A Project Report
On

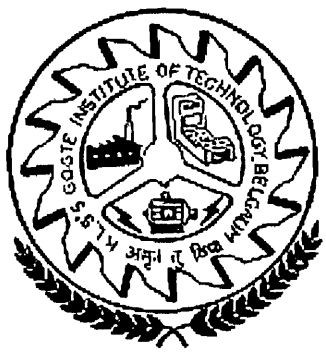
"DATABASE DESIGNER TOOL"

Submitted in partial fulfillment of requirement for the
Award of degree Bachelor of Engineering
In Information Science & Engineering

Submitted by

ESHA MANE	**(2GI04IS015)**
GAUTAM A.DEMATTI	**(2GI05IS013)**
SMITA N.IDDALGAVE	**(2GI05IS046)**

Under The Guidance Of
Prof. S.F.RODD



Department of Information Science & Engineering

KARNATAK LAW SOCIETY'S
GOGTE INSTITUTE OF TECHNOLOGY
UDYAMBAG, BELGAUM-590 008

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

2008-2009

CHAPTER 1

INTRODUCTION

Database and database system have become an essential component of everyday life in modern society. In the course of a day, most of us encounter several activities that involve some interaction with the database. Databases and database technology are having a major impact on the growing use of computers. It is fare to tell that databases play a critical role in almost all areas where computers are used, including business, electronic commerce, medicine, law, education and library science, to name a few. A database is a collection of related data. By data, we mean known facts that can be recorded and that has implicit meaning.

A database has the following properties:

- A database represents some aspect of the real world, sometimes called the miniworld. Changes to the miniworld are reflected in the database.
- A database is a logically coherent collection of data with some inherent meaning.
- A database is designed, built, and populated with data for a specific purpose.

1.1 Data Models

A data model, by definition, is a collection of concepts that can be used to describe the structure of a database. Most data models also include a set of basic operations for specifying retrievals and updates on the database.

DATABASE SYSTEM

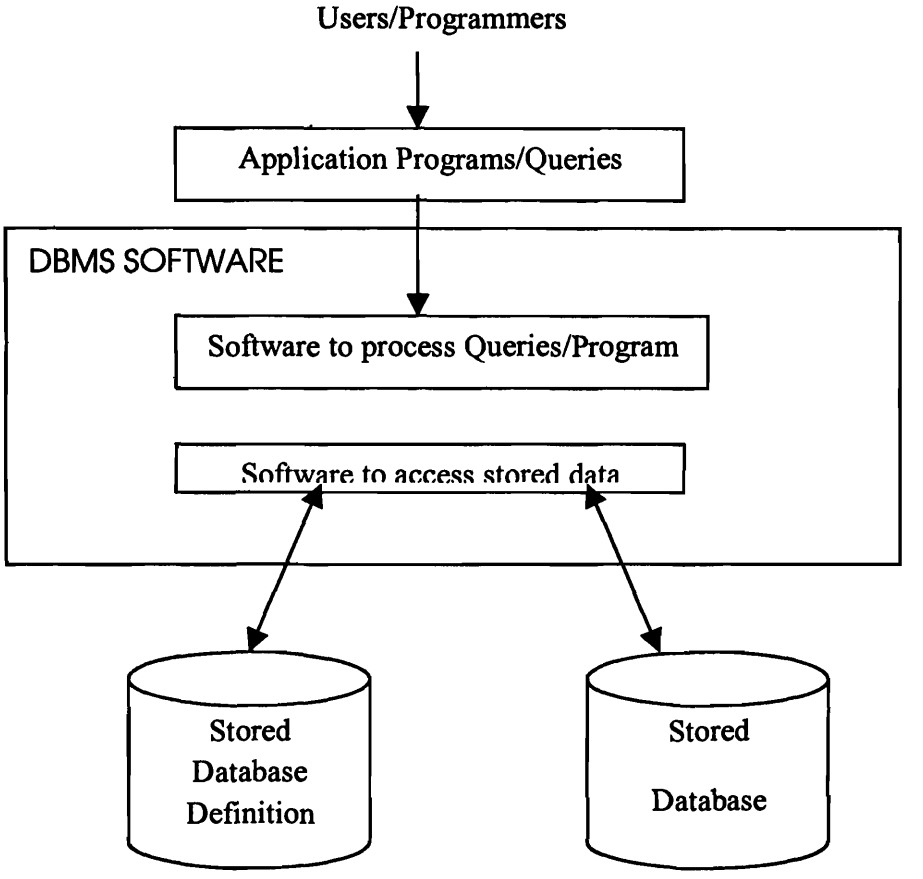


Fig. 1.1 A simplified database system environment

1.2 Categories of Data Models

The data models can be categorized according to the types of concepts they use to describe the database structure.

- High-level or Conceptual data models:

  These provide concepts that are close to the way many users perceive data.

- Low-level or Physical data models:

  These provide concepts that describe the details of how data is stored in the computer.

- Representational data models:

Also called as implementation data models provide concepts that may be understood by end users but that are not too far removed from the way the data is organized within the computer.

These hide some details of data storage but can be implemented on a computer system in a direct way.

These models are the ones most frequently used in traditional commercial DBMSs. These include the widely used *relational data model* and the *legacy data models.*

1.3 Relational Data Model

The relational model was first introduced by Ted Codd, and attracted immediate attention due to its

- Simplicity.
- Mathematical foundation.

The model uses the concept of a *mathematical relation*- which looks like a table of values, and has its theoretical basis in a set theory and first order predicate logic.

The relational model represents the database as a collection of *relations.* Each relation resembles a table of values or, a flat file of records. Each row in a table represents a collection of related data values. In a relational model, each row represents a fact that typically corresponds to a real-world entity or relationship. The column name and the table names are used to help in interpreting the meaning of the values in each row.

Relational model terminologies:

Tuple: A row of a table is called as a tuple.

Attribute: A column header of a table is called an attribute.

Relation: The table itself is called as a relation in terms of relational models.

Domain: A domain D is a set of atomic values i.e, each value in the domain is indivisible as far as the relational model is concerned.

Relation Schema: A relation Aschema R, denoted by R (A1,A2.....An), is made up of a relation name R and a list of attributes A1, A2, A3.....An.

Database model:

The product(outcome) of the database design process which aims to identify and organize the required data conceptually and logically. A database model tells you what information is to be contained in a particular database, how the information will be used, and how the items in the database will be related to each other. A well thought-out database model reduces the need for changes. Future systems may re-use parts of existing models, which should lower development costs.

Background:

Normalization is the process of efficiently organizing data in a database. There are two goals of the normalization process:

- Eliminating redundant data (for example, storing the same data in more than one table).
- Ensuring data dependencies make sense (only storing related data in a table). Both of these are worthy goals as they reduce the amount of space a database consumes and ensure that data is logically stored.

1.4 Normalization of Relations

Database normalization is not a theory - It is a set of clearly defined rules that, when followed, without exception should give you a much better performing finished system right from the start of your analysis phase.

The normalization process, as first proposed by Codd (1972), takes a relation schema through a series of tests to "certify" whether it satisfies a certain normal form. The process that proceeds in top-down fashion by evaluating each relation against the criteria for normal forms and decomposing relations as necessary, can thus be considered as *relational design by analysis.*

For the design of good relational schema a relational database design theory evaluates the relational schemas for the design quality and groups the attributes into relation schema that are in normal form ,i.e. they satisfy certain desirable properties. The process of normalization consists of analyzing relations to meet increasingly more stringent normal forms leading to progressively better grouping of attributes.

The process of normalizing the data is to analyze the given relation schemas based on their FDs and primary keys.

1.5 Motivation

Database Design involves activities like data collection, modeling, mapping and normalization. The normalization involves lot many criteria to check to check to certify that the design is free from undesirable features such as redundancy, anomalies and inconsistencies. If the process is done manually it is not only tedious, it is error prone as well, especially when large number of (more than 10) relations are to be normalized. This tool greatly simplifies the design process and enables the designer to normalize the relations and also create them in a chosen database.

This chapter describes the background of the database such as the different data models, the relational data model and the importance of relational data model and of normalization process. It also briefs out the motivation for this project. The following chapter specifies the problem definition and the also specifies the user and functional requirements.