

[SQL Interview Questions](#)

Some Important Links

Free Placement Preparation Material!!!!

www.Notes hacker.com

- [20+ Interview Experience Shared by Placed Students.](#)
- [Aptitude Test Example.](#)
- [Syllabus of Company wise placement Exam.](#)
- [Online job.](#)

Are you preparing for a service-based or product-based company?. Then the interviewer will always check your SQL Knowledge. That is why it is important to know what are the types of SQL Questions asked in the interview and thus prepare well to crack any sort of interview.

Below is the list of questions just prepare it well.

SQL Interview Questions And Answers

1. What is Database management System?

www.Notes hacker.com

SQL Interview Questions

Ans: **Database** is the structured collection and organization of data in the physical storage. And Database management system is the system used for managing this organized data.

A DBMS allow user to interact, modify, and retrieve data and provide flexibility to perform various operations on it.

2. What is SQL?

Ans: Full form of SQL is Structured Query Language, SQL is a Standard language used to communicate with Database and used to perform various operation on Databases like insertion, deletion, updating, and retrieval of data from the database.

3. What are the different subsets of SQL?

Ans: Following are the different subsets of SQL:-

- DDL- DDL stands for **Data Definition Language**, with the help of DDL end-user can perform operations on databases such as CREATE, ALTER, and DELETE data objects.
- DML- DML stands for **Data Manipulation Language** as the name suggests it is to manipulate data, with the help of DML end-user can perform the operations on a database such as INSERT, UPDATE, DELETE.
- DCL-DCL stands for **Data Control Language**, it allow user to have control access to the database. Example-Grant permission and Revoke permission.

4. What are Table, Fields, and Record in Database?

Ans: The data stored in the form of rows and columns in an organized fashion is called a table. The columns in the table are called fields and rows in the table are called records.

5. Explain Constraints in SQL?

Ans: Constraints are used to specify limits on database attributes. Constraints can be applied to single or multiple fields in the SQL table during creation or after the creation of the table.

SQL Interview Questions

ALTER TABLE command is to set the constraints of the table. The constraints are:

- PRIMARY KEY.
- FOREIGN KEY.
- UNIQUE KEY.
- NOT NULL
- DEFAULT KEY.

6. Explain Primary Key?

- The primary key is a field or the set of fields that distinctly specify a row.
- The Primary key is the special type of Unique key.
- Value of primary key Cannot Be Null.
- For example- Aadhar card number can be a primary key.

7. Write SQL Query implement Primary key in while defining table?

```
1Create table Student
2(
3Student_ID int not null,
4Student_Name Varchar2,
5Student_Last_Name Varchar2,
6Primary key( Student_ID)
7);
```

8. Write SQL Query to Implement Primary Key after defining table?

```
1ALTER TABLE Student
2ADD CONSTRAINT PK_Student Primary Key(Student_ID);
```

9. Explain Foreign Key?

Ans: Suppose if we want to combine or link together two tables foreign key is used, Foreign key is also called as Referencing key. It is a field or

SQL Interview Questions

collection of fields in one table that refers to the PRIMARY KEY of another table.

Foreign key in a columns or set of columns must match to the value of Primary Key of the other table.

10. Write SQL Query to Implement Foreign key on table?

Table- Student

```
1 Create table Student
2 (
3   Student_ID int not null,
4   Student_Name Varchar2,
5   Registration_No int,
6   Student_Last_Name Varchar2,
7   Primary key( Student_ID)
8   FOREIGN KEY() REFERENCES School(Registration_No)
9 );
```

Table- Student_Details

```
1 Create table Student_Details
2 (
3   Student_ID int not null PRIMARY KEY,
4   Primary key( Student_ID),
5   Registration_No int FOREIGN KEY REFERENCES
6   School(Registration_No),
7 );
```

11. What is Unique Key?

SQL Interview Questions

Ans: Use of Unique Key Constraint to Uniquely identify each records in the database. It ensures that all values in the columns are always different.

A PRIMARY KEY already has unique key constraints. It can accept only null values.

12. What is NOT NULL constraints?

In the table, Columns hold NULL values. With the help of NOT NULL constraints, Columns cannot accepts NULL values.

13. What is DEFAULT KEY?

If we want certain columns to have default values, We can achieve it by using DEFAULT KEY constraints.

The default values to added to all new records if no other values is specified.

14. Explain DEFAULT KEY with example?

```
1Create table Student
2(
3Student_ID int not null,
4Student_Name Varchar2,
5Student_Last_Name Varchar2,
6School_Name Varchar2 DEFAULT 'Delhi Public School'
7);
```

15.What is the difference between Primary and Unique Key?

| Primary Key | Unique Key |
|--|--|
| The primary key holds the Unique Values but the field of Primary Key | The unique key holds the Unique Values but it can have a single NULL |

SQL Interview Questions

| Primary Key | Unique Key |
|--|--|
| cannot be NULL. | value field. |
| We can have only one Primary key in the Table. | We can have more than one Unique key in the table. |
| By default it adds a clustered index. | By default it adds a non-clustered index. |

16. What is Join List types of Join ?

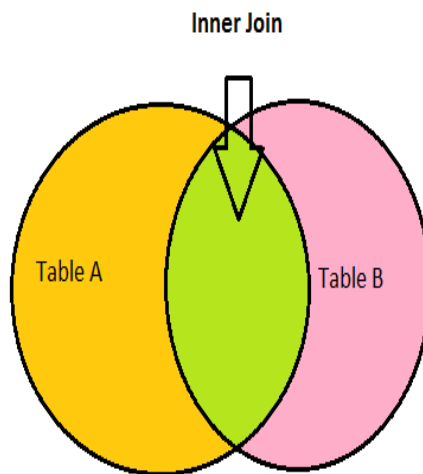
In SQL join Clause is used to combine or join records of two or more tables. This combination of two or more tables occurs with the help of some common attributes or columns between tables. Joining to tables is not possible if tables is not having any common attributes.

In SQL there four different types of Joins:

- Inner Join
- Full Join
- Right Join
- Left Join

17. What is Inner Join?

SQL Interview Questions



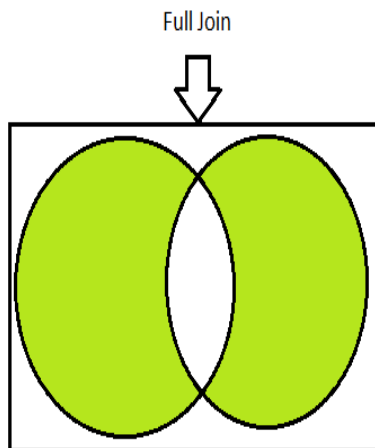
INNER JOIN– Inner join fetch or retrieves the records that are common between both the tables.

Example:-

```
1SELECT * FROM Table_A
2JOIN Table_B;
3SELECT * FROM Table_A
4INNER JOIN Table_B;
```

18. What is Full Join?

SQL Interview Questions



FULL JOIN – Full Join is also called Outer Join. It fetch or retrieves the all records when there is a match in left (Table A) or right (Table B) records

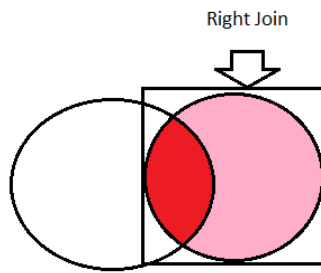
Note: FULL OUTER JOIN can have return very large result sets.

Example:-

```
1SELECT *  
2FROM Table_A a1  
3FULL JOIN Table_B b1  
4ON a1.col= b1.col;
```

19. What is Right join?

[SQL Interview Questions](#)

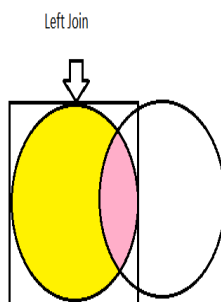


RIGHT (OUTER) JOIN- It retrieves all the records from the right and the matched record from the left table.

Example:-

```
1SELECT *  
2FROM Table A a1  
3RIGHT JOIN Table b1  
4ON a1.col=b1.col;
```

20. What is Left Join?



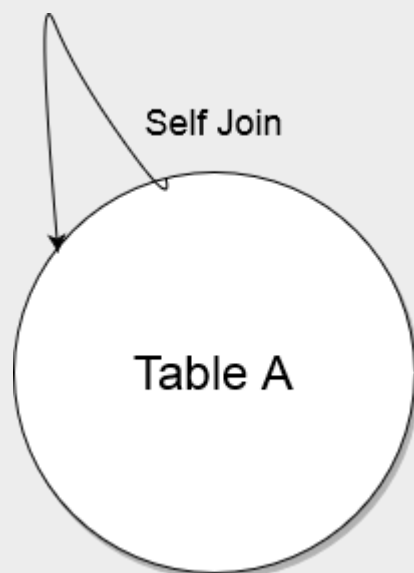
SQL Interview Questions

LEFT (OUTER) JOIN- retrieves all the records from the left and the matched records from right table.

Example:-

```
1SELECT *  
2FROM Table A a1  
3LEFT JOIN Table B b1  
4ON a.col=b1.col;
```

21. What is Self Join?



As the name suggest, In SELF JOIN table is the joined itself. That means each record of the table is joined to its and all the other records depending upon certain conditions.

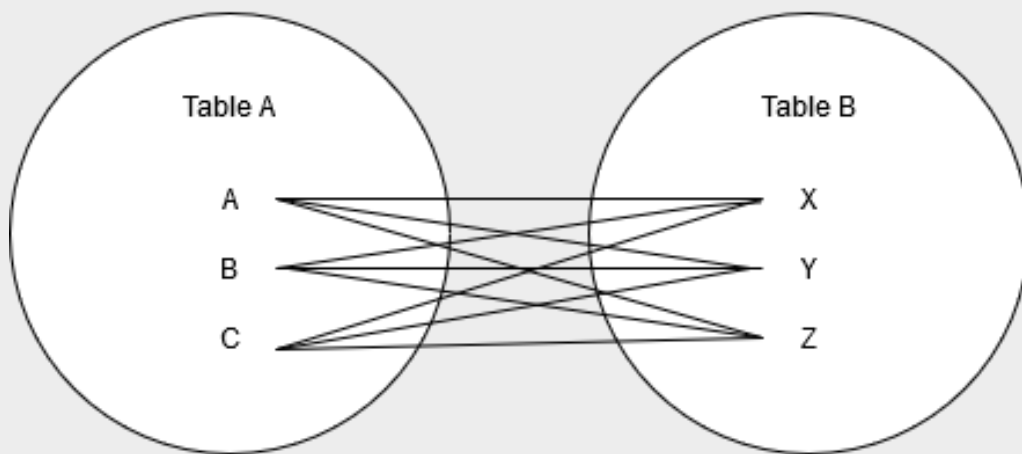
Example:-

```
1SELECT a.Roll_No, b.Name  
2From Student a, Student b  
3WHERE a.Roll_No<b.Roll_No;
```

22. What is Cross Join?

[SQL Interview Questions](#)

Cross Join



Cross Join is the Cartesian product of the two tables that are included in the join. After Cross Join Operation table contain same numbers of as in the cross product of rows in two tables.

```
1SELECT Stu.name, sub.subject
2FROM students AS Stu
3CROSS JOIN subjects AS sub;
```

23. What is Data Integrity?

Data Integrity defines the accuracy(that is how accurate your data is) and the consistency(data stored must no change) of data stored in a database. That means our stored data in the database must be the same, accurate, and consistent.

24. Explain ACID property?

ACID is acronym for Atomicity, Consistency, Isolation, and Durability.

- **Atomicity**– If Transaction T Takes place, either Transaction T must be executed fully or terminated.
- **Consistency**-The database should be consistent before and after the transaction. That means there should be no change in the database before and after the transaction.

SQL Interview Questions

- **Isolation**– This property ensures that when multiple transactions are taking place, No transaction should interfere in other transaction execution.
- **Durability**– After the successful execution of the transaction on a database, the database must remain in the same state in which it was committed.

25. What is Normalization?

Normalization is the process of reducing or minimizing dependency and redundancy of table and thus improves data integrity.

26. Why Normalization is important?

Without Normalization in SQL we may face following issues:

- **Insertion Anomaly**– It occurs when we cannot insert data into the table without the presence of another attribute.
- **Deletion Anomaly**– It occurs when certain attributes are lost because of the deletion of other attributes.
- **Update Anomaly**– The data inconsistency that causes data redundancy and partial update.

27. Enlist Normalization Types?

The types of Normalization are:

- 1st Normal Form(1NF)
- 2nd Normal Form(2NF)
- 3rd Normal Form(3NF)

28. What is 1st Normal Form?

1st Normal Form should remove all the duplicates Attributes/columns from the table. That means it must maintain atomicity.

29. What is 2nd Normal Form?

SQL Interview Questions

Data should be in 1st Normal form, In 2NF we place subsets of data in separate table and thus creating relationship between the tables using primary keys.

30. What is 3rd Normal Form?

Data should be in 2nd Normal Form In this we remove all the attributes columns that are not dependent on primary key constraints.

31. What is Index, Enlist its Types?

Just like the index page of our book in which all the contents are in a proper format. DBMS also maintains Index which is a high tuning method that helps in faster retrieval of records from the table. An index creates an entry for each value added to the table hence this is how we achieve faster access data.

Types of Index:

- Unique Index
- Clustered Index
- Non Clustered Index

32. Explain Unique Index?

In this type of Indexing, Index does not allow the fields to have duplicate values. That means here we are ensuring data integrity by ensuring that no two rows of the data in the table have identical key values.

For example: every chapter in our book is having different page number, this is what unique index is.

Example:-

```
1CREATE UNIQUE INDEX Index1  
2ON Employee (Emp_no);
```

33. What is Clustered Index?

SQL Interview Questions

Clustered Index are the indexes whose ordering of rows corresponds to the rows in the index. That means only we can have only one Clustered Index on a given table.

For example- the book contains chapters and every chapter has its subtopics, This chapter can be assumed as a clustered index.

Suppose if we index book again Chapter wise, Now we can accessing topics become more faster.

34. What is Non-Clustered Index?

This type of Index does not alter the physical order of the table and it maintains logical order of the data. At most each table can have 999 Non Clustered Indexes.

35. What is the difference between clustered and non clustered Index?

| Clustered Index | Non-Clustered Index |
|---|---|
| Clustered index modifies the the way in which records are stored in database based on indexed column. | Non-Clustered Index creates a separate entry in the table that references the original table. |
| They are more fast than Non-clustered Index. | They are comparatively slow. |
| In SQL a single table can have only one Clustered Index. | Whereas SQL can have up to 999 Non-Clustered Index in single table. |

36. What is a View?

SQL Interview Questions

Table A

| Title 1 | Title 2 | Title 3 |
|----------|----------|----------|
| Value 1 | Value 2 | Value 3 |
| Value 4 | Value 5 | Value 6 |
| Value 7 | Value 8 | Value 9 |
| Value 10 | Value 11 | Value 12 |

Table B

| Title 1 | Title 2 | Title 3 |
|------------|------------|------------|
| Value 100 | Value 200 | Value 300 |
| Value 400 | Value 500 | Value 600 |
| Value 700 | Value 800 | Value 900 |
| Value 1000 | Value 1100 | Value 1200 |

View

| Title 1 | Title 2 | Title 3 |
|------------|------------|------------|
| Value 1 | Value 2 | Value 3 |
| Value 4 | Value 5 | Value 6 |
| Value 700 | Value 800 | Value 900 |
| Value 1000 | Value 1100 | Value 1200 |

Query

A View in SQL is the Virtual Table based on our requirement and the result set of SQL Statements.

Suppose if there are two tables lets say Table A and Table B and we want some data of Table A and some data of Table B should be stored and we do not want end-user to see our actual Table A and Table B in such cases we can make just a view of these two tables and show it to end-user instead of showing them entire data.

37. What is Cursor in SQL?

A database Cursor is control aspects that allow us to traverse the row or the records of the table. This can be viewed as pointer in the rows or row sets. Cursor is very useful because we can retrieve, add, and remove records from the database.

38. What are Triggers?

SQL Interview Questions

A Database trigger is a code or a programs that is automatically executed with response to some event on the table or view. It is used to maintain Data Integrity.

Consider the example of mouse trap, As soon as mouse touch the trap it gets lock in it. same is with triggers whenever we want something happen we call triggers.

39. What is Stored Procedure?

Stored Procedure is a function consists of many SQL statements to access the database System. SQL statements are written into a stored procedure and we can execute these stored procedures whenever and wherever required.

40. What is a relationship and what are its types?

We define database relationship as the connection between the tables of the database. the various types of relationships are:

- One to One relationship.
- One to Many relationship.
- Many to One relationship.
- Many to Many relationship.

41. What is Query in SQL?

A Query is the request data or information from database table or combination of tables. the most important and common functions of queries is to retrieve the data stored in respective databases.

```
1SELECT * FROM emp;
```

42. What is Sub Query in SQL?

A Sub Query is define as Query inside another Query. Subqueries are always executed first and their result are always passed to the outer query or main query. We write it under SELECT UPDATE or within another query.

SQL Interview Questions

43. What are the different types of the Sub Queries?

There are two types of Sub Queries namely Correlated and Non-Correlated.

Correlated Query-These are the Queries which select the data from a table referenced in the outer query. It is not an independent query as it refers to another table and refers to the columns in a table.

Non- Correlated Query– This Query is an independent query where the output of sub query is given to the main query.

44. What are the different types of operators available in SQL?

There are namely three types of operators available in SQL:-

- Arithmetic Operators.
- Logical Operators.
- Comparison Operators.

45. What is Clause in SQL?

SQL clause helps to limit the result set of query after execution by implementing certain conditions. It help to filter the rows from the entire set of records.

For Example- WHERE, HAVING clause.

46. What is difference between Having clause and where clause?

| Having Clause | Where Clause |
|---|---|
| Having clause can be used only with SELECT Statement. | Where clause is used when we want to implement some conditions in our query. |
| It is usually used with a group by clause. | whenever Group by clause is not used HAVING clause behave likes WHERE clause. |

[SQL Interview Questions](#)

47. what is the difference between “BETWEEN” and “IN” condition operators?

BETWEEN operator is used for displaying rows, based on a range of values in a row whereas the IN condition operator is used to check for values contained in a specific set of values.

Example of **BETWEEN**:

```
1SELECT * FROM STUDENTS WHERE ROLL_NO BETWEEN 10 AND 50;
```

Example of **IN**:

```
1SELECT * FROM STUDENTS WHERE ROLL_NO IN (8,15,25);
```

48. What is the use of SQL functions ?

Uses of SQL functions are:

- To perform some calculations on the data.
- Modify individual data items.
- Manipulate the output.
- Convert the data types.

49. How we can insert NULL values in a columns while inserting data?

We can insert NULL values in the following ways:

1. Implicitly by omitting column from column list.
2. Explicitly by specifying NULL keyword in the Values clause.

50. What is Auto Increment in SQL?

Auto Increment keyword allows the users to create a unique number to get whenever we add a new record into the table.

This keyword is usually required when Primary Key is used.

[SQL Interview Questions](#)

Wishing You Best of Luck For Your Placements!!

**Follow [Noteshacker.com](#) For Free and Simplified
Interview Preparation Material and Guidance!**

DBMS INTERVIEW QUESTIONS

Most asked Interview Questions

BY : CODE OF GEEKS



CODE OF GEEKS

DBMS Interview Questions

This e-book contains **most frequently asked questions** on **Database Management System**.

Prepared by **CODE OF GEEKS**

© 2020

All rights reserved. No portion of this e-book may be reproduced in any form without the permission from the publisher.

In case of bug-reporting, please mail us at

support@codeofgeeks.com

This article contains **most frequently asked questions** on **Database Management System**..

SET 1 – Q1 – Q5

Q. What is Data ?

A. Data refers to raw facts and figures that can be recorded.

Q. What is Database ?

A. Database refers to the collection of interrelated and coherent data.

Q. Explain DBMS ?

A. DBMS stands for Database Management System. It is a software package designed to define, manipulate, retrieve and manage data in database.

Q. Why DBMS ?

A. To make information easy to access and protected, we use database management systems. DBMS is important because it manages the data efficiently and allow users to perform multiple tasks on it with the ease.

Q. Name some of the popular Database Management System ?

A. MySQL, Oracle, SQL Server, Amazon simple DB (Cloud-based), etc.

SET 2 – Q6 – Q10

Q. What is a database system?

A. The collection of database and DBMS software together is known as a database system.

Q. What do you mean by Data Modelling ?

A. Data Modelling is the set of conceptual tools for describing data relationship, data semantics, and consistency constraints. Different data models are : Network model, Relational model, Object Oriented model, ER model, and more.

Q. Explain RDBMS ?

A. RDBMS stands for Relational Database Management System. It arranges information into allied rows and columns. RDMS is an information management system which is oriented on a data model. RDBMS Example systems are SQL Server, Oracle, MySQL, MariaDB and SQLite.

Q. Explain Abstraction of Data, with reference to DBMS ?

A. Data Abstraction refers to the process of hiding background details from user.

Q. Explain the 3 L's of Data Abstraction ?

A. It refers to three levels of abstraction. They are :

1. Physical Level : It is lowest level of abstraction. It describes **how data is actually stored**. It also describes complex data structure in detail.
2. Logical Level : It describes **what data get stored in the database** and **what are the relationships among them**.
3. View Level : It is the highest level of data abstraction that only describes a part of database indirectly.

SET 3 – Q11 – Q15

Q. What are the disadvantages of using Flat File System ?

- A. 1. Data Redundancy and Inconsistency.
- 2. Difficulty in accessing data.
- 3. Data Isolation.
- 4. Integrity Problem.
- 5. Security Issues.

Q. What is Database Schema ?

- A. Schema refers to the overall structure of database without data values.

Q. What do you mean by transparent DBMS?

- A. The transparent DBMS is a type of DBMS which keeps its physical structure hidden from users.

Q. Explain ER Model ?

- A. This model is based on the perception of real world that consists of collection of basic entities and relationship among these objects. It is the graphical representation of the database.

Q. What do you understand by Data Independency ?

- A. It refers to the capacity to change data at one level without affecting next higher level is called Data Independence. It is of two types : Physical DI, Logical DI.

Physical DI : It indicates that physical storage of device could be changed without affecting conceptual view.

Logical DI : It indicates that conceptual schema can be changed without affecting existing external schema.

SET 4 – Q16 – Q20

Q. What is a Database Language ?

A. Database Language is a medium by which we can interact with the database system through some set of commands. These commands are structured.

Q. What are different types of database languages ?

A. 1. DDL : Data Definition Language defines different structures in database.

Example – create, alter, drop, truncate are some DDL commands.

2. DML : Data Manipulation Language allows database user to manipulate data.

Example – insert, insert into, update, delete, select are DML commands.

3. TCL : Transaction Control Language commands are used to manage transactions in the database.

Example – commit, rollback, savepoint are TCL commands.

4. DCL : Data Control Language is used to control access to data stored in a database.

Example – Grant, Revoke are DCL commands.

Q. Suppose we want to insert multiple values in a table at same time. How we can do this?

A. We can add multiple values at same time using **insert into** statement.

Syntax :

INSERT ALL

INTO table_name (col1, col2,, coln) VALUES (expr1, expr2, expr_n)

INTO table_name(col1, col2,, coln) VALUES (expr1, expr2, expr_n)

SELECT * FROM dual;

Q. List the difference between following commands : drop, truncate, delete.

A. drop and truncate commands are the DDL commands, used to delete tables from the database. Once the table gets deleted, all the privileges and indexes that are related to the table also get deleted. These 2 operations cannot be rolled back.

On the other hand, delete is a DML Command which is also used to delete rows from the table and this can be rolled back.

Q. What is a Tuple ?

A. A single row of a table, which contains a single record for that relation is called a tuple.

SET 5 – Q21 – Q25

Q. Explain degree and Cardinality ?

A. Degree is the total number of attributes in a relation or table and cardinality is total number of tuples/rows in a relation/table.

Q, What is a relation in DBMS ?

A. A database relation refers to an individual table in a relational database. A table is a relation because it stores the relation between data in its column-row format.

Q. What are the different types of relationship in DBMS ?

A. There are basically three types of relationship, that can be defined among various different objects.

One-To-One: In this, one record of an object relates to one record of another object.

One-To-Many/ Many-To-One : In this, one record of an object relates to many records of other object and vice versa.

Many-To-Many: In this, more than one records of an object relates to 'n' number of records of another object.

Q. What is the role of DML Compiler ?

A. It translates DML statements in a query language into low-level instructions that the query evaluation engine can easily understand.

Q. Explain me the role of using clause for queries ?

A. Clause enables you to specify conditions that filters the results as per the requirement. Some of the most commonly used clauses are : having, where etc.

SET 6 – Q26 – Q30

Q. What is a Query ?

A. Query is a statement that is used for the extraction of data from database.

For example – select * from table1 is a query.

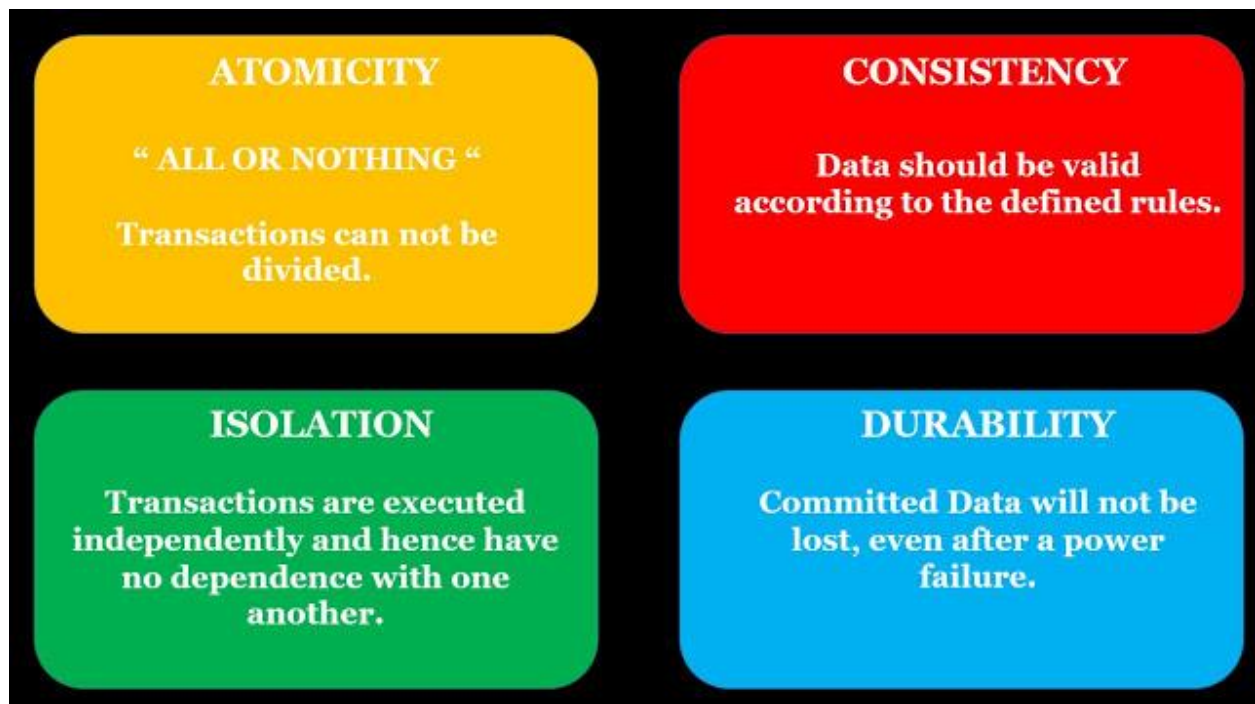
Q. What is Subquery ?

A. Subquery is a query within query.

For example – select * from students where marks = (select max(marks) from students);

Q. What are the ACID properties in DBMS ?

A.



Q. Give brief information about entity, entity type, entity set ?

A. Entity is any real world object about which data can be stored in a database.

Example – Book, Person.

Entity Type is a collection of the entities which have the same attributes.

Example – Employee table is an entity type containing ‘n’ rows, in which each row defines different data for different entities

Entity Set is a collection of the entities of the same type.

Example – A collection of the employees of a company.

Q. What is Normalization ?

A. Normalization refers to the decomposition of relation. It is required to remove data anomalies, data redundancy and data inconsistency. Normalization of a database increases more restrictions on it.

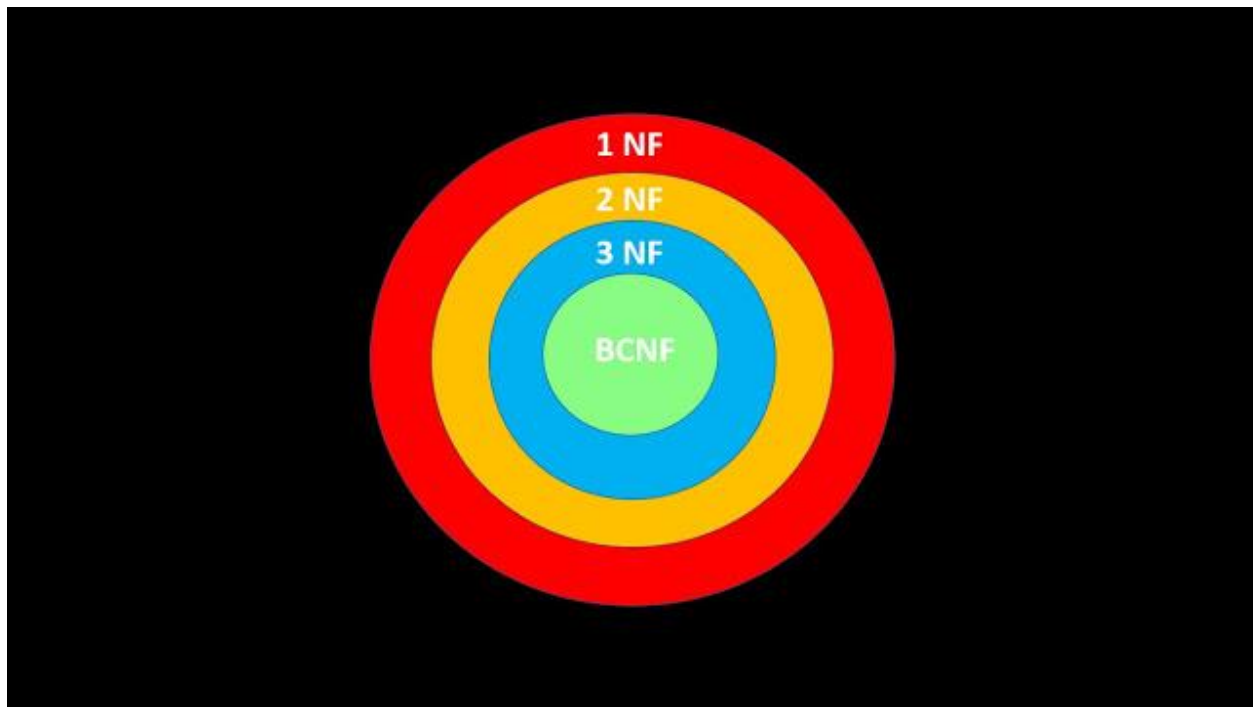
Most commonly used normal forms are :

First Normal Form

Second Normal Form

Third Normal Form

Boyce & Codd Normal Form



SET 7 – Q31 – Q35

Q. What are the rules for 1 NF ?

- A. 1. Each table cell should contain a single value.
2. Each record needs to be unique.

Q. What is 2 NF ?

A. A relation is said to be in 2 NF, if it satisfies following rules :

1. It is in 1 NF.
2. Every non-prime attribute is fully functionally dependent on the primary key.

Q. What is 3 NF ?

A. A relation is said to be in 3 NF, if it satisfies following rules :

1. It is in 2 NF.
2. There is no transitive functional dependency.

Q. Explain BCNF ?

A. BCNF is Boyce-Codd Normal Form. It is considered to be the advanced version of 3 NF. Hence it is also referred to as 3.5 NF. A relation is said to be in BCNF, if it satisfies following rules :

1. It is in 3NF.
2. For every functional dependency $P \rightarrow Q$, P should be the super key of the table.

Q. What are Stored Procedures ?

A. Stored Procedure refers to the set of Structured Query Language(SQL) statements stored in a relational database management system as a group. It can further be reused and shared by multiple programs. It provides a layer of security between a user interface and database.

SET 8 – Q36 – Q40

Q. Can you create a table without using create command ?

A. Yes, we can create table with the help of **SELECT INTO** statement. It copies content of one table to another table. However, there should be atleast one table from where we can copy content.

Example :

Copying all columns : `select * into new_table from old_table where condition`

Copying specific column : `select col1,col2 into new_table from old_table where condition`

Creating new empty table : `select * into new_table from old_table where 1 = 0`

Q. What is Denormalization ?

A. It is the reverse process of Normalization. It is the process of trying to improve the readability of the database by grouping data. Denormalization is also used for speeding up the performance.

Q. What are Joins ?

A. Join clause are used to combine rows from two or more tables, depending upon the columns between them.

Q. What are the different types of Joins ?

A. Different types of Joins are :

1. INNER JOIN : It returns all records that are common in both tables.
2. LEFT OUTER JOIN : It returns all records from the left table, and matched records from right table.
3. RIGHT OUTER JOIN : It returns all records from the right table, and matched records from left table.
4. FULL OUTER JOIN : It returns all records when there is a match in either left or right table.

Q. Explain Transaction ?

A. Transaction refers to the collection of multiple statements, that are responsible for transferring a database from one consistent state to another consistent state.

SET 9 – Q41 – Q45

Q. Explain the role of views in database ?

A.View refers to the virtual table. We can create view using **create view statement**.

```
CREATE VIEW as Select col1
```

```
FROM table1
```

```
where CONDITION;
```

Q. Explain Trigger ?

A. Triggers are defined as special kind of stored programs, which are automatically executed whenever a specific operation occurs in the database server.

Q. What are Locks ?

A. Locking is the mechanism to protect data integrity and ensure data consistency during transactions. Locks are the most common cause of blocked processes. Stronger the Isolation level, more the chances of blocking.

Q. Explain different types of Locks ?

A. Locks are broadly characterized into following types :

Shared Locks : These locks are acquired by readers during read operations. In other words, these locks exist when two transactions are granted read access. Data updation is not allowed until shared lock is released.

Exclusive Locks : In exclusive lock, data items can be both read as well as written by the transaction. In Exclusive lock, multiple transactions do not modify the same data simultaneously.

Q. What is Super Key ?

A. An attribute or set of attributes that uniqueness in database is referred to as Super key. It is the superset of Candidate key.

SET 10 – Q46 – Q52

Q. What is Candidate Key ?

A. A minimal set of attribute/attributes that can be used to uniquely identify a single row in a given relation is referred to as Candidate key.

Q. Explain Primary Key ?

A. DB Designer selects one of the candidate key as primary key for a relation for the purpose of identification of a tuple uniquely. It is identified during table creation.

Q. What is Composite Key ?

A. If a primary key has more than one attribute, then it is referred to as Composite key.

Q. Explain Foreign Key ?

A. A set of attribute/attributes that is used to establish and enforce a link between data in two or more relations.

Q. Can a table have more than one primary key ?

A. No.

Q. Can We Have NULL Value in Primary Key?

A. No.

Q. What are cursors ?

A. A cursor is a temporary work area created in system memory when a SQL statement is executed. A cursor can hold more than one row, but can process only one row at a time.

So, these are most frequently asked interview questions on DBMS.

We, at CODE OF GEEKS, wish you all the best for your upcoming future.

DS INTERVIEW QUESTIONS

Most asked Interview Questions

BY : CODE OF GEEKS



CODE OF GEEKS

Data Structures Interview Questions

This e-book contains **most frequently asked questions** on **Data Structures**.

Prepared by **CODE OF GEEKS**

© 2020

All rights reserved. No portion of this e-book may be reproduced in any form without the permission from the publisher.

In case of bug-reporting, please mail us at

support@codeofgeeks.com

SET 1 : Q1-Q5

Q. What is Data?

A. Data is a raw material for data processing. It refers to unprocessed information.

Q. What is information?

A. It is the data that has been processed in the meaningful form to the one who receives it.

Q. What is Data Structure?

A. It is the specified format for organizing and storing data.

Q. What are the different type of data structures?

A. Data Structures are divided into two categories:

1. Primitive Data Structure (int, char, float, double etc)
2. Non Primitive Data Structure

Non Primitive datatype are further divided into two categories :

- a. Linear (Array, linked list, stack, queue)
- b. Non Linear (Tree, Graph)

Q. What are the different operations applied on Data Structures?

A. Traversing, Searching, Insertion, deletion, sorting and searching.

SET 2 : Q6-Q10

Q. Give some areas where data structures are used?

A. Data Structure provide us means to manage large amounts of data efficiently for uses such as large databases and internet indexing services.

Q. Name the type of data structure used in following:

1. Hierarchical Data Model : Tree
2. RDBMS : Array
3. Network Data Model : Graph

Q. What is an Algorithm?

A. Algorithm denotes a sequence of steps to solve a particular problem.

Q. What are different approaches to develop algorithms?

A. Greedy, Divide and Conquer, Dynamic Programming.

Q. What is Hashing?

A. Hashing is the process of mapping a given value with a particular key for faster access of elements. Efficiency of mapping depends of the efficiency of the hash function used.

SET 3 : Q11-Q15

Q. Explain Greedy algorithm?

A. Algorithms following greedy approach build up solution step by step. It is mostly used in optimization problems. It makes optimal choice at each step, to solve entire problem.

Example: Dijkstra Algo, Prim's Algo, Kruskal.

Q. Explain Divide & Conquer algorithm?

A. Algorithms following D&C approach works in two steps-Divide & Combine. Atfirst we divide the problem into subparts, solve them individually and then combine the result of all subparts to get a collective solution.

Example: Binary Search, Merge Sort.

Q. Explain Dynamic Programming?

A. DP is used to find the most optimized solution by eliminating the standard recursive calls.

Example: Finding fibonacci series.

Q. What are the parameters that are cared for an algorithm?

A. Time Complexity and Space Complexity.

Q. What are Abstract Datatypes?

A. ADTs are the special datatypes constructed from the collection of data items.

Example : Array, Linked list, Queue.

SET 4 : Q16-Q20

Q. What is the need of Data Structure?

A. It tells how data can be stored and accessed in its elementary level. It allows us to manage huge amount of data efficiently. It provides different techniques for searching and sorting data.

Q. Differentiate between Static memory allocation and dynamic memory allocation.

A.

| STATIC MEMORY ALLOCATION | DYNAMIC MEMORY ALLOCATION |
|---|---|
| Performed at compile time. | Performed at run time. |
| Assigned to STACK area. | Assigned to HEAP area. |
| Best when size of required memory is specified. | Best when size of required memory is not specified. |

Q. Explain the role of malloc(), calloc(), realloc() and free() in dynamic memory allocation.

A. 1. malloc() is one of the functions used for dynamic memory allocation. It takes up single arguments, which denotes the number of bytes to be allocated.

malloc() is faster than calloc().

Syntax : `int *p = (int *)malloc(sizeof(int))`

2. calloc() is one of the functions used for contiguous dynamic memory allocation. It takes up two arguments, in which first argument denotes the

number of bytes to be allocated, and second argument denotes size of each block. It initializes allocated memory by 0.

3. The `realloc()` function is used to resize allocated memory without losing old data.

Syntax: `void *realloc(void *p, size_t newsize);`

4. `free()` is use to free the memory block that had been allocated dynamically.

Q. What is Array?

A. Array refers to the collection of similar data items.

Syntax – `int a[10];`

Here, a is the array having size 10.

Q. What is 2D Array?

A. 2D array or 2 dimensional array is array of arrays. It is used to store the data in tabular form-in the terms of rows and columns.

It is represented as `int a[m][n]`, where m denotes number of rows and n denotes number of columns.

SET 5 : Q21-Q25

Q. What is Linked List?

A. Linked list is a list of data elements linked to one another. In linked list, each element consists of a node, with two field each :

- a. data field (variable that denotes the content of node)
- b. next (pointer variable that stores the address of next node)

Types of Linked List :

1. Singly LL
2. Doubly LL
3. Circular LL
4. Circular Doubly LL

Q. How linked list is better than array?

- A. 1. Array is static and Linked list is dynamic.
2. Linked list avoids memory wastage.

Q. What do you mean by Stack?

A. Stack is linear data structure in which insertion and deletion is done only from one end. It follows LIFO (Last In First Out) order.

Q. What are the operations that we can apply on stack?

A. Push : Insertion of element on top

Pop : Deletion of element on top

Q. What is Stack Overflow & Stack Underflow?

A. Stack Overflow : Condition when array is full and user requests for another insertion.

Stack Underflow : Condition when array is empty and user requests for deletion operation.

SET 6 : Q26-Q30

Q. In how ways we can implement stack?

A. Two ways : using arrays and linked list

Q. What is peek() operation in Stack?

A. It returns top most element of Stack.

Q. What is the condition of Stack Overflow?

A. $\text{top} = n - 1$, where n is the number of elements in stack.

Q. Give some applications of stack?

- A. 1. For data reversal.
- 2. Evaluating arithmetic operations.
- 3. To calculate postfix expressions.
- 4. For parsing.
- 5. For simulation of recursion.

Q. What is recursion?

A. Recursion is the process in which a function is called by itself again & again.

Example : Recursive solution of printing a factorial of a number

fact(n)

{

```

if(n==0)
{
return 1;
}
else
{
return n*fact(n-1);
}
}

```

SET 7 : Q31-Q35

Q. Differentiate between iteration and recursion?

A.

| RECURSION | ITERATION |
|--|---|
| Recursion achieves repetition through repeated function calls. | Iteration explicitly uses repeated structure. |
| Recursion terminates when base case is recognized. | Iteration terminates when loop condition fails. |
| Recursion returns a value to the calling function. | Iteration does not returns any value. |
| Recursion makes a code smaller. | Iteration makes a code larger. |
| Recursion is a slower process than Iteration. | Iteration is faster. |

Q. What is Queue?

A. Queue is a non-primitive non-linear data structure. It is a homogenous collection of elements. It follows FIFO order – First In First Out. Insertion of any new value takes place at ‘rear’ while deletion takes place at ‘front’.

Q. What is the basic condition to check whether a circular queue is full or not?

A. $(\text{rear} + 1) \% \text{size} = \text{front}$

Q. Explain me the concept of Priority Queue?

A. Priority queue is the collection of elements such that each element has been assigned a priority i.e order in which elements are deleted or processed. An element of high priority is processed before any element of lower priority.

Q. What are the minimum number of queues required to implement priority queue?

A. 2, one for data & one for priority.

SET 8 : Q36-Q40

Q. What is dequeue operation?

A. It is doubly-ended queue. In doubly-ended queue, insertion and deletion takes place at both ends.

Q. What do you know about Tree data structure?

A. Tree is a non-linear data structure which is defined as the finite set of one or more nodes.

Q. Explain me the property of Tree data structure?

A. * Top most node of a tree is known as 'root'.

* Tree comprises of one or more subtrees.

Q. What is degree of a node?

A. It is the number of subtree(s) of a node.

Q. What is the degree of a tree?

A. It is the maximum degree of node in tree. A node of tree with degree 0 i.e no child is called leaf node.

SET 9 : Q41-Q45

Q. What is the depth of a tree?

A. It is also known as the height of a tree. It represents the maximum level of tree.

Q. What is Forest of a tree?

A. It is the set of disjoint tree. In a tree, if you remove its root node then it becomes a forest.

Q. How many children a binary tree may have?

A. 0 | 1 | 2.

Q. Differentiate between binary tree and tree.

A. In an ordinary tree, parent may have many children, but a binary tree can have at most 2 children.

Q. Explain different types of binary tree?

A. 1. Full Binary tree : Every node has 0 or 2 children.

2. Complete Binary tree : All internal nodes have 2 children.

3. Skewed tree : Tree that goes in single direction.

Left Skewed tree : Node have only left child not right.

Right Skewed tree : Node have only right child not left.

SET 10 : Q46-Q50

Q. What is the maximum number of nodes in a binary tree of height 'h'?

A. $2^{(h+1)}$

Q. What is the depth of binary tree with 'n' nodes?

A. $D = \log(\text{base } 2)(n)+1$

Q. Explain the game of Tower of Hanoi.

A. The Tower of Hanoi is a mathematical game or puzzle. It consists of three rods and a number of disks of different sizes, which can slide onto any rod. The puzzle starts with the disks in a neat stack in ascending order of size on one rod, the smallest at the top, thus making a conical shape.

Q. In Tower of Hanoi game, what could be the possible number of moves for 5 disks?

A. 31.

General formula is given as : $2^n - 1$

Q. How Binary Search Tree works?

A. It is a binary tree which may be either empty or satisfies following properties :

1. Value of key in the left child is less than the value of the root.
2. Value of key in the right child is more than or equal to the value of the root.

SET 11 : Q51-Q55

Q. What are the different cases for deleting an element?

- A. 1. When node (to be deleted) is leaf node – delete the node directly.
2. When node has only ONE child – Make child node as parent (swapping the position of both nodes) and then we can delete it directly.
3. When node has TWO children – Find inorder successor of that given node and swap their position and delete the node.

Q. Where BST is used?

- A. 1. To implement multilevel indexing in database.
- 2. To implement various efficient algorithms.
- 3. To implement applications that require a sorted list as input like various e-commerce websites.
- 4. To manage Virtual Memory Areas.
- 5. To index various IP addresses.

Q. Give the worst case complexity for BST operation-insertion.

- A. Insertion : $O(h)$, h is height of BST.

Q. Give me the properties of Threaded Binary tree?

- A. It is a binary tree with 'n' nodes out of which $n+1$ are always null, and this space is used to contain some useful information.

A Left null pointer stores the address of inorder predecessor of the node and a right null pointer stores the address of inorder successor of the node. These pointers are referred to as Threads.

It is more efficient than a normal binary tree.

Q. Explain the concept of Huffman coding?

- A. It is a particular type of optimal prefix code that is used for lossless data compression. It is an example of Greedy algorithm. It assigns variable length code to all the characters. The code length of a character depends on how frequently it occurs in the given text. The character which occurs most frequently gets the smallest code. The character which occurs least frequently gets the largest code.

Q. Differentiate between B-Tree & B+ Tree?

A. B-tree is a self-balancing tree data structure that maintains sorted data and allows searches, sequential access, insertions, and deletions in logarithmic time. The B-tree is a generalization of a binary search tree in that a node can have more than two children.

In B+ Tree, each node contains key only(not pairs), and all pointers to data-records exists at leaf level only.

Q. How can we overcome drawbacks of BST?

A. Using AVL Trees.

Q. What is AVL Tree?

A. Concept of AVL Tree was given by Adelson, Velski, Landis. AVL trees are height balancing BST. It checks the height of left&right subtree and assures that difference is not more than 1, this difference is termed as balanced factor.

Q. What are the different operations applied on AVL tree?

- A. 1. Left-Left Rotation (LL) : right rotate node p.
- 2. Left-Right Rotation (LR) : left rotate “parent of p” and right rotate “parent of parent of p (p-parent-parent)”.
- 3. Right-Right Rotation (RR) : left rotate node p.
- 4. Right-Left Rotation (RL) : right rotate “parent of p” and left rotate “parent of parent of p (p-parent-parent)”.

where p is the node with violating balance-factor.

Q. Define Graph Data Structure?

A. Graph is an abstract datatype, containing the set of vertices and edges.

SET 13 : Q61-Q65

Q. Define Path & cycle?

A. Path represents the sequence of adjacent vertices whereas a cycle represents a closed path.

Q. What are the different ways to represent a graph?

A. There are two ways to represent a graph, using Adjacency Matrix and Adjacency List.

Q. What are the application areas of Graph data structure?

- A. 1. Circuit Designing.
- 2. Computer Networks.
- 3. In study of DNA structure of organism.

Q. What is a vertex in graph?

A. Vertex is a point where lines meet.

Q. What is eccentricity?

A. It is the maximum distance between a vertex to all other vertices.

SET 14 : Q66-Q70

Q. What is Spanning Tree?

A. It is a subset of a graph, which has all the vertices covered with minimum possible number of edges. It does not have cycles and can't be disconnected.

Q. What is MST?

A. MST is minimum spanning tree. It is a spanning tree having minimum weight than any other spanning tree in the same graph.

Example : Prims, Kruskal algorithm.

Q. Tell something about BFS & DFS?

A. BFS is Breadth First Search. It is used to traverse a graph in horizontal manner.

DFS is Depth First Search. It is used to traverse a graph in vertical or depthward manner.

Q. Name the data structure used in BFS?

A. Queue.

Q. Name the data structure used in DFS?

A. Stack.

SET 15 : Q71-Q76

Q. Tell any one Single Source Shortest Path algorithm?

A. Dijkstra Algorithm.

Questions on Searching and Sorting techniques

Q. What is linear searching?

A. Linear Search is a linear time searching technique in which a complete list/array is traversed in order to search a element.

Time complexity of linear search : $O(n)$, where n denotes the number of elements in an item.

Q. What is the best case for Binary Search?

A. When element is present at middle position.

Q. What are inplace sorting techniques, tell me one inplace and one non-inplace sorting technique.

A. Inplace sorting techniques does not require any extra space to sort a given list/array.

Inplace Sorting – Bubble Sort

Non-inplace Sorting – Merge Sort

Q. Is bubble sort stable?

A. Yes.

SET 16 : Q77-Q81

Q. Explain the working of selection sort?

A. In Selection sort, we select a minimum element from the array and store it in the appropriate position.

Time complexity for selection sort – $O(n^2)$.

Q. Explain the working of Insertion Sort?

A. In this, left most element is considered to be already sorted. From remaining elements, left most is taken out and is compared to already sorted elements to its left.

Best Case Time Complexity : $O(n)$

Q. Is insertion sort stable?

A. Yes.

Q. Is insertion sort inplace?

A. Yes.

Q. Explain me the working of Quick sort?

A. Quick sort works on divide and conquer technique. In quick sort, we partition the array into subarrays, this partition takes place around a special element called pivot.

Time Complexity of Quick sort is $O(n \log n)$.

SET 17 : Q82-Q86

Q. What is the worst time complexity of quick sort?

A. $O(n^2)$, it happens when :

Array is already sorted in same order.

Array is already sorted in reverse order.

All elements are same.

Q. Is Quick Sort stable?

A. No.

Q. What is the role of minheap operation in heap sort?

A. It extracts the minimum element from heap.

Q. What is randomized quick sort?

A. In randomized quick sort, initial position of pivot is determined randomly.

Q. What are the disadvantages of radix sort?

A. It needs more memory.

This sorting algo. works for integers only.

So, these are the most asked interview questions on DSA.

We, at CODE OF GEEKS, wish you all the best for your upcoming future.

For any assistance, feel free to mail us at support@codeofgeeks.com.