INTRODUCTION TO DBMS

Class: BCA –Vth Semester

TOPIC - BASIC CONCEPTS OF DATABASE

UNIT – 1

Dr Piyush Srivastava
Department of Computer Application
Jagatpur PG College, Jagatpur, Varanasi
E-mail – piyush31@gmail.com
Mobile - 7505068403

Self Declaration

"The content is exclusively meant for academic purpose and for enhancing teaching and learning . Any other use for economic/ commercial purpose is strictly prohibited .The users of the content shall not distribute, disseminate or share it with anyone else and its use is restricted to advancement of individual knowledge. The information provided in this e-content is authentic and best as per my knowledge."

Dr. Piyush Srivastava
Jagatpur P.G. College, Varanasi

SYLLABUS – INTRODUCTION TO DBMS
UNIT -I

Introduction

Characteristics of Database Approach, Data Models, DBMS Architecture and Data Independance

Database

- Database is an organized collection of logically related data
- It is stored in computer
- Database is controlled by a database management system (DBMS)
- Data and DBMS, along with applications associated with them are referred as Database System
- In the database, the data is kept in tables consisting of row and column to make processing and data query efficient
- The data in the database can be easily accessed, managed, updated, controlled and organized.
- Most database use Structured Query Language (SQL) for writing and querying data.

Characteristics of Database Approach

- In the database approach, a single repository maintains data that is defined once and then accessed by various users.
- In a database, the names of data are defined once, and used repeatedly by queries, transactions, and applications
- Whereas, **in file systems**, each application is free to name data elements independently.

Characteristics of Database Approach

Some other characteristics of database approach are –

1. **Self-describing nature of a database system**
   - Database system **contains database and also a complete definition or description** of the database structure and constraints.
   - This definition is stored in the **DBMS catalog**, which contains information such as the structure of each file, the type and storage format of each data item, and various constraints on the data.
   - **The information stored in the catalog is called meta-data**, and it describes the structure of the primary database.
   - The catalog is used by the DBMS software and also by database users who need information about the database structure.
   - **In traditional file processing**, data definition is typically part of the application programs themselves. Hence, these programs are constrained to work with only one specific database, whose structure is declared in the application programs.

Characteristics of Database Approach

2. **Insulation between programs and data, and data abstraction**
   - **In traditional file processing**, the structure of data files is embedded in the application programs, so any changes to the structure of a file may require changing all programs that access that file. **By contrast**, DBMS access programs do not require such changes in most cases. The structure of data files is stored in the DBMS catalog separately from the access programs. **We call this property program-data independence**.
   - The characteristic that allows program-data independence and program-operation independence is called data abstraction. A DBMS provides users with a conceptual representation of data that does not include many of the details of how the data is stored or how the operations are implemented..

Characteristics of Database Approach

3. Support of multiple views of the data

- A database typically has many users, each of whom may require a different perspective or view of the database. A view may be a subset of the database or it may contain virtual data that is derived from the database files but is not explicitly stored. Some users may not need to be aware of whether the data they refer to is stored or derived. A multiuser DBMS whose users have a variety of distinct applications must provide facilities for defining multiple views.

Characteristics of Database Approach

4. Sharing of data and multiuser transaction processing

- A transaction is an executing program or process that includes one or more database accesses, such as reading or updating of database records. Each transaction is supposed to execute a logically correct database access if executed in its entirety without interference from other transactions.
- Database allow multiple users to access the database at the same time. This is essential if data for multiple applications is to be integrated and maintained in a single database. The DBMS includes concurrency control software to ensure that several users trying to update the same data do so in a controlled manner so that the result of the updates is correct.

Characteristics of Database Approach

5. Control Data Redundancy

- In database approach, each data item is stored in only one place in the database

6. Data Sharing

- The integration of the whole data in an organization leads to the ability to produce more information from a given amount of data.

Characteristics of Database Approach

7. Enforcing Integrity Constraints

- DBMS provides capabilities to define and enforce certain constraints such as data type, data uniqueness etc.

8. Restrictive Unauthorized Access

- All users of the system do not have the same accessing privilege.
- DBMS provides security subsystem to create and control the user accounts.

Characteristics of Database Approach

9. Transaction Processing

- DBMS includes concurrency control mechanism to ensure that several people trying to access the same data may do so in a controlled manner
- The result of any update to the database must maintain consistency and validity.

Questions

1. What is database?
2. What are the characteristics of Databas Approach?
3. What is the difference between Database System and File Management System?

References

- https://padakuu.com/article/237-characteristics-of-the-database-approach
- https://www.oracle.com/in/database/what-is-database.html
- Sharma Neeraj & Sharma Shailendra, Introduction to DBMS. Thakur Publishers

Thank You