iv) Field Name: Each field in the table has some name. For example, the name is a field that contains some values or data.

v) Field Value: Every field has a value. For example, the university name is a field in a database, and that contains a value, KKHSOU. So, the KKHSOU is a field value.

vi) Query: Query is a request for data from a table of a database. One can use this query, to select the records from a table. The query may execute based on the conditions or may not.

vii) Form: It is used to view the data of a record.

viii) Report: A document or a report is produced from the data or information in a database.



CHECK YOUR PROGRESS

Q 1: What do you mean by a database?

Q 2: What is data?

Q 3: What is data integrity?

Q 4: What is a table in the database?

Q 5: The information about data in a database is called _____. (Fill in the blank)

11.6 LOGICAL AND PHYSICAL VIEWS OF DATA

The data of the database are presented in terms of logical and physical views. The logical views define the top-level design and are created at the requirements gathering, and system analysis. The logical view of data is what data look like. The physical view of a database is the way data or information exists in the physical storage of a database. It deals with how data are stored in the database, data accessed, or related to other data in storage.

To handle logical views of data, a logical data model defines the data element and its relationship. The data architect and business analytics are also defined by the logical data model. It produces a technical map of rules for the data and its structures. Like, the physical data model, defines

8. **Efficiency consideration**: Cost is a major factor while designing the form. The form should be cost effective. Unnecessary data should be eliminated from the form.
9. **Type of report**: While designing the form, the purpose of the form should be considered. It should be known whether the form is for executive summary, intermediate managerial information or supporting data. The requirements of the users define the final form design.

10.9.2 Types of Forms

Various types of forms are available. They are—

Flat forms

It is a single copy form. It is prepared manually or by a machine and printed on paper. If additional copies of the original form are needed, carbon papers are inserted in between the copies. The advantage of flat form is that it is simple, inexpensive to design, print and reproduce.

Unit Set/Snap out forms

These forms are either hand written or prepared by machines. These are forms with one time carbon interleaved into unit sets. Carbons may be either blue or black in color with standard grade medium intensity. Generally it's a good practice to use blue carbon for hand written forms and black carbon for machine forms.

Continuous Strip/Fanfold forms

They are multiple unit forms. They are joined in a continuous strip with perforations between each pair of forms. It is comparatively less expensive method for large volume of data.

No Carbon Required (NCR) paper

These forms are carbonless. They have two chemical coatings (capsules), one on the front and other on the back of a sheet of paper. When pressure is applied, the two capsules come in contact and an image is created. It is the cleanest and costliest type of form.



10.10 LET US SUM UP

- The process of converting user originated inputs to a computer based format is known as input design.
- The input design is the connection that joins information system of the world to the users.
- There are two types of data that must be inputted when transactions are processed: Variable data and Identification data
- The design of appropriate data input methods is very important. It helps to prevent errors while entering data.
- Source data is the form in which data are initially captured.
- A source document should be logical. It should be easy to understand
- Following things should be considered while designing the source document: Layout and Caption.
- The three major approaches for entering data into the system or computer are: Menus, formatted forms and prompts.
- The main objective of screen display design is simplicity, accuracy and quick data capture or data entry. The screen display design should be simple so that the user can understand easily.
- The most important task of any system is the design of the output. Outputs are the reports that the system produces.
- The basic principles of output design are: Understand Report Usage, manage Information Load and minimize Bias
- The various types of outputs are: external outputs, internal outputs and media.
- A form identifies the data that we want to collect. It is a powerful tool that allows entering data into the database, displaying it to review or do modification if required and also printing it for distribution.
- There are some useful questions that should be considered while creating the forms such as “who, what, how, where, when”. This will help to design effective forms.

to check the quality of the data in the database, and also to verify the data, in the database.

c) **Data independence:** Data independence defines the change of database schema at one level without hampering the other level or another schema. In the database, there are two types of data independence, a) Physical data independence b) Logical data independence. Physical data independence separatesthe conceptual levels of the database from the physical level of the database. The logical data independence changes the conceptual scheme without changing the external views or API.

The followings are the characteristics of a database.

1. It providessecurity for databy applying cryptography techniques.
2. The redundancy is reduced by a database.
3. It acts as insulation between programs and data abstraction.
4. Multiple views of the data are possible in the database.
5. Sharing of data and multi transaction processing are possible in the database.
6. A database accepts the ACID property, Atomicity, Consistency, Isolation, and Durability.
7. DBMS supports a multi-user environment that allows users to access and manipulate data in parallel.

11.5 KEY TERMS IN THE DATABASE

The following are the key terms that are related to a database.

i) **Table:**A table is a group of related records or information or data in a database. It consists of rows and columns.

ii) **Record:** A group of related fields in a table of a database is known as a record. Every record has the same fields.

iii) **Field:** The smallest unit of data or information of a database is known as field. For example, the name of the person contains the first, middle, and last name. So, the first, middle, and last names are the field of data.

will also be discussed in this unit. In the next unit, we will discuss about system testing and the parameters related to it.

11.3 DATABASE CONCEPT

A database is an organized collection of information or data. This information and data are stored in a computer system and can access digitally using another computer system. It is a method of storing, managing, and retrieving information. Before the discussion of the database, first, you should know about the data. A data is a fact that relates to an object, such as name, age, father name, semester, branch, etc. The data may be numeric, text, image, video, etc. It may be in any format. The storing, managing, and retrieving of data is known as a database. It is the collection of inter-related data for efficient retrieval, insertion, and deletion to and from a database.The data of a database are organized in the form of tables, views, schemas, reports, etc. For Example, the KKHSOU database organizes the data or information about students, faculty, and admin staff, etc.

11.4 OBJECTIVES AND CHARACTERISTICS OF THE DATABASE

A database should have the following objectives:

a) **Data Availability:** It defines the degree or limit or extent up to which data is readable. A data along with the management procedure, technologies, etc. should be available for access in the database. Data acquisition is also referred to as data availability. Data acquisition means the gathering of information from various sources, in the forms of text, image, video, etc.The data availability ensures that data continues to be available at a required level. The data may recover, repair, but the process ensures the availability of the data upon request.

b) **Data Integrity:** The correctness, completeness, accuracy, and reliability of data define data integrity. It defines the authenticity and consistency of the data. The data integrity test is usually performed

- There are three basic classification of forms based on what a form does in the system: Action, Memory and report
- Various types of forms are available are: Flat forms, Unit Set/Snap out forms, Continuous Strip/Fanfold forms and No Carbon Required (NCR) paper



10.11 FURTHER READINGS

1. Howryskiewycz, System Analysis and Design, PHI
2. Rajaraman, Analysis and Design of Information Systems, PHI.



10.12 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q No 1: The volume of input data should be reduced because data reduction can lower costs by reducing labor expense. It also helps to speed up the entire process from capturing the data to providing the results to the user. It helps to minimize errors, avoid delays, keep the process simple and avoid extra steps.

Ans. to Q No 2: The types of data that should not be entered as inputs are—

1. Constant data: Data is same for every record or entry.
2. Details that system can retrieve: Here the stored data can be quickly retrieved from the system.
3. Details that the system can retrieve: Here system can produce results using the combination of stored data and entered data.

Ans. to Q No 3: Few popular data input methods are:

1. Offline data input method or batch input method.
2. Online data entry.
3. Computer readable forms.
4. Interactive data input.

Ans. to Q No 4: The captions of a source document should be simple. Captions on source document tell the user the type of data that should

be entered and when they should be entered. The caption should be brief and easy to understand. The captions should be the standard terms that all the users use. It is a good idea to avoid abbreviations. Simple examples should be included that tells the users how to feed the data.

Ans. to QNo 5: Punch cards is one of the traditional input devices.

Ans. to QNo 6. The formatted form for "employee details"

Enter Employee Details

Employee Name: _____

Employee ID: _____

Designation: _____

Salary: _____



10.13 MODEL QUESTIONS

Q1. What is input design? What are its objectives?

Q2. What type of data should be entered as input and what type of data should not be entered as input?

Q3. What is input integrity control?

Q4. Explain how a source document should be designed.

Q5. Explain the source data capture methods.

Q6. Write notes on any one input media and device.

Q7. Design a prompt for "students details system".

Q8. Write short notes on screen design.

Q9. What are the objectives of a good form design?

Q10. What are the requirements of a form design?

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UNIT 11: DATABASE DESIGN

UNIT STRUCTURE

11.1 Learning Objectives
11.2 Introduction
11.3 Database Concept
11.4 Objectives and Characteristics of the Database
11.5 Key Terms in a Database
11.6 Logical and Physical Views of Data
11.7 Schema and Subschema
11.8 Types of Relationships in the Database
11.9 Types of Database
11.10 Role of Database Administrators
11.11 Normalization
11.12 Let Us Sum Up
11.13 Further Readings
11.14 Answer to Check Your Progress
11.15 Model Questions

11.1 LEARNING OBJECTIVES

After going through this unit, you will be able to –

- understand about the database and its types, characteristics
- learn logical and physical views of data
- describe about schema and subschema
- understand about the role of a database administrator
- learn about normalization

11.2 INTRODUCTION

In the previous unit, we discussed about input, output and form design. In this unit, we will discuss about the database, the physical and logical view of data, different types of relationships in the database. The various types of databases along with the role of database administrator