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**COURSE CODE: CS 311**

**COURSE NAME: Database Concepts and Technologies I**

1. Describe the role of database management systems (DBMS) in the database approach. Discuss why knowledge of DBMS is important for database administrators.

To understand the role of the database management system, we ought to understand what is meant by a database management system. A database management system is the backbone for designing, constructing, and implementing any database scheme and integrating it with application programs. In the database approach, the database management system is responsible for abstracting the intricacies of the structure of the database to end users and application programs, it instead provides end users with functionalities like; accessing the database, modifying the records in the database, etc., without having to worry about the internal architecture of the database.

Primarily, it is important for database administrators to have extensive knowledge of data base management system as it is a prerequisite to be able to construct efficient database systems to satisfy particular end user requirements. More so, being knowledgeable about DBMS makes it easier to for database administrators to diagnose system errors and hence fix them. Again, they can modify the reconfigure the DBMS when there is the need for certain modifications or upgrades. arson

1. Describe the main characteristics of the database approach and contrast it with the file-based approach.

The main characteristic of the database approach is that its uses a DBMS catalog to store the descriptions of a particular database so as to make identification of that database easier. This consequently allows the DMBS work with multiple database applications.

The data files structure is separately stored in the DBMS catalog, and the access programs also in another, as such modifications on the data file can be made, without affecting the access programs.

With the file -based approach however, each application program stores and manages its own set of data, as such, any changes to the data requires modifying the application program also.

Again, data for particular program cannot be used for another application program as they wouldn’t be compatible.

1. Describe the five components of the DBMS environment and discuss how they relate to each other.

The first component of the database include the hardware on which the software, operates upon .This can be the home or office desktop and also the server computers where everything runs on, everything that’s being done is fed into the hardware as signals in terms of 0 and 1. The next component includes the software which is the DBMS, the database and the application programs that makes a call to the database. The next component includes the data which is the raw information or files that are being stored on a storage medium on the computer desktop. The next component includes the procedures that is required to access information from the database, thus the queries, etc.

The final component then is the end users that use information from the database in decision making and also the application programs.

1. Discuss the roles of the following personnel in the database environment:
   1. data administrator

The data administrator oversees there is accurate, complete, and accurate data to the customer, product, inventory, and vendor, using the database. Again, they make reports from the database, to provide understanding into sales, marketing, and business trends.

* 1. database administrator.

Primarily, the database administrator has the responsibility of designing a database that meets the demands of the users, they are also responsible for moving the database set from a physical base to a cloud base or in between applications. It is the duty of the database administrator to upgrade the database software files when there is a new update, as a result, protecting the software from security breaches. They also monitor the database and movement of data in the database. Another important role of the database administrator is to backup every data in the database, recurrently.

* 1. logical database designer

the role of the logical database designer is to identify data, which constitutes the entities, attributes, and relationships between the data and the limitation on such data that is being stored on the database. Their role also includes being knowledgeable about the organization’s data and the limitations regarding each dataset.

* 1. physical database designer

The physical database designer is concerned with implementing the architecture of the logical database design; thus, they map the logical database design into a set of tables and integrity constraints. They are further tasked with selecting specific storage structures and access methods for competent performance.

* 1. application developer

Application developers are tasked with the responsibility of writing DML Queries using languages using programming languages to interact with the database. The main purpose of this is to provide a means through which end users can access the data from the database

* 1. end-users

They utilize the database that has been designed and implemented. The intricacies that are involved in setting up the database system and its functionality is abstracted to them, and they are only concerned with making use of the system.

1. Discuss the three generations of DBMSs

Starting with the first generation of database management systems, which constitutes the hierarchical and the network models that dates back to the 1960s. These models were based on the conference on data systems language (CODASYL) specifications. In this era, information systems were based on mainframe large computers. It had a lot of short coming that prompted the DBMS of subsequent generations to e developed. They hierarchical model operated on the binary tree paradigm; the network model is also based on the mathematical set theory paradigm.

In the second generation, which was somewhere in the 1970s, the relational databases emerged. in such databases, information is stored in the form of tables which are related to each other.

It was also modelled on relational calculus and algebra

The third generation saw the emergence of objected oriented DBMS, which operates on the

Objected oriented principles like polymorphism, encapsulation, classes, inheritance, etc.

This was necessary as there was the need to reduce the complexity of building application software for the DMBS