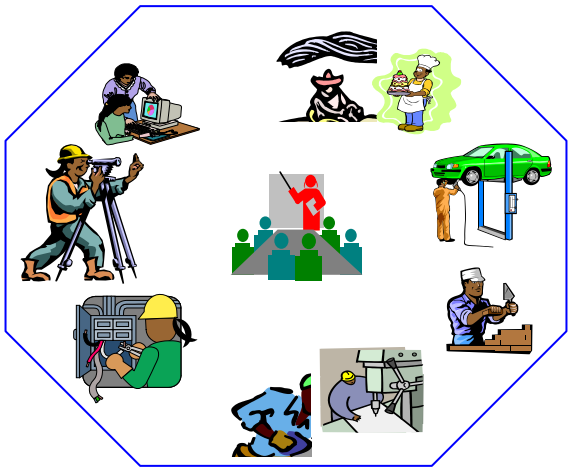
DATABASE ADMINISTRATION LEVEL III

Based on August, 2011, Version 3 Occupational Standards (OS) and Curriculum



Module Title: Identifying Physical Database Requirements

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Instruction sheet

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

- Identifying System architecture
- Reviewing requirements of the user
- Determining database size
- Documenting database and scope of project
- Evaluating database management systems

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Identify System architecture
- Review requirements of the user
- Determine database size
- Document database and scope of project
- Evaluate database management systems

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
3. Accomplish the “Self-checks” which are placed following all information sheets.
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Information sheet 1: Identifying System architecture

Introduction

The overviews of this competency is define the knowledge, skills and attitudes regarding to identify physical database requirements for developing database for any enterprise using a data dictionary and design specifications.

1.1 Identifying System architecture

Database management system (DBMS) architecture can be seen as single tier, multi tier and n-tier architecture divides the whole system into related but independent n modules, which can be independently modified, altered, changed or replaced.

In 1-tier architecture, DBMS is the only entity where user directly sits on DBMS and uses it. Any changes done here will directly be done on DBMS itself. It does not provide handy tools for end users and preferably database designer and programmers use single tier architecture. If the architecture of DBMS is 2-tier then must have some application, which uses the DBMS. Programmers use 2-tier architecture where they access DBMS by means of application. Here application tier is entirely independent of database in term of operation, design and programming.

3-tier architecture most widely used architecture is 3-tier architecture. 3-tier architecture separates it tier from each other on basis of users. It is described as follows:

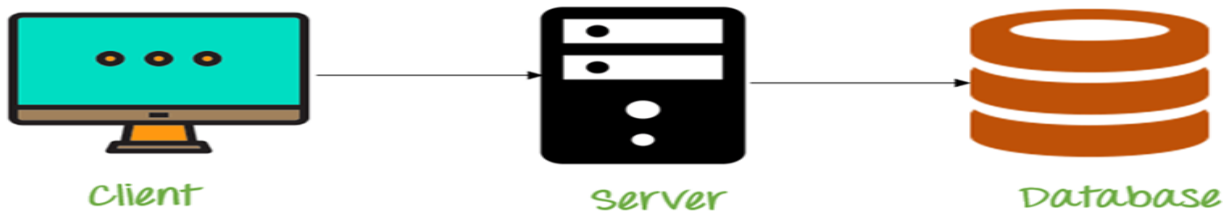

Fig 1.1 1 3 tier of database Architecture

- Database Tier

At this tier, the database resides along with its query processing languages. Also have the relations that define the data and their constraints at this level.

- Application Tier

At this tier the application server and program, which access database, resides. For a user this application tier works as abstracted view of database. Users are unaware of any existence of database beyond application. For database tier, application tier is the user of it. Database tier is not aware of any other user beyond application tier. This tier works as mediator between the two.

- User Tier

An end user sits on this tier. From a user's aspect this tier is everything. He/she doesn't know about any existence or form of database beyond this layer. At this layer multiple views of database can be provided by the application. All views are generated by applications, which reside in application tier. Multiple tier database architecture is highly modifiable as almost all its components are independent and can be changed independently.

1.1.1 Identifying Operating system

Operating system is a program that controls the execution of programs and acts as an interface between the user of a computer and the computer hardware. It is software that manages the computer hardware. The purpose of an OS is to provide an environment in which a user can execute programs in a convenient and efficient manner. The hardware must provide appropriate mechanisms to ensure the correct operation of the computer system and to prevent user programs from interfering with the proper operation of the system. An OS is concerned with the allocation of resources and services, such as memory, processors, devices and information. The operating system correspondingly includes programs to manage these resources, such as a traffic controller, a scheduler, memory management module, I/O programs, and a file system.

Functions of Operating system:

1. Convenience: An OS makes a computer more convenient/suitable to use.

2. Efficiency: An OS allows the computer system resources to be used in an efficient manner.
3. Ability to Evolve: An OS should be constructed in such a way as to permit the effective development, testing and introduction of new system functions at the same time without interfering with service.

Every general purpose computer consists of the hardware, operating system, system programs, and application programs. The hardware consists of memory, CPU, ALU, and I/O devices, peripheral device, and storage device. System program consists of compilers, loaders, editors, OS, etc. The application program consists of business programs, database programs.

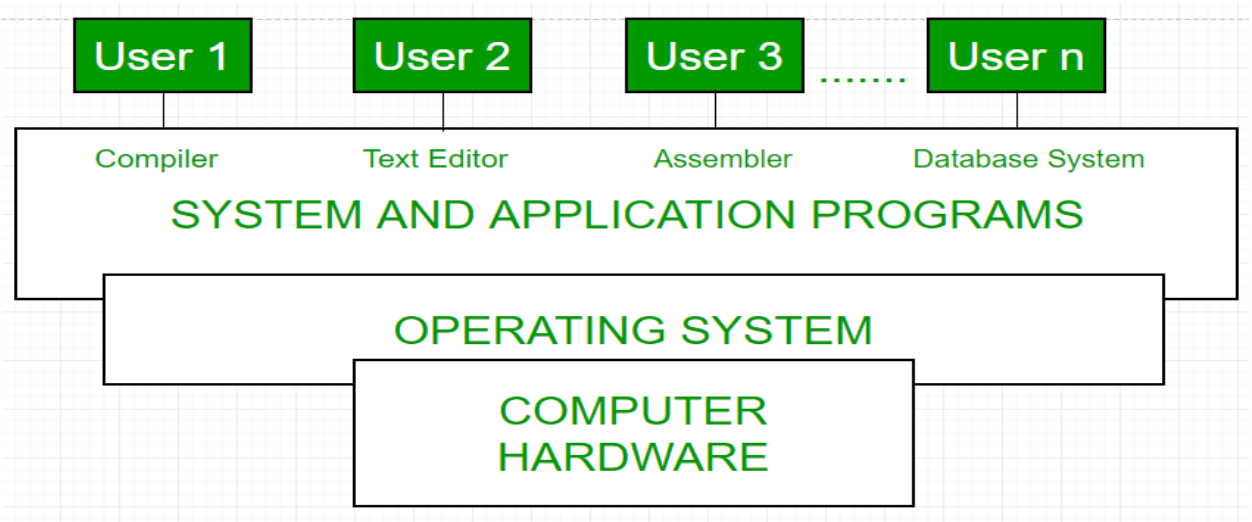

Fig1.2 Conceptual view of a computer system

OS classified as follows:

- Multi-user: Allows two or more users to run programs at the same time.

Some operating systems permit hundreds or even thousands of concurrent users.

- Multiprocessing : Supports running a program on more than one CPU.
- Multitasking : Allows more than one program to run concurrently.
- Multithreading : Allows different parts of a single program to run concurrently.
- Real time: Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.

1.1.2 Identifying Database software

DBMS is a set of computer programs that controls the creation, maintenance, and the use of a database. It allows organizations to place control of database development in the hands of database administrators (DBAs) and other specialists. A DBMS is a system software package that helps the use of integrated collection of data records and files known as databases. It allows different user application programs to easily access the same database. In large systems, a DBMS allows users and other software to store and retrieve data in a structured way. Instead of having to write computer programs to extract information, user can ask simple questions in a query language. Thus, many DBMS packages provide Fourth-generation programming language (4GLs) and other application development features. It helps to specify the logical organization for a database and access and use the information within a database. A DBMS also provides the ability to logically present database information to users.

DBMs software includes:

- Microsoft SQL Server

It was designed to create web, enterprise, and desktop database systems. It is used with various goals and at different levels. It allows you to store large amount of data which handles components like video, photographs, numbers, text, and much more.

- Oracle

Oracle is one of the leading commercial SQL relational database management systems. It is available in a variety of configurations from small personal versions to fail-safe, enterprise-class versions. This powerful system requires a lot of deep knowledge and skill to handle large environments of database.

- MySQL

It is a popular used for web applications connected with PHP programming language and backend for its data warehouse and websites. It has a high speed hence selected for web applications, gaming and medium or small data storages MySQL surpasses all the other database management systems.

- Microsoft Office Access

It combines software development tools and the relational Microsoft Jet Database Engine with easy to use GUI. It is an ideal solution for start level users as they have the ability to create database structures and relations.

- PostgreSQL

It is a relational DBMS that many web application developers prefer as the back-end data management component. It's principally used by many distinguished organizations applying it for mission critical or wide-ranging applications. The .info and .org domain name registries use it as their primary data store, so do many financial institutions and large companies.

- SQLite

It is a small C library that performs a standalone, embeddable, zero-configuration SQL database engine. This database engine provides a rapid and easy method to work with flat file databases. SQLite is an ideal solution in situations where implementation,

maintenance, and simplicity of administration are more significant than the innumerable complex features that enterprise database engines provide.

- Microsoft Visual FoxPro,

It was abbreviated as VFP, is closely integrated with its own relational database engine, which broadens FoxPro's xBase capabilities to maintain SQL inquiry and data manipulation. Unlike most DBMSs, Visual FoxPro is a full-function, dynamic programming language that does not demand the use of an additional universal programming environment.

1.1.3 Determining memory configuration

Determine memory requirements are defined after considering demands of the application, operating system, supporting software and files, and other running processes. Optimal performance of other unrelated software running on a multitasking computer system is also considered when defining the requirements. The capability of the computer's CPU, its memory chip configuration, and its operating system all play roles in how the computer's memory is allocated.

Proper sizing and effective use of the Oracle Database memory caches greatly improves database performance. Oracle recommends using automatic memory management to manage the memory on the system.

In order to configuring a new instance, it is impossible to know the correct size for the buffer cache. Typically, a database administrator makes a first estimate for the cache size, then runs a representative workload on the instance and examines the relevant statistics to see whether the cache is under or over configured.

Self-Check 1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I choose the best answer (each 2 point)

1. DBMS architecture can be seen as
   A. single tier architecture
   B. multi tier architecture
   C. n-tier architecture
   D. All
2. At which tier where the users directly sits on DBMS and uses it.
   A. 1-Tier
   B. 2-Tier
   C. 31-Tier
   D. All
3. A program that controls the execution of application programs and acts interface between computer and the computer hardware.
   A.DBMS
   B. Application Software
   C. Operating system
   D. Database architecture

Part II fills the blank space

1. Write at least three DBMS application software! (3 pt)
   _____
   _____
   _____
2. List 3- tier of database architecture (3pt)
   _____
   _____
   _____
3. Write at least 3 classifications of operating systems(3pt)
   _____
   _____
   _____

Answer the following question!

Note: Satisfactory rating 15 points Unsatisfactory - below 15 points

You can ask you teacher for the copy of the correct answers.

Score = _____
Rating: _____

Answer Sheet

Name: _____ Date: _____

Information sheet 2: Reviewing requirements of the user

2.1 Reviewing requirements of the user

Systems requirements are the building blocks for developers use to build the system. These are the traditional shall statements that describe what the system "shall do."

The review team should check each requirement for consistency and should check the requirements as a whole for completeness. Reviewers may also check for:

- Verifiability is the requirement as stated realistically testable?
- Comprehensibility does the procurers or end-users of the system properly understand the requirement?
- Traceability is the origin of the requirement clearly stated? You may have to go back to the source of the requirement to assess the impact of a change. Traceability is important as it allows the impact of change on the rest of the system to be assessed.
- Adaptability is the requirement adaptable? That is, can the requirement be changed without large-scale effects on other system requirements?

Conflicts, contradictions, errors and omissions in the requirements should be pointed out by reviewers and formally recorded in the review report. It is then up to the users, the system client and the system developer to negotiate a solution to these identified problems.

A functional requirement specifies something that a **user needs** to perform their work.

It is classified to:

1. Functional requirements
2. Non Functional requirements

For example, a system may be required to enter and print cost estimates; this is a functional requirement.

Non-functional requirements specify all the remaining requirements not covered by the functional requirements. The plan for implementing functional requirements is detailed in the system design.

The list below shows various types of Non-functional in system.

- Accessibility
- Usability
- Testability
- Compatibility of software, tools, standards, platform, database, and the like
- Configuration management
- Deployment
- Documentation
- Disaster recovery
- Effectiveness (resulting performance in relation to effort)
- Error handling
- Portability
- Quality
- Resource constraints (processor speed, memory, disk space, network bandwidth, etc.)
- Response time
- Robustness
- Security

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I choose the best answer (each 2 point)

1. Which Systems requirements directly affect the system?
   A. Functional requirements
   B. Non Functional requirements
   C. User requirement
   D. None
2. Functional requirements specify
   A. user expectation
   B. user needs
   C. user requirement
   D. all
3. Which one is different from the rests?
   A. Print
   B. Security
   C. Response time
   D. Deployment

Part II fills the blank space

4. Explain Systems requirements (3 pt)

   _____
   _____
   _____

Answer the following question!

Note: Satisfactory rating 6 points Unsatisfactory - below 6 points

You can ask you teacher for the copy of the correct answers.

Score = _____
Rating: _____

Answer Sheet

Name: _____ Date: _____

Information sheet 3: Determine database size

3.1 Determining Database size

While design a database, the database designer may have to estimate how large the database will be filled with data. Estimating the size of the database can help database designer that determine the hardware configuration that require doing the following:

- Achieve the performance required by applications;
- Guarantee the appropriate physical amount of disk space required to store the data and indexes.

Estimating the size of a database can also help designer that determine whether the database design needs refining.

For example

You may determine that the estimated size of the database is too large to implement in your organization and that more normalization is required. Conversely, the estimated size may be smaller than expected. This would allow you to de normalize the database to improve query performance.

3.1 Relational Database

A relational database is a type of database that stores and provides access to data points that are related to one another. Relational databases are based on the relational model, sensitive, straightforward way of representing data in tables. In RD, each row in the table is a record with a unique ID called the key. The columns of the table hold attributes of the data, and each record usually has a value for each attribute, making it easy to establish the relationships among data points.

Example

A **customer info** table includes a customer's name, address, shipping and billing information, phone number, and other contact information. Each bit of information in its own column, and the database assigns a unique ID (a key) to each row.

3.2 Objects-Relational Database (ORD)

An object relational database (ORD) is a database management system (DBMS) that's composed of both a relational database (RDBMS) and an object oriented database (OODBMS). ORD supports the basic components of any object-oriented database model in its schemas and the query language used, such as objects, classes and inheritance. An object relational database may also be known as object relational database management systems (ORDBMS).

In ORD, the basic approach is based on RDB, since the data is stored in a traditional database and manipulated and accessed using queries written in a query language like SQL. However, ORD also showcases an object oriented characteristic in that the database is considered an object store, usually for software that is written in an object-oriented programming language. It also aims to connect the divide between relational databases and the object oriented modeling techniques that are usually used in programming languages like Java, C# and C++.

3.3 Proprietary database

This data can be protected under copyright laws, or patents. In the world of intelligence and trade secrets, it is important for organizations to manage their data in this legal manner. Also it is privately owned and password protected. It is usually unavailable to the general public, and a person who wishes to access its contents must first purchase rights from its owners.

3.4 Commercial Off-the-Shelf (COTS)

COTS is software that is commercially produced and sold in a retail store or online, ready to use without any form of modification by the user, and accessible to everyone.

Examples

ERP- Enterprise Resource Planning packages, CRM- Customer Relationship Management packages and POS- Point of Sale packages.

Self-Check 3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I choose the best answer (each 2 point)

1. In DBMS who is responsible for determine database size?
   A. Database administrator
   B. Data entry
   C. Database designer
   D. System Administrator
2. Table is example of:
   A. COTS database
   B. ORD database
   C. Proprietary database
   D. Relational database
3. Which database type applies the principle of languages like Java, C# and C++?
   A. ORD database
   B. Relational database
   C. A and B
   D. All can be answer
4. Which of the following is not example of COTS database?
   A. Enterprise Resource Planning packages.
   B. Customer Relationship Management packages.
   C. Point of Sale packages
   D. SQL server

Answer the following question!

Note: Satisfactory rating 8 points Unsatisfactory - below 8 points

You can ask you teacher for the copy of the correct answers.

Score = _____
Rating: _____

Answer Sheet

Name: _____ Date: _____

Information sheet 4: documenting the scope of database project

4.1 Documenting the scope of database project

A document database is a type of NoSQL(None Structured Query Language) relational database that is designed to store and query data as JSON (JavaScript Object Notation) like documents. Document databases make it easier for developers to store and query data in a database by using the same document model format they use in their application code.

Characteristics of document databases:

- Document DBMSs are NoSQL databases.
- Document DBMSs use key/value to store and access documents data.
- Document DBMSs have a flexible schema that can be different for each document.
- Document DBMS include JSON, XML docs, Catalogs, PDFs and Excel docs etc.

The scope of good database is one that is simple to understand and well planned. The database doesn't have redundant tables. One can use ERD's (Entity-Relationship Diagrams) in order to make a good database. Well if you have good database then

- Easy to locate the data or information in no time.
- No redundant data.
- No repetition.
- More security. Like if one is accessing or changing the data other can not change the same data at that time.
- Table references (keys like: Primary and foreign keys) are easy to maintain.

Example

```
<contact>
   <firstname>Bob</firstname>
   <lastname>Smith</lastname>
   <phone type="Cell">(123) 555-0178</phone>
   <phone type="Work">(890) 555-0133</phone>
   <address>
     <type>Home</type>
     <street1>123 Back St.</street1>
     <city>Boys</city>
     <state>AR</state>
     <zip>32225</zip>
     <country>US</country>
   </address>
 </contact>
```

Purpose of the documentation

- Makes maintenance easier, and reduces risk when extending or upgrading a system.
- Reduces training costs, by acting as a mediator between newcomers and existing staff.
- Improves productivity of both newcomers and seasoned employees
- Provides a common language between business decision makers and IT personnel

Self-Check 4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I fills the blank space

1. Write at least four characteristics of database documentation (4 pt)

   _____
   _____
   _____

2. Write at least four purpose of database documentation(4pts)

   _____
   _____
   _____
   _____

Answer the following question!

Note: Satisfactory rating 8 points Unsatisfactory - below 8 points

You can ask you teacher for the copy of the correct answers.

Score = _____
Rating: _____

Answer Sheet

Name: _____ Date: _____

Information sheet 5: Evaluating database management system

5.1 Evaluating database management systems

5.1.1 Distributed database

A distributed database (DDB) is an integrated collection of databases that is physically distributed across sites in a computer network. It is the software system that manages a distributed database such that the distribution aspects are transparent to the users. To form a distributed database system, the files must be structured, logically interrelated, and physically distributed across multiple sites. In addition, there must be a common interface to access the distributed data.

Example

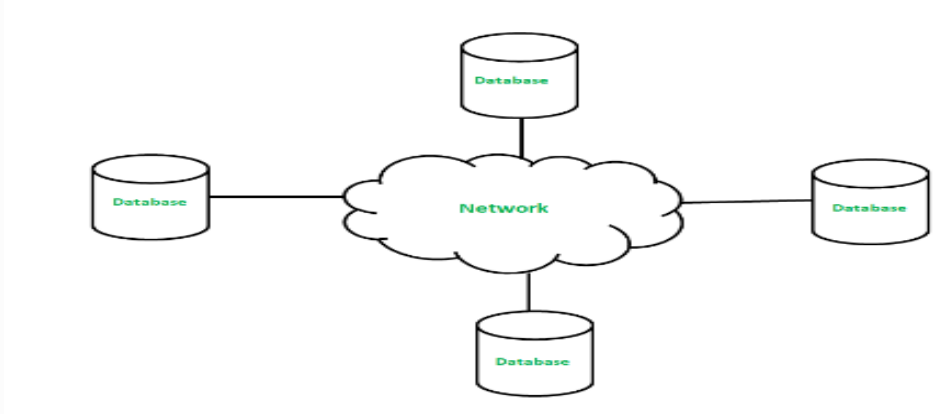

Fig 5.1Distributed database

Advantages

- Easily expanded as data is already spread across different physical locations.
- Easily accessed from different networks.
- More secure in comparison to centralized database.

Disadvantages

- Very costly and it is difficult to maintain because of its complexity.
- Difficult to provide a uniform view to user since it is spread across different physical locations.

5.1.2 Centralized database

Centralized database is stored at a single location such as a mainframe computer. It is maintained and modified from that location only and usually accessed using an internet connection such as a LAN or WAN. The centralized database is used by organizations such as colleges, hospitals, small companies and banks etc.

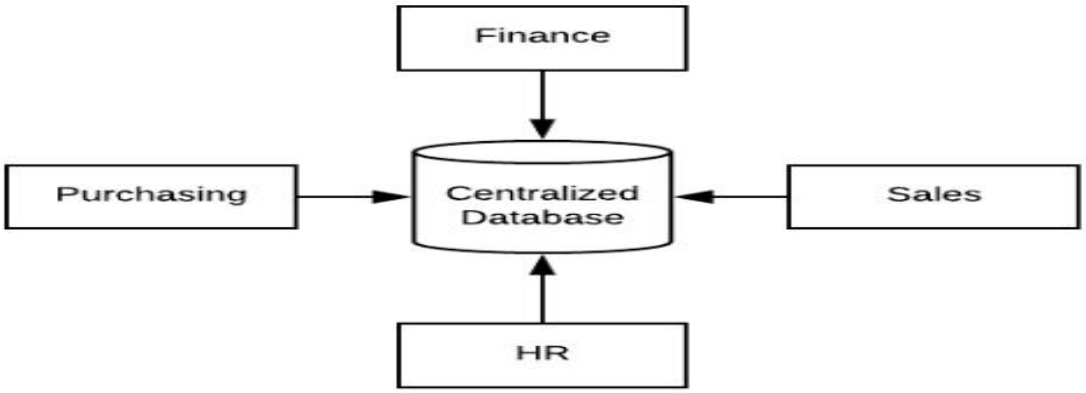

Fig5.2 Centralized database

From the above diagram, all the information for the organization is stored in single database. This database is known as the centralized database.

In a centralized database system, client/server architecture is used it is the very simplest form of a database system in which one client sent a request to the server. The server will receive a request and will be a response. Many small organizations use a centralized database system.

Advantages

- The integrity of data is increased as the whole database is stored at a single physical location(easy to manage)
- The data redundancy is controlled in a centralized database.
- Database is much secured because all data is stored in one place
- Data is easily portable because it is stored in the same place.
- The centralized database is inexpensive than other databases.
- Information is easily accessible.

Disadvantages

- If the network is slow, the searching process takes much time.
- If centralized server failure due to some reasons all database will be a loss.
- All data is stored in one place when many users access data at the same time it may create many problems.
- When much record on same place will be accessed at the same time the collision will be occurred data will be lost.

Self-Check 5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Which database type based on internet connection?
   A. Centralized database
   B. Distributed database
   C. Standalone database
   D. None
2. Which of the following is the advantage of distributed database?
   A. More secured
   B. Easily accessed
   C. Easily expanded
   D. All

Part II fills the blank space

1. Write at least three disadvantage of centralized database (3%)

_____

_____

_____

2. Write the disadvantage of distributed database (2%)

_____,

_____,

Answer the following question!

Note: Satisfactory rating 9 points Unsatisfactory - below 9 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

LG #18	LO#2: Identify database requirements

Instruction sheet

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

- Reviewing technical specifications of database
- Identifying database tables and relationships
- Identifying Database
- Developing database reports based on acceptance criteria and requirements

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Review technical specifications of database
- Identify database tables and relationships
- Identify Database
- Develop database reports based on acceptance criteria and requirements

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Information sheet 1: Reviewing technical specifications of database

1.1 Reviewing technical specifications of database

Technical specification document defines the requirements for a project, product, or system. A specification is the information on technical design, development, and procedures related to the requirements it outlines. Also define the purpose of the database which specific about the broad functions of the database will perform and how these will support the work of the organization. Alternatively, consider whether any of the objectives could be better met by some other means. Make a list of the major entities about which information will be captured (eg. clients, organizations, orders, products, sales and etc). For each of these, list the specific information which will be needed.

Example

Entity	Associated Data
Client	Name Address Phone number Organization name
Sale	Customer name Date of purchase Item purchased Cost of items purchased

Fig 1.1 technical specifications of database

It document how the data will be used. What specific operations will the database perform (eg. automate letters (mail out), generate reports, facilitate searching and matching, perform statistical analysis, etc).

Self-Check 1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Which one is the application of Technical specification documentation in database?
   A. Automate letters
   B. Generate reports
   C. Facilitate searching
   D. All can be
2. A Technical specification is the information on:-
   A. Technical design
   B. Development
   C. Procedures related to the requirements
   D. All can be

Answer the following question!

Note: Satisfactory rating 4 points Unsatisfactory - below 4 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information sheet 2: Identifying database tables and relationships

2.2 Identifying database tables and relationships

Table is a collection of related data held in a table format within a database. In relational databases, and flat file databases, a table is a set of data elements (values) using a model of vertical columns (identifiable by name) and horizontal rows; the cell is being the unit where a row and column intersect.

A table has a specified number of columns, but can have any number of rows. Each row is identified by one or more values appearing in a particular column subset. A specific choice of columns which uniquely identify rows is called the primary key.

Table is another term for Relation, although there is the difference in that a table is usually a multi set (bag) of rows where a relation is a set and does not allow duplicates. Besides the actual data rows, tables generally have associated with them some metadata, such as constraints on the table or on the values within particular columns.

Example

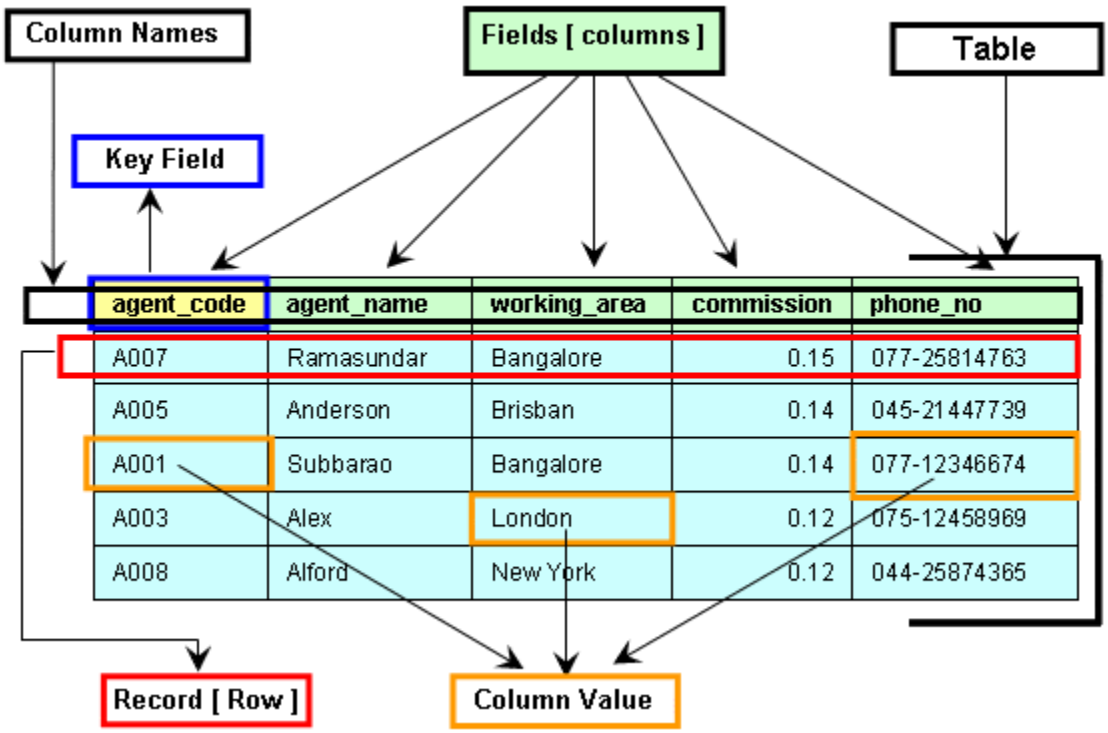

Fig 2.1 Relational database (Table)

Database relationship is a situation that exists between two relational database tables when one table has a foreign key that references the primary key of the other table. Relationships allow relational databases to split and store data in different tables, while linking disparate data items. Also, associations between tables that are created using join statements to retrieve data. Both tables can have only one record on each side of the relationship. Each primary key value relates to none or only one record in the related table.

Types of Relationship

1. One-to-one
2. One-to-many
3. Many-to-many

1. One-to-one

A one-to-one (1:1) relationship is when at most one instance of an entity A is associated with one instance of entity B.

Example

A person can have only one passport, and a passport is assigned to a single person.

If there are two entities 'Person' (Id, Name, Age, Address) and 'Passport' (Passport_id, Passport_no). So, each person can have only one passport and each passport belongs to only one person.

Fig 2.3 One-to-one relationship

Such relationship is not very common. However, this relationship is used for security purposes. In the above example, we can easily store the passport id in the 'Person' table only. But, we make another table for the 'Passport' because Passport number may be sensitive data and it should be hidden from certain users.

1. One-to-Many

A relationship exists when each record of one table can be related to one or more than one record of the other table. This relationship is the most common relationship found. A one-to-many relationship can also be said as a many-to-one relationship depending upon the way we view it.

Example,

If there are two entity type 'Customer' and 'Account' then each 'Customer' can have more than one 'Account' but each 'Account' is held by only one 'Customer'. In this example, we can say that each Customer is associated with many Accounts. So, it is a one-to-many relationship. But, if we see it the other wa,

i.e many Account is associated with one Customer then we can say that it is a many-to-one relationship.

Fig 2.4 one -to-Many relationship

A relationship exists when each record of the first table can be related to one or more than one record of the second table and a single record of the second table can be related to one or more than one record of the first table. A many-to-many relationship can be seen as a two one-to-many relationship which is linked by a 'linking table' or 'associate table'. The linking table links two tables by having fields which are the primary key of the other two tables. We can understand this with the following example.

Example:

If there are two entities type ‘Customer’ and ‘Product’ then each customer can buy more than one product and a product can be bought by many different customers.

Fig 2.5 Many-to-Many relationship

To understand the concept of the linking table here, we can have the ‘Order’ entity as a linking table which links the ‘Customer’ and ‘Product’ entity. We can break this many-to-many relationship in two one-to-many relationships.

First, each ‘Customer’ can have many ‘Order’ whereas each ‘Order’ is related to only one ‘Customer’.

Second, each ‘Order’ is related only one Product where as there can many orders for the same Product

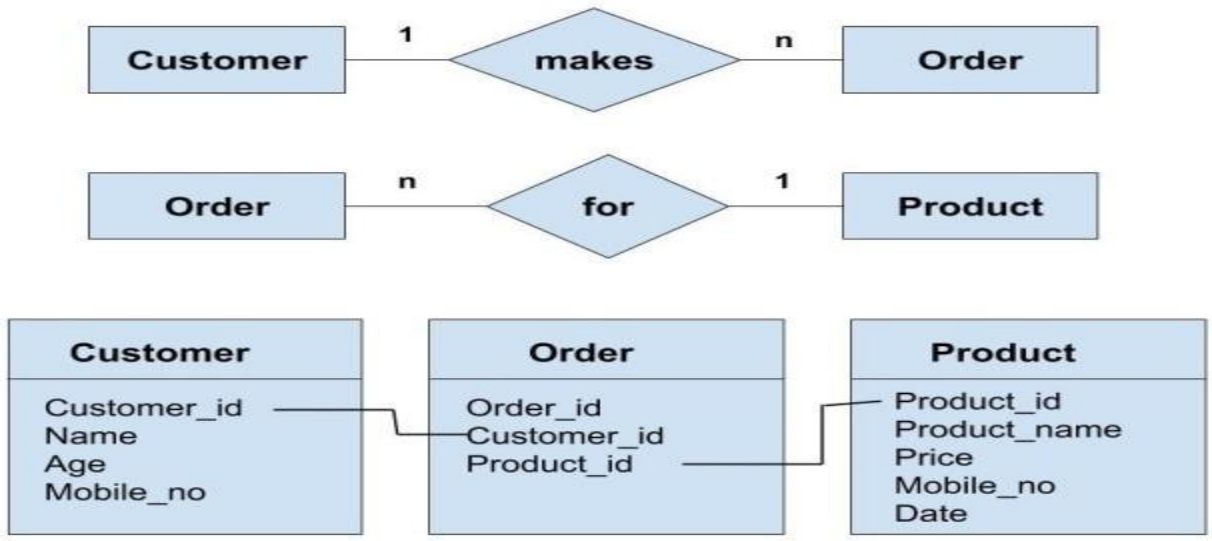

Fig 2.6 Many-to-Many relationship using junction table

In the above concept of linking can be understood with the help of taking into consideration all the attributes of the entities 'Customer', 'Order' and 'Product'. We can see that the primary key of both 'Customer' and 'Product' entity are included in the linking table i.e 'Order' table. This key act as foreign keys while referring to the respective table from the 'Order' table.

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. What is the other name of Table is?
   A. Tuple
   B. Relation
   C. Record
   D. Attribute
2. The association between two or more relation is :
   A. Cardinality ratio
   B. Data mapping
   C. Relationship
   D. None
3. Which relationship types need “Junction” table
   A. One-to-one
   B. One-to-many
   C. many-to-one
   D. many-to-many
4. Which relationships is the most common in DBMS?
   A. many-to-many
   B. One-to-one
   C. One-to-many
   D. All can be

. Answer the following question!

Note: Satisfactory rating 8 points Unsatisfactory - below 8 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information sheet 3: Identifying Database

Database is an organized collection of data, generally stored and accessed electronically from a computer system. Where databases are more complex they are often developed using formal design and modeling techniques.

Data Dictionary consists of database metadata. It has records about objects in the database. The data dictionary is very important as it contains information such as what is in the database, who is allowed to access it, where is the database physically stored etc. The users of the database normally don't interact with the data dictionary; it is only handled by the database administrators.

Data Dictionary consists of the following information:-

- Name of the tables in the database
- Constraints of a table i.e. keys, relationships, etc.
- Columns of the tables that related to each other
- Owner of the table
- Last accessed information of the object
- Last updated information of the object

Example of Data Dictionary can be personal details of a student

<StudentPersonalDetails>

Student_ID	Student_Name	Student_Address	Student_City

The following is the data dictionary for the above fields

Field Name	Datatype	Field Length	Constraint	Description
Student_ID	Number	5	Primary Key	Student id
Student_Name	Varchar	20	Not Null	Name of the student
Student_Address	Varchar	30	Not Null	Address of the student
Student_City	Varchar	20	Not Null	City of the student

Fig 3.1 Data Dictionary

Types of Data Dictionary

a. Active Data Dictionary

The DBMS software manages the active data dictionary automatically. The modification is an automatic task and most RDBMS has active data dictionary. It is also known as integrated data dictionary.

b. Passive Data Dictionary

Managed by the users and is modified manually when the database structure change. Also known as non-integrated data dictionary.

3.2. Identifying table attributes and keys

The columns are known as attributes whereas the rows are known as records. Attributes are the descriptive properties which are owned by each entity of an Entity Set. An attribute is a property or characteristic of an entity. An entity may contain any number of attributes. One of the attributes is considered as the primary key.

Types of Attributes

1. Simple attributes
2. Composite attributes
3. Single valued attributes
4. Multi valued attributes
5. Derived attributes
6. Key attributes

1. Simple Attributes

Simple attributes are those attributes which cannot be divided further.

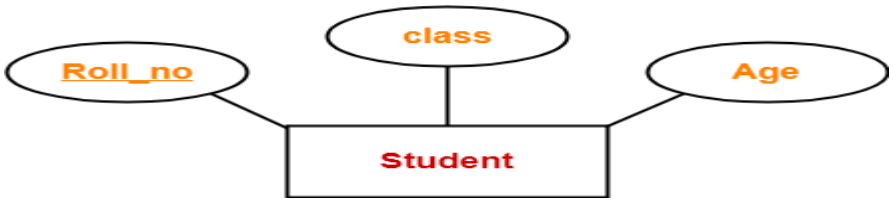

Fig 3.3 Simple Attributes

From the above figure all the attributes are simple attributes as they cannot be divided further.

2. Composite Attributes

Composite attributes are those attributes which are composed of many other simple attributes.

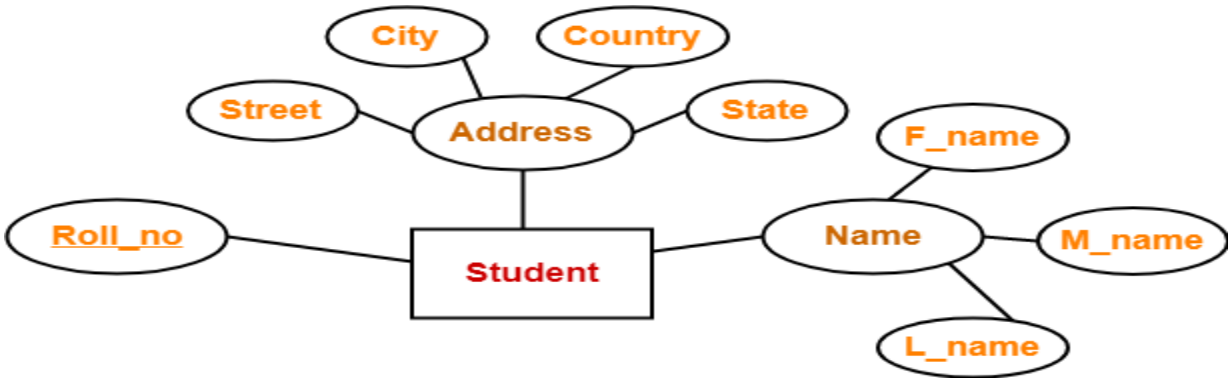

Fig 3.4 Composite Attributes

From the above figure, the attributes “Name” and “Address” are composite attributes as they are composed of many other simple attributes.

3. Single Valued Attributes

Single valued attributes are those attributes which can take only one value for a given entity from an entity set.

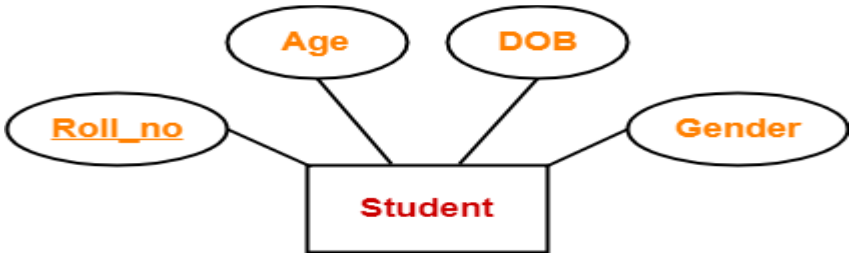

Fig 3.5 Single Valued Attributes

Here, all the attributes are single valued attributes as they can take only one specific value for each entity.

4. Multi Valued Attributes

Multi valued attributes are those attributes which can take more than one value for a given entity from an entity set.

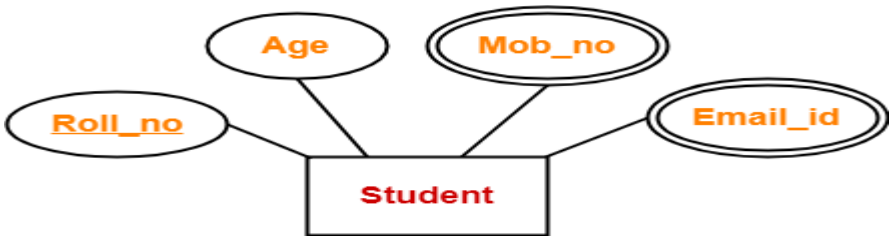

Fig 3.6 Multi Valued Attributes

From the above figure, the attributes “Mob_no” and “Email_id” are multi valued attributes as they can take more than one values for a given entity.

5. Derived Attributes

Derived attributes are those attributes which can be derived from other attribute(s).

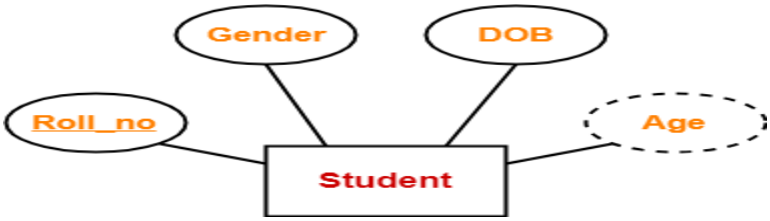

Fig 3.7 Derived Attributes

Here, the attribute Age is a derived attribute as it can be derived from the attribute “DOB”.

6. Key Attributes

Key attributes are those attributes which can identify an entity uniquely in an entity set.

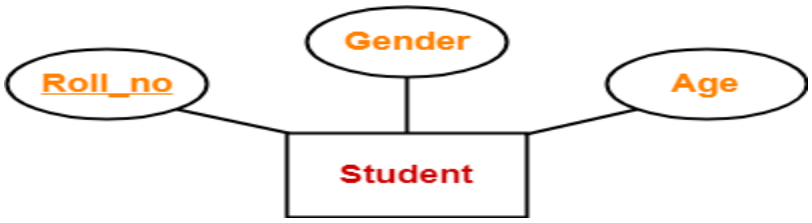

Fig 3.8 Key Attributes

Here, the attribute “Roll_no” is a key attribute as it can identify any student uniquely.

Key

A Key is a data item that exclusively identifies a record. It is a set of column(s) that is used to uniquely identify the record in a table. It is used to fetch or retrieve records / data rows from data table according to the condition/requirement. Key provides several types of constraints like column can’t store duplicate values or null values. Keys are also used to generate relationship among different database tables or views.

Types of keys:-

1. Primary Key
2. Super Key
3. Candidate Key
4. Alternate Key
5. Composite Key
6. Foreign Key

- Primary Key

A primary is a column or set of columns in a table that uniquely identifies rows in that table.

- Super Key

A super key is a set of one of more columns to uniquely identify rows in a table.

- Candidate Key

A super key with no redundant attribute is known as candidate key

- Alternate Key

Out of all candidate keys, only one gets selected as primary key, remaining keys are known as alternate or secondary keys.

- Composite Key

A key that consists of more than one attribute to uniquely identify rows n a table is called composite key.

- Foreign Key

Foreign keys are the columns of a table that points to the primary key of another table. They act as a cross reference between tables.

Self-Check 3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. In DBMS, column is:
   A. Record
   B. Attribute
   C. Cardinality ratio
   D. None
2. "Age" can be?
   A. Single attribute
   B. Composite attribute
   C. Derived attribute
   D. All
3. Which key is always identifying one record from the other?
   A. Foreign key
   B. Primary key
   C. Composite Key
   D. Alternate Key

Part II fills the blank space

1. List at least three consideration of Data Dictionary (3%)

_____

_____

_____

2. List all categories of attributes (5%)

_____,_____

_____,_____

_____,_____

Answer the following question!

Note: Satisfactory rating 14 points Unsatisfactory - below 14 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information sheet 4: Developing database reports

2.4 Developing database reports

A database report is a report created from a culmination of queried data visualized for the purposes of analysis, data discovery and decision-making.

Database reports can be created through traditional BI platforms and embedded BI platforms through front end calls to a backend database. These calls are often formulated as SQL queries.

A traditional BI platform may run a call to an internal data resource to then visualize a database report through a centralized front end BI system.

Example

A banking software application may contain specifically defined reports on all customers with large deposits or reports on monthly loan summaries for all customers.

Business Intelligence (BI)

Business Intelligence is an umbrella term for a set of analytical tools and methods that allow users to observe, visualize, and analyze data. Users can pull and combine different data sources by executing multiple database queries to mash up different data elements. These queries are then visualized into reports, dashboards and other visualizations allowing decision makers to easily view data in a usable way and then analyze said data to make better business decisions.

Acceptance criteria represent a condition that states whether the specified requirements are fulfilled or not. It has emerged as measurement criteria for assessing the functioning and thus verifying and validating the results. Example it is based on the acceptance criteria that the software testing teams perform acceptance testing on the software product.

In the Software Development industry, the word 'Requirement' defines what our goal is, what the customers exactly need and what will make our company to increase its business.

Be it a product company which makes software products or a service company which offers services in various software fields, the prime base for all of them is the requirement and the success is defined by how well the requirements are met.

In a perfect world, people would understand each other at a glance and nothing could create confusion among them. But in the real world we have to come up with ways to communicate our ideas clearly so that our peers don't misunderstand us.

In software development, acceptance criteria help to properly set a client's expectations for a product.

An acceptance criterion is a set of accepted conditions or business rules which the functionality or feature should satisfy and meet, in order to be accepted by the Product Owner/Stakeholders.

This is a very important part of user story completion and it should be studied by the Product Owner and Business Analyst very carefully because missing a single criterion can cost a lot.

Example

The acceptance criteria could be set as follows:

- Search by the name of a book only.
- Search by the publisher name that shows all books belonging to the same category.
- Restrict the search with the name of a website.
- The user should not be able to execute the search if all the mandatory fields are not entered.
- The user must see the sequence number of the book.

Benefits of Acceptance

- The acceptance criteria enable the development team to identify the user story which they can use as a reference of whether the product functionality works as required.
- A common understanding between the client and the development team is synchronized as the client has specific expectations from the team while the team has detailed scenarios of the development process and the requirements of the final product.
- The software development project is usually divided into tasks, and, after each is completed, it is confirmed whether they meet the requirement of the project development scope. This is made possible by the use of the acceptance criteria.
- Before any software begins to be developed, planning and the estimation of resources and time are required. The use of acceptance criteria allows for the easy division of tasks, which can then be easily budgeted and assigned.

Self-Check 4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Database report is a culmination of queried data visualized for the purposes of analysis
   A. True B. False
2. Which one is True about database Report
   A. Can be traditional BI platforms
   B. Formulated from SQL queries
   C. Extracted from internal data resource
   D. All can be
3. Which one is the example Database report
   A. Banking report B. Billing report
   C. Grade report D. All

Part II fills the blank space

1. Define Business Intelligence (BI) (3%)

_____

_____

_____

Answer the following question!

Note: Satisfactory rating 9 points Unsatisfactory - below 9 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

LG #19	LO#3: Identify security requirements

Instruction sheet

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

- Reviewing system security plan
- Choosing database management system
- Identifying, evaluating and recording Database performance, recovery and audit trail

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Review system security plan
- Choose database management system
- Identify, evaluate and record Database performance, recovery and audit trail

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
3. Accomplish the “Self-checks” which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
5. If your performance is satisfactory proceed to the next learning guide,

Information sheet 1: Reviewing system security plan

1.1 Reviewing system security plan

System security plan is a formal plan that defines the plan of action to secure a computer or information system. It provides a systematic approach and techniques for protecting a computer from being used by unauthorized users, guards against worms and viruses as well as any other incident/event/process that can jeopardize the underlying system's security.

It is primarily implemented in organizational IT environments. It can be a proposed plan to protect and control an information system, or a plan that is already in implementation. It is usually created using the organization/IT environment security policy as the benchmark.

A System Security Plan (SSP) acts as the roadmap for a cyber security program and defines the "how" an organization meets regulatory and control requirements.

If the organization operates in a regulatory environment much of that risk has been defined by minimum control requirements to ensure your System Security Plan stays updated and that it addresses all the control requirements with documented policies and procedures as the risk environment changes.

System security plan includes:

- List of authorized users that can access the system;
- Level of access/tiered access, or what each user is allowed and not allowed to do on the system;
- Access control methods, or how users will access the system (user ID/password, digital card, biometrics);
- Strengths and weaknesses of the system and how weaknesses are handled;
- May also include system backup/restoration procedures

Self-Check 1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Which one is the function of system security plan?
   A. It provides a systematic approach
   B. Techniques for protecting a computer from unauthorized users,
   C. Guards against worms and virus
   D. All can be answer
2. System security plan is implemented:-
   A. Organizational IT environments
   B. Management environment
   C. Decision making environment
   D. All
3. Which of the following is not the system security plan focus area?
   A. Access control methods
   B. Level of access
   C. List of authorized users
   D. None

Part II fills the blank space

1. Define System security plan (3%)

_____

_____

_____

. Answer the following question!

Note: Satisfactory rating 9 points Unsatisfactory - below 9 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information sheet 2: Choosing database management system

2.1 Clarifying database for user security

Database security

Database security refers to the collective measures used to protect and secure a database from illegitimate use and malicious cyber threats and attacks. Database security procedures are aimed at protecting not just the data inside the database, but the database management system and all the applications that access it from intrusion, misuse of data, and damage.

When data is stored on a database, the security measures that should be considered comprise of the following:-

- Encrypting the data stored so as to provide confidentiality.
- Compressing data as to occupy less space additionally, compression offers augmented security as it shuffle data.
- Prevent against SQL injection attack so that input forms for data entry cannot be exploited to potentially damaging SQL instructions. As an example, if a database system is vulnerable against SQL injection attack, an attacker can “inject” a rogue statement (such as dropping a database table) to execute, immediately following a biased statement (e.g., as simple as “1 = 1”) that will always yield true.
- Secure the database physically so that data can be protected against access from unintended third parties.

The three main points that should be considered when securing a database are the following:

- Protecting data from unauthorized access.
- Preventing unauthorized disclosure.
- Recovering from hardware or software errors.

2.2. Confirming database security aligned with security system plan

It is important to develop a security policy for every database. The security policy establishes methods for protecting the database from accidental or malicious destruction of data or damage to the database infrastructure. Each database can have an administrator, referred to as the security administrator, who is responsible for implementing and maintaining the database security policy

To connect to the database, each user must specify a valid user name that has been previously defined to the database. An account must have been established for the user, with information about the user being stored in the data dictionary.

When you create a database user (account), you specify the following attributes of the user:

- User name
- Authentication method
- User profile

Important steps to ensuring database security

- Isolate sensitive databases an accurate inventory of all databases deployed across the enterprise should be kept. In addition, all sensitive data stored in those databases shall be identified.
- Eliminate vulnerabilities all database vulnerabilities affecting it safety should be assessed, identified and remediated on a regular basis.
- Enforce least privileges employees should have access to that minimum information necessary to perform their duties and that's all.
- Monitor for deviations appropriate database policies should be implemented and all activity that deviates from usual behavior should be monitored.
- Respond to suspicious behavior in case of suspicious or abnormal database behavior the security team should be alerted immediately to minimize risk of attack.

Every modern company or organization should develop and implement a general database security policy within the company. This policy and its guidelines shall be obligatory for all the company employees.

This policy should also take into account having the following security components for any database management system:

- Firewall a database security component that can be put between a database and client applications which will be serving as a point where all database traffic is inspected and filtered. If a query looks suspicious it may be blocked and the user disconnected from the database.
- Data masking a database security tool that can effectively prevent sensitive data from exposure. Data masking may be static or dynamic, each serving a specific goal in database management system security.

- Database activity monitoring aids in the process of reducing vulnerabilities by providing real-time visibility into all database activity. Such tools collect data, aggregate it and analyze the data to look for activities that are in violation of security policy or that indicate that anomalies have occurred.
- Sensitive data discovery as part of a database security policy, a company should understand what databases need protection, which can be done more efficiently through finding all sensitive data.

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Which one is NOT the responsibility of database security?
   A. Compressing data
   B. Prevent against SQL injection
   C. Encrypting the data stored
   D. None
2. What is the main consideration when securing a database
   A. Protecting data from unauthorized access
   B. Preventing unauthorized disclosure of data
   C. Recovering from hardware or software errors.
   D. All can be answer
3. When creating database users you consider the following except?
   A. Share password
   B. User name
   C. User profile
   D. Authentication method

Part II fills the blank space

1. What is database security policy (3%)

_____

_____

_____

. Answer the following question!

Note: Satisfactory rating 9 points Unsatisfactory - below 9 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information sheet 3: Identifying Database performance, recovery and audit trail

3.1 Identifying Database performance, recovery and audit trail

Database performance management is the process of monitoring, analyzing and performing the subsequent performance of a database system in order to optimize performance and increase efficiency. The goal is to find, analyze and then resolve various database blocks that can impact application response times or hinder application performance. It is also a proactive approach; it is used to look for potential failure points rather than simply waiting and detecting for failures and fixing them.

Database performance management offers the following benefits:

- Monitor performance metrics such as top users, queries, programs, etc.
- Visualize end-to-end application performance right from the tools being used.
- Get alerts when set database thresholds are about to be violated.
- Visualize the SQL execution plans in order to isolate bottlenecks.

Database auditing is the monitoring and recording of selected user database actions to knows who and when accessed your database tables, and what modifications were done to them.

Typically, auditing is used for:

- Enabling accountability for actions performed in a particular schema, table, row, or affecting specific content.
- Preventing database users from inappropriate actions based on that accountability.
- Investigating suspicious activity and revealing data breaches. Database trails help the investigators to find the criminal and prevent such things from occurrence in the future.

- Intrusion detection. Audit trails help to identify a data breach in progress. Bad guys sometimes work for a long time trying to breach the security system, or an insider copies the sensitive data by parts. All these things leave a trail.
- Detecting problems with an authorization or implementation of access control and providing help in reassessing user authorizations. Audit trails enable you to identify abuse of access rights either by regular users or by privileged users thus it helps to asses proper rights to these users.
- Monitoring and gathering information about specific database activities.

The most typical questions associated with database audits are:

- Who viewed and modified sensitive data inside your system?
- When the data of interest has been changed?
- How a specific user got access to this data?
- Were these changes approved?
- Did the privileged users abuse their unlimited access rights?

Self-Check 3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Which one is NOT the goal of database performance management?
   A. To find database blocks
   B. To analyze database blocks
   C. To resolve database blocks
   D. None of the above
2. Which one is the advantage of Database performance management
   A. Visualize the SQL execution plans
   B. Visualize end-to-end application performance
   C. Monitor performance metrics such as top users, queries, programs
   D. All can be answer
3. Why database auditing?
   A. To Detect database problems
   B. To Prevent database users
   C. To identify Intrusion detection
   D. All can be answer

Part II fills the blank space

1. What is Database performance management (3%)

_____

_____

_____

2. What is a Database auditing trial (3pt?)

_____

_____

_____

. Answer the following question!

Note: Satisfactory rating 12 points Unsatisfactory - below 12 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer Sheet

Name: _____ Date: _____

LG #20	LO#4: Seek client feedback and approval

Instruction sheet

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

- Presenting database scope and technical requirements
- Reviewing user feedback to adjust database
- presenting Database and documentation

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Present database scope and technical requirements
- Review user feedback to adjust database
- present Database and documentation

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described below.
2. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
3. Accomplish the “Self-checks” which are placed following all information sheets.
4. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
5. If your performance is satisfactory proceed to the next learning guide,

Information sheet 1: Seek client feedback and approval

1.1 Presenting database scope and technical requirements

The database project scope is defined during the planning phase. A successful project scope statement should be concise and clear. Anyone reading the statement should have a good idea of what the project consists of (and what will not be part of the project). This statement will give a view of the project. It is also important to be specific in a project scope statement.

Technical requirements are the technical issues that must be considered to successfully complete a project. These are aspects such as performance, reliability, and availability that the project must meet on in order to proceed with a project.

Technical requirements, in the context of software development and systems engineering, are the factors required to deliver a desired function or behavior from a system to satisfy a user's standards and needs. It can refer to systems like software, electronic hardware devices or software-driven electronic devices.

The factors considered in technical requirements are often referred to as "itties" as this is the same suffix on many of the factor types. Factors include types include accessibility, adaptability, usability, auditability, maintainability and performance. The combination of factors and the individual emphasis of each to most effectively meet the needs of users are determined through a consultation process.

Self-Check 1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Project scope is determined at what stage?
   A. Planning Phase
   B. Requirement gathering phase
   C. Design phase
   D. Implementation phase
2. A successful project scope statement should be:
   A. Delayed in time
   B. Complex and clear.
   C. Concise and clear.
   D. High resource consumption
3. Good database project met the following characters except?
   A. Performance
   B. Reliability
   C. Availability
   D. Complexity

Answer the following question!

Note: Satisfactory rating 6 points Unsatisfactory - below 6 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer Sheet

Name: _____ Date: _____

Information sheet 2: Reviewing user feedback to adjust database

2.1 Reviewing user feedback to adjust database

Feedback is not advice, praise, or evaluation. Feedback is information about how one is doing in effort to reach a goal. There are two types of feedback giving and receiving and both are not the easiest. Understanding of how to give feedback and to receive feedback is important in a leadership role.

Feedback is:

- Written comments
- Electronic Comments
- Meetings with individuals
- Suggestions from peers

Feedback used?

- Used to provide constructive criticism or to receive positive suggestions to better oneself, an organization, or a team. If done right, improvements can be made from the information that if either provided or received.
- Individuals can grow from the information gaining positive reinforcement or correct negative behaviors
- Feedback should be given in a way that does not attack the person, but condemns the behavior.
- Remember feedback is not always constructive and it can be positive

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. Feedback is conducted in the following except
   A. Suggestions from peers
   B. Electronic Comments
   C. Written comments
   D. None
2. Which one is the benefit of Feedback
   A. Show the right direction
   B. Improve work in workplace
   C. Can be positive or negative
   D. All can be answer

Part II: fill the blank space

1. Define Feedback (3pt)

_____

_____

_____

. Answer the following question!

Note: Satisfactory rating 7 points Unsatisfactory - below 7 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer Sheet

Name: _____ Date: _____

Information sheet 3: Presenting Database and documentation

3.1 Presenting Database and documentation

Documentation is any communicable material that is used to describe, explain or instruct regarding some attributes of an object, system or procedure, such as its parts, assembly, installation, maintenance and use. It can be provided on paper, online, or on digital or analog media, such as audio tape or CDs.

Examples:-

User guides, white papers, online help, and quick reference guides.

Paper or hard copy documentation has become less common. Documentation is often distributed via websites, software products, and other online applications.

Benefits of database documentation

- Help developers quickly prototype a database structure for the current project
- Business members (sales, BA) can easily understand the context and meaning of table fields with rich metadata that developers input.
- Help developers generate a holistic database document that acts as a single source of truth for everyone.
- A shared data can help avoid future conflicts when the team expands.
- Allow share ability where external users can access the most up-to-date version of the database document online.

Self-Check 3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I Choose the best answer (each 2 point)

1. What are the examples of documentation?
   A. User guides
   B. Online help
   C. Reference guides
   D. All can be
2. Documentation is often distributed via except
   A. Websites
   B. Software products
   C. Online applications
   D. Paper based
3. Why database documentation is needed?
   A. Help developers
   B. Conflicts reduction
   C. Uses for understand metadata
   D. All can be a

Part II: fill the blank space

1. Define database documentation (3pt)

_____

_____

_____

. Answer the following question!

Note: Satisfactory rating 9 points Unsatisfactory - below 9 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer Sheet

Name: _____ Date: _____

Reference

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This TTLM developed on December 2020 at Bishoftu, Ethiopia.

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Answer Key

Module Title: Identifying Physical Database Requirements

LO #1- Identify database scope	
Self-Check1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I:

1. D
2. A
3. C

Part II

1. Microsoft SQL Server, Oracle, MySQL, PostgreSQL and Microsoft Office Access
2. 1-tier architecture, 2-1-tier architecture and 3-tier architecture
3. Multiprocessing, Multi-user, Multitasking, Real time and Multithreading

Self-Check 2	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. A
2. B
3. A

Part II

1. Systems requirements are the building blocks for developers use to build the system. These are the traditional shall statements that describe what the system "shall do."

Self-Check 3	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. C
2. D
3. A
4. D

Self-Check 4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I:

1. Document DBMSs are NoSQL databases.
   Document DBMSs use key/value to store and access documents data.
   Document DBMSs have a flexible schema that can be different for each document.
   Document DBMS include JSON, XML docs, Catalogs, PDFs and Excel docs etc.

2. Makes maintenance easier,
   Reduces training costs,
   Improves productivity
   Provides a common language between business decision makers and IT personnel

Self-Check 5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. A
2. D

Part II:

1. Database is much secured
   The data redundancy is controlled
   The integrity of data is increased

2. Very costly and it is difficult to maintain because of its complexity.
   Difficult to provide a uniform view to user since it is spread across different physical locations.

LO #2- Identify database scope	
Self-Check1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. D
2. D

Self-Check 2	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. B
2. C
3. D
4. C

Self-Check 3	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. B
2. C
3. B

Part II:

1. Name of the tables in the database

   Constraints of a table i.e. keys, relationships, etc.
   Columns of the tables that related to each other

2. Simple attributes
   Composite attributes
   Single valued attributes
   Multi valued attributes
   Derived attributes

Key attributes

Self-Check 4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

2. A
3. D
4. D

Part II:

1. Business Intelligence is an umbrella term for a set of analytical tools and methods that allow users to observe, visualize, and analyze data.

LO #3- Reviewing system security plan	
Self-Check 1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. D
2. A
3. D

Part II:

1. System security plan is a formal plan that defines the plan of action to secure a computer or information system.

Self-Check 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. D
2. D
3. A

Part II:

1. The security policy establishes methods for protecting the database from accidental or malicious destruction of data or damage to the database infrastructure.

Self-Check 3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1.D
2.D
3.D

Part II:

2. Database performance management is the process of monitoring, analyzing and performing the subsequent performance of a database system in order to optimize performance and increase efficiency.
3. Database auditing is the monitoring and recording of selected user database actions to knows who and when accessed your database tables, and what modifications were done to them.

Self-Check 4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. D
2. D
3. D

Part II:

1. Database performance management is the process of monitoring, analyzing and performing the subsequent performance of a database system in order to optimize performance and increase efficiency.
2. Database auditing is the monitoring and recording of selected user database actions to knows who and when accessed your database tables, and what modifications were done to them.

LO#4. Seek client feedback and approval	
Self-Check 1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. A
2. C
3. D

Self-Check 2	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. D
2. D

Part II:

1. Feedback is not advice, praise, or evaluation. Feedback is information about how one is doing in effort to reach a goal

Self-Check 3	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I

1. D
2. D
3. D

Part II:

Documentation is any communicable material that is used to describe, explain or instruct regarding some attributes of an object, system or procedure, such as its parts, assembly, installation, maintenance and use