Savitribai Phule Pune University
Thirdd Year of Artificial Intelligence and Data Science (2019 Course)
317523: Software Laboratory I

Home

Teaching Scheme:	Credit	Examination Scheme:
PR: 04 Hours/Week	02	Term Work (TW): 25 Marks Practical(PR): 25 Marks

Prerequisite Courses, if any: Fundamentals of Data Structures (210242), Data Structures and Algorithms (210253)

Companion Course, if any: Artificial Intelligence (310253), Database Management Systems (310241)

Course Objectives:
- To learn and apply various search strategies for AI
- To Formalize and implement constraints in search problems
- To develop basic Database manipulation skills
- To develop skills to handle NoSQL database
- To learn understand to develop application using SQL or NoSQL databases.

Course Outcomes:
On completion of the course, learner will be able to–
    CO1: Implement SQL queries for given requirements, using different SQL concepts
    CO2: Implement NoSQL queries using MongoDB
    CO3: Design and develop application using database considering specific requirements
    CO4: Design a system using different informed search / uninformed search or heuristic approaches
    CO5: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
    CO6: Design and develop an interactive AI application

Guidelines for Instructor's Manual
The instructor's manual is to be developed as a reference and hands-on resource. It should include prologue (about University/program/ institute/ department/foreword/ preface), curriculum of the course, conduction and Assessment guidelines, topics under consideration, concept, objectives, outcomes, set of typical applications/assignments/ guidelines, and references.

Guidelines for Student's Laboratory Journal
The laboratory assignments are to be submitted by student in the form of journal. Journal consists of Certificate, table of contents, and handwritten write-up of each assignment (Title, Date of Completion, Objectives, Problem Statement, Software and Hardware requirements, Assessment grade/marks and assessor's sign, Theory- Concept in brief, algorithm, flowchart, test cases, Test Data Set(if applicable), mathematical model (if applicable), conclusion/analysis. Program codes with sample output of all performed assignments are to be submitted as softcopy. As a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers as part of write-ups and program listing to journal must be avoided. Use of DVD containing students programs maintained by Laboratory In-charge is highly encouraged. For reference one or two journals may be maintained with program prints in the Laboratory.

Guidelines for Laboratory /Term Work Assessment
Continuous assessment of laboratory work should be based on overall performance of Laboratory assignments by a student. Each Laboratory assignment assessment will assign grade/marks based on parameters, such as timely completion, performance, innovation, efficient codes, and punctuality.

Guidelines for Practical Examination
Problem statements must be decided jointly by the internal examiner and external examiner. During practical assessment, maximum weightage should be given to satisfactory implementation of the problem statement. Relevant questions may be asked at the time of evaluation to test the student's understanding of the fundamentals, effective and efficient implementation. This will encourage, transparent evaluation and fair approach, and hence will not create any uncertainty or doubt in the minds of the students. So, adhering to these principles will consummate our team efforts to the promising start of student's academics.

Guidelines for Laboratory Conduction

The instructor is expected to frame the assignments by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. The assignment framing policy need to address the average students and inclusive of an element to attract and promote the intelligent students. Use of open source software is encouraged. Based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to AI & DS branch beyond the scope of the syllabus.

Operating System recommended :- 64-bit Open source Linux or its derivative Programming tools recommended: - MYSQL/Oracle, MongoDB, ERD plus, ER Win

List of Assignments

Group A (DBMS) Perform 6 assignment
(Any 5 Assignments from 1 - 6. Assignment 7 is compulsory)

1. SQL Queries:
- Design and Develop SQL DDL statements which demonstrate the use of SQL objects such as Table, View, Index, Sequence, Synonym, different constraints etc.
- Write at least 10 SQL queries on the suitable database application using SQL DML statements.

Note: Instructor will design the queries which demonstrate the use of concepts like Insert, Select, Update, Delete with operators, functions, and set operator etc.

2. SQL Queries – all types of Join, Sub-Query and View:
Write at least10 SQL queries for suitable database application using SQL DML statements. Note: Instructor will design the queries which demonstrate the use of concepts like all types of Join ,Sub-Query and View

3. MongoDB Queries:
Design and Develop MongoDB Queries using CRUD operations. (Use CRUD operations, SAVE method, logical operators etc.).

4. Unnamed PL/SQLcode block: Use of Control structure and Exception handling is mandatory.
Suggested Problem statement:
Consider Tables:
1. Borrower (Roll_no, Name, Date_of_Issue, Name_of_Book, Status)
2. Fine (Roll_no, Date, Amt)
- Accept Roll_no and Name_of_Book from user.
- Check the number of days (from Date_of_Issue).
- If days are between 15 to 30 then fine amount will be Rs 5per day.
- If no. of days>30, per day fine will be Rs 50 per day and for days less than 30, Rs. 5 per day.
- After submitting the book, status will change from I to R.
- If condition of fine is true, then details will be stored into fine table.
- Also handles the exception by named exception handler or user define exception handler.

OR
- MongoDB – Aggregation and Indexing: Design and Develop MongoDB Queries using aggregation and indexing with suitable example using MongoDB.
- MongoDB – Map-reduce operations: Implement Map-reduce operation with suitable example using MongoDB.

5. Exporting and Importing data
- Design and develop SQL DML statements to demonstrate **exporting** tables to external files of different file formats ex. CSV, XLSX, TXT, etc.
- Design and develop SQL DML statements to demonstrate **importing** data from external files of different file formats ex. CSV, XLSX, TXT, etc.

6. Cursors: (All types: Implicit, Explicit, Cursor FOR Loop, Parameterized Cursor)
Write a PL/SQL block of code using parameterized Cursor that will merge the data available in the newly created table N_Roll_Call with the data available in the table O_Roll_Call. If the data in the first table already exists in the second table then that data should be skipped.
Note: Instructor will frame the problem statement for writing PL/SQL block using all types of Cursors in line with above statement.

7. Database Connectivity:
Write a program to implement MySQL/Oracle database connectivity with any front end language to implement Database navigation operations (add, delete, edit etc.)