Chapter I

Introduction to the Databases (DB)

No matter how much you know, you can only explain as much as the listener can understand.
Mevlana

Technological changes accelerated by scientific developments that have increased the mobility of social life in recent years. Accordingly, new concepts and terms are encountered every day. Especially in the last fifty years, dizzying developments in the field of Information Technologies (IT) have brought new concepts as well as new meanings to the old concepts. The terms such as data, information, knowledge, relational database, data mining, data warehouse, big data, XML, and knowledge management are among the main concepts in the field of Databases.

In the information age, the Internet, computer softwares, electronic devices and social media have been producing new structured and unstructured data every day and the importance of storing, managing, accessing and analyzing of these data increases day by day. In order to control this increase, database softwares (Database Management Systems-DBMS) are being used for structured part. The unstructured part is another issue that is not addressed in this book.

During the usage of databases, database architects, database administrators (DBAs), users and programmers have given different names to the same concept of the Relational Database (RDB) objects. Comparison of these terms is listed in Table-1.1. This comparison is important because it must be known by everyone (in order to ensure meaning unity) which terminology each group uses during DB design, operation and management. Each term have been used in the book according to the case of subjects in sections.

Table-1.1: Database Terminologies (Kroenke-Auer, 2012)		
RDB Designer	**Programmer**	**User**
Relation/Entity	File	Table
Tuple-Row	Record	Row
Attribute	Field	Column

1.1. Concepts and Terms of Database

Prior to the explanation, design and management of databases, the introduction of some technical or practical terms related to databases will

provide a great convenience in understanding the subjects described in the following pages. The short descriptions of key terms in the Database field are listed in Table-1.2.

Table-1.2: Database Concepts and Terms		
Term	**Abbreviation**	**Explanation**
Data		It is called raw information.
Information		It is called processed and encoded data that has the appropriate meaning for a particular use based on its contents.
Knowledge		It refers to concepts that cannot be coded or written, which merely bear a meaning in the human mind.
Database	DB	It is a set of integrated records that collect and process relevant data for a particular subject and purpose. The purpose of a database is to help people track transactions. The real power of a database is that it can display the data as a desired way.
Database Management System	DBMS	Computer software that provides access to databases, performs its management, security and control, and provides processing, storage and reporting of data. It is a program to define structure, store, manage, secure, maintain, access, process, and administer the databases by allowing to store data, to reduce data duplication, to facilitate data integrity and to represent and process the real world objects information.
Database System	DBS	The database system includes all related databases, the database management system (DBMS) software, the application softwares and the workers.
Table (Entity)	TB	In Relational DBs, Tables are the stored structures of the same set of data. The tables are made up of columns and rows.
Record (Row)		The combination of fields that hold a data set on each row.
Column (Attribute)		Each data field or attribute defined in the database for each record placed in tables. Attributes can be of different types according to their functions.
Primary Key	PK	It is a field or group of fields to define each record in the table as unique.
Foreign Key	FK	The field that references the Primary key field of related table.
Default	DF	Instead of inserting a NULL value into any column/field, this DB objects are employed to insert the assigned value.

Index	IND	Indexes are DB objects that provide faster access to records in a table through specific field data.
View		These are recorded queries that provide a customized representation of data in one or more tables or other views. Views do not contain data; they import data from the underlying tables.
Stored Procedure	SP	DB objects that store SQL codes that are written to perform any operation in DB. The main purpose of the SP is to use the written codes in repetitive procedures in the DB or in their application programs.
Trigger	TR	Triggers are DB objects formed by transaction codes that are automatically triggered after a particular operation in the DB. The trigger object is the SQL code that can be specified on the table or DB level and can run before and after a transaction on the data.
Structured Query Language	SQL	It is a structured query/computer language that enables operations such as storing, processing, changing, querying data in Relational Databases.
Entity-Relation Diagram	ERD	Diagrams that define modeling of real-world entities, attributes, data and the relationships among them.
Data set		It is called a set of records. This set can be either a whole table or a group of records or a group of fields selected from more than one table.
Metadata		The data about the database and its objects. For example, data about tables, views, indexes, triggers, attributes, default values, and their properties.
Normalization		Normalization is the process of creating a relational data model from a flat data. The 3rd Normal Form (3NF) is the lowest accepted level.
Transactions		Transactions are the representations of events or actions in DB.
Relationship		The relation among tables, attributes and data in RDBs. There is 1:1 (One-to-One), 1:N (One-to-Many) and N:M (Many-to Many) types.

In addition to the concepts of database listed in Table 1.2, there are many other terms that define other concepts. These terms and concepts will be explained in the following pages. Moreover, the detailed information about the terms in the above list will be explained.