Revision Notes

Class-11 Accountancy

Chapter 14 - Structuring Database for Accounting

A. Structuring Database for Accounting

Structuring a database for accounting is an important and complex function of a business. The data content of an accounting transaction is identified, stored, and retrieved in the computerised accounting process. For smooth storing and retrieval, a suitable database for accounting is designed, which includes interrelated data tables structured such that data integrity and consistency is ensured.

B. Data Processing Cycle

Data processing provides useful and meaningful information as required for decision-making. This involves collecting of data items, sorting them, relating them, interpreting them, and finally, computing them.

Data processing involves a series of steps, that is, data capturing, inputting, processing, and generating the information that is available to the user. These are described below:

1) Source Documents: The first step in the data processing cycle is to prepare a voucher. A voucher is a document that expresses and contains information about an accounting transaction.

2) Input of Data: The data in the vouchers is then entered and stored into a computer's storage device using a data entry form. The form is designed using software and appears on the computer monitor such that data can be entered, similar to a physical voucher document.

3) Data Storage: The next step involves providing a blank data record which is used for storing the input of data. The data includes code of conduct, name of account, and the category of the account. A suitable data storage structure is necessary in order to provide for a blank data record.

4) Manipulation of Data: The next step involves manipulating the stored data such that it can be transformed for generation of final reports.

5) Output of Data: The final step involves obtaining the accounting reports such as the ledger accounts. The reports are obtained in a pre-designed format.

C. Designing Database for Accounting

A definite data structure is required for storing accounting data in both computerised and computer-based AIS. The database designing process for accounting begins with the accounting reality.

1) Reality: Reality refers to that aspect of real-life situations for which the database will be designed. Accounting reality refers to the aspect of accounting situations that need to be expressed and described completely.

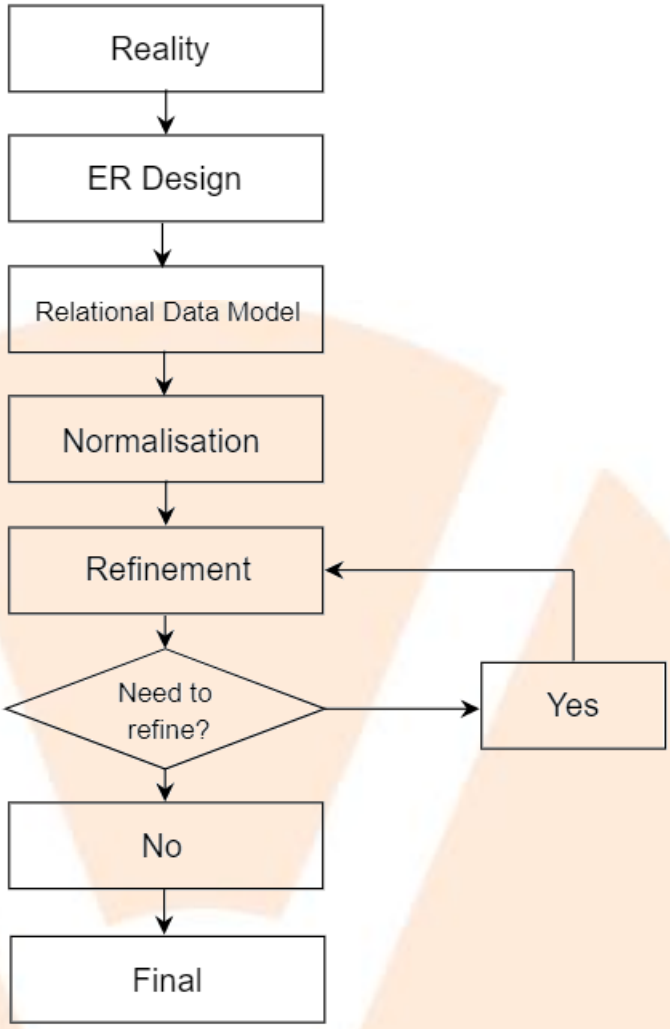
2) ER Design: In this, Entity Relationship (ER) model concepts are utilised to represent the description of reality using a formal blueprint consisting of a pictorial presentation.

3) Relational Data Model: The ER design constructed in the previous step is to be transformed into interrelated data tables. This is done through a representational data model called the relational data model.

The ER design is transformed into the data tables together with a restriction in the form of certain rules. These rules are implemented to ensure data integrity and consistency while storing it.

4) Normalisation: The database design consisting of the inter-related data tables is to be refined to reduce or eliminate the possibility of irrelevant data items. This process is called normalisation.

5) Refinement: This involves the final database design that arrives after refinement through the process of normalisation.



D. Entity Relationship (ER) Model

The ER Model is a popular database model, commonly used in database-oriented applications. This model is best depicted using symbols called ER symbols, and a list. The ER symbol depictions are described as follows:

Elements	Symbols
Entity	Rectangle
Weak entity	Double lined rectangle
Relationship	Diamond shape
Identifying relationship	Double lined diamond shape
Attribute	Ovals attached to straight lines
Key attribute	Name enclose within ovals and ovals attached to straight lines

The ER Model helps to express a reality with the help of **five major elements**, each of which depicts certain unique functions. These major elements are: entities, identifiers, attributes, and relationships and weak entities.

1) Entities: Entities have an independent existence, and are similar to reality. The existence of an entity might be physical, such as trees, or conceptual, such as education. In accounting, there are five entities, namely vouchers, employees, accounts, support documents, and accounts type.

2) Attributes: The features used to describe an entity are called attributes. The attributes used can be single-valued or multi-valued, null or complex, composite or simple, etc.

3) Identifiers: The key attributes that describe a certain identity and make them unique are called identifiers. For instance, a voucher number is an identifier for each transaction because it is unique for all transactions.

4) Relationships: The relation between entities and their relevant attributes are called relationships.

5) Weak Entity Types: The entities that lack any key attributes, that are identified, are called weak entity types. These entity types are not unique, and are identified by relating them to other entities in combination with some of the attribute values.

E. Database Technology

Designing a database requires certain essential and unique techniques which include concepts for developing the database structure or design. The set of these unique techniques is called database technologies.

Some concepts essential for developing the database structure or design are described as follows:

1) Reality: Reality refers to some aspect of the real world. It constitutes an organisation and its environment in which it operates. The people, facilities, and resources of an organisation operate in that environment to achieve the specific goals.

2) Data: Facts that have implicit meaning, and can be recorded constitute data. It represents the facts concerning various entities, objects, places, people, concepts, etc. The data can be categorised as quantitative and qualitative, financial and non-financial, etc.

3) Database: After the data is collected and categorised, it has to be stored in a database such that a number of users can use the data. The shared collection of data tables, files, structures, and other data to fulfil the requirements of the organisation is called a database.

4) Information: After the data is stored, it has to be processed in a form that will facilitate effective decision-making. Information is the raw data after it is processed according to the needs of the decision-maker.

F. How does structuring a database for accounting advantages the organization?

Accounting databases are possible only because computers were adopted for accounting purposes. Due to this, structuring a database for accounting has the following advantages:

1) It facilitates the storing of accounting data for a longer duration of time.

2) The data that is stored can be retrieved within minutes.

3) Policies can be amended, and emergency decisions can be made much quickly.

4) It makes financial reports more accurate, precise, and reliable.

5) It facilitates confident decision-making with integrity.

G. Relational Data Model

This model represents the database as a collection of relations, in the form of data tables. A collection of related data values is represented by each row in the table, and corresponds to an entity or relationship. These rows are called data records. The name of the table and the columns describe the contents of the rows. The columns contain values having the same data type.

H. Relational Databases and Schemas

A set of relation schemas and a set of integrity constraints is called a relational database schema. A relational database state is a set of relation states. The integrity constraints

specified on relational database schema are satisfied by each relational database state. Some important points that are worth being specially considered are:

1) A particular attribute can appear in two or more relations with the same or distinct name, if it stands for the same real-world concept.

2) Different names must be used to represent a particular real-world concept that appears two or more times in a relation.

3) The Integrity constraints that are specified on the database schema must hold true in every database state of that particular database schema.

I. Constraints and Database Schemas

Some constraints that can be specified on relational databases are: domain constraint; key constraint; entity integrity constraint; referential integrity constraints. These are described as follows:

1) Domain Constraint: The value of every attribute should be indivisible and drawn out of the possible values associated to its domain. This means that each value should conform to the data type that is associated with the domain.

2) Key Constraints and NULL Values: The data records corresponding to a tuple (row) in a table must be distinct, such that no two tuples in the table have the exact same combination of values. Each relation has a minimum of one key, called a super key, which specifies the uniqueness constraint. The combination representing the super-key can include redundant attributes.

3) Entity integrity constraint: Null values imply that there are some tuples that cannot be identified. Failing to distinguish the tuples means that the tuples are duplicates.

4) Referential integrity constraint: This constraint is specified between two or more relations. It is necessary to specify this constraint such that consistency is maintained among the tuples of such relations.

J. Operations and Constraint Violations

The operations on the relational model can be categorised as updates or retrieval. There are **three basic types of updates**, which are described as follows:

1) Insert: The insert operation is used to insert, that is add a new tuple in an existing relation. This operation can violate any of the four constraints. This helps to add a particular data record to the table.

2) Delete: The delete operation is used to delete, that is remove a tuple from an existing relation. This operation can breach only the referential integrity, when the tuple that is to

be removed is referred by a foreign key from other tuples. This helps to remove a particular data record from the table.

3) Modify: The modify operation is used to change the attribute values in an existing tuple. This operation does not result in problems, as long as the modification is not directed on the primary or the foreign key. This helps to modify a particular accounting record in the data table.

K. Designing Relational Database Schema

Certain steps are provided by the rules and guidelines to transform the ER design into a relational data model, which is designed to constitute the database. These steps are described as below:

1) Create a relation for every strong entity

A separate relation is created for each strong entity type having a primary key in ER schema. This relation includes all the simple attributes of that strong entity type. Either a key attribute, or a set of attributes is chosen as the primary key to uniquely identify the relation created.

2) Create a different and unique relation for every weak entity type

A weak entity type is identified by a relationship, and has an owner identity. A separate relation is created for it, which includes its attributes. The primary key for this relation is formed by the combination of the unique attributes for a particular tuple in the owner relation, combined with the primary key attribute of that owner relation.

3) Identify entity types participating in binary 1:N relationship type

The first relation is identified on the n-side of the relationship, and the second relation is identified on the 1-side of the relationship. The primary key of the second relation must be included in the first relation as its foreign key.

4) Identify entity types participating in binary M:N relationship type

A new relation is to be created to represent each binary M:N relationship type. This relation includes the primary keys of the relations representing the entity types as foreign keys.

L. Illustrating the Database Structure for Example Realities

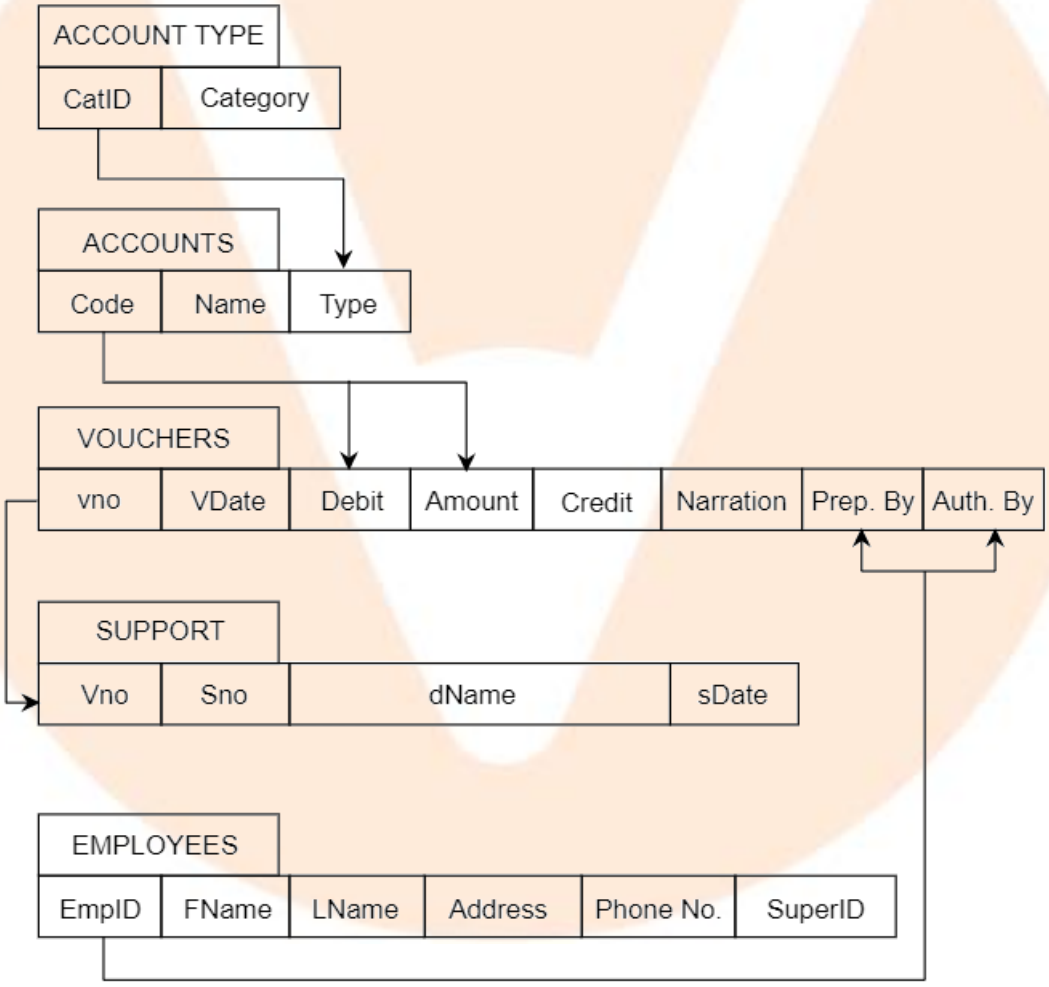
The DBMS software is used for the implementation of the data model by creation of tables, setting up the interrelationships, and imposing the constraints as described in the design of the database.

After the implementation of the design, the software should allow for smooth retrieval of data and information by querying the database. SQL statements are used for querying the database.

When requests are made for retrieval of data and information, new virtual tables are formed out of one or more of existing tables. The theoretical foundations for computerised reporting require a proper understanding of the SQL statement because the extraction of the information from a report is done on the basis of these retrieval requests.

Example: Consider the following models which consist of a set of relations and integrity constraints. These models constitute the design of the database for accounting.

Model-I: This model is based on the initial conceptual design of example reality.



Model-II: The set relations given below are based on the modified example reality, which uses Credit and Debit vouchers shown as follows:

CREDIT VOUCHER

Voucher No: 01 **Date:** April 01, 2018

Debit Account: 642052 Bank Account **M/s Shipra Computers**

Credit Accounts

S. No.	Code	Name of Account	Amount	Narration
1	154255	Capital Account	2,50,000	Commenced Business
		Total Amount	2,50,000	

Authorised By: Kartik **Prepared By:** James

DEBIT VOUCHER

Voucher No: 07 **Date:** April 07, 2018

Credit Account: 645078 Bank Account **M/s Shipra Computers**

Debit Accounts

S. No.	Code	Name of Account	Amount	Narration
1	726124	Purchases	50,000	Purchases from R. and Sons
2	751214	Carriage Inwards	7,800	Paid to M/s Sana Transports
		Total Amount	57,800	

Authorised By: Kartik **Prepared By:** James