**Lab 8 Submittal**

Project one: Creating and Populating a DB Table

Step 1: Creating a Tables

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First we needed to create the craftStore and craftRegion tables and then craftShopItems as the craftShopItems had craftStoreID as the foreign key.

Step 2: Populate the tables.

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Populating the craftStore

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Populating the craftRegion Table

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Populating the craftShopItems Table

Step 3 & 4: Performing each queries on the Table and attaching their respective snapshots.

Query 1: Return the records containing Crafts for Kids as craftVendor.

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Query 2: Return the records of craftStores that are not located in the state of Michigan.

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Query 3: Return the records of craftRegions that are west of the Mississippi river.

**A close-up of a computer screen

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Query 4: Return the records of **craftShopItems** that are not vended by Toys Deluxe.

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Project 2: Creating the View

Step 1: Create the views. & Step 2 & Step 3: Listing and pasting snapshots

(a)

Toys Deluxe

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Dollies

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A screenshot of a computer

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Kids

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A screenshot of a computer

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Artiste

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A screenshot of a computer

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Yarn

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(b)

Regions:

New England

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A screenshot of a computer

Description automatically generated

Mid Atlantic

A screenshot of a computer

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A screenshot of a computer

Description automatically generated

East North Central

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

West North Central

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

South Atlantic

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

East South Central

A screenshot of a computer

Description automatically generated

A blue and white stripes

Description automatically generated

West South Central

A screenshot of a computer

Description automatically generated

A close-up of a computer screen

Description automatically generated

Mountain

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

Pacific

A screenshot of a computer

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Project 3: Creation of Sequence.

Step 1: Create the Sequence

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Step 2: Use The Sequence

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Step 3: Determine the current value of the sequence.

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Project 4: Creation of an Index

Step 1: Create an Index on a Single Column.

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Step 2: Use the Index on Two Columns

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Step 3: Snapshots of all Indexes

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Project 5: Creation of a Synonym

Step 1: Create the Synonym

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Step 2: Use the Synonym

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Description automatically generated

**Alternate Query for above:**

As we don’t have the necessary privileges, we cannot create the synonyms. However we can achieve the result by just running the normal select query.

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Project 6: Creation of Trigger

Step 1: Create the Trigger

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Step 2: Use the Trigger

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Project 7: Answer the following questions.

Step 1:

(a)

As a database grows and its tables fill with many entries, adding more database objects such as views, sequences, indexes, and synonyms may be quite beneficial for organizing and retrieving data.

Views: By presenting portions of data from tables, views streamline complicated searches and guarantee consistent data presentation, all while providing streamlined data access. By restricting access to particular data, they improve database security and strengthen security.

Sequences: Sequences provide distinct, increasing values for records by automating the creation of IDs. By preallocating blocks of data, they improve speed by minimizing conflict during ID queries.

Indexes: By establishing an ordered structure for quicker row lookups, indexes speed up data retrieval. Indexes minimize the amount of data scanned in order to maximize query performance as data volume grows.

Synonyms: Synonyms improve code readability and streamline searches by offering user-friendly, alternate names for database objects. They disentangle dependencies so that modifications to the database schema may be made without impacting scripts or programs that use synonyms.

(b)

Database profiles are essential for resource allocation, user access management, and security measure enforcement. For database users, they should be made for a number of reasons:

Resource Management: Profiles assist in allocating CPU, memory, and I/O limits—as well as other database resources—for various user groups or individuals. By doing this, it is impossible for one user to monopolize system resources, guaranteeing equitable distribution and peak performance for everyone.

Security and Access Control: By imposing restrictions on user sessions, they enable administrators to implement security rules. This involves preventing unwanted operations from occurring and restricting access to particular tables, schemas, or functionality in order to improve overall database security. Control and Customization: Profiles allow experiences for users to be tailored to their requirements or responsibilities. They can, for instance, impose session timeouts, password rules, or settings unique to certain user groups.

Performance Optimization: Database administrators (DBAs) may fine-tune characteristics such as query execution time, parallelism, or resource consumption thresholds for certain user types by specifying particular parameters in profiles.

Users are allocated profiles according to their jobs, responsibilities, and access needs. They maintain an organized and regulated environment inside the database, adjusting performance, security, and resource use to meet the demands of different user groups or people.

(c)

A view's capacity to update a table is dependent on a number of variables, mostly the view's design.

Updatable Views: If a view is deemed updatable, then newly added records via it have the ability to change the underlying table. A view that permits changes (insert, update, and delete) to the underlying table or tables via the view is called an updatable view. Not every viewpoint, though, can be updated automatically.

A view needs to fulfill certain requirements in order to be updatable:

Only one base table may be referenced by the view.

The columns in the base table that are being changed in the view must match those columns exactly.

Certain query constructs, like as aggregate functions, GROUP BY, DISTINCT, etc., must not be included in the view.

Data Transformation Statements with Views: The SQL standard states that there is a cap on the quantity of data manipulation statements that may be used in conjunction with views. In general, INSERT, UPDATE, and DELETE statements can be used to alter a single table view (simple view) that satisfies the requirements for updatability. However, the ability to change data through the view may be limited or prohibited when working with more complicated views or those that incorporate many tables*. (Ma & Wang, 2011)*

(d)

By explicitly designating the value to be used for the subsequent sequence value or by changing the sequence itself, a Database Administrator (DBA) can override the record value created by a sequence. This may be done by changing the sequence to a specified value or by modifying the current value of the sequence using SQL instructions.

An example for that can be:

CREATE SEQUENCE sequenceXYZ

START WITH 1

INCREMENT BY 1;

ALTER SEQUENCE sequenceXYZ RESTART WITH 100;

This command overrides the sequence's default incrementation and resets it to start producing values at 100.

Another way to achieve the same can be using the data insertion using the basic normal query.

(e)

Triggers serve different roles in database architecture depending on whether they are triggered before or after Data Manipulation Language (DML) activities.

BEFORE Triggers: Perfect for applying restrictions or verifying data before DML operations. They alter incoming data, stop illegal activity, or make ensuring prerequisites are satisfied before authorizing an operation.

AFTER Triggers: Suitable for post-DML operations such as updating derived data, preserving referential integrity, or recording modifications following the conclusion of the DML activity. beneficial for establishing uniformity between tables or conducting audits.

Performance effects are taken into account; response times may be impacted by pre-operation validations BEFORE triggers, whilst data consistency is ensured post-action AFTER triggers.

Depending on your needs, you may choose between BEFORE and AFTER triggers to manage activities post-operation, such as reporting changes or preserving data integrity, or to handle pre-action tasks like data transformation or validation.

Step 2: Further considerations for this Database Project

(a)

In order to handle issues that may arise during trigger execution, exception handling in triggers is essential. Typical exception handling methods used in triggers include the following:

Exception logging is the process of identifying exceptions inside of triggers and recording specific error messages or other relevant data into a log table or error handling system. This makes mistake analysis and troubleshooting easier.

Error Notification: Notifying administrators or other pertinent parties when exceptions arise from triggers. This guarantees that problems that might impair database operations receive quick attention.

Rollback Transactions: To preserve data consistency and integrity, handle exceptions by rolling back the transaction as necessary. This stops updates from being made that are inaccurate or incomplete.

Custom Error Handling: Applying certain procedures according to the kind of error that has been detected. To minimize the problem, one might attempt retrying the process, implementing alternate logic, or taking fallback actions. SQLERRM can be used to print the Exception using DBMS\_OUTPUT.PUT\_LINE().

User-Friendly Messages: Giving users or programs interacting with the database concise, understandable error messages that help them resolve problems brought on by exceptions connected to triggers.

Trigger exception management basically entails identifying mistakes, recording pertinent data, alerting stakeholders, preserving data consistency, and providing advice or other solutions to address problems that arise during trigger execution.

(b)

The "craftShopItems" table, which has columns for the craft ID, item name, seller, and store ID, identifies particular products in a craft shop. Similar information is contained in the "craftStore" database, which also provides shop and region IDs, locations, and cities for craft retailers. Furthermore, areas associated to crafts are defined by region IDs and descriptions in the "craftRegion" database.

Although the layout of these tables is conventional, a more thorough study necessitates knowing the details of each criteria and how they relate to one another. If linkages or dependencies between the tables aren't totally obvious from the information presented, then more standardization could be required. So, basically, we don’t require any more normalization here at moment.

(c)

The "craftID" field functions as the primary key in the "craftShopItems" database, automatically generating a unique index for effective identification and guaranteeing uniqueness within that column.

Similar to this, the "craftStoreID" serves as the primary key in the "craftStore" table, creating a distinct index that allows each row in the database to be uniquely identified.

Like in the other tables, the "craftRegionID" serves as the primary key in the "craftRegion" table, automatically generating a unique index.

When a primary key is defined on a column in a relational database, the column's unique index is automatically created, guaranteeing that every value is distinct and promoting quick data retrieval.

(d)

Yes, we can observe the time taken to execute the queries in the Oracle SQL Developer. The snapshot for the same is attached below.

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This was the time taken to execute a basic select query which is 149 milliseconds.