



SQL Interview Questions

1

What is Database?

A database is a container where data can be collected systematically. Managing, manipulation of those data are easy



Example of Database

Suppose an online telephone directory uses a database to store their data, Like: Name, address, phone numbers, other contact details.



Example of Database

An online library who has millions of books. In order maintain their data they use database



2

Between what two components does DBMS act as an interface?

- Database application and the database
- Data and the database
- The user and the database application
- Database application and SQL

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3

Which one is not the component of DBMS?

- User data
- Meta data
- Reports
- indexes

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Amazon an on-line commercial site is an example of a(n)

- Multiuser database application
- Single-user database application
- E-commerce database application
- Data mining database application

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4

What is the full form of SQL?

- Structured Query Language
- Sequential Query Language
- Structured Question Language
- Sequential Question Language

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5

How can A company keep track of their business?

- Database
- Table
- Instance
- relationship

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What is Relational database management system?

The relationship between data files is relational in RDMS. They connect the data and the different files by using common data numbers or may be by using key concepts.

Properties of RDMS

Values are Atomic in RDBMS

Each row is different

Columns are different

Each column can have a common name

Integrity constraints help to maintain the data consistency for multiple tables

What is the difference between DBMS Vs File System?

File System	DBMS
File system is basically a collection of data and any management with the file system has to write the procedures.	DBMS is a collection of data but user is not required to write the procedures to manage the database.
File systems are not efficient for storing and retrieving of data	DBMS is efficient to use as there are large varieties of techniques to store and retrieve the data.

What is the difference between DBMS Vs File System?

File System	DBMS
<p>File system doesn't have crash recovery mechanism.</p> <p>Example: While we are entering some data into the file if the system crashes then content of the file is lost.</p>	<p>DBMS has a crash recovery option, it protects user from the effects of system failures.</p>
<p>Protecting a file using file system is very difficult.</p>	<p>DBMS has its own security process to save the data.</p>

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What is the difference between DBMS Vs RDBMS?

DBMS	RDBMS
DBMS stores data as file.	RDBMS stores data in a tabular form.
In DBMS, data is stored in two way: <ul style="list-style-type: none">• hierarchical form• or a navigational form.	In RDBMS: the tables have a classifier known as primary key and the data values are stored in the tabular format.
Normalization is not needed in DBMS.	Normalization is needed in RDBMS.

What is the difference between DBMS Vs RDBMS?

DBMS	RDBMS
DBMS does not have any security for data manipulation.	RDBMS has the integrity constraint for the purpose of ACID (Atomicity, Consistency, Isolation and Durability) property.
In DBMS there are no relation between the tables.	in RDBMS there should be a relationship between the data values.
DBMS is used for small organization and always deals with small data. it also supports single user.	RDBMS is used for large data and also supports multiple users.

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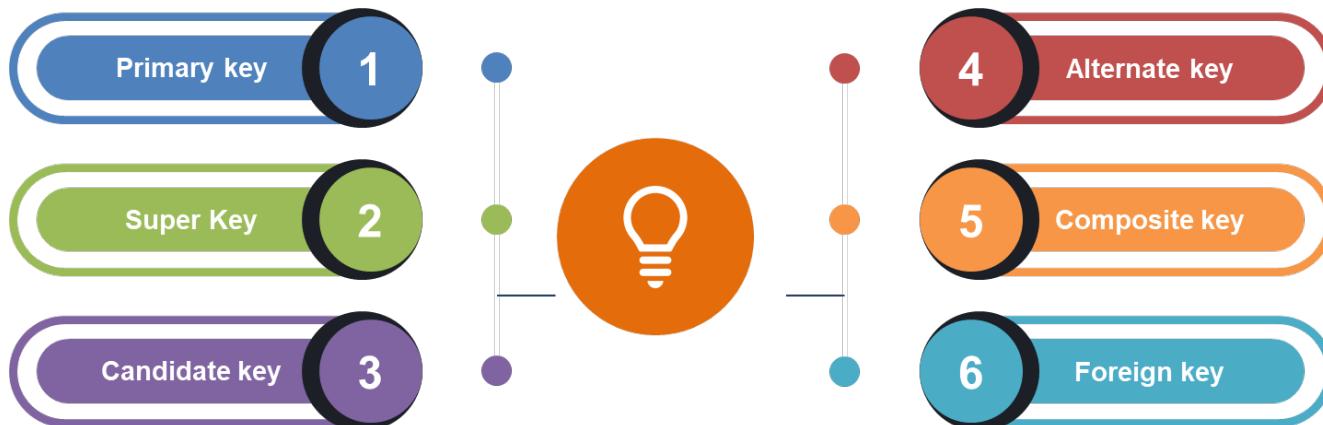
What is Key in RDBMS?

Key concept has an important role in relational database management system. This technique is used for identifying the unique rows from table and also help to establish relationship among the tables



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What are the types of Key in RDBMS?



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What is primary key?

A primary key concept is basically a technique to classify unique tuples (rows) in a table

- Primary key does not contain null value
- Value should be unique
- Primary keys are not always to be a single

Student_id	Name	Age
C001	Ram	15
C002	Shyam	16

attribute /column and It can also be a set of

more than one attributes/columns

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What is super key?

A super key is a set of one or more columns or attributes to uniquely classify rows in a table

- Super key is a superset of a candidate key
- Example: In the student table:
 1. Student_id
 2. Student_id, Name

are the super key

Student_id	Name	Age
C001	Ram	15
C002	Shyam	16

Note: In the student table(Student_id,Name) the name of two students can be the same, but their Student_ID can't be the same. So, this combination can also be a key

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What is candidate key?

A candidate key is a set of one or more columns or attributes to uniquely classify rows in a table

- All the remaining attributes or columns except for the primary key are considered as a candidate key.
- The candidate keys are also as strong as the primary key

Student_id	Name	Passport number	License number
C001	Ram	CDF56432	87
C002	Shyam	DFC4321	98

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What is alternate key?

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

- Candidate key:
- Student_id → Primary key
- Passport number }
- License number }

Alternate key

Student_id	Name	Passport number	License number
C001	Ram	CDF56432	87
C002	Shyam	DFC4321	98

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What is composite key?

Composite key consists of greater than one attribute to uniquely classify rows or records & tuples in a table

- None of the columns can perform as a primary key
- So the combinations of key can be considered as composite key

product_id	Customer_id	Order_id	Product_total
C001	O001	P008	33
C002	O0019	P0065	109

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What is foreign key?

Foreign keys are the columns of a table which refers to the primary key of another table and basically they act as a cross-reference between tables

The diagram illustrates a foreign key relationship between two tables. On the left, a table has columns: Student_id, Name, Passport number, and License number. The Student_id column contains values C001 and C002. An arrow labeled "Foreign key" points from the Student_id column of the first table to the Student_id column of a second table on the right. The second table has columns: Student_id and Course_id. It contains two rows: one with Student_id C001 and Course_id De002, and another with Student_id C002 and Course_id De001.

Student_id	Name	Passport number	License number	Student_id	Course_id
C001	Ram	CDF56432	87	C001	De002
C002	Shyam	DFC4321	98		De001

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What is the difference between super key vs candidate key?

Super key	Candidate key
All the candidate keys are super keys	Candidate keys are taken from super keys
All super keys can not be candidate key	But all candidate keys should be super key
Combination of various super keys make the criteria to choose the candidate keys.	Combination of various candidate keys make the criteria to choose the primary keys.

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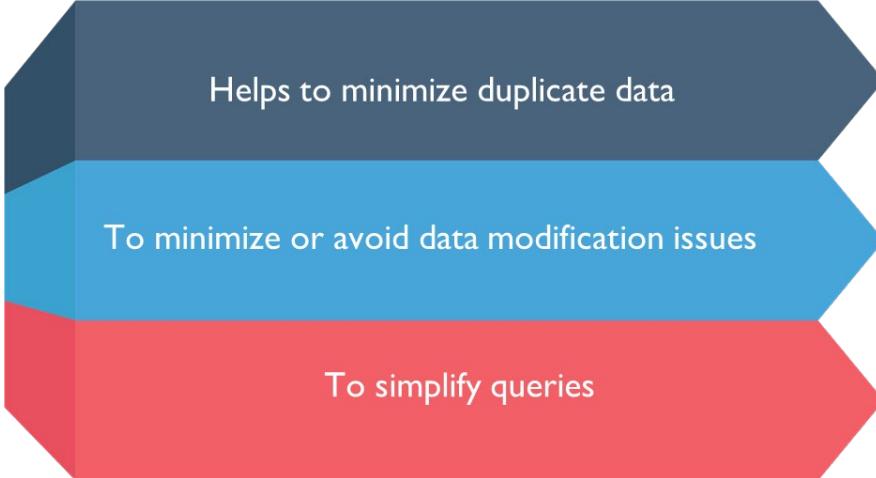
What is the difference between super key vs candidate key?

Super key	Candidate key
In a table, number of super keys are always greater than number of candidate keys.	In a table, number of super keys are always less than number of super keys.
Super key's attributes can contain NULL values.	Candidate key's attributes can also contain NULL values.

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What is Normalization?

Normalization is the process of organizing data to avoid duplication and redundancy



Helps to minimize duplicate data

To minimize or avoid data modification issues

To simplify queries

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What are the types of normalization?

Normalization rule are divided into few categories

First Normal Form

Second Normal Form

Third Normal Form

Boyce and Codd Normal Form
(BCNF)

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What is 1 NF?

First Normal Form

- Each set of column should have a unique value
- It helps to prevent using the multiple columns to fetch the same row
- Each should contain a primary key that identifies all the rows as unique data
- The Primary key is usually a single column, but if needed then more than one column can be combined to create a single primary key

Second Normal Form

Third Normal Form

Boyce and Codd Normal Form (BCNF)

Example of 1 NF

Student	Age	Course
Raj	16	CR001, CR005
Shyam	18	CR005
Joy	19	CR005

After using 1 NF

Student	Age	Course
Raj	16	CR001
Shyam	18	CR005
Joy	19	CR005
Raj	16	CR005

After implementing the First Normal Form may be the data redundancy increases but each row as a whole will be unique

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What is 2NF?

First Normal Form

Second Normal Form

Third Normal Form

Boyce and Codd Normal
Form (BCNF)

- In the 2NF, relational must be in 1NF
- First normal form is not able to reduce the data redundancy
- 2NF follows that there will not be any partial dependency of any column on primary key
- It follows the concept of full functional dependency

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What is 3NF?

First Normal Form

Second Normal Form

Third Normal Form

Boyce and Codd Normal Form (BCNF)

- A relation of a table will be in 3NF if it is already in 2NF and does not contain any transitive partial dependency.
- 3NF helps to reduce the data duplication.
- It also supports in achieving data integrity.
- If table has no transitive dependency for non-prime attributes, then the relation should be in third normal form.

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What is BCNF?

First Normal Form

Second Normal Form

Third Normal Form

Boyce and Codd Normal
Form (BCNF)

- BCNF is basically the advance version of 3NF
- It is more strict than 3NF
- To use the law of BCNF we need to make sure that our data is already in 3NF

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What is ER diagram?

An Entity–relationship model (ER model) helps to describe the structure of a particular database with the help of a diagram, that is known as Entity Relationship Diagram (ER Diagram).



Why ER diagram is important?

- ER model helps to draw Database Design
- It is an easy to display graphical tool for modeling data
- Mostly used in Database Design
- It is a GUI (graphical user interface) representation of the logical structure of a Database
- It assists you to identifies the entities that exist in a system and the relationships between those entities



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What are the components of ER diagram?

- Three basic and most used concepts in ER diagram
- Entities
- Attributes
- Relationships



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What is MySQL?

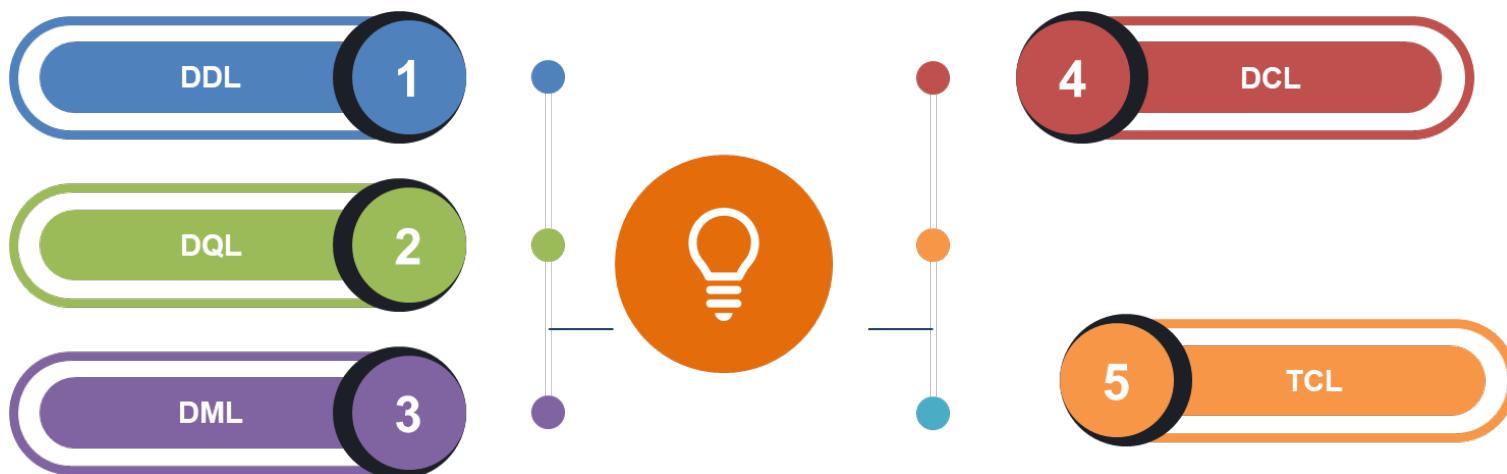
MySQL is a database management system and also it is a relational database management system based on SQL – Structured Query Language.



How to Install MySQL?

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How many types of commands do we have in MySQL?



What are DDL commands?

- DDL → Data definition language
- Helps to define the database schema
- Deals with description of the database
- Also have power to deal with creating and modifying the structure of database object

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Give examples of DDL commands

- CREATE – This command is used to create the database. It also have some objects like table, index, function, views, store procedure and triggers
- DROP – DROP is mainly used to delete objects from the database
- ALTER –ALTER is used to alter the structure of the database
- TRUNCATE – TRUNCATE command is used to remove all records from a table which includes all memory allocated for the records are removed.
- COMMENT – It is used to add comments to the data dictionary
- RENAME– This is used to rename an object existing in the database.

What are DML commands?

- DML → Data Manipulation Language
- This DML command handles all the data manipulation part
- It includes most important parts of the SQL

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Give examples of DML commands

- INSERT – INSERT is used to insert the data in the table
- UPDATE - Helps to update existing data within a table
- DELETE - To delete records from a database table

What are DQL commands?

- DQL → Data Query Language
- DQL used to make queries on the data within schema objects
- The main focus of DQL Command is to get some schema relation based on the query passed into it
- SELECT → This command is used to retrieve all the data from the table

What are DCL commands?

- DCL → Data Control Language
- Deals with the rights and permission of the database
- Works for the controlling part of the data
- GRANT → provides user's access privileges to database.
- REVOKE → Helps to withdraw user's access privileges given by using the GRANT command.

What are TCL commands?

- TCL → Transaction Control Language
- COMMIT – commits a Transaction
- ROLLBACK – rollbacks a transaction for any error occurs
- SAVEPOINT – use a save point within a transaction
- SET TRANSACTION – specify the characteristics for the transaction

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What is an aggregate function?

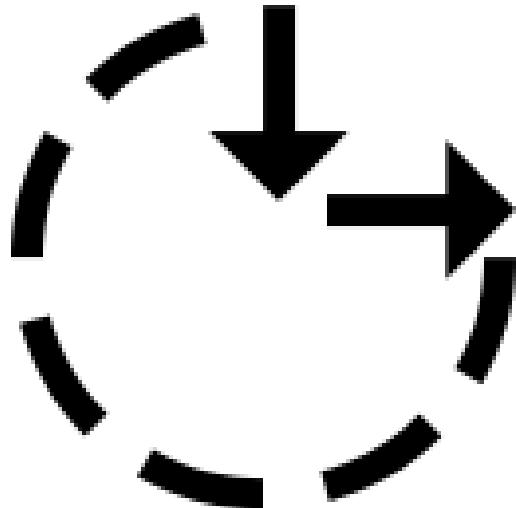
An aggregate function is a function where the values of multiple rows are grouped together as input on certain criteria to form a single value of more significant meaning.



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What is min function?

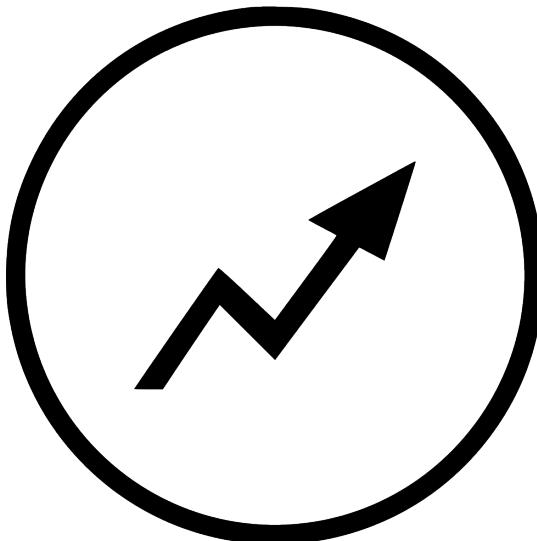
MIN function returns the smallest value in the table



39

What is max function?

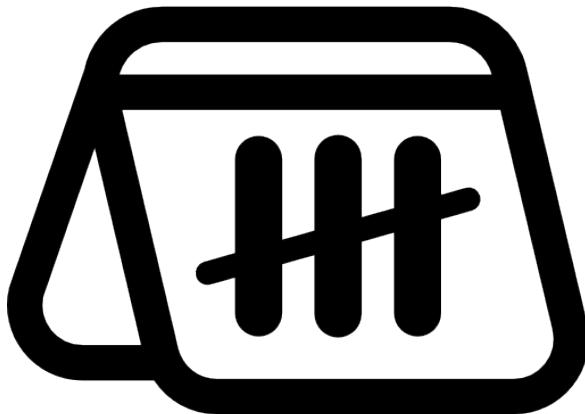
MAX function returns the largest value in the table



40

What is count function?

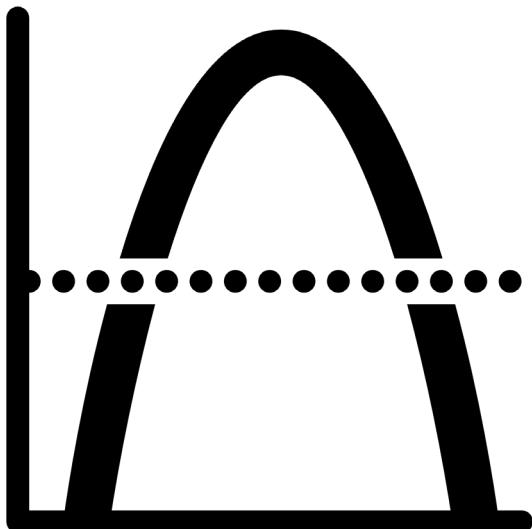
COUNT function returns the total count of the rows which are matched with the condition



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What is average function?

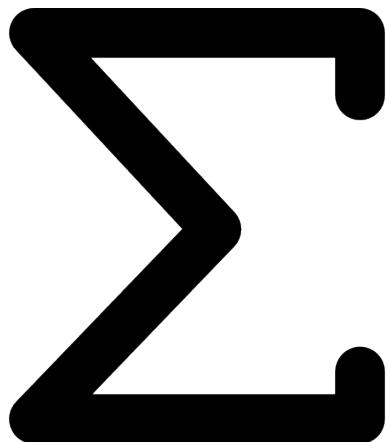
Average function returns the average value of a specific columns



42

What is sum function?

Sum function returns the total sum of the column



43

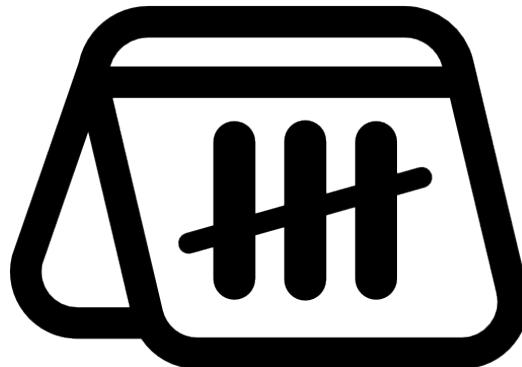
What is views?

- View stands for virtual table which is based on the result-set of an SQL statement
- Normally in view, it contains rows and columns which is like a real table.
- The fields in a view are fields from one or more real tables in the database.

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What is alias in sql?

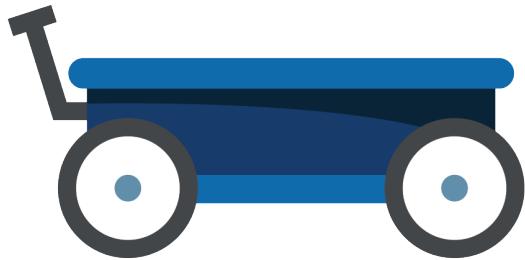
Alias concept is used in SQL to give temporary name to the table or the column of the table



45

What is join?

A JOIN which is basically a clause used to combine rows from different tables based on a condition.



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Types of joins in SQL?

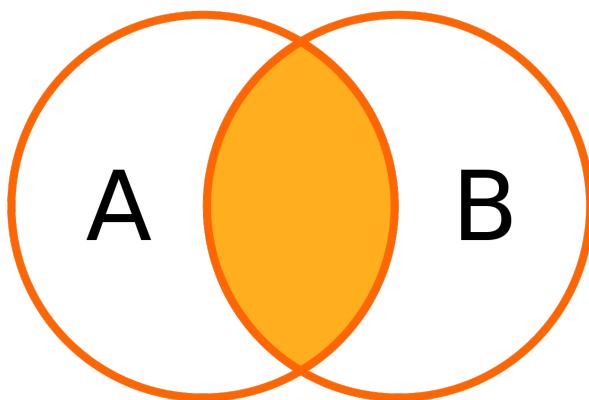
Types of join in SQL



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What is inner join?

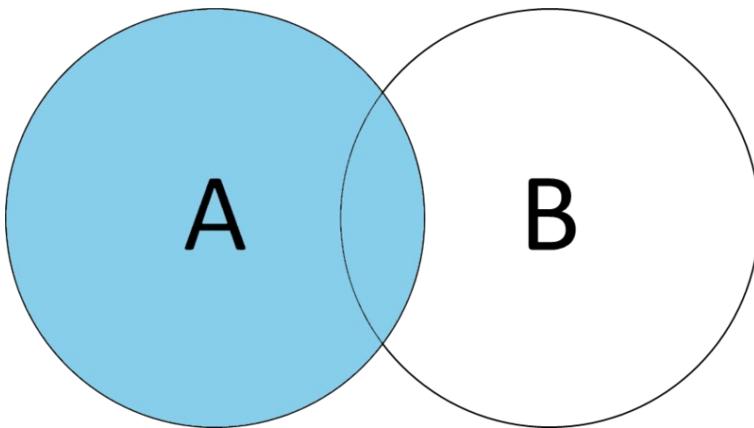
The INNER JOIN helps to select the matching records from the both tables



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What is left join?

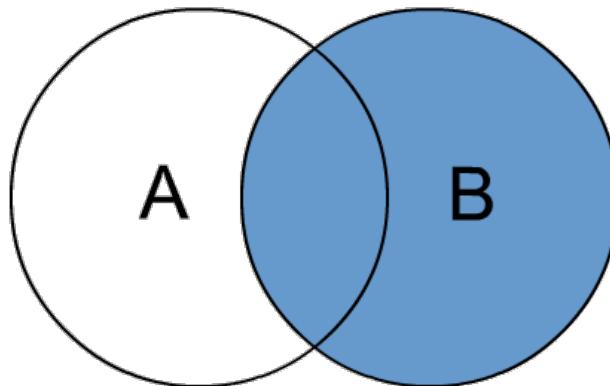
The LEFT JOIN helps to fetch all records from the left table and the matching records from the right table



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What is right join?

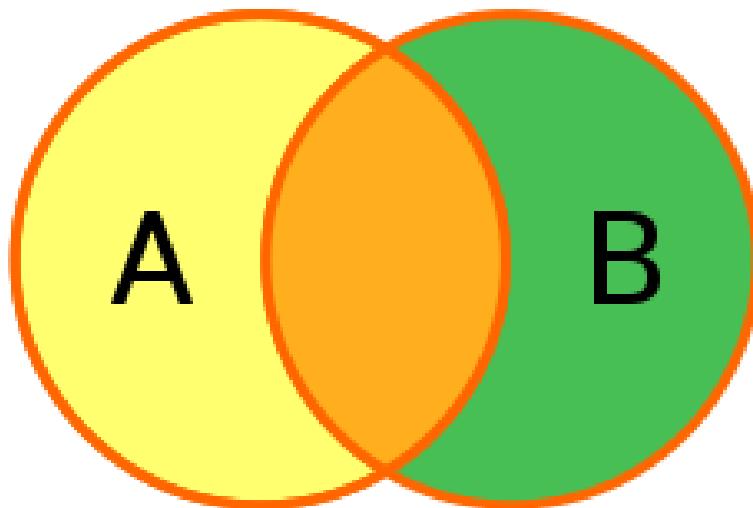
The RIGHT JOIN helps to fetch all records from the right table and the matched records from the left table



50

What is full join?

The FULL OUTER JOIN helps to fetch all the records from both the table whether there is a match or not



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What is self join?

A self join helps to join with itself

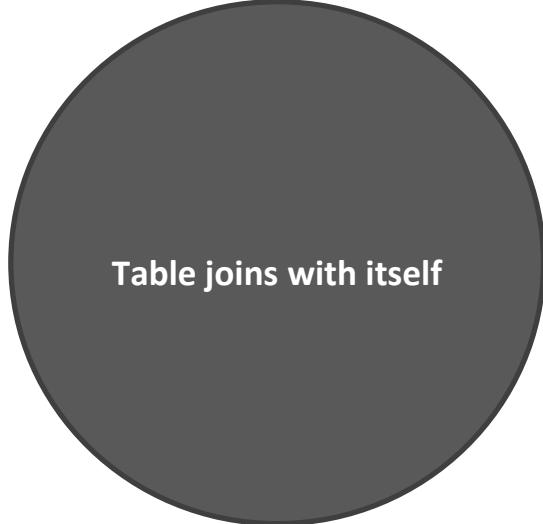


Table joins with itself

52

What join is needed when you include rows that do not have matching values?

- Equi-join
- Left join
- Right join
- Full outer join

53

What join is needed when you include rows that do not have matching values?

- Equi-join
- Left join
- Right join
- Full outer join

54

What join is needed when you include rows that do have matching values?

- Equi-join
- Left join
- Right join
- Full outer join
- All of the above

55

What join is needed when you include rows that do have matching values?

- Equi-join
- Left join
- Right join
- Full outer join
- All of the above



Subqueries in SQL

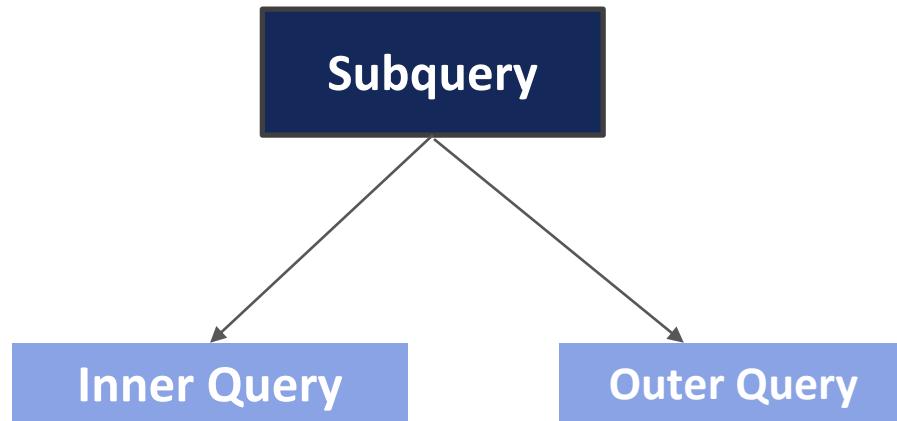
What is subqueries in SQL?

Subquery is a SQL command which is used to select query that contain another query inside



57

How many parts are there in a subquery?



How does a subquery execute?

First inner query get executed



Get the result from inner query



Output of inner query added to the outer query



Outer query will get executed to get the final result

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How many types of subqueries are there?

- **Nested subquery:** Nested subquery first executes the inner SELECT query and then with the returning values executes the outer query
- **Correlated subquery:** A correlated subquery reads every row in a table and comparing values in each row against related data

Difference between subquery and join

Topic	Subquery	Join
Description	A Subquery or Inner query or Nested query is also a query within SQL query and comes after the WHERE clause	A join is nothing but a query which combines records from different tables
Handling complex queries	Subqueries break the complex query into isolated parts in order to make a complex query into a series of logical steps.	Fetching data using join concept is faster

Difference between subquery and join

Topic	Subquery	Join
Code maintenance	Easy to understand and code maintenance is also at ease.	Joins are not easy to read like subqueries
Result	Subqueries help or allow to use the results of another query in the outer query.	As we have different types of joins so it is difficult to understand which one will give you the proper result
Optimizer	Subquery is easier to work with but optimization is not good	Join is the good optimizer by server

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Which of the following statements are TRUE for subqueries?

- A subquery can retrieve zero or more row
- A subquery can appear on either side of a comparison operator
- There is no limit on the number of subquery levels in the WHERE clause of a SELECT statement
- Both A and B

63

Which of the following statements are TRUE for subqueries?

- A subquery can retrieve zero or more row
- A subquery can appear on either side of a comparison operator
- There is no limit on the number of subquery levels in the WHERE clause of a SELECT statement
- **Both A and B**

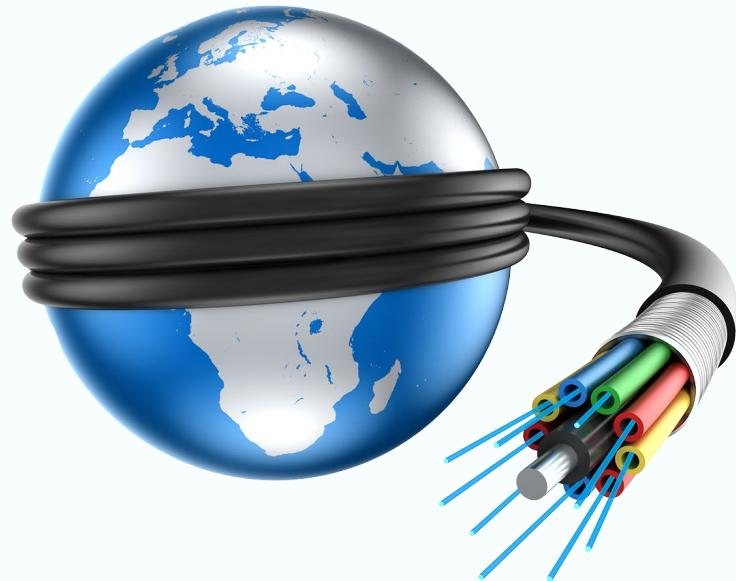
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Where can you not use subqueries?

- Field names in the SELECT statement
- The WHERE clause only in the SELECT statement
- The WHERE clause in SELECT as well as all DML statements
- The FROM clause in the SELECT statement

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- Field names in the SELECT statement
- **The WHERE clause only in the SELECT statement**
- The WHERE clause in SELECT as well as all DML statements
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Broadband Database Management system

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Create a query to display unique cities from the Customers table



67

Create a query to display unique states from the Customers table.



68

Create a query to display unique combination of cities and states from Customers table



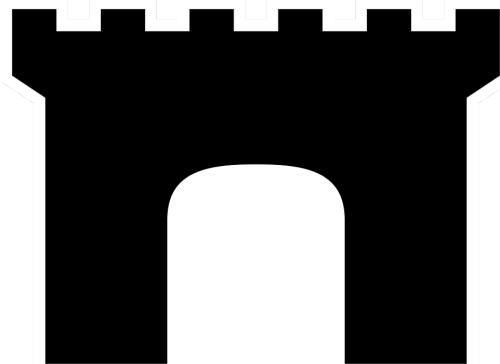
69

Create a query to display unique monthly discounts in Customers table.



70

Create a query to display unique packages



71

Display all the data from Packages table for packages whose speed is “5Mbps”.



72

Display the first name and monthly discount for all customers whose first name ends with an e



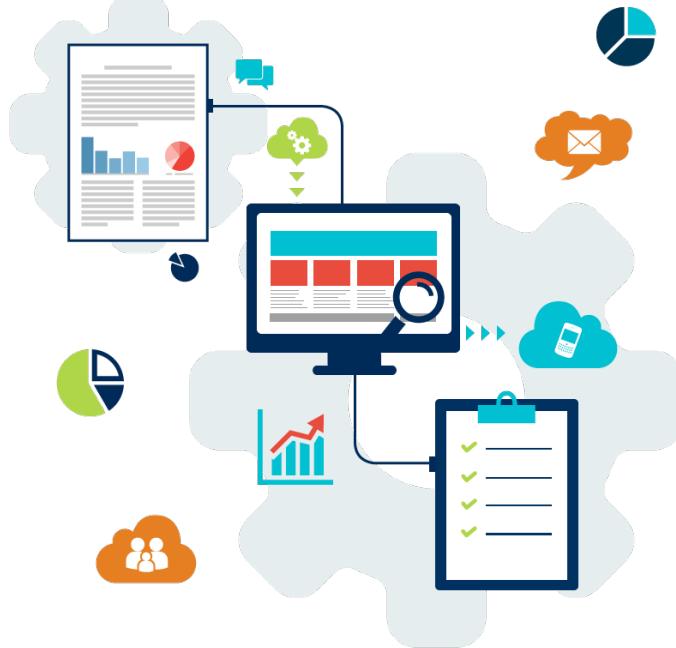
73

Create a query to display unique monthly discounts in Customers table.



74

Display the first name, birthdate and age for all customers whose older than 50



75

All customers whose package number is not 8,19, or 30 and whose join date is before January 1st, 2007



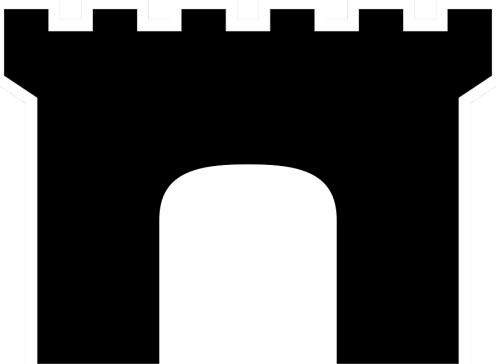
76

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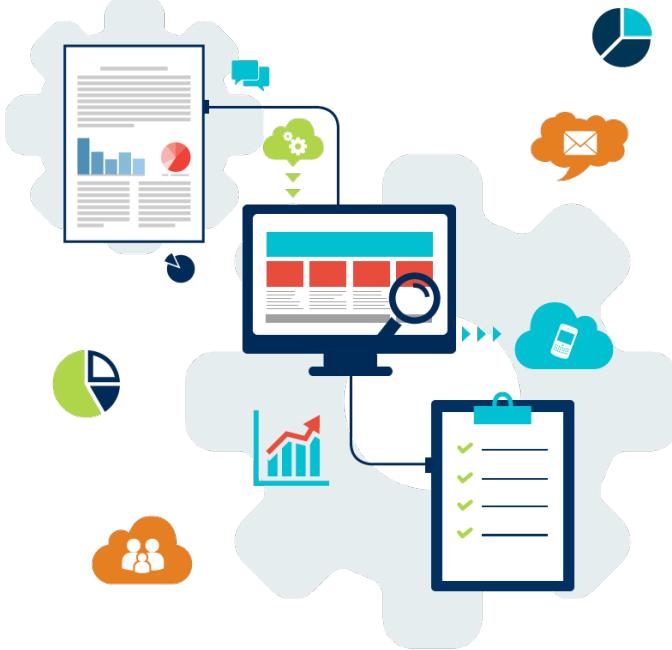
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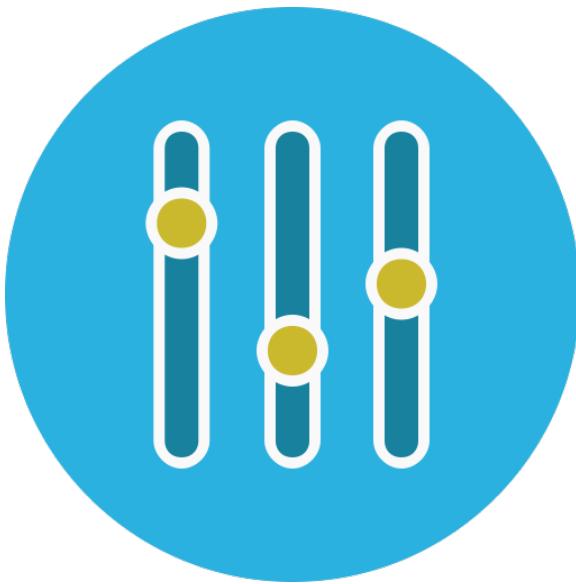
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Create a query to display unique packages (package_id) in Customers table.



80

Create a query to display unique monthly discounts in Customers table.

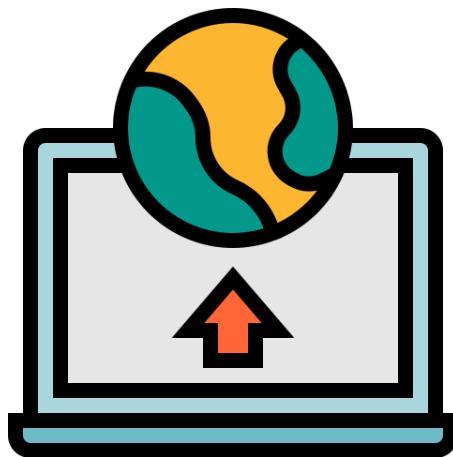




HR Database Management System

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Write a query to get unique department ID from employee table.



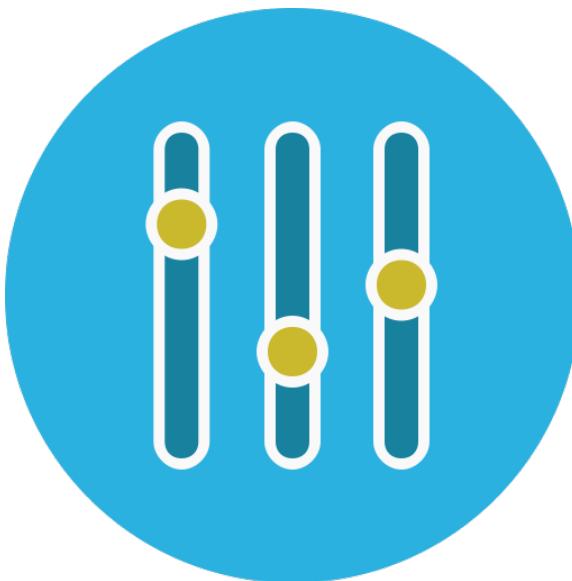
82

Write a query to get the total salaries payable to employees.



83

Write a query to get the maximum and minimum salary from employees table.



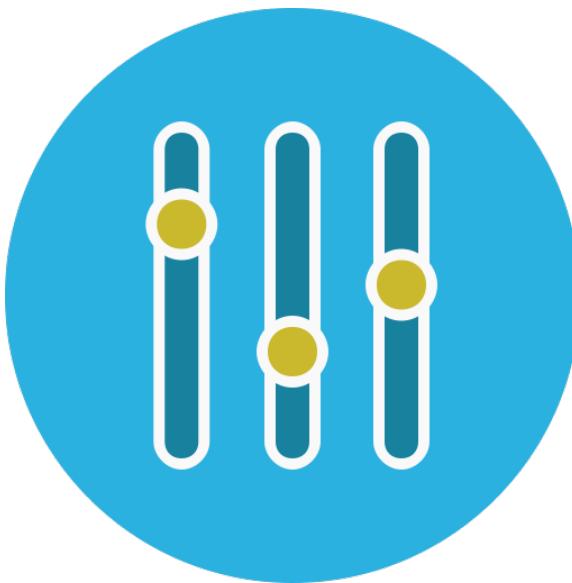
84

Write a query to get the number of employees working with the company.



85

Write a query to calculate $171*214+625$.



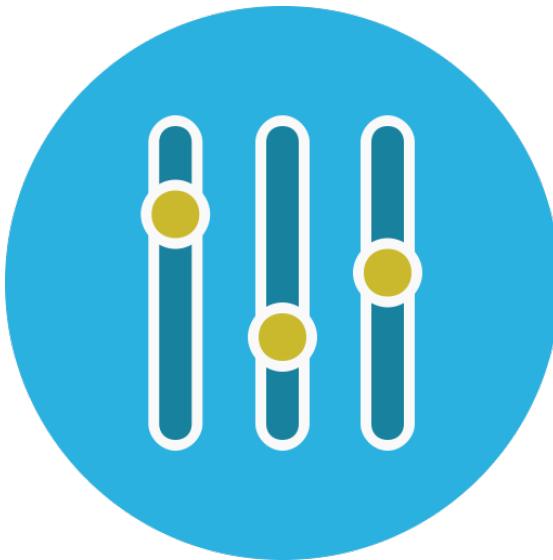
86

Write a query to get first name from employees table after removing white spaces from both side.



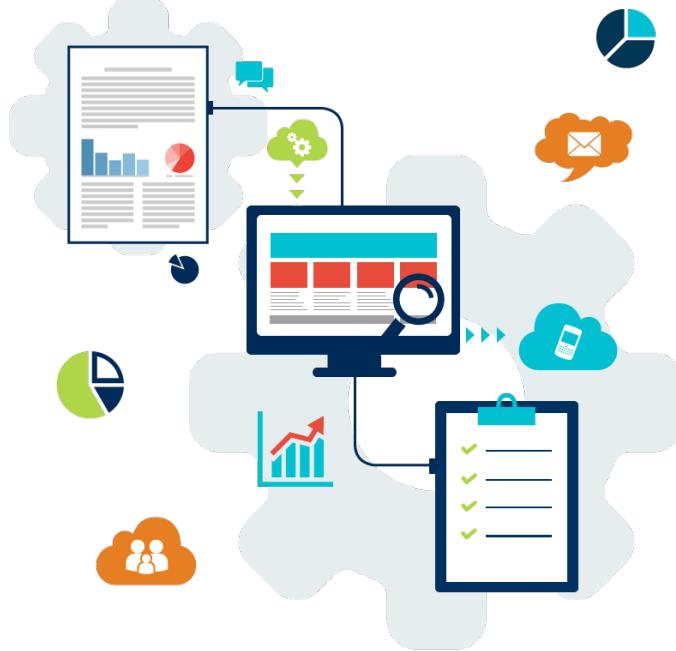
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Write a query to get the length of the employee names from employees table.



88

Write a query to check if the first_name fields of the employees table contains numbers.



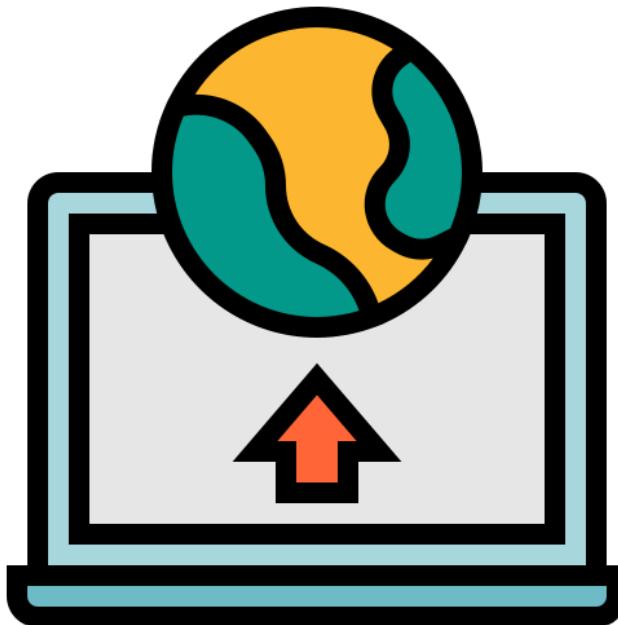
89

Write a query to select first 10 records from a table.



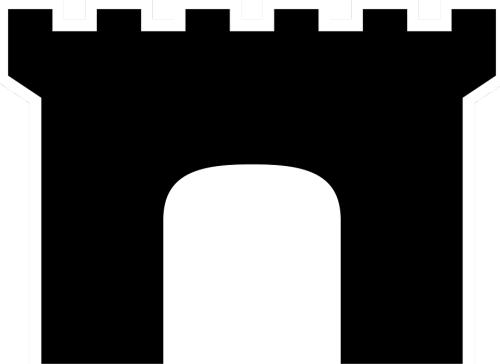
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Write a query to display the last name of employees whose names have exactly 6 characters.



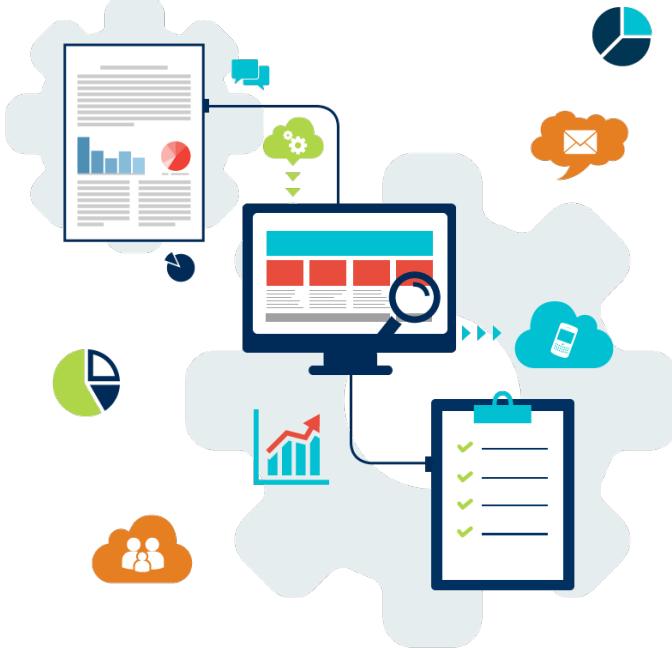
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Write a query to display the last name of employees having 'e' as the third character.



92

Write a query to display the jobs/designations available in the employees table.



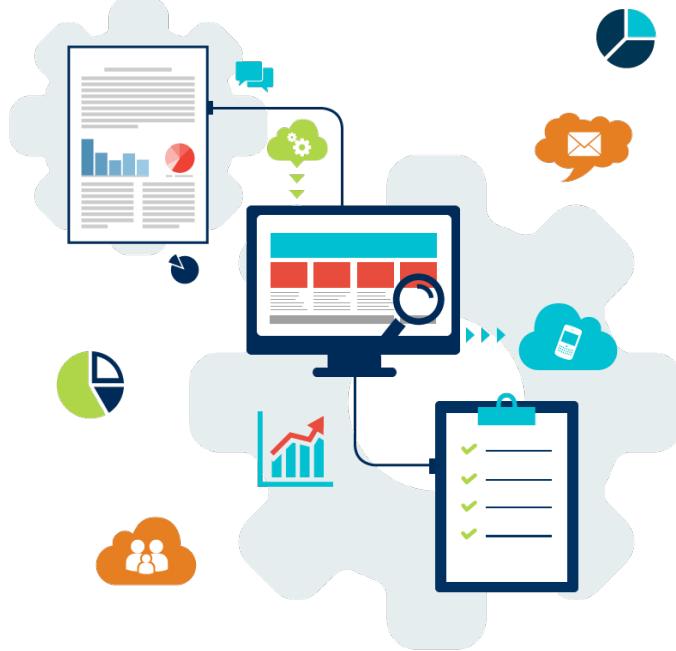
93

Write a query to select all record from employees where last name in 'BLAKE', 'SCOTT', 'KING' and 'FORD'.



94

Write a query to list the number of jobs available in the employees table.



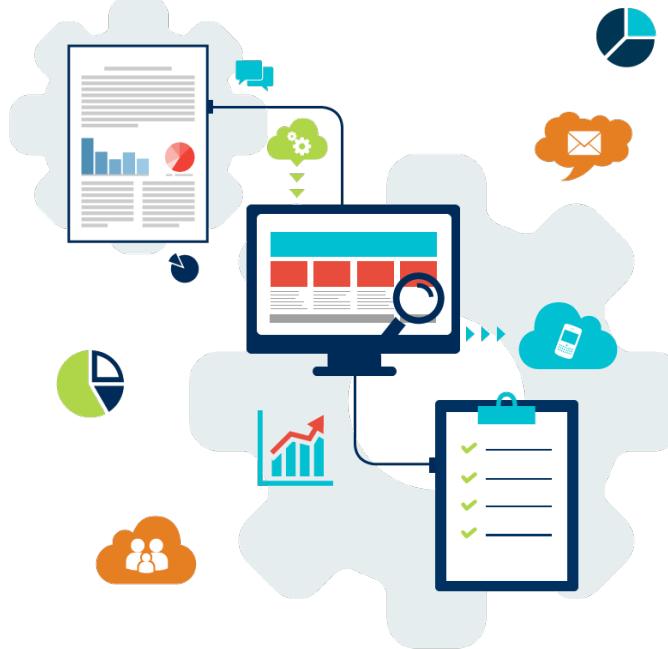
95

Write a query to get the total salaries payable to employees.



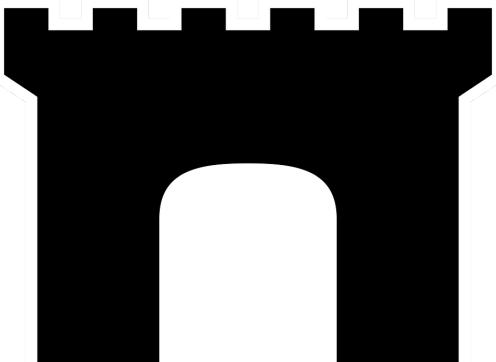
96

Write a query to get the minimum salary from employees table.



97

Write a query to get the names (first_name, last_name), salary, PF of all the employees (PF is calculated as 15% of salary)



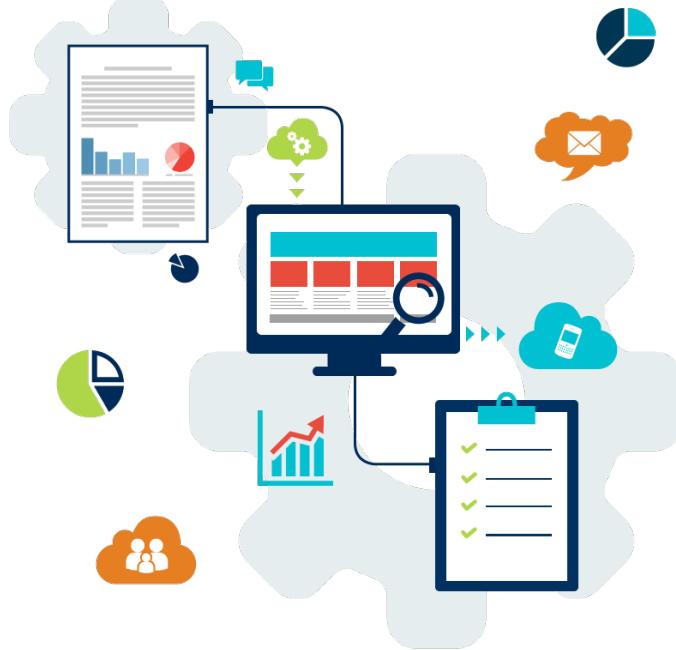
98

Write a query to get the employee ID, names (first_name, last_name), salary in ascending order of salary



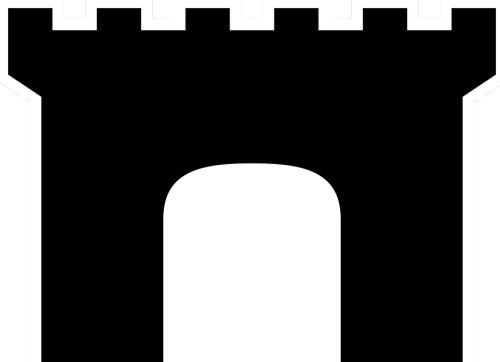
99

Write a query to get the number of employees working with the company.



100

Write a query to get the first 3 characters of first name from employees table.



Thank You!