MapReduce program to find the number of products sold in each country by  
considering sales data containing fields

Lab 9: Develop a MapReduce program to find the tags associated with each movie by analyzing movie  
lens data.

Lab 10: XYZ.com is an online music website where users listen to various tracks, the data  
gets collected which is given,

Lab 11: Develop a MapReduce program to find the frequency of books published each year and find in  
which year maximum number of books were published using the given data.

Lab 12: Develop a MapReduce program to analyze Titanic ship data and to find the average age of  
the people (both male and female) who died in the tragedy. How many persons are survived in each  
class.

Lab 13: Develop a MapReduce program to analyze Uber data set to find the days on which each  
basement has more trips using the given dataset.

Lab 14: Develop a program to calculate the maximum recorded temperature by yearwise for the  
weather dataset in Pig Latin

Lab 15: Write queries to sort and aggregate the data in a table using HiveQL.

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**Circular – 2023-24**  
**BCA DS 5th Sem**  
**INTELLIGENT AUTOMATION (UDS23503J )**  
**List of Programs**

- Lab 1: Introduction to RPA Tools
- Lab 2: Installation of RPA Blue Prism
- Lab 3: Automation Implementation Strategies
- Lab 4: Building a Robotic Process Automation Workflow
- Lab 5: Data Cleansing and Preprocessing for Automation Lab
- Lab 6: Building a Predictive Model for Automation Tasks
- Lab 7: Exploring with python libraries
- 8: Process Automation with Python Lab
- Lab 9: Introduction to Web Scraping and Automation
- Lab 10: Web scraping and automation
- Lab 11: Exploring cognitive automation Lab
- Lab 12: Exploring AI Integration
- Lab 13 : Build an Industry Specific Automation Solution-1
- Lab 14: Build an Industry Specific Automation Solution-2
- Lab 15: Build an Industry Specific Automation Solution-3



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**Circular – 2023-24**  
**BCA DS 5th Sem**  
**Data Warehousing and Data Mining (UDS23D01J )**  
**List of Programs**

Lab 1: : Installation of WEKA Tool - Investigation the Application interfaces of the Weka tool

Lab2: Overview -Working in the Console

Lab 3: Getting Help in weka tool and Quitting WEKA

Lab 4: Pre-process a given dataset based on Attribute selection

Lab 5: Pre-process a given dataset based on Handling Missing Values

Lab 6: Create a Weather Table with the help of Data Mining Tool WEKA.

Lab 7: Generate Association Rules using the Apriori Algorithm

Lab 8: Generate Association Rules using the Apriori Algorithm

Lab 9: Build a Decision Tree by using J48 algorithm

Lab 10: Naïve bayes classification on a given data set

Lab 11: Finding Association Rules for Employee data.

Lab 12: To Construct Decision Tree for Weather data and classify it..

Lab 13: Applying k-means clustering on a given data set

Lab14: Distance Measures in Algorithmic Methods

Lab 15: Write a procedure for Employee data using MakeDensityBased Cluster Algorithm

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**Circular – 2023-24**  
**BCA DS 5th Sem**  
**Introduction to Cloud Computing (UDS23D02J)**  
**List of Programs**

- Lab 1: Create a virtual machine
- Lab 2: Installation of Platforms
- Lab 3: Deploying existing Apps
- Lab 4: Create a drop box using Google AP
- Lab 5: Transfer Data using Google APPs
- Lab 6: upload and download using Google APPs
- Lab 7: Encryption and Decryption of Text
- Lab 8: Simple Experiments in Cloud Sim
- Lab 9: Simple Experiments in Cloud Sim
- Lab 10: Develop a Hello World application using Google App Engine
- Lab 11: Develop a Guestbook Application using Google App Engine
- Lab 12: Develop a Windows Azure Hello World application
- Lab 13: Create a Warehouse Application in Sales force.Com
- Lab 14: Create a Warehouse Application in Sales force.Com using Apex prog Lang
- Lab 15: Implementation of SOAP Web Services

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**BCA DS 5th Sem**  
**No-Code Applications (UDS23G03J)**  
**List of Programs**

- Lab 1: Tour around the different No-Code Tool landscape
- Lab 2: Building Workflow Automation using Low-Code
- Lab 3: Create a web scraping tool using No-Code
- Lab 4: Working with the Designer interface of WebFlow
- Lab 5: Create Responsive WebPage using WebFlow
- Lab 6: Using Bubble build features like sign up forms, expense trackers, inboxes, shopping carts
- Lab 7: Build a Midfullness app using Glide
- Lab 8: Build a Task Tracker App Using Glide
- Lab 9: Build an app using Thunkable to sell products
- Lab 10: Detect and Classify Face Masks using GoogleTeachable machine
- Lab 11: Build a Image Classification Model Using Lobe.ai
- Lab 12: Build a Conversational Chatbot using LandBot
- Lab 13: Create a workflow in AirTable
- Lab 14: Build Online Store using Shopify
- Lab 15: Develop a website using a No-Code Stack of your choice

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**BCA DS 2<sup>nd</sup> Sem**  
**Introduction to Computing with Distributed Data Processing (UDS23201J)**  
**List of Programs**

- Lab 1: Write a program to implement Remote Method Invocation
- Lab 2: Write a Program to implement Remote Procedure Call
- Lab 3: Case study: PaaS (FaceBook, GoogleAppEngine)
- Lab 4: Virtualization in Cloud by using KVM and VMware
- Lab 5: MongoDB Atlas Installation
- Lab 6. MongoDB CRUD operations
- Lab 7: Data modeling in MongoDB
- Lab 8 : Creation of Queries in MongoDB
- Lab 9. Write a program to sort a single field in MongoDB
- Lab 10 : Hadoop installation – Setting up a Single Node
- Lab 11: Example programs-Hadoop Streaming
- Lab 12 : Writing a Hadoop MapReduce program in python
- Lab 13: Create an Application using ApacheSpark. ( Ex.: Similarity word count during searching )
- Lab 14: Writing spark applications
- Lab 15: Write a MPI Program to send data across all processes Perform a Simple Vector Addition using OpenMP Programming
- Lab 16: Create a Simple Virtual Machine on Google Compute Service

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**BCA DS 2<sup>nd</sup> Sem**  
**Fundamentals of Data Structures and Algorithms (UDS23202J)**  
**List of Programs**

Lab1: Recursion

Lab2:Arrays

Lab3:LinkedList

Lab 4: stack and its applications

Lab 5:Queue implementation using array and pointers

Lab 6: Implementation of binary tree using Arrays

Lab7:TreeTraversals

Lab 8: Implementation of BST Heap Data Structure

Lab9: Heap Implementation

Lab10: Implementation of Bubble and Insertion sort

Lab11:ImplementationofQuicksortandmergesort Introduction to searching

Lab12:ImplementationofGraphusingArray

Lab13:Implementation of shortest path algorithm

Lab14: Implementationofminimumspanningtree

Lab15: To implement binary search using divide and conquer strategy

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**BCA DS 6<sup>th</sup> Sem**

**Introduction to computer vision (UDS23601J)**  
**List of Programs**

- Lab 1-Read, Displaying, Write images using OpenCV
- Lab 2:Working Basic Image operating using OpenCV
- Lab 3: Working with Image Annotation using OpenCV
- Lab 4: Implement different Morphological Operations
- Lab 5 : Working with Contour Analysis
- Lab 6 : Convert the images into different color spaces
- Lab7: Implement Canny Edge Detection
- Lab 8 : Face Blending
- Lab 9 : Implement Geometric Transforms in OpenCV
- Lab 10 : Image segmentation using GrabCut in openCV
- Lab 11: MotionDetection in OpenCV
- Lab 12: Tracking using MeanShift and CamShift
- Lab13 :Face Detection using OpenCV
- Lab 14 : Work with a YOLO/single shot object detection system.
- Lab 15: Image Classification using OpenCV

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**BCA DS 6<sup>th</sup> Sem**

**Advanced Analytics and Data Visualization for Enterprise (UDS23602J )**  
**List of Programs**

- Lab1: Data Visualization Tools
- Lab2: Visualizing location based data for business insights
- Lab3: Techniques and Best Practices Techniques
- Lab4: Working with comment widgets and scripting objects
- Lab5: Applying Color theory in Data Visualization
- Lab6: Types of Data Visualization
- Lab7: Business Benefits of APSAC Stories
- Lab8: Data Modeling in SAPSAC
- Lab9: Analytic Application SAPSAC
- Lab10: Placing the Right information on the page
- Lab11: Scripting in SAPSAC Analytic Applications
- Lab12: Scripting in SAPSAC Analytic Applications
- Lab13: Model Creation
- Lab 14: Predictive Modeling in SAPSAC
- Lab15: Model Creation

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**BCA DS 6<sup>th</sup> Sem**

**MACHINE LEARNING FOR ENTERPRISE (UDS23D03J)**  
**List of Programs**

- Lab1:Machine Learning Approaches
- Lab2: Python Code for Binary Class classification
- Lab3:Perform K-Means Clustering algorithm
- Lab4: Demonstrate Markov Decision Processes
- Lab5: Steps involved in Data Preprocessing Feature EngineeringBestPractices
- Lab6: Decision Tree Regression
- Lab7:Gaussian Naïve bayes
- Lab8: Demonstrate Clustering Problems CollaborativeFiltering
- Lab 9: Reinforcemen tLearning
- Lab10: application of Reinforcement Learning Real World Example
- Lab11: Demonstrate Learning Agent
- Lab12: Bagging and Boosting Algorithms
- Lab13: demonstration of AutoMLClassification
- Lab14: Data Pipeline
- Lab15:Datavisualization



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**BCA DS 6<sup>th</sup> Sem**

**Blockchain Technology (UDS23D04J )**  
**List of Programs**

Lab1: Create a Public Ledger vs. Private Ledger with the various attributes like Access, Network Actors, Native token, Security, Speed and examples.

Lab2: -Peer-to-Peer Network Simulation

Lab3: Explore available tools for blockchain technology

Lab 4: -Bitcoin Wallet Creation and Transactions

Lab 5: -Bitcoin Mining Simulation

Lab6: implementation of Cryptographic hash functions used in password verification

Lab7: -Building a Distributed Peer to-Peer Network

Lab 8: Consensus Mechanism Simulation

Lab 9: Block chain network creation – with application

Lab 10: -Ethereum Network Setup

Lab 11: Solidity Smart Contract Development

lab 12: Explore any one Decentralized Applications (DApps)

Lab13: Understanding Zcash , a privacy-focused cryptocurrency

Lab 14: Case Study about the different attacks

Lab 15: Simple application using web3

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**BCA DS 6<sup>th</sup> Sem**

**INTRODUCTION TO ANIMATION (UDS23G04J)**  
**List of Programs**

Lab 1: a) Extract The Flower Only From Given Photographic Image And Organize It On A Background. Selecting Your Own Background For Organization b) Use Effective Cropping Techniques to design a collage

Lab 2: a) To Use Appropriate Tool(S) From The Toolbox, Cut the Objects From 3 Files (F1.Jpg, F2.Jpg & F3.Jpg); Organise Them In a Single File And Apply Feather Effects b) Paint a scenery of a park using different tools of Photoshop.

Lab 3: a) Picture manipulations using all possible tools of Photoshop. b) Pick any picture of a magazine cover page make changes using selection tool.

Lab 4: a) Create An Animation To Represent The Growing Moon b) Simulation of cricket game

Lab 5: a) Create An Animation To Indicate A Ball Bouncing On Steps b) Character Walk Animation in Flash

Lab 6: a) Simulate Movement Of A Cloud b) Simulations of change of shapes

Lab 7: Draw The Fan Blades And To Give Proper Animation

Lab 8: Create An Animation With The Following Features.- Welcome\* Letters Should Appear One By One\* The Fill Colour Of The Text Should Change To A Different Colour After The Display Of The Full Word

Lab 9: Create An Animated Cursor Using `Startdrag("Ss", True); Mouse.Hide()`

Lab 10: Design a poster for 2024 election and show the difference in resolution and quality for Print and Web

Lab 11: Make a 3D animation from an A.I generated image

Lab 12: Design an animation for banning of mobile phones using a suitable software

Lab 13: a) Study the notes of a piano and simulate them using keyboard and save your file b) Create a web page for your institution which contains all the branches of study and at least 10 links to other web pages

Lab 14: Working with DREAMWEAVER and creating minimum of two programs with this tool

Lab 15: Adding Video, Audio, and Animation to Webpages using Dreamweaver

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**Circular – 2024-25**  
**BCA DS 1<sup>st</sup> Sem**  
**Fundamentals of Data Science (UDS24102J)**  
**List of Programs**

Lab 1: Write a Python script to print a statement

Lab 2: Perform Analysis on Simple Dataset for Data Science and Business Intelligence Applications

Lab 3: Write a python Program for swapping two numbers and write a Python script for performing subset (), aggregate () functions on iris dataset.

Lab 4: Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location.

Lab 5: Install Python and apply all basic python functions and perform Numerical Array Processing using NumPy

Lab 6: Write a Python script to find basic descriptive statistics using summary, str, quartile function on mtcars & cars datasets

Lab 7: Find the correlation Matrix.

Lab 8: Plot the correlation plot on dataset and visualize giving an overview of relationships among data on iris data.

Lab 9: Install and perform a simple Exploratory Data Analysis using Pandas and Explore a Sample Dataset with it

Lab 10: Install, Import Scikit Learn and Explore Iris Dataset with Pandas for ML Modelling

Lab 11: Explore all the Data Visualization Graphs and Find the outliers using plot.

Lab 12: Find the data distributions using box and Scatter plot.

Lab 13: Plot the histogram, bar chart and pie chart on sample data

Lab 14: Install, Import Matplotlib. Explore all the Data Visualization Graphs and write a Python

Lab 15 : Python program for customizing plotprogram for line chart

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**BCA DS 2<sup>nd</sup> Sem**

**Elements of Distributed Data Processing (UDS24201J)**

**List of Programs**

Lab 1: Write a program to implement Remote Method Invocation

Lab 2: Write a Program to implement Remote Procedure Call

Lab 3: Case study: PaaS (FaceBook, GoogleAppEngine)

Lab 4: Virtualization in Cloud by using KVM and VMware

Lab 5: MongoDB Atlas – Installation

Lab 6: MongoDB CRUD operations

Lab 7: Data modeling in MongoDB

Lab 8 : Creation of Queries in MongoDB

Lab 9: Write a program to sort a single field in MongoDB

Lab 10: Hadoop installation – Setting up a Single Node

Lab 11: Example programs-Hadoop Streaming Practice:

Lab 12: Writing a Hadoop MapReduce program in python

Lab 13: Create an Application using Apache Spark. (Ex.: Similarity word count during searching)

Lab 14: Writing spark applications

Lab15: Write a MPI Program to send data across all processes Perform a Simple Vector Addition using OpenMP Programming

Practice: Lab16: Create a Simple Virtual Machine on Google Compute Service

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**BCA DS 2<sup>nd</sup> Sem**  
**Internet of Things (UDS24M01J)**  
**List of Programs**

- Lab 1: Explain working of Raspberry Pi.
- Lab 2: Controlling LED with Raspberry Pi.
- Lab 3: Interfacing Light Sensor with Raspberry pi.
- Lab 4: Demonstrate a smart object API gateway service reference implementation in IoT toolkit.
- Lab 5: Write and explain working of an HTTP- to-CoAP semantic mapping proxy in IoT toolkit.
- Lab 6: Describe gateway as a service deployment in IoT toolkit.
- Lab 7: Explain application framework and embedded software agents for IoT toolkit.
- Lab 8: Arduino with ESP8266 explanation
- Lab 9: Weather Monitoring System.
- Lab 10: Reading Data from Internet using sensor.
- Lab 11: Home Automation
- Lab 12: Remote Surveillance System.
- Lab 13: Smart Irrigation System
- Lab 14: Health care system
- Lab 15: Air Pollution Monitoring System.