What is σ?

1

What is π?

2

What is δ?

3

What is $\times$?

4

What is $\bowtie$?

5

What is ρ?

6

What are the three layers of DBMS abstraction?

7

Name three DBMS interface languages

8

The selection operator (selects rows).

1

The projection operator (selects columns).

2

The distinct operator (makes sure no rows are repeated).

3

The product operator (produces all permutations of the rows of two tables).

4

The join operator (natural or otherwise, it joins two tables together based on a column).

5

The rename operator (renames column names).

6

Physical, logical and view

7

- *DDL: Data Definition Language*
- *DML: Data Manipulation Language*
- *DQL: Data Query Language*

8

To select the age column from the people table without duplicates you would do:

```
SELECT                  FROM       ;
```

9

To select all the columns of people who are above 50 you would do:

```
SELECT * FROM        WHERE          ;
```

10

To select all the columns of people who are between 20 and 40 you would do:

```
SELECT * FROM        WHERE
                                    ;
```

11

What are the three SQL set operations?

12

What is the SQL syntax to join 2 tables on a certain column name?

13

What is the SQL syntax for a natural join on 2 tables?

14

What is the SQL syntax for renaming tables?

15

What is the SQL syntax for sorting rows by a column value

16

To select all the columns of people who are above 50 you would do:

```
SELECT * FROM people WHERE age > 50;
```

10

To select the age column from the people table without duplicates you would do:

```
SELECT DISTINCT age FROM people;
```

9

UNION, EXCEPT & INTERSECT

12

To select all the columns of people who are between 20 and 40 you would do:

```
SELECT * FROM people WHERE age BETWEEN 20
AND 40;
```

11

```
SELECT *
FROM table1 NATURAL JOIN table2;
```

14

```
SELECT *
FROM table1 JOIN table2
USING (<column-name>);
```

13

```
SELECT *
FROM table1
GROUP BY <column-name>;
```

16

```
SELECT *
FROM table1 as a, table2 as b
WHERE a.col > b.col;
```

15

To select the average salary from the workers table you do:

```
SELECT AVG(salary) FROM workers
```

17

To select the number of distinct salaries from the workers table you do:

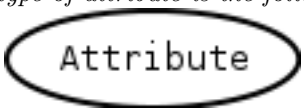
```
SELECT COUNT(DISTINCT salary) FROM workers
```

18

What are the three main constructs in ER modelling?

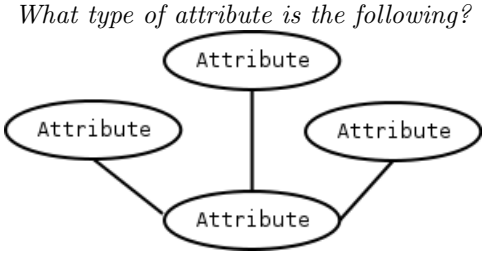
19

What type of attribute is the following?



20

What type of attribute is the following?

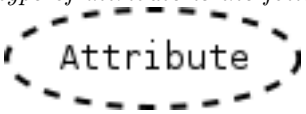


21

What type of attribute is the following?

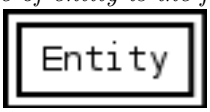
22

What type of attribute is the following?



23

What type of entity is the following?



24

To select the number of distinct salaries from the workers table you do:
`SELECT COUNT(DISTINCT salary) FROM workers`

18

To select the average salary from the workers table you do:
`SELECT AVG(salary) FROM workers`

17

Simple attribute

Entity types, attribute types & relationship types.

20

19

Multi-valued attribute

Composite attribute

22

21

Weak entity

Derived attribute

24

23

Explain normalization

25

What does the normal form indicate?

26

What does 1NF mean?

27

The main technique we use to try and refine schema is .

28

What allows us to access one row of an SQL command at a time and iterate over the rows?

29

Triggers are constructs that react to certain conditions. They obey an *model.*

30

What is a transaction?

31

What happens if a transaction fails?

32

The quality level of the database schema

26

The process of decomposing unsatisfactory relations by creating smaller relations from them.

25

The main technique we use to try and refine schema is decomposition.

28

This is a relation in its first normal form, where every field contains only atomic values.

27

Triggers are constructs that react to certain conditions. They obey an event-condition-action model.

30

A cursor

29

The database is rolled back to it's most recent consistent state.

32

An action or series of actions carried out by the user that read or update the contents of the database.

31

What are a transactions four basic properties?

33

In terms of transaction, what does atomicity mean?

34

In terms of transaction, what does consistency mean?

35

In terms of transaction, what does isolation mean?

36

In terms of transaction, what does durability mean?

37

What is concurrency control?

38

When does a 'lost update problem' occur? How do you solve it?

39

When does an uncommitted dependency problem occur? How do you solve it?

40

1. *Atomicity*
2. *Consistency*
3. *Isolation*
4. *Durability*

33

A transaction must either complete all work or else it must be as if no partial work was ever done.

34

A transaction must transform databases from one consistent state to another.

35

Partial effects of incomplete transactions should not be visible to other transactions.

36

The effects of a committed transaction are permanent and must not be lost because of later failure.

37

The process of managing simultaneous operations on the database without allowing them to interfere with one another.

38

When a user's update overwrites another user's update. Mitigated by stopping concurrent operations from reading objects/tables while another operation is writing to it.

39

When one transaction can see the immediate results of another transaction before it has committed. Mitigate this by stopping reads from occurring on objects that haven't been committed.

40

When does an inconsistent analysis problem occur? How do you solve it?

41

What does serializability guarantee?

42

What is a schedule?

43

What is a serial schedule?

44

What is a non-serial schedule?

45

To make the database as efficient as possible we want to find as many [redacted] *schedules as we can so that we can get* [redacted] *computation.*

46

The two most basic control techniques are [redacted] *and* [redacted].

47

What is locking?

48

Sequences of execution that will ensure consistency

42

When a transaction A reads values that transaction B has updated during transaction A occurs. Mitigate this by stopping one transaction from reading while another is updating and vice versa

41

This is when reads and writes must be executed consecutively with no interleaving operations.

44

A set of reads and writes to the database by concurrent transactions.

43

To make the database as efficient as possible we want to find as many non-serial schedules as we can so that we can get parallel computation.

46

One where any operations can be interleaved?

45

This is when data items are locked to prevent other transactions from viewing or updating them.

48

The two most basic control techniques are locking and timestamping.

47

Transactions must obtain a [redacted] *lock on a data item when it wants to read.*

49

Transactions must obtain an [redacted] *lock when it wants to write.*

50

Locks are assigned using the [redacted] *protocol.*

51

The two phases in the two-phase-locking protocol are the [redacted] *phase and the* [redacted] *phase.*

52

What happens in the growing phase of the two-phase-locking protocol?

53

What happens in the shrinking phase of the two-phase-locking protocol?

54

How can cascading rollback be prevented?

55

What should happen if deadlock occurs?

56

Transactions must obtain an exclusive lock when it wants to write.

50

Transactions must obtain a shared lock on a data item when it wants to read.

49

The two phases in the two-phase-locking protocol are the growing phase and the shrinking phase.

52

Locks are assigned using the two-phase-locking protocol.

51

The transaction my release locks but cannot acquire them.

54

The transaction my acquire locks but cannot release them.

53

One or more of the transactions should be aborted and restarted.

56

By ensuring that locks are only released at the end of transactions.

55