Mindtree

1.What is a command line argument?

The argument passed to the main() function while executing the program is known as a command line argument.

2.Can we compile a program without the main() function?

We can compile a program without the main() function; however, the program won't be executed. However, adding #define, we can compile and run the program without using the main() function.

3. How can you restrict inheritance?

By the following methods:

1. Using the final keyword.
2. Making the method final.
3. Using private constructor.

4. What are static methods and static variables?

They are methods and variables shared by all the objects in a class. Their static nature comes from the class and not from the object itself.

5. What is enumeration?

It is an interface you can use to access original data structure.

6. What is method overloading?

It is a polymorphism technique that allows us to create multiple methods with the same name but different signatures.

7. What is interpreted language?

An interpreted language executes its statements line by line. Interpreted language codes can run directly from the source code with no intermediary compilation step.

8. What is pass in Python?

Pass keyword represents a null operation in python. Used for the purpose of filling up empty block code which may execute during runtime, but are yet to be written

9. What is self in Python?

Self is a keyword that defines an instance of an object of a class. It is explicitly used as the first parameter.

10.What is an operator in Python?

Operator is a symbol, which is used on some values and produces an output as a result. Operator works on operands.

- Arithmetic
- Relational
- Assignment
- Logical
- Identify
- Bitwise

11. What is swapcase() function in Python?

It is a string function which converts all uppercase characters into lowercase and vice versa.

It is used for altering the existing case of the string.

This method creates a copy of the string which contains all the characters in the swap case.

12. What is the Python decorator?

It is a powerful tool that allows you to add functionality in an existing code. It is also known as meta-programming.

13. What is DBMS?

DBMS stands for Database Management System. It carries out operations like creation, maintenance and use of a database.

14. What are tables, fields and record?

Tables: Data organized in a model with Rows and Columns is called a table. Rows are horizontal while tables are vertical.

Fields: In a table there are a specified number of columns known as fields.

Records: There are infinite number of rows which is called a record.

15. What is Foreign Key?

Foreign Key is a key which links 2 tables.

It is a field or a collection of fields in a table that corresponds to the Primary Key of another table.

16. What is the difference between DELETE and TRUNCATE?

DELETE	TRUNCATE
This command will delete a row of a table.	This command will delete a row of a table.
Rollback of data is not possible.	Rollback of data is possible.
It is a DML command.	It is a DDL command.
It is comparatively slower.	It is comparatively faster.

17. What is a constraint?

Constraints are limitations on the data type of a given table. Samples of constraints are:

- Not Null
- Check
- Default

18. What is SQL?

SQL stands for Structured Query Language and is used to communicate with the Database. It is a standard language for accessing and manipulating databases.

19. What is a unique key?

A Unique key constraint identifies each record in the database. It provides for the column or set of columns.

A unique key is a set of one or more than one field of a table that can uniquely identify a record in a database table.

20. What is a relationship and what are they?

Relationship is the interconnection of tables within the database. There are various relationships,

- One to One Relationship.
- One to Many Relationships.
- Many to One Relationship.
- Self-Referencing Relationship.

21. What is a query?

A query is really a request for data. A DB query is a code written in order to get the information back from the database. You ask the database for something and it answers in the best way it knows with data as a result of a query.

22. What is Machine Learning?

Machine Learning is the science of getting computers to act in a real-time situation without being programmed explicitly. It is an application of AI and it enables systems to learn automatically and to improve from previous experience.

23. How does IoT work?

Iot is built on the concept of AI. An IoT device has a sensor which collects data, the cloud facilitates the network between the devices, the software processes and stores the data and finally the UI enables the device to respond to the stimulation.

24. What is the difference between IP and MAC address?

IP Address:- IP address is assigned to a device so that it can be located on the network.

MAC Address:- MAC Address is a unique serial number assigned to every network interface on every device.

25. What is serialization?

Serialization is a mechanism of converting the state of an object into a byte stream.

26. What is Inner Join and Outer Join and their uses?

Inner Join: When there is no join condition, an inner join would combine all rows from one table with those from another. If the first table contained three rows, and the second contained four, then final result would contain twelve (3*4=12)

Outer Join: An outer join is used to return results by combining rows from two or more tables. But unlike an inner join, the outer join will return every row from one specified table, even if the join condition fails.

27. What is Static function?

A static function is a member function of a class that can be called even when an object of the class is not initialized.

A static function cannot access any variable of its class except for static variables.

28. What are the advantages and disadvantages of views in databases?

Advantages of views:

As there is no physical location where the data in views is stored, it generates output without wasting resources.

Data access is restricted as it does not allow commands like insertion, updating, and deletion.

Disadvantages of views:

View becomes irrelevant if we drop a table related to that view

More memory is occupied when the view is created for large tables.

29. What are checked and unchecked exceptions?

Checked Exceptions: Checked exceptions are inherited from the exception class. It can be handled by a catch clause. Client code handles these exceptions. Example-SQLException

Unchecked Exceptions: Client code does not handle these exceptions, hence the name unchecked.

Example-Null Pointer Exception

30. What is an ABAP query?

ABAP Query is a commanding tool. It is shaped by a central Functional Group and a User Group.

ABAP query is executed using transaction SQ01 and SQ02.

31. What is Gregorian Calendar Class?

Gregorian Calendar is a concrete subclass of Calendar. It is a hybrid calendar from the Julian and Gregorian calendar systems, and is the standard calendar system that is commonly used.

A Gregorian Calendar unlike the Calendar can be instantiated.

32. What are the types of polymorphism?

There are two types of polymorphism:-

1. Static polymorphism or compile time polymorphism
2. Dynamic polymorphism or runtime polymorphism

33. What is the difference between arrays and structures?

Arrays	Structures
Collection of variables of the same data type.	Collection of variables of different data types.
Memory is allocated in consecutive blocks	Memory is not necessarily allocated in consecutive blocks
Comparatively faster	They are slower comparatively

34. Difference between linear search and binary search.

Linear search	Binary search
It starts searching from the first element and compares each element with a search element.	It starts searching by finding the middle element of the array, and finding the position of the searched element.
Elements can be organised in any order	Elements need to be arranged in a sorted order
Used for small size data sets	Used for large size data sets

35. How can you check whether the given Binary tree is a Binary Search Tree or not?

If the in-array traversal of the given Binary tree is sorted it is a Binary Search Tree

36. What is HAVING clause in SQL?

HAVING clause in SQL specifies that any SQL SELECT statement can only return rows where aggregate values fulfil the specified conditions.

It is used along with the GROUP BY clause, to restrict the groups of returned rows to only those who fulfil the specified condition.

37. What is a trigger in SQL?

Triggers are database objects which runs automatically when an event occurs in the server.

In DML, triggers run when a user uses INSERT,UPDATE or DELETE statements.

In DDL, triggers run when a user uses CREATE,ALTER or DROP statements.

38. What is __init__?

Answer
Explanation

__init__ is called a constructor in object-oriented programming. It is a reserved method in python.

39. What are constraints?

Constraints in sql are a set of rules that are implemented in relational databases. Constraints dictate which data can be modified or deleted from a table.

40. Name some of the sorting algorithms.

Quick Sort
Bubble Sort
Merge Sort
Insertion Sort
Heap Sort

41. What is tree traversal?

Tree traversal is a form of graph traversal where it visits each node in a tree data structure exactly once.

They are categorised on the basis of nodes which are visited.

42. What do you mean by Pre order, In order and Post order traversal?

Pre order Traversal :- It is used to create the copy of the tree.

Algorithm:-

Visit the root

Traverse the left subtree

Traverse the right subtree

In order Traversal:-

Used in BST, to get nodes in non-decreasing order

Algorithm:

Traverse the left subtree

Visit the root

Traverse the right subtree

43. Differentiate between the .equals() method and ==.

==	.equals() method
It is an operator	It is a method of object class
Checks whether both reference points to same location or not	Checks the content
Cannot be overridden	Can be overridden

44. What are the advantages of Object-Oriented Programming?

- Instead of needing to start writing code from scratch, we can build programs from standard functioning modules that communicate with one another, saving time and increasing productivity.
- The Object-Oriented Programming language allows us to divide the program down into small-sized problems that can be solved quickly (one object at a time).
- The Object-Oriented Programming Language increases programmer efficiency, improves software quality, and reduces maintenance costs.
- OOPs, concepts can be applied from tiny to large systems.
- It is possible for numerous instances of objects to coexist without interfering with one other

45. Differentiate between interface and abstract class?

Interface	Abstract class
Only abstract methods are allowed in an interface. It can also contain default and static methods with Java 8.	There are abstract and non-abstract methods in an abstract class.
We cannot implement the concept of multiple inheritances using interfaces.	We cannot implement the concept of multiple inheritances using abstract classes.
The implementation of an abstract class cannot be provided by an interface.	An abstract class can provide interface implementation.
Only static and final variables are used in the interface.	Variables in an abstract class can be final, non-final, static, or non-static.
To declare an interface, we use the interface keyword.	To declare an abstract class, we use the abstract keyword.

46. Write a program to calculate the Least Common Multiple (LCM) of two numbers. Example : Input : a = 10, b =15 Output : 30 a = 5, b = 7 Output : 35

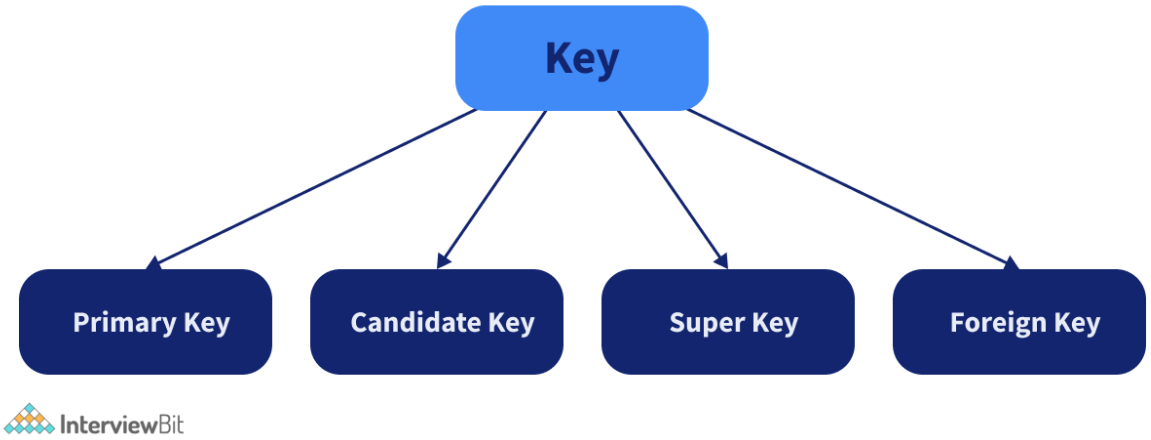
47.give best performance in every case (best, worst and average). Example : Input : arr = {3, 5, 7, 1, 2, 4, 6} Output : {1, 2, 3, 4, 5, 6, 7}

- Remove Space from a String
- No is palindrome or not
- Count even and odd no in an integer
- Determine the no is prime or not

48. You have 15 rupees on you. You enter a shop and the shopkeeper informs you that each chocolate costs one rupee. He also informs you that in exchange for three wrappers, you will receive a chocolate. How many chocolates can you eat in total?

We can eat a total of 22 chocolates for Rs. 15. First, we will buy 15 chocolates for 15 rupees since each chocolate costs Re. 1. Now, we have 15 wrappers. We return all the 15 wrappers to the shopkeeper which gives us 5 chocolates (15 / 3 = 5). We eat those five chocolates and return 3 wrappers to the shopkeeper and get 1 chocolate. We eat that chocolate and again give 3 wrappers which give us one chocolate. So, in total, we can have 15 + 5 + 1 + 1 chocolates.

49. What do you understand by super key, candidate key, primary key and foreign key in the context of database management systems?



- **Super key:** Super Key is a set of attributes that can be used to uniquely identify a tuple. The super key is created by adding zero or more attributes to the candidate key. A candidate key is a super key, but not the other way around.
- **Candidate key:** A candidate key is the smallest set of attributes that can uniquely identify a tuple. For each tuple, the Candidate Key value is unique and non-null. In relation, there can be more than one candidate key. The candidate key might be simple (only having one attribute) or composite (containing multiple attributes).
- **Primary key:** In relation, there may be more than one candidate key, with one being chosen as the primary key. This primary key is chosen by the database administrator based on the requirements amongst the candidate keys.
- **Foreign key:** A foreign key is a column or set of columns in a relational database table that connects data from two other tables. It serves as a cross-reference between tables by referencing the primary key of another table and therefore creating a relationship between them.

For example, let us consider tables with the following schema :

Teacher :

```
teacher_id (primary key), teacher_name, teacher_phone_number, teacher_aadha
r, teacher_department_id
```

Department :

```
department_id (primary key), department_name
```

Here, for the Teacher table, the following are the different types of keys present :

- The candidate keys can be teacher_id, teacher_phone_number and teacher_aadhar since they all can uniquely identify a record of the table.
- Out of the above three candidate keys, any one of them can be chosen as the primary key. We generally choose teacher_id as the primary key.
- Any of the above candidate keys when grouped with any other key form the super key. For example, teacher_id, teacher_name can together form a super key.
- Teacher_department_id is a foreign key for the Teacher table since it is a primary key in the Department table and it links the two tables.

50. What are the different types of SQL commands?

- **Data Definition Language (DDL):** DDL commands are those commands that modify the table's structure, such as by adding, deleting, or changing a table. All DDL commands are auto-committed, which means they store all database changes permanently. Example - Create, Drop, Truncate, Alter.
- **Data Manipulation Language (DML):** The database is modified using DML commands. It is in charge of all database modifications of any kind. The DML command is not auto-committed, which means it cannot preserve all database modifications permanently. They have the potential to be rolled back. Example - Insert, Update, Delete.
- **Data Control Language:** Any database user can be granted or revoked authority using DCL commands. Example - Grant, Revoke.
- **Transaction Control Language (TCL):** Transaction Control Language commands are commands that are used to manage transactions in a database. Only DML commands like INSERT, DELETE, and UPDATE can be used with TCL commands. Because these activities are automatically committed to the database, they can't be used while creating or dropping tables. Example - Commit, Rollback, Savepoint.
- **Data Query Language (DQL):** DQL commands are used to fetch data from the database. Example - Select.

51. Differentiate between Delete and Truncate SQL commands.

Delete	Truncate
The DELETE command is used to remove specific rows from a table (one or more).	This command is used to delete all of the rows in a table.
It is a Data Manipulation Language (DML) command.	It is a Data Definition Language (DDL) command.
In order to filter the records, the DELETE command may include a WHERE clause.	The TRUNCATE command may not use a WHERE clause.
The DELETE statement deletes rows one by one and records each deleted row in the transaction log.	TRUNCATE TABLE deletes data by relocating the data pages that were used to hold the table data, and only the page deallocations are recorded in the transaction log.

52. Differentiate between WHERE clause and HAVING clause in SQL.

The following table lists the differences between the WHERE clause and the HAVING clause:

WHERE	HAVING
The WHERE Clause is used to filter records from a table depending on a condition that is given.	The HAVING Clause is used to filter records from groups based on a condition that is given.
You can use the WHERE Clause without the GROUP BY Clause.	The HAVING Clause is ineffective without the GROUP BY Clause.
The WHERE Clause is used in row operations.	The HAVING Clause is used to implement column operations.
The WHERE clause can be used in conjunction with the SELECT, UPDATE, and DELETE statements.	Only the SELECT statement can employ the HAVING Clause.
The aggregate function cannot be used in the WHERE Clause.	The HAVING Clause is capable of containing aggregate functions.
With single-row functions such as UPPER, LOWER, and so on, the WHERE Clause is used.	With multiple-row functions like SUM, COUNT, and others, the HAVING Clause is employed.

53. Write a query in SQL to find the details of an employee having the nth highest salary from a given table Employee. The value of n needs to be taken as user input. Assume that the table Employee has the following schema.

name - denoting the name of the employee
salary - denoting the salary of the employee

Approach:

We use the dense_rank() function to display the details of the employee having the nth highest salary. The function DENSE_RANK returns the rank of a row in an ordered collection of rows as a NUMBER. The ranks are in ascending order, starting with 1. Based on the values of the value exprs in the order by clause, DENSE RANK computes the rank of each row returned from a query in relation to the other rows as an analytic function.

Query:

```
select name, salary from(
select name, salary, dense_rank()
over(order by salary desc)input from Employee)
where input = &n;
```

Explanation:

In the above query, we first sort the data according to the descending order of the salary and assign a rank to each of the employees starting from 1. In case of an event where the salary of two employees is the same, they both are assigned the same rank. Then we display the data whose rank is equal to the given input