# PUNE INSTITUTE OF COMPUTER TECHNOLOGY DHANKAWADI, PUNE –43

**SHEDULE OF LAB EXPERIMENTS**

**ACADEMIC YEAR: 2022- 2023**

**Department:** Computer Engineering **Date:** 18/07/2021

**Class:** B.E. **Semester:** II

**Subject:** Laboratory Practice III (410246) **Examination scheme:**TW-50, PR-50

|  |  |  |
| --- | --- | --- |
| **LAB EXP. NO** | **PROBLEM STATEMENT**  **(Any 05 assignments Design and Analysis of Algorithms, Machine Learning & Blockchain Technology AND 01 Mini- project per course)** | **Last date for performance** |
| **GROUP A** | **Based on Design and Analysis of Algorithms (410241)** |  |
| 1. | Write a program non-recursive and recursive program to calculate Fibonacci numbers and analyze their time and space complexity. | 3rd week of July 2022 |
| 2. | Write a program to implement Huffman Encoding using a greedy strategy. | 2nd week of August 2022 |
| 3. | Write a program to solve a 0-1 Knapsack problem using dynamic programming or branch and bound strategy. | 1st week of September 2022 |
| 4. | Design n-Queens matrix having first Queen placed. Use backtracking to place remaining Queens to generate the final n-queen | 3rd week of September 2022 |
| 5. | Write a program for analysis of quick sort by using deterministic and randomized variant. | 2nd week of October 2022 |
| 6 | **Mini-Project on DAA**   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. 2. **Mini Project -** Implement merge sort and multithreaded merge sort. Compare time required by 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 for string matching. Observe difference in working of both the algorithms for the same input. 4. **Mini Project -** Different exact and approximation algorithms for Travelling-Sales-Person Problem | 1st week of November 2022 |
| **GROUP B** | **Based on Machine Learning (410242)** |  |
| 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](http://www.kaggle.com/datasets/yasserh/uber-fares-dataset) | 4th week of July 2022 |
| 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> | 3rd week of August 2022 |
| 3 | Given a bank customer, build a neural network-based classifier that can determine whether they 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](http://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 same.   Print the accuracy score and confusion matrix (5 points). | 1st week of September 2022 |
| 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 | 4th week of September 2022 |
| 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](http://www.kaggle.com/datasets/kyanyoga/sample-sales-data) | 3rd week of October 2022 |
| 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> | 1st week of November 2022 |
| **GROUP C** | **Based on Blockchain Technology (410243)** |  |
| 1. | Installation of MetaMask and Create your own wallet using Metamask for crypto transactions. | 1st week of Aug 2022 |
| 2. | Write a smart contract on a test network, for Bank account of a customer for following operations:  a.      Deposit money  b.     Withdraw Money  c.      Show balance | 4th week of August 2022 |
| 3. | Write a program in solidity to create Student data. Use the following constructs:  a.      Structures  b.     Arrays  c.      Fallback  Deploy this as smart contract on Ethereum and Observe the transaction fee and Gas values. | 2nd week of September 2022 |
| 4. | Study spending Ether per transaction. | 1st week of October 2022 |
| 5. | Write a survey report on types of Blockchains and its real time use cases. | 4th week of October 2022 |
| 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 | 1st week of November 2022 |

Subject Coordinator Head, Dept. of CE (Yogesh Handge) ( Dr. G. V. Kale)