2016

Q.Anomaly: Anomalies in DBMS An anomaly is a deviation from the norm, a glitch or an error that doesn't fit in with the rest of the pattern of the database.

A database anomaly is **a fault in a database that usually emerges as a result of shoddy planning and storing everything in a flat database**. In most cases, this is removed through the normalization procedure, which involves the joining and splitting of tables.

Q.Referential integrity constraints:

Foregin Key in a relation refrencing a Primary key in a relation

A foreign key constraint (also referred to as a referential constraint or a referential integrity constraint) is **a logical rule about values in one or more columns in one or more tables**. For example, a set of tables shares information about a corporation's suppliers.

Q.What is meant by transitive dependency?

A Transitive dependency in a database is **an indirect relationship between values in the same table that causes a functional dependency**. By nature, a transitive dependency requires three or more attributes. To achieve the normalization standard of Third Normal Form (3NF), any transitive dependency must be eliminated.

Q.What is hash table index?

Hash tables are **a type of data structure in which the address/ index value of the data element is generated from a hash function**. This enables very fast data access as the index value behaves as a key for the data value.

Q.What is 3 tier architecture?

Three-tier architecture is a well-established software application architecture that organizes applications into three logical and physical computing tiers: the presentation tier, or user interface; the application tier, where data is processed; and the data tier, where the data associated with the application is stored and managed.

Q.Difference b/t physical and logical independence. →

Logica Data Independence	Physical Data Independence
Logical Data Independence is mainly concerned with the structure or changing the data definition.	Mainly concerned with the storage of the data.
It is difficult as the retrieving of data is mainly dependent on the logical structure of data.	It is easy to retrieve.
Compared to Logic Physical independence it is difficult to achieve logical data independence.	Compared to Logical Independence it is easy to achieve physical data independence.
You need to make changes in the Application program if new fields are added or deleted from the database.	A change in the physical level usually does not need change at the Application program level.

Q.Integrity constraints:

Integrity Constraints are **the protocols that a table's data columns must follow**. These are used to restrict the types of information that can be entered into a table. This means that the data in the database is accurate and reliable. You may apply integrity Constraints at the column or table level.

Q.What is transaction?

A transaction can be defined as a group of tasks. A single task is the minimum processing unit which cannot be divided further.

Q.Purpose of data model:

Data models are a foundational element of software development and analytics. They **provide a standardized method for defining and formatting database contents consistently across systems, enabling different applications to share the same data**.

Q.Aggregation:

Aggregation refers to **the process by which entities are combined to form a single meaningful entity**. The specific entities are combined because they do not make sense on their own. To establish a single entity, aggregation creates a relationship that combines these entities.

Q.Degree vs Cardinality in relation:

- Degree of a Relationship : The number of participating entities in a relationship. This can be unary, binary, ternary, quaternary, etc
- Cardinality : The number of relationship instances an entity can participate in. Ex: 1:1, 1:Many, Many:N
- (Min,Max) notation : Minimum represents the participation constraints while Maximum stands for the cardinality ratio.
- Degree of a relation : Number of columns(attributes) in a relation(table).

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Q.Repository:

database repository is a logical, but also sometimes physical grouping of data from related but separate databases.

This is usually done when there is a 'higher purpose' for the data, but the data items needed to do this reside on different databases. In these cases, a repository is necessary to bring together the discrete data items and operate on them as one.

Q.Exclusive locks:

When a statement modifies data, its transaction holds an exclusive lock on data that prevents other transactions from accessing the data. This lock remains in place until the transaction holding the lock issues a commit or rollback. Table-level locking lowers concurrency in a multi-user system.

Q.Term “view” in SQL:

A view is **a subset of a database that is generated from a user query and gets stored as a permanent object**. In a structured query language (SQL) database, for example, a view becomes a type of virtual table with filtered rows and columns that mimic those of the original database.

Q.Entity integrity vs referential integrity:

Q.Hashed file organization:

Hashed file organisation is **also called a direct file organisation**. In this method, for storing the records a hash function is calculated, which provides the address of the block to store the record. Any type of mathematical function can be used as a hash function. It can be simple or complex.

Q.Data warehouse:

A data warehouse is **a central repository of information that can be analyzed to make more informed decisions**. Data flows into a data warehouse from transactional systems, relational databases, and other sources, typically on a regular cadence.

Q.Homogeneous vs heterogeneous databases:

Homogeneous database	Heterogeneous database
• All sites use the same DBMS product.	• Sites may have different products with a different underlying model, such as network, relational, or object-oriented.
• Homogeneous systems are easier to design and can be managed in a simple manner.	• In heterogeneous systems, individual sites may have different databases and so translations are required before two databases can communicate.
• It allows incremental growth and also improved performance due to the parallel execution of query processing.	• Incremental growth may be difficult and a new site may have different hardware and different DBMS products.
• Database schema is same on all databases.	• A common conceptual schema has to be formed, integrating all local conceptual schemas.

Q.Referential integrity constraints:

Referential integrity (or foreign key) constraints. A foreign key constraint (also referred to as a referential constraint or a referential integrity constraint) is **a logical rule about values in one or more columns in one or more tables**. For example, a set of tables shares information about a corporation's suppliers.

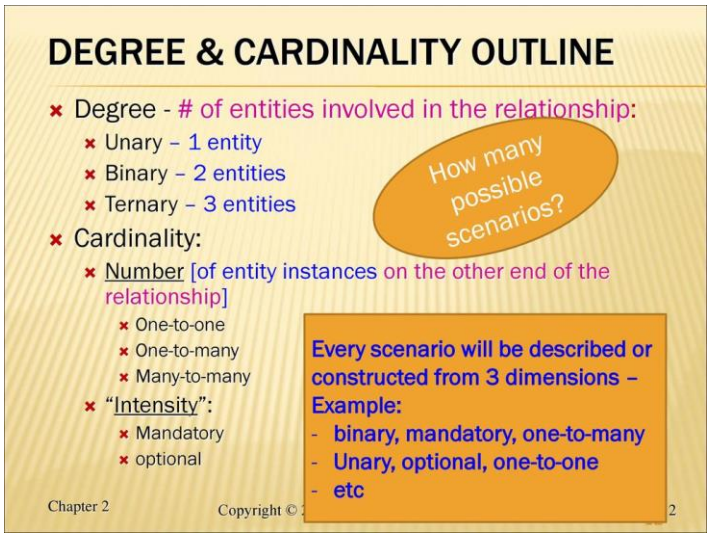
Q.Disjointness constraints:

The disjoint constraint only applies when a superclass has more than one subclass. If the subclasses are disjoint, then an entity occurrence can be a member of only one of the subclasses, e.g. postgrads or undergrads â€“ you cannot be both.

Q.Entity cluster:

Entity cluster is **a temporary entity which is not real because it is not used in final ERD**. It is a virtual entity which gives benefit to present the multiple entities and relationship in the ERD. An entity cluster is used to combine the multiple entities and relationship which relate each other into a single entity.

Q.Degree vs cardinality in relation:



The **degree** of a relation is the number of attributes it contains. The **cardinality** of a relation is the number of tuples it contains. A relational database is a collection of normalized relations with distinct relation names.

Q.RDBMS:

The software used to store, manage, query, and retrieve data stored in a relational database is called a **relational database management system** (RDBMS). The RDBMS provides an interface between users and applications and the database, as well as administrative functions for managing data storage, access, and performance.

Q.DBMS:

A database management system (DBMS) is a software package designed to store, retrieve, query and manage data. User interfaces (UIs) allows data to be created, read, updated and deleted by authorized entities.

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DBMS	**RDBMS**
DBMS stores data as file.	RDBMS stores data in tabular form.
Data elements need to access individually.	Multiple data elements can be accessed at the same time.
No relationship between data.	Data is stored in the form of tables which are related to each other.
Normalization is not present.	Normalization is present.
DBMS does not support distributed database.	RDBMS supports distributed database.
It stores data in either a navigational or hierarchical form.	It uses a tabular structure where the headers are the column names, and the rows contain corresponding values.
It deals with small quantity of data.	It deals with large amount of data.
Data redundancy is common in this model.	Keys and indexes do not allow Data redundancy.
It is used for small organization and deal with small data.	It is used to handle large amount of data.
It supports single user.	It supports multiple users.
Data fetching is slower for the large amount of data.	Data fetching is fast because of relational approach.
The data in a DBMS is subject to low security levels with regards to data manipulation.	There exists multiple levels of data security in a RDBMS.
Low software and hardware necessities.	Higher software and hardware necessities.
Examples: XML, Window Registry, etc.	Examples: MySQL, PostgreSQL, SQL Server, Oracle, Microsoft Access etc.

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Q.Subtype vs Supertype :

- A supertype is a generic entity type that has relationship with one or more subtypes.
- A subtype is sub-grouping of entities in any entity that is meaningful to any organization and that shares common attributes or relationships distinct from other subgroups.
- Subtype inherit all supertype attributes.
- Subtypes have attributes that are different from other subtypes.

At times, few entities in a data model may share some common properties (attributes) within themselves apart from having one or more distinct attributes. Based on the attributes, these entities are categorized as Supertype and Subtype entities.

Supertype is an entity type that has got relationship (parent to child relationship) with one or more subtypes and it contains attributes that are common to its subtypes.

Subtypes are subgroups of the supertype entity and have unique attributes, but they will be different from each subtype.

Supertypes and Subtypes are parent and child entities respectively and the primary keys of supertype and subtype are always identical.

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Q.Basic initialization parameters:

- Basic Initialization Parameters.
- CLUSTER_DATABASE.
- CONTROL_FILES.
- DB_BLOCK_SIZE.
- DB_CREATE_FILE_DEST.
- DB_DOMAIN.
- DB_NAME.
- DB_RECOVERY_FILE_DEST.

Q.Advanced initialization parameters:

Initialization parameters are **stored in an initialization parameter file and can be applied to all database instances on a server**. Parameters that affect system performance involve cursor sharing, the policy that determines work area size, the number of concurrent processes, and memory area sizes.

Q.Tablespace architecture:

A table space is **a storage structure containing tables, indexes, large objects, and long data**. They are used to organize data in a database into logical storage groupings that relate to where data is stored on a system. Table spaces are stored in database partition groups.

Q.Tablespace types:

Oracle Tablespaces

Data Type			Data Size	
Permanent tablespace	**Temporary tablespace**	**Undo tablespace**	**Big File tablespace**	**Small File tablespace**
Stores schema objects which remain after the session/transaction end.	Stores schema objects existing for the session / transaction duration only	Manages data used for roll-back transactions in automatic undo management mode.	Stores large data amounts.	The Oracle's default tablespace type.
Stores objects in datafiles.	Stores objects in temp files.	Stores data permanently.	Consists of one single file (datafile or tempfile).	Can contain multiple datafiles (up to 1022).
			Min file size is 7 Mb (8K blocks) and 12 Mb (32K blocks).	One datafile can include up to 222 data blocks.
			Max file size is 32 TB (8K blocks) and 128 TB (32K blocks).	Is perfect for almost all Oracle tables and indexes.

A table space is **a storage structure containing tables, indexes, large objects, and long data**. They are used to organize data in a database into logical storage groupings that relate to where data is stored on a system. Table spaces are stored in database partition groups.

Q.Optimal Flexible Architecture:

The Optimal Flexible Architecture standard **helps you to organize database software and configure databases to allow multiple databases, of different versions, owned by different users to coexist**.

Q.Oracle installation:

1. Go to Oracle Database Software Downloads in your browser.
2. Download the 64-bit .zip file. Select the.zip file and right click to select **Extract All**. Extract both the .zip files to the same folder.

Don't extract the archive using unzip command, which may result in an unsuccessful run of the setup.exe.

3. Run the setup.exe and select the installation options according to your database and Windows user requirements.
4. In the **Specify Database Identifiers** screen of the installation process, enter the Global database name (for example, amc2) and the Oracle system identifier, SID (for example, amc2). Don't select the check box for the option **Create as Container database**. The Install button gets enabled.
5. Click **Install** to install the product.

Oracle Database is installed on Windows.

6. Start the SQL Plus application. From the command-line, enter the command SQLPLUS to start SQL Plus.

From Windows **Start**, click **Programs**, Oracle-*OraHomeName*, **Application Development**, and **SQL Plus**.

Q.SYSTEM Tablespaces:

The system tablespace is the storage area for the InnoDB data dictionary, the doublewrite buffer, the change buffer, and undo logs. It may also contain table and index data if tables are created in the system tablespace rather than file-per-table tablespaces.

The system tablespace can have one or more data files. By default, a single system tablespace data file, named ibdata1, is created in the data directory.

Q.Data files:

Data files **contain data and objects such as tables, indexes, stored procedures, and views**. Log files contain the information that is required to recover all transactions in the database.

Q.Redo Log Files:

The most crucial structure for recovery operations is the redo log, which consists of **two or more preallocated files that store all changes made to the database as they occur**. Every instance of an Oracle Database has an associated redo log to protect the database in case of an instance failure.

Q.Control files:

A control file tracks the physical components of the database. It is the root file that the database uses to find all the other files used by the database. Because of the importance of the control file, Oracle recommends that the control file be **multiplexed**, or have multiple identical copies. For databases created with Oracle Database Configuration Assistant (DBCA), two copies of the control file are automatically created and kept synchronized with each other.

Every Oracle database has a **control file**. A control file is a small binary file that records the physical structure of the database and includes:

- The database name
- Names and locations of associated datafiles and online redo log files
- The timestamp of the database creation
- The current log sequence number
- Checkpoint information

The control file must be available for writing by the Oracle database server whenever the database is open. Without the control file, the database cannot be mounted and recovery is difficult.

Q.Archived log files:

The archive log files are **included in database backups and are used for roll-forward recovery of the database to the current point-in-time**. All logs since the last full database backup must be available to the restore function. These log files are stored in the archive log.

Q.Logical backups:

A logical backup **copies data, but not physical files, from one location to another**. A logical backup is used to move or archive a database, tables, or schemas and to verify database structures.

Q.Physical backups:

Physical backups are **copies of physical database files**. For example, a physical backup might copy database content from a local disk drive to another secure location. A physical backup can be hot or cold: Hot backup—Users can modify the database during a hot backup.

Q.Offline backups:

A cold backup, also called an offline backup, is **a database backup during which the database is offline and not accessible to update**. This is the safest way to back up because it avoids the risk of copying data that may be in the process of being updated.

Q.Oracle managed files:

Oracle Managed Files (OMF) **directly manages file creation and deletion at the operating system level**. Operations are specified in terms of database objects rather than filenames.