

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics.

- Defining business requirements following existing data.
- Confirming Database *objectives* inline with defined requirements.
- Analyzing the *Database* to identify the business rules, entities and relationships.
- Identifying Existing and proposed business models.
- Confirming the Database functionality with *client*.

This guide will also assist the trainee to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, the trainee will be able to:

- Define business requirements following existing data
- Confirm Database *objectives* with defined requirements.
- Analyze the *Database* to identify the business rules, entities and relationships.
- Identify Existing and proposed business models.
- Document Existing database and environment according to work place procedure.
- Confirm the Database functionality with *client*.

### Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask your teacher for assistance if you have hard time understanding them.
3. Accomplish the “Self-check 1”.
4. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
5. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is not satisfactory, see your teacher for further instructions,
6. Submit your accomplished Self-check. This will form part of your training portfolio.

## MODULE TITLE: **Determine Suitability of Database Functionality and Scalability**

### MODULE CONTENTS:

#### LO1 Determine database functionality

- 1.1 Defining business requirements following existing data.
- 1.2 Confirming Database *objectives* inline with defined requirements.
- 1.3 Analyzing the *Database* to identify the business rules, entities and relationships.
- 1.4 Identifying Existing and proposed business models.
- 1.5 Confirming the Database functionality with *client*.

#### **LO1: Determine database functionality**

##### **Defining business requirements following existing data.**

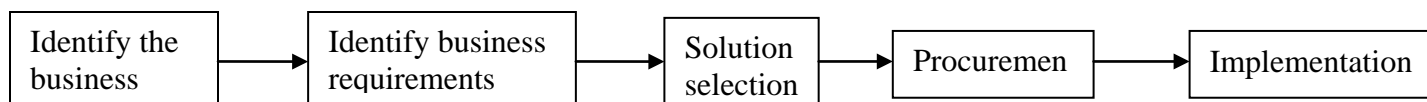
A **requirement** is a condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed document.

**Business requirements** are higher-level statements/description of the goals, objectives, or needs of the system. They describe such things the reasons why a project is initiated, the things that the project will achieve, and the metrics which will be used to measure its success.

**I.e.: Business requirements** are instructions describing the functions the system should provide and the characteristics the solution should have.

##### **How to identify business requirements?**

Identifying business requirements means listing the things you will need to make in how the business operates. These things can range from work activities to procedures, policies, and installing new equipment or software. A comprehensive look into business requirements can turn up a surprising number of opportunities for taking the organization to a new level of operating efficiency.



##### **Confirming Database *objectives* inline with defined requirements.**

The objectives of a database are to provide a method of:

- Organized data storage,
- Convenient retrieval of selected data,
- Presenting selected data in a convenient format (Generating reports based on the criteria).

DBMS has many objectives; some of them are as follows.

- DBMS give multi-user access
- Give good security to database.
- Give full control to Data
- Platform independent.
- Support online documentation
- Keep and maintain proper backups.
- Concurrency control.
- crash recovery
- Complex query support

### Analyzing the Database to identify the business rules, entities and relationships

A business rule is a statement (a rule of a business, company, or corporation) that describes a business policy or procedure. Business rules express business policy using a formalized vocabulary and a series of if-then statements

Those business rules related to the use case steps or business process actions will often be of the following types:

Limitations: For example: Only two pieces of luggage per passenger is allowed

Validation Rules: For example: Transferring account is not possible if the account is created after 1/1/1980

Permissions: For example: Account details must be visible for Gold members only

Evaluation: For example: If the order sum is higher than €4000, the customer is granted a 4% discount

Process rule: For example: If the door lock has been activated the "Occupied" sign must be switched on.

### Identify Entities

An **entity** may be an object with a physical existence - a particular person, car, house, or employee - or it may be an object with a conceptual existence - a company, a job, a university course, payment or project that exists by itself.

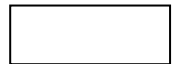
For example, to develop a company's database for maintaining information on employees, the application should be able to store and provide data on employee such as:

- which department does employee work for
- who is his/her manager
- What is his/her skill level, etc.

**Generally, entity** can be roles, events, locations, tangible things or concepts.

- Each entity must have its own identity that distinguishes it from every other entity, called **unique identifier**.

In E-R Diagram, an entity is represented by a rectangle, and the name is indicated in capital letters.



### Identify Relationships

A relationship, in the context of database, is an association that exists between two or more participating entities in a database when one table has a foreign key that references the primary key of the other table.

- The function of relationship is to share data between entities.
- In E-R Diagram, a relationship type is represented by a diamond shape with the relationship verb in it.

### Identifying Existing and Proposed Business Models

At a conceptual level, a business model includes all aspects of a company's approach to developing a profitable offering and delivering it to its target customers.

A **business model** describes the rationale of how an organization creates, delivers, and captures value. The process of business model construction is part of business strategy.

### Confirming Database Functionality

In determining database functionality, a user need analysis is conducted/performed to determine database functionality. A database program must be able to add, delete and edit records in the tables which make up the database and also to search for specific records in the tables by using different search criteria. In most cases, user authentication is required.

A relational DBMS is special software that is used to manage the organization, storage, access, security and integrity of data. This specialized software allows application systems to focus on the user interface, data validation and screen navigation. When there is a need to add, modify, delete or display data, the application system simply makes a "call" to the RDBMS.

### **Exercise: Self-check**


1. What is requirement?
2. What is business requirement?
3. Explain the objectives of database.
4. What is business rule?
5. Explain the Database Functionality.
6. Explain business model.

### **Instruction Sheet-2**

### **Learning Guide #2**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics.

 Identifying Scalability of Database Component Requirements.

 Comparing Functionality and Scalability Database Features

 Determining and Documenting Gap Features

This guide will also assist the trainee to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, the trainee will be able to:

- › Identify Scalability of Database Component Requirements.
- › Compare Functionality and Scalability Database Features
- › Determine and Documenting Gap Features.

### **Learning Instructions:**

7. Read the specific objectives of this Learning Guide.
8. Read the information written in the “Information Sheets 2”. Try to understand what are being discussed. Ask your teacher for assistance if you have hard time understanding them.
9. Accomplish the “Self-check 2”.
10. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).
11. If you earned a satisfactory evaluation proceed to “Information Sheet 3”. However, if your rating is not satisfactory, see your teacher for further instructions,
12. Submit your accomplished Self-check. This will form part of your training portfolio.

### **L02. Identify scalability and functionality requirements**

2.1 Identifying Scalability of Database Component Requirements :

2.1.1 System Architecture

2.1.2 Data Models

2.1.3 Data Structures

#### 2.1.4 Hardware and Software

#### 2.2 Comparing Functionality and Scalability Database Features

#### 2.3 Determining and Documenting Gap Features

### **Identifying Scalability of Database Component Requirements**

- **System Architecture**

**System Architecture** is set of conventions, rules, and standards employed in a computer system's technical framework, plus customer requirements and specifications.

The architecture of a database system determines its capability, reliability, effectiveness and efficiency in meeting user requirements. Good database architecture should provide:

- a) Independence of data and programs
- b) Ease of system design
- c) Ease of programming
- d) Powerful query facilities
- e) Protection of data

#### **Data Models**

Data modeling is the formalization and documentation of existing processes and events that occur during application software design and development. Data modeling techniques and tools capture and translate complex system designs into easily understood representations of the data flows and processes, creating a blueprint for construction and/or re-engineering.

- I.e.: A data model is a set of concepts that can be used to describe the structure of the database: data types, relationships, and constraints that should hold on the data.

There are several different approaches to data modeling, including:

- **Conceptual Data Modeling** - identifies the highest-level relationships between different entities.
  - › It addresses the unique requirements of a specific business.
- **Logical Data Modeling** - illustrates the specific entities, attributes and relationships involved in a business function.
- **Physical Data Modeling** - represents an application and database-specific implementation of a logical data model.

Use these guidelines to create a data model:

- › Identify the different data components- consider raw and processed data.
- › Identify the relationships between the different data components.
- › Identify the strengths and constraints of the technology (hardware and software).
- › Build a draft model of the entities and their relations.
- › Incorporate intended usage and technology constraints as needed to derive the simplest, most general model possible
- › Test the model with different scenarios.
- › Repeat these steps to optimize the model

#### **Data Structures**

**Data structure** is interrelationship among data elements that determine how data is recorded, manipulated, stored, and presented by a database.

- It is a particular way of storing and organizing data in a computer so that it can be used efficiently.

Data structures provide a means to manage large amounts of data efficiently, such as large databases and internet indexing services. Usually, efficient data structures are a key to designing efficient algorithms.

**Exercise:****Self-check**

1. Explain Data model
2. Explain data structure
3. List down the guidelines to create a data model
4. Explain the difference between **conceptual**, **logical** and **physical** data model

**Instruction Sheet-3****Learning Guide #3**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics.

- Documenting Functionality and scalability of database.
- Submitting Report on database functionality and scalability to client for review.

This guide will also assist the trainee to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, the trainee will be able to:

- Document Functionality and scalability of database.
- Submit Report on database functionality and scalability to client for review.

**Learning Instructions:**

13. Read the specific objectives of this Learning Guide.
14. Read the information written in the “Information Sheets 2”. Try to understand what are being discussed. Ask your teacher for assistance if you have hard time understanding them.
15. Accomplish the “Self-check 3”.
16. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 3).
17. If you earned a satisfactory evaluation proceed to “Information Sheet 4”. However, if your rating is not satisfactory, see your teacher for further instructions,
18. Submit your accomplished Self-check. This will form part of your training portfolio.

**L03. Prepare report**

- 3.1 Documenting Database Functionality and Scalability
- 3.2 Submitting the Database Functionality and Scalability Report for Review

### **Documenting Database Functionality and Scalability**

Database functionality means a database program must be able to add, control, delete and edit records in the tables which make up the database and able to search for specific records in the tables by using different search criteria.

i.e.: Function of Database includes:

- |               |                       |
|---------------|-----------------------|
| › Indexing    | › Backup and Recovery |
| › Views       | › Design              |
| › Security    | › Documentation       |
| › Integrity   | › Update              |
| › Concurrency | › Query               |

**Scalability** is the ability of a system, network, or process to handle a growing amount of work in a capable manner or its ability to be enlarged to accommodate that growth.

- It can refer to the capability of a system to increase total throughput under an increased load when resources (typically hardware) are added.

A system, whose performance improves after adding hardware, proportionally to the capacity added, is said to be a **scalable system**.

Functionality and scalability of database must be documented.

### **Submitting the Database Functionality and Scalability Report for Review**

Report on database functionality and scalability should be submitted to client for review.

### **Exercise 3: self-check**

1. Explain database functionality.
2. What is database scalability?
3. Explain Backup and Recovery.