Seminar Topic Summary Report

Tentative Cover Page

Institution Name: Basaveshwar Engineering College, Bagalkot

Department Of Computer Applications (MCA)

Course: MCA

Semester: II

Seminar Topic: QUERY OPTIMIZATION

Submitted by:

USN: 2BA24MC048

Student Name: Soundarya Aiholli

Date of Submission: 26/06/2025

Guide/Faculty Name: Prof.S.S.Gujarathi

Guide Signature:

Table of Contents

1. Introduction:

Seminars in the MCA program play a vital role in enhancing students' understanding of current technologies and research topics. Selecting a topic like Query Optimization allows students to explore how databases perform efficiently and handle complex queries. Efficient data retrieval is critical in modern applications, and query optimization ensures that database systems provide timely, reliable results. Understanding the strategies behind this optimization offers valuable insight into database internals, system performance, and software development best practices.

2. Seminar Topic Details:

- **Title of the Topic:** Query Optimization
- **Area/Domain:** Database Management Systems (DBMS), Data Science
- **Keywords:**Query Optimization, Execution Plan, Cost Estimation, Indexing

3.Topic Summary:

Query optimization refers to the process by which a database management system (DBMS) determines the most efficient way to execute a given query. When a user submits a SQL query, the DBMS doesn’t immediately execute it—instead, it uses a query optimizer to evaluate possible query execution plans and selects the one with the lowest estimated cost.

There are generally two types of optimization: heuristic and cost-based. Heuristic optimization applies a set of rules (e.g., perform selection before join) to rewrite queries into more efficient forms. Cost-based optimization, on the other hand, estimates the cost of various execution plans by analyzing available statistics like table size, index availability, and data distribution.

4. Relevance to MCA Curriculum:

This topic is directly related to core subjects such as:

* Database Management Systems (DBMS)

* Advanced Databases

* Data Warehousing

* Data Science and Analytics

* Software Engineering

It helps MCA students understand how database systems work internally and how software developers and database administrators can write better-performing queries. It also introduces them to performance tuning, which is a key industry skill.

5. Learning Objectives:

* Understand the importance and process of query optimization in DBMS.

* Learn the difference between heuristic and cost-based optimization techniques.

* Analyze query execution plans to evaluate performance.

* Study the role of indexes and join algorithms in query performance.

* Gain exposure to optimization tools in real-world database systems.

6. Expected Outcome:

The ability to write and tune SQL queries for better performance. They will understand how query plans are formed and how the optimizer selects the most efficient path. These skills are crucial in roles such as backend developer, database administrator, and data analyst, as they directly impact the scalability and speed of software applications.

7. References:

[1] Garcia-Molina, H.Ullman, J. D.& Widom, J. (2008). Database Systems: The Complete Book. Pearson.

[2] Ramakrishnan, R., & Gehrke, J. (2003). Database Management Systems. McGraw-Hill.

[3] Elmasri, R., & Navathe, S. B. (2015). Fundamentals of Database Systems. Pearson.

Coordinator Signature: **HOD Signature:**