CHEET SHEET

OBJECTIVE 1

DATABASE DESIGN

A database is an organized collection of structured Data information, or data, typically stored electronically in a computer system. A database is usually controlled by a database management system (DBMS).

Component Database :

1.Entitas
2.Row/Records
3.Field/Columns

Appropriate Primary Key

is a column in a relational database table that's distinctive for each record. A primary key must have a unique value.

Appropriate Composite Key

A composite key is a candidate key that consists of two or more attributes (table columns) that together uniquely identify an entity occurrence (table row).

·Data types

A data type is an attribute associated with a piece of data that tells a computer system how to interpret its value. Example data types :

SQL server says	Access says	Access Data Field Lenght
int	Number	Long Integer
text	Long Text	
date	Date/Time	
varchar	Long Text	
float	Number	Double

Entities Relationship Diagram

A type of structural diagram for use in database design. An ERD contains different symbols and connectors that visualize two important information.

How to create ERD:

1. Determine the Entities in Your ERD.
2. Add Attributes to Each Entity.
3. Define the Relationships Between Entities.
4. Add Cardinality to Every Relationship in your ER Diagram.
5. Finish and Save Your ERD.

Data Protection Measures

Database backup is the process of creating, managing, and storing copies of data in case it's lost, corrupted, or damaged

Some command to do protection database are

1. GRANT : This is a SQL command which is used to provide privileges/permissions to modify and retrieve database objects
2. REVOKE: Is used to revoke or withdraw permissions that were previously granted to an account on a database object.
3. WITHGRANT: The difference between these options is very simple. The username will be able to give the permission after receiving requests from other users.

- ·The principle of least privilege (PoLP) is an information security concept which maintains that a user or entity should only have access to the specific data,
- ·A role is a collection of privileges that can be granted to one or more users or other roles.

OBJECTIVE 2

Data Definition Language (DDL)

A data definition language (DDL) is a computer language used to create and modify the structure of database objects in a database. These database objects include views, schemas, tables, indexes, etc.

DDL Command

CREATE

to create a database and its objects like (table, index, views, store procedure, function, and triggers), example syntax :

```
create table customer (
    customer_id int primary key not null,
    first_name varchar (50) not null,
    last_name varchar (50) not null,);
```

ALTER

Alters the structure of the existing database, example syntax :

```
alter table customer
add email varchar(50) not null;
```

DROP

Delete objects from the data base, example syntax :

```
drop table customer ;
```

•TRUNCATE

Remove all records from a table, including all spaces allocated for the records are removed,example syntax :

```
truncate table customer;
```

COMMENT

Add comments to the data dictionary
-- Information in code

RENAME

Rename an object

```
ALTER TABLE employees
RENAME TO staff;
```


Group 1

1. Ahmad Zarwantoni
2. Dava Mohamad Rizki
3. Tegar Tri Ananda Putra
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Object View

In a database, a view is the result set of a stored query, which can be queried in the same manner as a persistent database collection object. This pre-established query command is kept in the data dictionary

Example Query For Object View

CREATE

```
create view gender as
        select s.gender
        from students s
        where s."name" = 'andi';
```

DROP

```
DROP VIEW IF EXISTS gender;
```

ALTER

because PostgreSQL does not have an **ALTER VIEW** command to change the definition directly, we must first delete the view and create a new view

TRUNCATE

in view there is **no truncate**

COMMENT

-- Information in code

RENAME

In view there is **no Rename**

Object Stored Procedure

A stored procedure is a subroutine available to applications that access a relational database management system. Such procedures are stored in the database data dictionary. Uses for stored procedures include data-validation or access-control mechanisms

Example Query For Object Stored Procedure

CREATE

```
CREATE OR REPLACE PROCEDURE
TRANSFER(
                sender int,
                receiver int,
                amount dec)
language plpgsql
AS $$
BEGIN
update accounts
set balance = balance - amount
where id = sender;
commit;
END;
```

DROP

```
DROP PROCEDURE IF EXISTS TRANSFER;
```

ALTER

because PostgreSQL does not have an ALTER Stored Procedure command to change the definition directly, we must first delete the procedure and create a new procedure

TRUNCATE

in view there is **no truncate**

COMMENT

-- Information in code

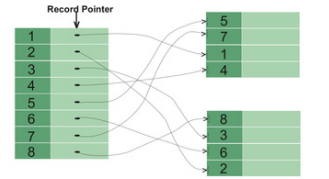
RENAME

In view there is **no Rename**

Cluster and Non Cluster

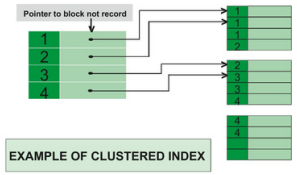
The main difference between the two is that a **clustered index** organizes the physical data in a table based on the index, while a **non-clustered index** is a list that connects index values to data locations in the table without changing the order of the physical data.

Example Of Non Clustered Index



EXAMPLE OF NON-CLUSTERED INDEX

Example Of Clustered index



EXAMPLE OF CLUSTERED INDEX

OBJECTIVE 3

DATA RETRIEVAL

Join

Joining in SQL means retrieving data from two or more than two tables based on a common field.

1) Inner Join

Query Example:

```
SELECT city.name, country.name
FROM city
INNER JOIN country
ON city.country_id = country.country_id;
```

2) Left Join

```
SELECT city.name, country.name
FROM city
LEFT JOIN country
ON city.country_id = country.country_id;
```

3) Right Join

```
SELECT city.name, country.name
FROM city
RIGHT JOIN country
ON city.country_id = country.country_id;
```

4) Full Join

```
SELECT city.name, country.name
FROM city
FULL JOIN country
ON city.country_id = country.country_id;
```

Union

Union clause/operator is used to combine the results of two or more SELECT statements without returning any duplicate rows.

Query example :

```
SELECT column_name(s)  FROM table1
UNION
SELECT column_name(s)  FROM table2;
```

Union All

Union all is Command combines the result set of two or more SELECT statements (allows duplicate values)

Example :

```
SELECT column_name(s) FROM table1
UNION ALL
SELECT column_name(s) FROM table2;
```

Distinct

Statement is used to return only distinct (unique) values.

Example :

```
SELECT DISTINCT Country FROM Costumers;
```

Intersect

Intersect is used to retrieve the records that are identical/common between the result sets of two SELECT (tables) statements.

Example :

```
SELECT column1, column2, ..., columnN
FROM table1, table2, ..., tableN
INTERSECT
SELECT column1, column2, ..., columnN
FROM table1, table2, ..., tableN
```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Alias
Aliases are often used to make column names more readable.
Example :
-Column
```
SELECT column_name AS alias_name
FROM table_name;
```
-Table
```
SELECT column_name(s)
FROM table_name AS alias_name;
```

Computed Column
Computed Column is a virtual column that is not physically stored in the table, unless the column is marked PERSISTED.
Example :
```
SELECT Id,
    first_name
    last_name,
    monthly_salary,
        CONCAT(first_name, ' ', last_name) AS full_name,
    (monthly_salary * 12) AS yearly_salary
FROM dbo.employee;
```

Sort
Sorting is the process of arranging data into meaningful order so that you can analyze it more effectively.
Example:
```
SELECT * FROM Customers
ORDER BY Country;
```
IF you are not Typing ASC or DESC, the code Will be ASC as Default syntax

Filter Data
Data filtering is the process of examining a dataset to exclude, rearrange, or apportion data according to certain criteria.

Limit
Example :
```
SELECT id, price
FROM product
ORDER BY price DESC
LIMIT 10
```

Where
Example :
```
SELECT id, city, email, gender
FROM customer
WHERE
  City = 'Jakarta' AND
  (email = 'Gmail' OR email = 'Hotmail') AND
  Gender = 'Female'
```

In
Example :
```
SELECT id, city, email, gender
FROM customer
WHERE
        City IN ('Jakarta', 'Surabaya
```

Between
Example :
```
SELECT id, city, email, gender
FROM customer
WHERE
        Id BETWEEN 10 AND 20
```

Null & Not Null
Example :
```
SELECT id, city, email, gender
FROM customer
WHERE
        City IS NULL
```
Or
```
SELECT id, city, email, gender
FROM customer
WHERE
        City IS NOT NULL
```

Aggregate
1) Group By
Group by is statement groups rows that have the same values into summary rows.
Example :
```
SELECT id, price
FROM product
ORDER BY price DESC
```

2) Having
Having clause was added to SQL because the WHERE keyword cannot be used with aggregate functions.
Example :
```
SELECT city, COUNT(id)
FROM customer
WHERE email = 'gmail' OR gender <> 'Male'
GROUP BY city
HAVING COUNT(id) > 20
```

OBJECTIVE 4

DATA MANIPULATION LANGUAGE

DML (Data Manipulation Language) statements are the element in the SQL language that is used for data retrieval and manipulation.

INSERT
Statement is used to add new rows of data to a table in the database. Example syntax :
```
INSERT INTO customers (customer_id, nama, email)
VALUES (1, 'John Doe', 'john.doe@example.com');
```

UPDATE
Statement is used to modify the existing records in a table. Example syntax :
```
UPDATE orders
SET order_status = 'Shipped'
WHERE order_id = 101;
```

DELETE
Statement is used to delete existing records in a table
```
DELETE FROM customers
WHERE nama = 'John Doe';
```

OBJECTIVE 5

TROUBLESHOOTING

Misspelling Commands
Mistakes in spelling or syntax. Example syntax :
```
Selct * from customers
```

Forgetting Brackets and Quotes
Failure to include parentheses and quotation marks. Example syntax :
```
UPDATE orders SET order_status = 'Shipped WHERE order_id = 101;
```

Invalid Statement Order
Errors in the order of creating statements. Example syntax :
```
FROM customers SELECT *;
```

Finding SQL Syntax Errors
Identifying and correcting errors in the written syntax. One tip for finding syntax errors is to properly format the code.

Already Exists
Creating a new table with a name that is already used in another existing table in the data. This occurs to prevent duplicates. Ways to address the issue:
- Create the table with a different name.
- Drop the previously existing table.
- Check for existing tables before creating a new one.

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