ST. XAVIER’S COLLEGE

**(Affiliated to Tribhuvan University)**

Maitighar, Kathmandu



**Database Management System Assignment #3**

**Submitted by:**

Bikash Paneru  
013BSCCSIT012

**Submitted to:**

|  |  |
| --- | --- |
| Er. Sanjay Kumar Yadav Lecturer, St. Xavier’s College |  |

**Date of Submission: August 3rd , 2015**

**Additional advantages of Database Approach**

**Expandability/Flexibility**

Database flexibility is a crucial criterion for database applicability. If stored in a flexible format, the same data may be useful in many different contexts. A database is very flexible as data can easily be extracted and inserted into it without knowing how the database works internally. The values of database entities can be changed according to the requirements. The database can also be designed in such a way that if a change it required, the physical structure of the database need not be changed. Also, a database will automatically expand according to the data stored in it.

**Reduce application development time**

A database makes it easy to store and retrieve data. For any application, data is a crucial component. Every application needs somewhere to store data and later retrieve it. If a database is used with an application for the purpose of storing data, the application will have an easy interface to work with data. The programmer need not worry about minor details of storing data as the database will do it for him. There is no need to open and close file streams and work with pointers because the database will return the required data with the means of a simple query.

**Economy of scale**

A properly implemented database can give rise to an economy of scale. A database is used to store data and this database can be accessed by multiple users at a time. This gives rise to the ability to use the same database for multiple users. This reduces cost of the system as only one database is required for a large number of users. Thus, a database increases the number of users while reducing the cost of the system.

**Centralized control by the DBA**

A database administrator is a person who has access control of the system. A database administrator is responsible for designing the database and ensuring periodic maintenance of the system. A database administrator has centralized control of the database as in he can control all aspects of the database. He can add, edit, remove components and scale the database as required.

**Database system components**

**Data**

Data are raw facts and figures. It is a very important component of the database system. Most of the organizations generate, store and process 1arge amount of data. The data acts a bridge between the machine parts i.e. hardware and software and the users which directly access it or access it through some application programs. Data may be of different types:

**User Data**- It consists of a table(s) of data called Relation(s) where Column(s) are called fields of attributes and rows are called Records for tables. A Relation must be structured properly.

**Metadata**- A description of the structure of the database is known as Metadata. It basically means "data about data". System Tables store the Metadata which includes.

- Number of Tables and Table Names

- Number of fields and field Names

- Primary Key Fields

**Application Metadata**- It stores the structure and format of Queries, reports and other applications components. '

**Hardware**

The hardware consists of the secondary storage devices such as magnetic disks (hard disk, zip disk, floppy disks), optical disks (CD-ROM), magnetic tapes etc. on which data is stored together with the Input/Output devices (mouse, keyboard, printers), processors, main memory etc. which are used for storing and retrieving the data in a fast and efficient manner. Since database can range from those of a single user with a desktop computer to those on mainframe computers with thousands of users, therefore proper care should be taken for choosing appropriate hardware devices for a required database.

**Software**

The Software part consists of DBMS which acts as a bridge between the user and the database or in other words, software that interacts with the users, application programs, and database and files system of a particular storage media (hard disk, magnetic tapes etc.) to insert, update, delete and retrieve data. For performing these operations such as insertion, deletion and updation we can either use the Query Languages like SQL, QUEL, Gupta SQL or application softwares such as Visual 3asic, Developer etc.

**Users**

Users are those persons who need the information from the database to carry out their primary business responsibilities i.e. Personnel, Staff, Clerical, Managers, Executives etc. On the basis of the job and requirements made by them they are provided access to the database totally or partially. The different types of users are:

**Naïve Users:** They are those users who use only one part of the database application.

**Application Programmers:** They are developers who create application programs related with the database.

**Sophisticated Users:** They are those users according to whose requirements the database has been created.

**Specialized Users:** They are those users who solve problems like hardware problems that may arise outside of the database.

**Database System Utilities**

* **Loading:** A loading utility is used to load existing data files-such as text files or sequential files-into the database. Usually, the current (source) format of the data file and the desired (target) database file structure are specified to the utility, which then automatically reformats the data and stores it in the database. With the proliferation of DBMSs, transferring data from one DBMS to another is becoming common in many organizations. Some vendors are offering products that generate the appropriate loading programs, given the existing source and target database storage descriptions (internal schemas). Such tools are also called conversion tools.
* **Backup:** A backup utility creates a backup copy of the database, usually by dumping the entire database onto tape. The backup copy can be used to restore the database in case of catastrophic failure. Incremental backups are also often used, where only changes since the previous backup are recorded. Incremental backup is more complex but saves space.
* **File Reorganization:** This utility can be used to reorganize a database file into a different file organization to improve performance.
* **Performance Monitoring:** Such a utility monitors database usage and provides statistics to the DBA. The DBA uses the statistics in making decisions such as whether or not to reorganize files to improve performance.

**Classification of DBMS**

### Based on Data Model

Object based logical Model

* Entity Relationship Model
* Object Oriented Model

Record based logical model

* Hierarchical Model
* Network Model
* Relational Model

Physical Model

### Based on the number of users

We can have a single user database system which supports one user at a time or multiuser systems which support multiple users concurrently.

### Based on ways the database is distributed

##### **Centralized Systems**

With centralized database systems, the system is stored at a single site.

##### **Distributed database system**

Actual database and DBMS software are distributed in various sites connected by a computer network.

##### **Homogeneous distributed Database Systems**

Use the same DBMS software at multiple sites.  Data is exchanged between various sites and can be handled easily.

##### **Heterogeneous distributed Database Systems**

Different sites might use different DBMS software.  There is additional software to support data exchange between sites.