WORKSHOP ON DATABASE MANAGEMENT SYSTEM AND STRUCTURED QUERY LANGUAGE (SQL)

The Department of Health Systems Management Studies (DHSMS) organized an intensive 3-day workshop on "Database Management Systems (DBMS)" from January 16th to 18th, 2025. The workshop aimed to provide participants with a comprehensive understanding of DBMS concepts, along with practical skills in SQL and MySQL. The sessions were designed to cater to both theoretical learning and hands-on experience, helping students build a strong foundation in database management.

The workshop was led by Dr. Chandru A. S., Associate Professor and Head of the Department of ISE at Vidya Vikas Institute of Engineering and Technology, Mysuru, and Mr. Akash, Assistant Professor, Department of ISE at the same institution.

DAY 1: INTRODUCTION TO DBMS CONCEPTS AND SQL BASICS

The first day of the workshop kicked off with Dr. Chandru's session on **Database Management Systems (DBMS)**. He provided an in-depth introduction to DBMS and discussed essential concepts such as **Data Organization and Storage**, **Data Retrieval and Querying**, **Data Integrity and Constraints**, **Concurrency Control**, and **Security and Access Control**. These foundational topics are crucial for understanding how modern database systems function, and they ensure that data is efficiently managed and securely accessed.

Dr. Chandru also covered **Data Definition Language (DDL)** and **Data Manipulation Language (DML)** in detail. He explained that DDL is used to define the database structure, such as creating, altering, and dropping tables, while DML is used for querying and modifying the data itself.

After the theoretical introduction, the students were introduced to **Oracle Live SQL**, a free, online platform provided by Oracle, which allows users to practice SQL without the need for any installation. This interactive tool enables students

to write and execute SQL queries directly in a web-based environment, providing instant feedback on their commands. The students worked through various basic SQL exercises, such as writing **SELECT**, **INSERT**, **UPDATE**, and **DELETE** queries. This hands-on experience was essential in helping students gain confidence in writing SQL queries.

The students were also introduced to the creation of a **Library Database**. This exercise helped them understand how a relational database is designed to manage data related to library operations, such as cataloguing books, tracking borrowers, and managing transactions. This task provided a practical application of the theoretical concepts discussed earlier.

DAY 2: MYSQL INSTALLATION, ADVANCED SQL CONCEPTS, AND ENTITY RELATIONSHIP DIAGRAMS.

On the second day, the workshop took a more hands-on approach as the students installed **MySQL** on their personal computers. Dr. Chandru and Mr. Akash guided them through the installation process and ensured that everyone was able to set up MySQL properly. MySQL is a powerful open-source relational database management system (RDBMS) known for its speed and reliability, making it an ideal choice for managing large-scale databases in various applications, including web development.

Once the installation was completed, Dr. Chandru introduced the students to advanced database concepts, such as **Entity Relationship (ER) Diagrams** and **Relational Schemas**. ER diagrams are essential tools used to visually represent

the relationships among different entities (such as tables) in a database. Students were taught how to design ER diagrams, which would help them visualize the structure and relationships in a database before actually creating it.

Dr. Chandru also explained **Relational Schema**, which outlines the structure and organization of tables in a relational database. The schema defines the tables, their attributes, and the relationships between them through the use of **foreign keys**. These concepts help ensure data consistency and integrity across the database.

In addition to these theoretical concepts, Mr. Akash discussed **Front-End** and **Back-End Programming Languages**. Front-end languages are used to develop the user interface of applications (e.g., HTML, CSS, JavaScript), while back-end languages are used to manage the server-side logic and interact with databases (e.g., SQL, Python). Understanding both front-end and back-end programming is vital for developing full-stack applications.

Later in the day, students were given a series of hands-on exercises, where they wrote more complex SQL queries using **MySQL**. They practiced the use of SQL commands such as **CREATE**, **SELECT**, **UPDATE**, **DELETE**, **ALTER**, and **DROP**. These queries allowed students to manipulate data within their databases, and the exercises became increasingly challenging, helping them deepen their understanding of SQL.

DAY 3: TRANSACTION PROCESSING, COMPLEX SQL QUERIES, AND REAL-WORLD APPLICATIONS.

The final day of the workshop began with a deeper dive into **Transaction Processing** in DBMS. Dr. Chandru explained that a **transaction** is a sequence of one or more SQL operations that are executed as a single logical unit of work. Transactions are essential for maintaining the **ACID** (Atomicity, Consistency, Isolation, Durability) properties of a database, ensuring that the data remains accurate and consistent even in the event of system failures.

Students learned how **transaction statements** work in DBMS, particularly how they allow multiple related operations to be executed together. If one part of a transaction fails, the entire transaction is rolled back, preventing data corruption or inconsistency.

After this theoretical session, the students engaged in hands-on practice with more complex SQL queries. They were given a real-world challenge: to create an **Employee Database**. This database was designed to store and manage employee-related information, such as employee names, positions, salaries, and

departments. Students were required to write SQL queries to meet specific requirements, such as retrieving employee details, updating records, and deleting outdated information. This task was more complex than previous exercises and required students to work with multiple tables and relationships, helping them apply their knowledge of database design and SQL query writing.

The final session of the workshop focused on the practical applications of the concepts learned throughout the three days. Dr. Chandru and Mr. Akash provided additional insights into real-world uses of DBMS, such as data management in business applications, healthcare systems, and e-commerce platforms. They emphasized the importance of database design, data integrity, and security in creating scalable and efficient systems.

CONCLUSION: SKILLS ACQUIRED AND FINAL THOUGHTS

The 3-day workshop was a resounding success, providing participants with both theoretical knowledge and practical skills in DBMS. Students gained a strong understanding of core DBMS concepts, such as data organization, querying,

transaction processing, and database design. They also acquired valuable hands-on experience with SQL and MySQL, learning how to write efficient queries and design relational databases.

By the end of the workshop, students were equipped with the skills necessary to work with databases in real-world applications. They also developed a deeper understanding of how SQL and MySQL play critical roles in managing and processing data across various industries. The workshop's combination of theory and practice ensured that students left with a well-rounded grasp of database management systems and their practical applications.

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