PUNE INSTITUTE OF COMPUTER TECHNOLOGY

DHANKAWADI, PUNE –43

LIST OF LAB EXPERIMENTS

ACADEMIC YEAR: 2024- 2025

Department: Computer Engineering
Class: B.E.
Subject: Laboratory Practice III (410246)

Date: 29/06/2024
Semester: I
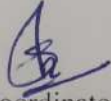**Examination scheme:** TW-50, PR-50

LAB EXP. NO	PROBLEM STATEMENT	Course Outcome
GROUP A	Based on Design and Analysis of Algorithms (410241) (Assignment numbers from 1 to 5 are mandatory, any 1 mini project from assignment number 6)	
1.	Write a program non-recursive and recursive program to calculate Fibonacci numbers andanalyze their time and space complexity.	CO4,
2.	Write a program to implement Huffman Encoding using a greedy strategy.	CO5
3.	Write a program to solve a 0-1 Knapsack problem using dynamic programming or branch andbound strategy.	CO5
4.	Design n-Queens matrix having first Queen placed. Use backtracking to place remainingQueens to generate the final n-queen	CO5
5.	Write a program for analysis of quick sort by using deterministic and randomized variant.	CO4, CO5
6	**Mini-Project on DAA (Any 1 mini project)** **1. Mini Project** - Write a program to implement matrix multiplication. Also implement multithreaded matrix multiplication with either one thread per row or one thread per cell. Analyze and compare their performance.	CO4, CO5

	2. **Mini Project** - Implement merge sort and multithreaded merge sort. Compare time requiredby both the algorithms. Also analyze the performance of each algorithm for the best case and the worst case.	
	3. **Mini Project** - Implement the Naive string matching algorithm and Rabin-Karp algorithm forstring matching. Observe difference in working of both the algorithms for the same input.	
	4. **Mini Project** - Different exact and approximation algorithms for Travelling-Sales-PersonProblem	
GROUP B	**Based on Machine Learning (410242)** **(Assignment numbers from 1 to 5 are mandatory, any 1 mini project from assignment number 6)**	
1	Predict the price of the Uber ride from a given pickup point to the agreed drop-off location.Perform following tasks: 1. Pre-process the dataset. 2. Identify outliers. 3. Check the correlation. 4. Implement linear regression and random forest regression models. Evaluate the models and compare their respective scores like R2, RMSE, etc. Dataset link: https://www.kaggle.com/datasets/yasserh/uber-fares-dataset	CO1, CO2
2	Classify the email using the binary classification method. Email Spam detection has two states: a) Normal State Not Spam, b) Abnormal State Spam. Use K-Nearest Neighbors and Support Vector Machine for classification. Analyze their performance. Dataset link: The emails.csv dataset on the Kaggle https://www.kaggle.com/datasets/balaka18/email-spam-classification-dataset-csv	CO3, CO4
3	Given a bank customer, build a neural network-based classifier that can determine whetherthey will leave or not in the next 6 months. Dataset Description: The case study is from an open-source dataset from Kaggle.The dataset contains 10,000 sample points with 14 distinct features such as CustomerId, CreditScore, Geography, Gender, Age, Tenure, Balance, etc. Link to the Kaggle project: https://www.kaggle.com/barelydedicated/bank-customer-churn modeling Perform following steps: 1. Read the dataset. 2. Distinguish the feature and target set and divide the data set into training and test sets. 3. Normalize the train and test data. 4. Initialize and build the model. Identify the points of improvement and implement the	CO1, CO3

	same. 5. Print the accuracy score and confusion matrix (5 points).	
4	Implement Gradient Descent Algorithm to find the local minima of a function. For example, find the local minima of the function $y=(x+3)^2$ starting from the point $x=2$	CO4
5	Implement K-Means clustering/ hierarchical clustering on sales_data_sample.csv dataset.Determine the number of clusters using the elbow method. Dataset link : https://www.kaggle.com/datasets/kyanyoga/sample-sales-data	CO3
6	**Mini-Project on Machine Learning** 1. **Mini Project** - - Use the following dataset to analyze ups and downs in the market and predictfuture stock price returns based on Indian Market data from 2000 to 2020. Dataset Link: https://www.kaggle.com/datasets/sagara9595/stock-data 2. **Mini Project** - Build a machine learning model that predicts the type of people who survivedthe Titanic shipwreck using passenger data (i.e. name, age, gender, socio-economic class, etc.).Dataset Link: https://www.kaggle.com/competitions/titanic/data	CO1, CO2, CO3, CO4
GROUP C	**Based on Blockchain Technology (410243)** **(Assignment numbers from 1 to 5 are mandatory, any 1 mini project from assignment number 6)**	
1.	Installation of MetaMask and study spending Ether per transaction.	CO6
2.	Create your own wallet using Metamask for crypto transactions.	CO6
3.	Write a smart contract on a test network, for Bank account of a customer for followingoperations: • Deposit money • Withdraw Money • Show balance	CO6

4.	Write a program in solidity to create Student data. Use the following constructs: • Structures • Arrays Deploy this as smart contract on Ethereum and Observe the transaction fee and Gas values.	C06
5.	Write a survey report on types of Blockchains and its real time use cases.	C06
6	**Mini-Project on Blockchain Technology** 1. **Mini Project** - Develop a Blockchain based application dApp (de-centralized app) for e-voting system. 2. **Mini Project** - Develop a Blockchain based application for transparent and genuine charity 3. **Mini Project** - Develop a Blockchain based application for health related medical records 4. **Mini Project** - Develop a Blockchain based application for mental health	C06

Subject Coordinator

(Mr. V. S. Gaikwad)

Head, Department of Computer Engineering

(Dr. Geetanjali. V. Kale)