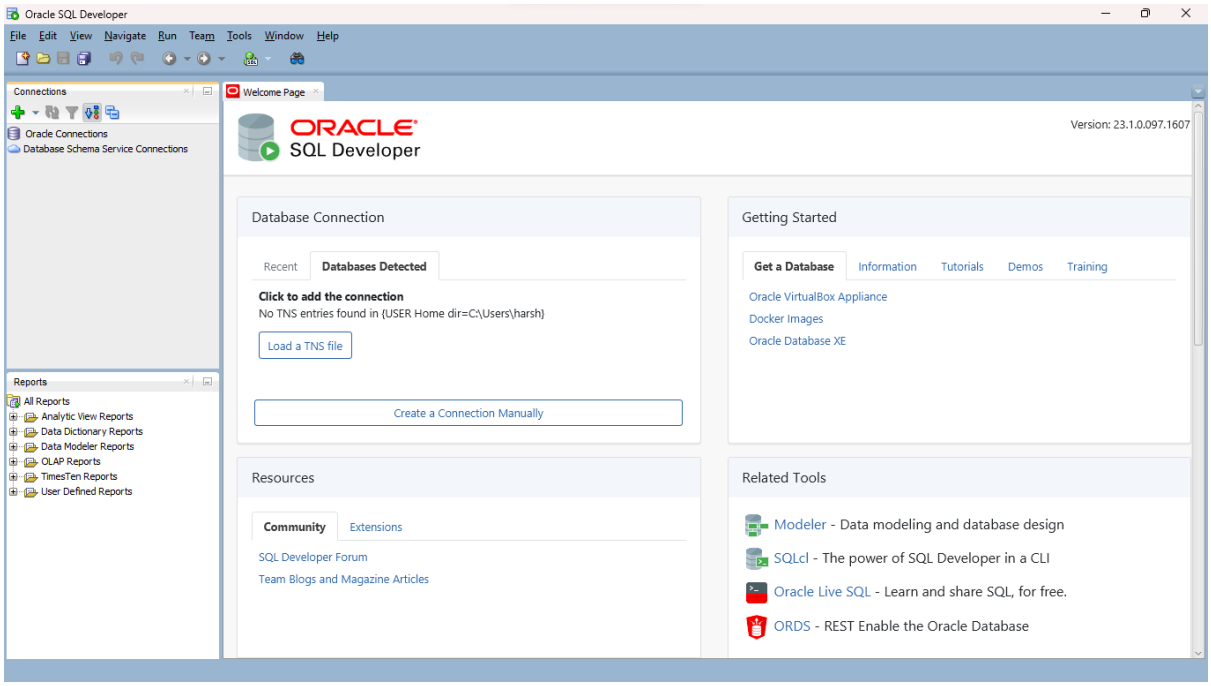
HARSHAL SAWANT
A20538827
Lab 2 ITMD 523 - 05

Lab 2 Submittal Document

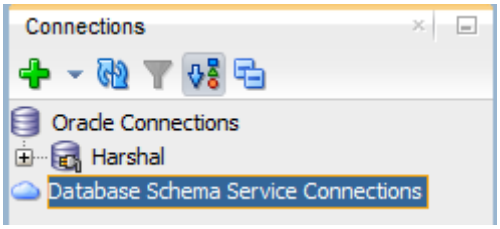
Project 1:

Step 1: Downloading and Setting up SQL Developer



SQL Developer Landing Page

Step 2: Connecting to Live Oracle server.



Connection Successful

The connection details are as follows:

Connection name: Harshal
Username: ora_hsawant1
Connection Type: Basic
Role: default
password: oracle
hostname: www.papademas.net
port: 1521

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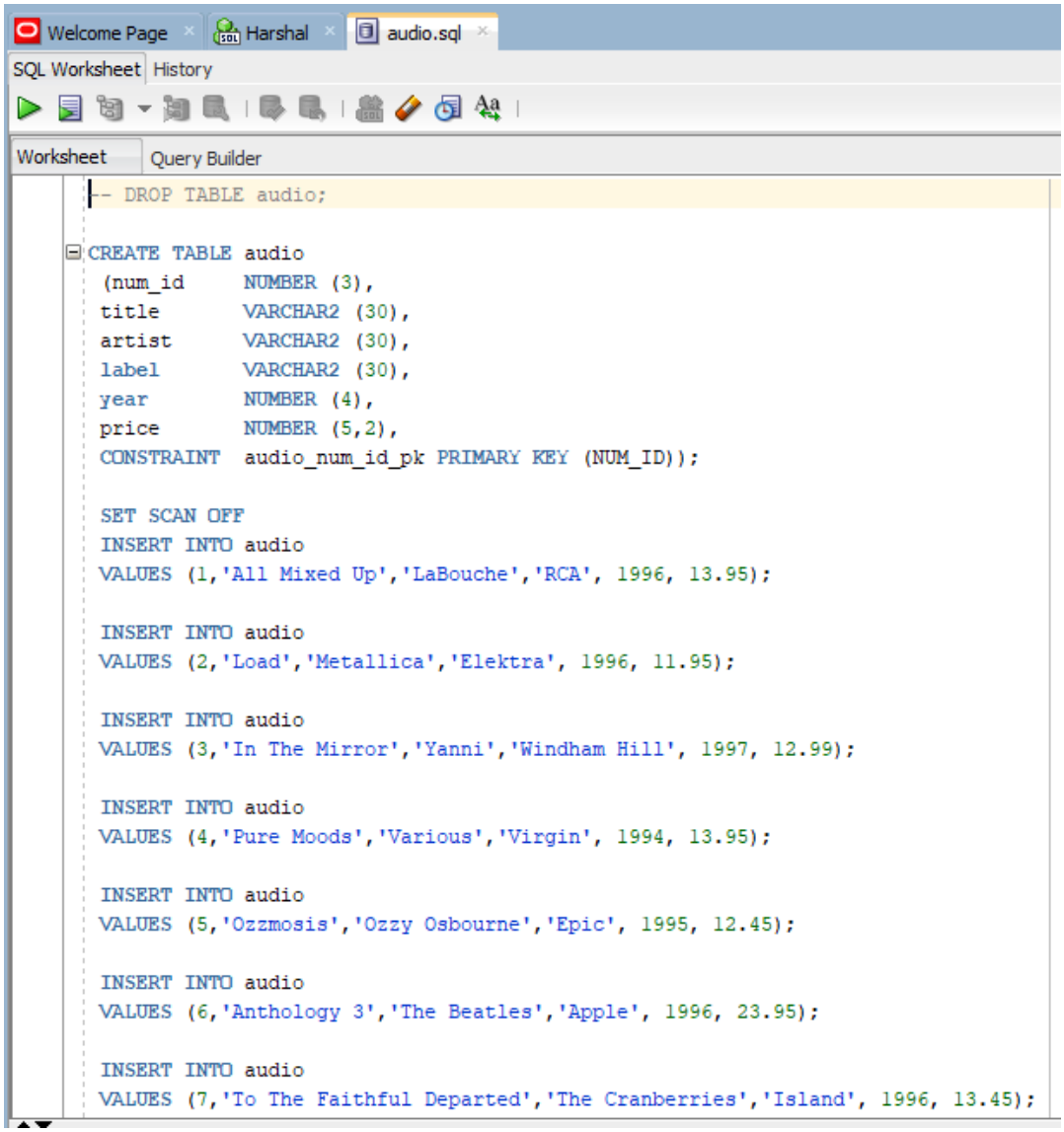
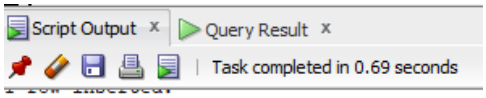
Project 2: Using Oracle to create a DB File

Step 1: Use SQL to create a Database Table

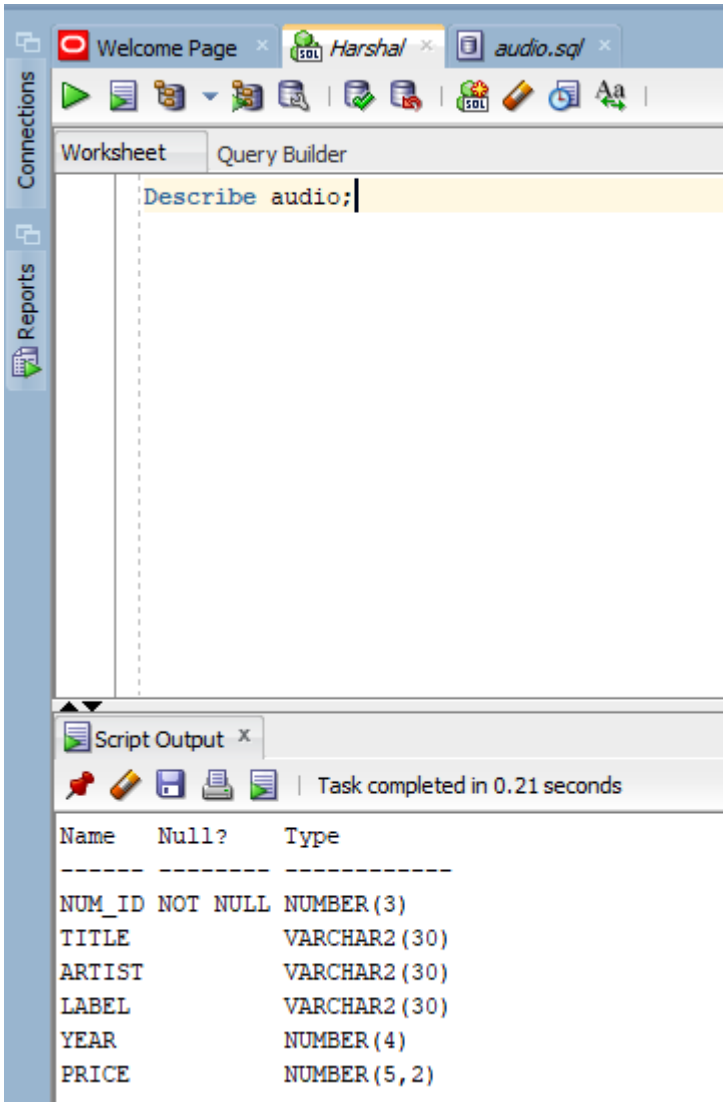
We opened the audio.sql file through the Oracle SQL Developer and ran the mentioned script, which resulted in the table being created.





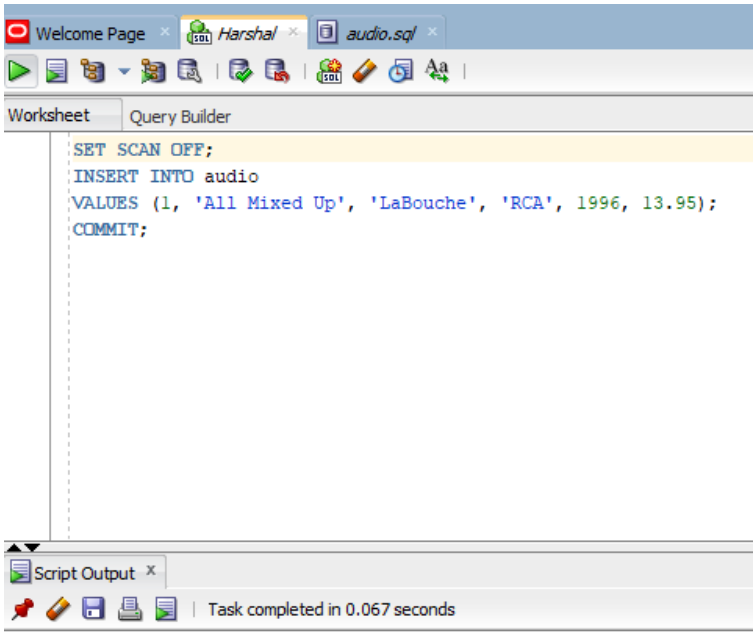

```
1 row inserted.

1 row inserted.

1 row inserted.

Commit complete.
```

Step 2: Use SQL to describe the table.



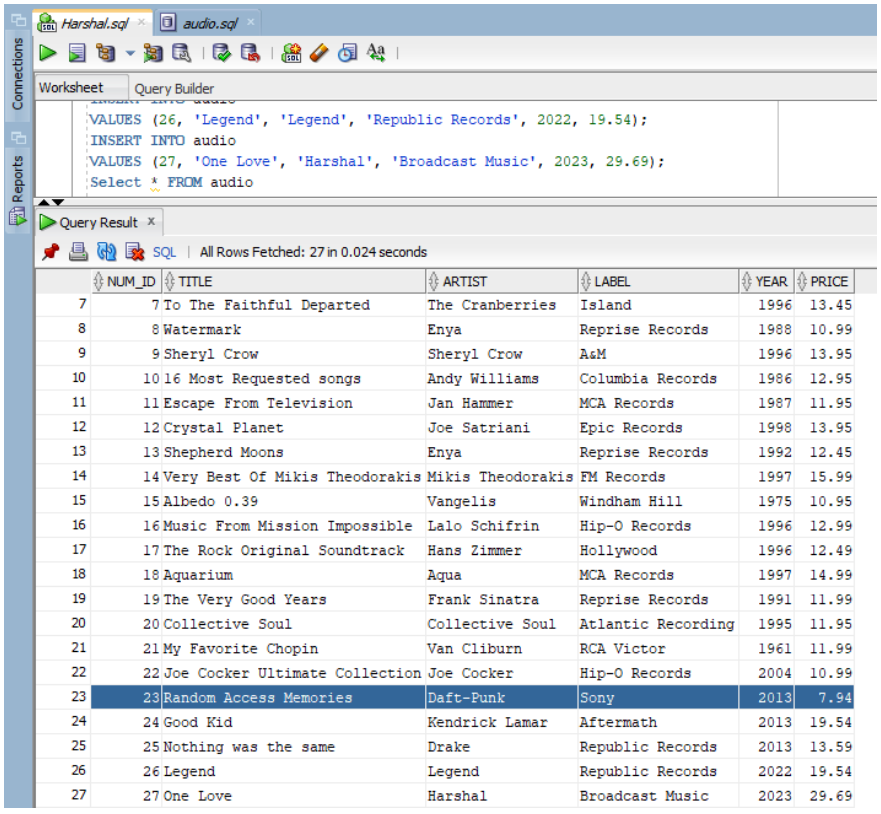
- Which field is described as "Not Null"?
  ➔ **NUM_ID**

Step 3: Populate the table from your datasheet information in the table.



The “COMMIT” command will save the inserted value in the database.

Step 4: Supplement Audio Table with Five additional records.



	NUM_ID	TITLE	ARTIST	LABEL	YEAR	PRICE
7	7	To The Faithful Departed	The Cranberries	Island	1996	13.45
8	8	Watermark	Enya	Reprise Records	1988	10.99
9	9	Sheryl Crow	Sheryl Crow	A&M	1996	13.95
10	10	16 Most Requested songs	Andy Williams	Columbia Records	1986	12.95
11	11	Escape From Television	Jan Hammer	MCA Records	1987	11.95
12	12	Crystal Planet	Joe Satriani	Epic Records	1998	13.95
13	13	Shepherd Moons	Enya	Reprise Records	1992	12.45
14	14	Very Best Of Mikis Theodorakis	Mikis Theodorakis	FM Records	1997	15.99
15	15	Albedo 0.39	Vangelis	Windham Hill	1975	10.95
16	16	Music From Mission Impossible	Lalo Schifrin	Hip-O Records	1996	12.99
17	17	The Rock Original Soundtrack	Hans Zimmer	Hollywood	1996	12.49
18	18	Aquarium	Aqua	MCA Records	1997	14.99
19	19	The Very Good Years	Frank Sinatra	Reprise Records	1991	11.99
20	20	Collective Soul	Collective Soul	Atlantic Recording	1995	11.95
21	21	My Favorite Chopin	Van Cliburn	RCA Victor	1961	11.99
22	22	Joe Cocker Ultimate Collection	Joe Cocker	Hip-O Records	2004	10.99
23	23	Random Access Memories	Daft-Punk	Sony	2013	7.94
24	24	Good Kid	Kendrick Lamar	Aftermath	2013	19.54
25	25	Nothing was the same	Drake	Republic Records	2013	13.59
26	26	Legend	Legend	Republic Records	2022	19.54
27	27	One Love	Harshal	Broadcast Music	2023	29.69

Here we have added 5 new records which can be seen from NUM_ID 23 to 27.

➔ The last record of NUM_ID 27 is the one with my name as the ARTIST.

Step 5: View the records in the table

```
Select * FROM audio
```

Query Result

SQL | All Rows Fetched: 27 in 0.024 seconds

	NUM_ID	TITLE	ARTIST	LABEL	YEAR	PRICE
7	7	To The Faithful Departed	The Cranberries	Island	1996	13.45
8	8	Watermark	Enya	Reprise Records	1988	10.99
9	9	Sheryl Crow	Sheryl Crow	A&M	1996	13.95
10	10	16 Most Requested songs	Andy Williams	Columbia Records	1986	12.95
11	11	Escape From Television	Jan Hammer	MCA Records	1987	11.95
12	12	Crystal Planet	Joe Satriani	Epic Records	1998	13.95
13	13	Shepherd Moons	Enya	Reprise Records	1992	12.45
14	14	Very Best Of Mikis Theodorakis	Mikis Theodorakis	FM Records	1997	15.99
15	15	Albedo 0.39	Vangelis	Windham Hill	1975	10.95
16	16	Music From Mission Impossible	Lalo Schifrin	Hip-O Records	1996	12.99
17	17	The Rock Original Soundtrack	Hans Zimmer	Hollywood	1996	12.49
18	18	Aquarium	Aqua	MCA Records	1997	14.99
19	19	The Very Good Years	Frank Sinatra	Reprise Records	1991	11.99
20	20	Collective Soul	Collective Soul	Atlantic Recording	1995	11.95
21	21	My Favorite Chopin	Van Cliburn	RCA Victor	1961	11.99
22	22	Joe Cocker Ultimate Collection	Joe Cocker	Hip-O Records	2004	10.99
23	23	Random Access Memories	Daft-Punk	Sony	2013	7.94
24	24	Good Kid	Kendrick Lamar	Aftermath	2013	19.54
25	25	Nothing was the same	Drake	Republic Records	2013	13.59
26	26	Legend	Legend	Republic Records	2022	19.54
27	27	One Love	Harshal	Broadcast Music	2023	29.69

Select * FROM audio – shows all the entries in the table

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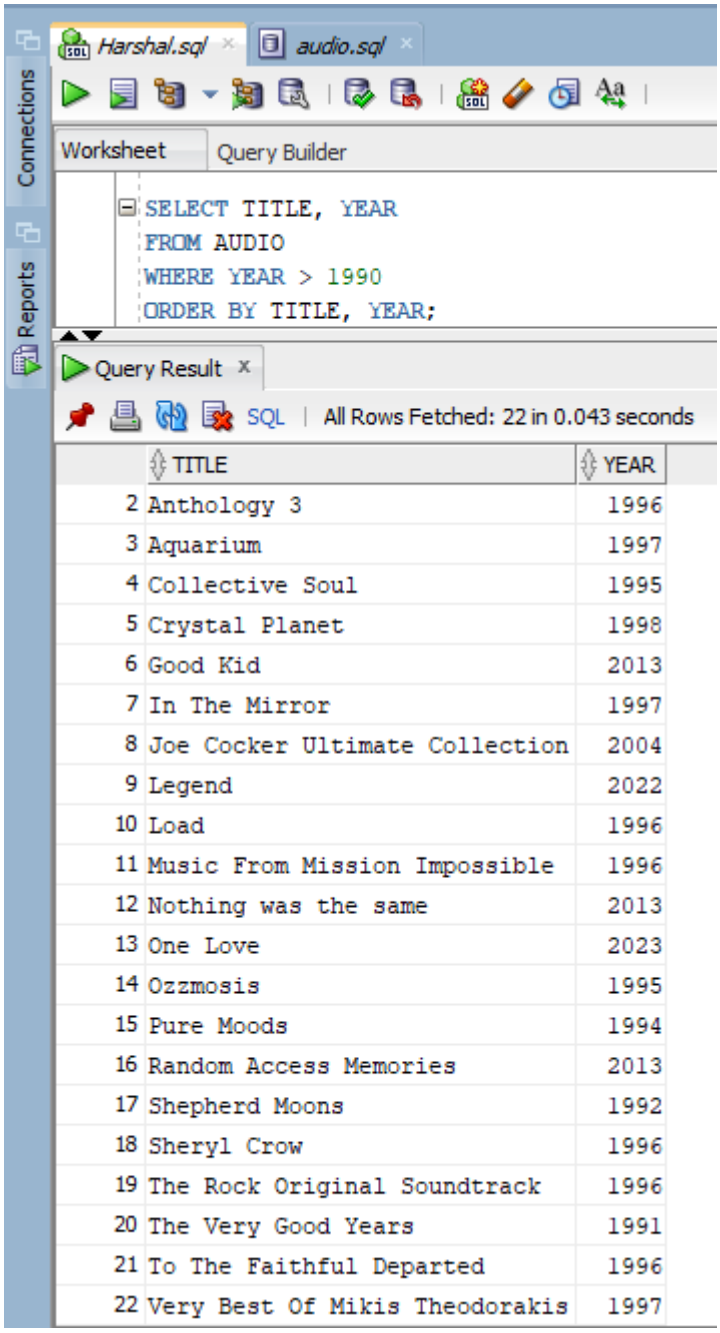
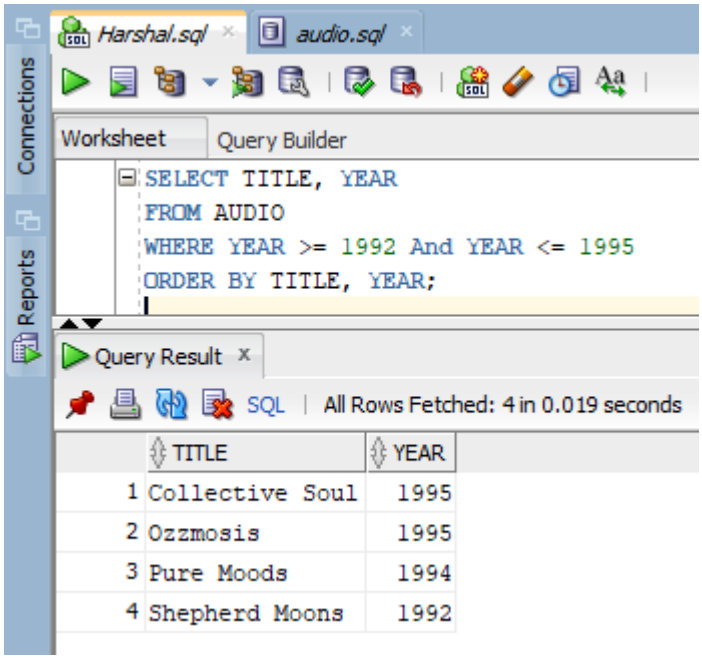
Project 3: Creating Queries using SQL

Step 1: create database query using SQL



	TITLE	YEAR
2	Anthology 3	1996
3	Aquarium	1997
4	Collective Soul	1995
5	Crystal Planet	1998
6	Good Kid	2013
7	In The Mirror	1997
8	Joe Cocker Ultimate Collection	2004
9	Legend	2022
10	Load	1996
11	Music From Mission Impossible	1996
12	Nothing was the same	2013
13	One Love	2023
14	Ozzmosis	1995
15	Pure Moods	1994
16	Random Access Memories	2013
17	Shepherd Moons	1992
18	Sheryl Crow	1996
19	The Rock Original Soundtrack	1996
20	The Very Good Years	1991
21	To The Faithful Departed	1996
22	Very Best Of Mikis Theodorakis	1997

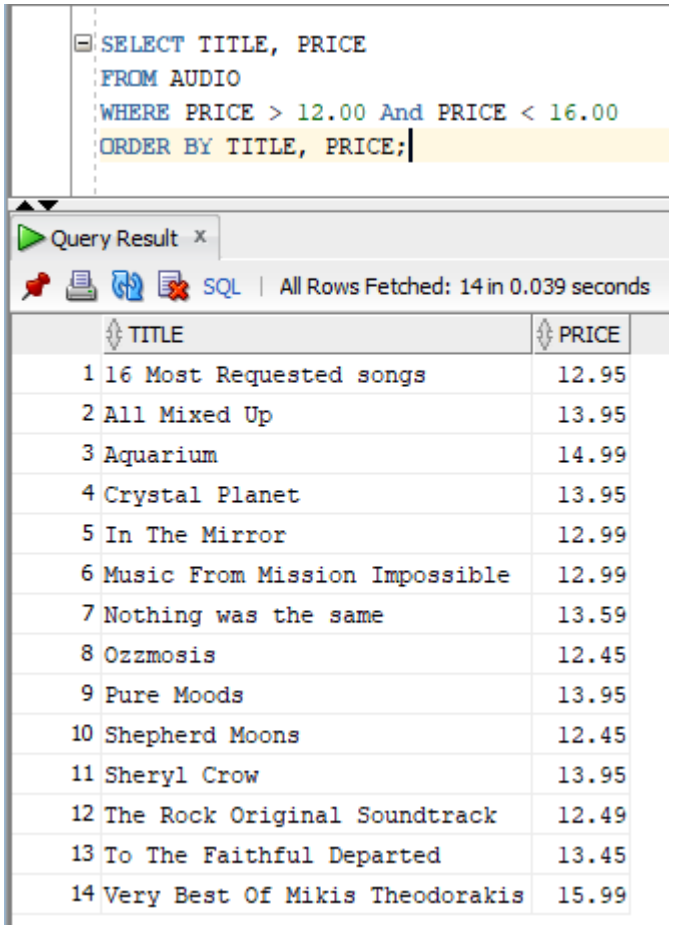
Step 2: Modify the SQL code



	TITLE	YEAR
1	Collective Soul	1995
2	Ozzmosis	1995
3	Pure Moods	1994
4	Shepherd Moons	1992

Step 3: Create Four New Queries in SQL

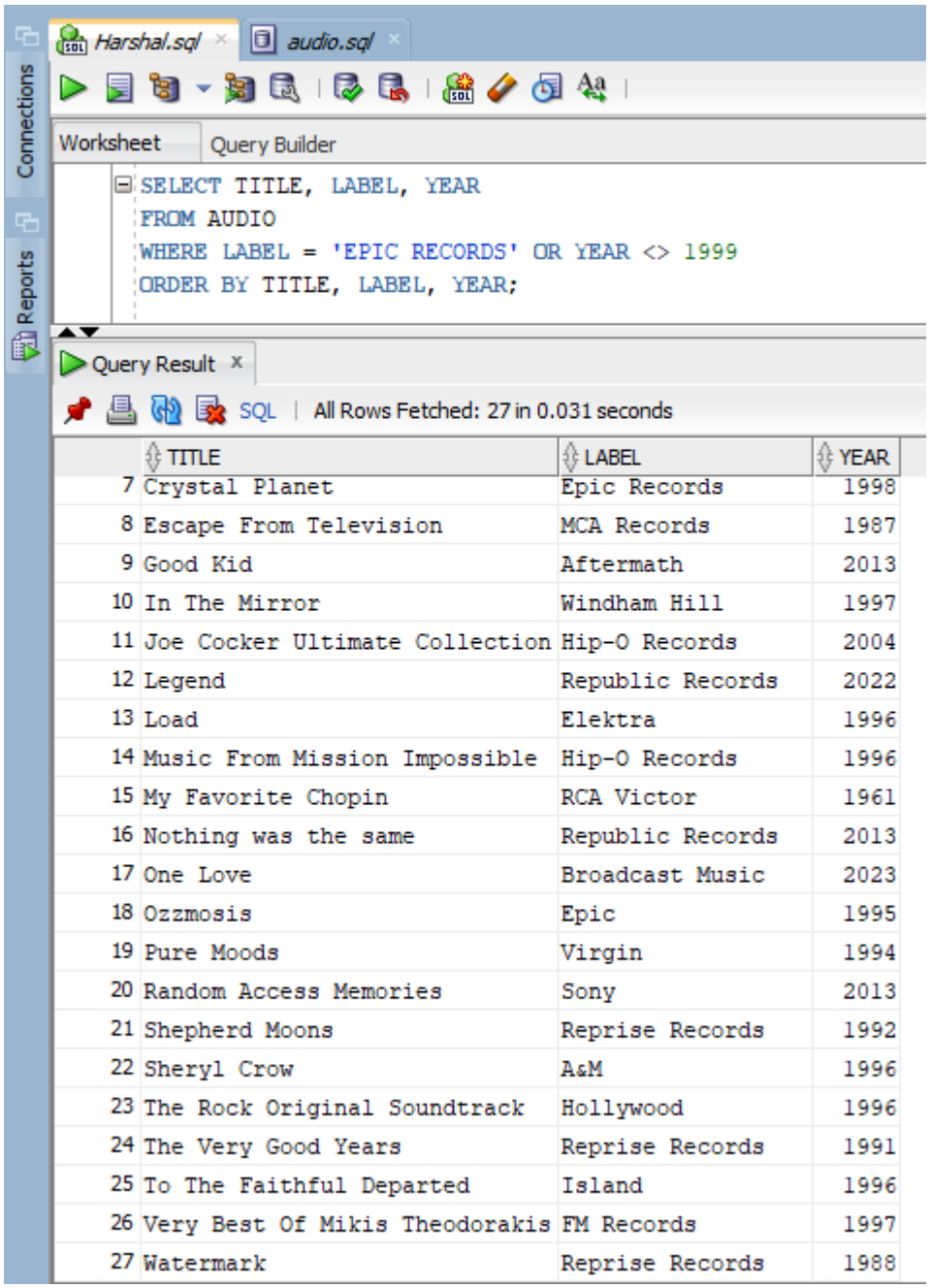
New Query 1:



	TITLE	PRICE
1	16 Most Requested songs	12.95
2	All Mixed Up	13.95
3	Aquarium	14.99
4	Crystal Planet	13.95
5	In The Mirror	12.99
6	Music From Mission Impossible	12.99
7	Nothing was the same	13.59
8	Ozzmosis	12.45
9	Pure Moods	13.95
10	Shepherd Moons	12.45
11	Sheryl Crow	13.95
12	The Rock Original Soundtrack	12.49
13	To The Faithful Departed	13.45
14	Very Best Of Mikis Theodorakis	15.99

I have displayed the PRICE field to be more specific about the price range.

New Query 2:



	TITLE	LABEL	YEAR
7	Crystal Planet	Epic Records	1998
8	Escape From Television	MCA Records	1987
9	Good Kid	Aftermath	2013
10	In The Mirror	Windham Hill	1997
11	Joe Cocker Ultimate Collection	Hip-O Records	2004
12	Legend	Republic Records	2022
13	Load	Elektra	1996
14	Music From Mission Impossible	Hip-O Records	1996
15	My Favorite Chopin	RCA Victor	1961
16	Nothing was the same	Republic Records	2013
17	One Love	Broadcast Music	2023
18	Ozzmosis	Epic	1995
19	Pure Moods	Virgin	1994
20	Random Access Memories	Sony	2013
21	Shepherd Moons	Reprise Records	1992
22	Sheryl Crow	A&M	1996
23	The Rock Original Soundtrack	Hollywood	1996
24	The Very Good Years	Reprise Records	1991
25	To The Faithful Departed	Island	1996
26	Very Best Of Mikis Theodorakis	FM Records	1997
27	Watermark	Reprise Records	1988

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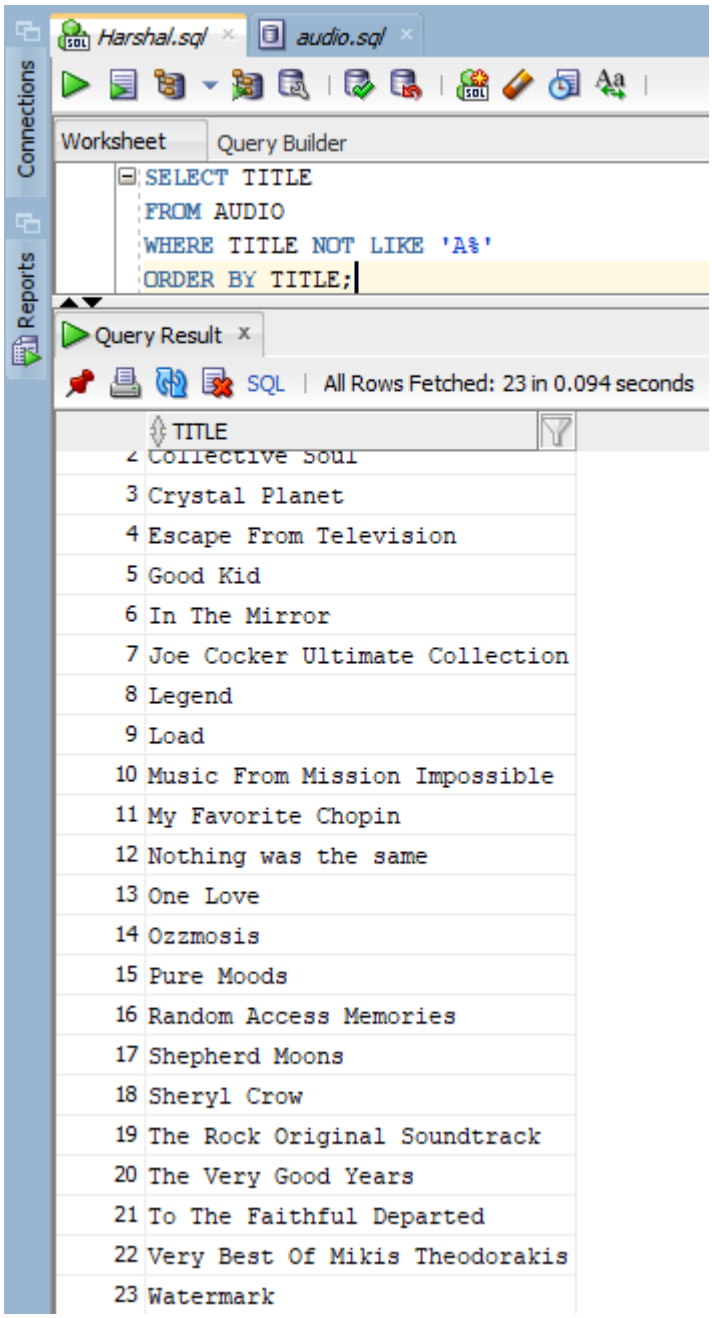
New Query 3:



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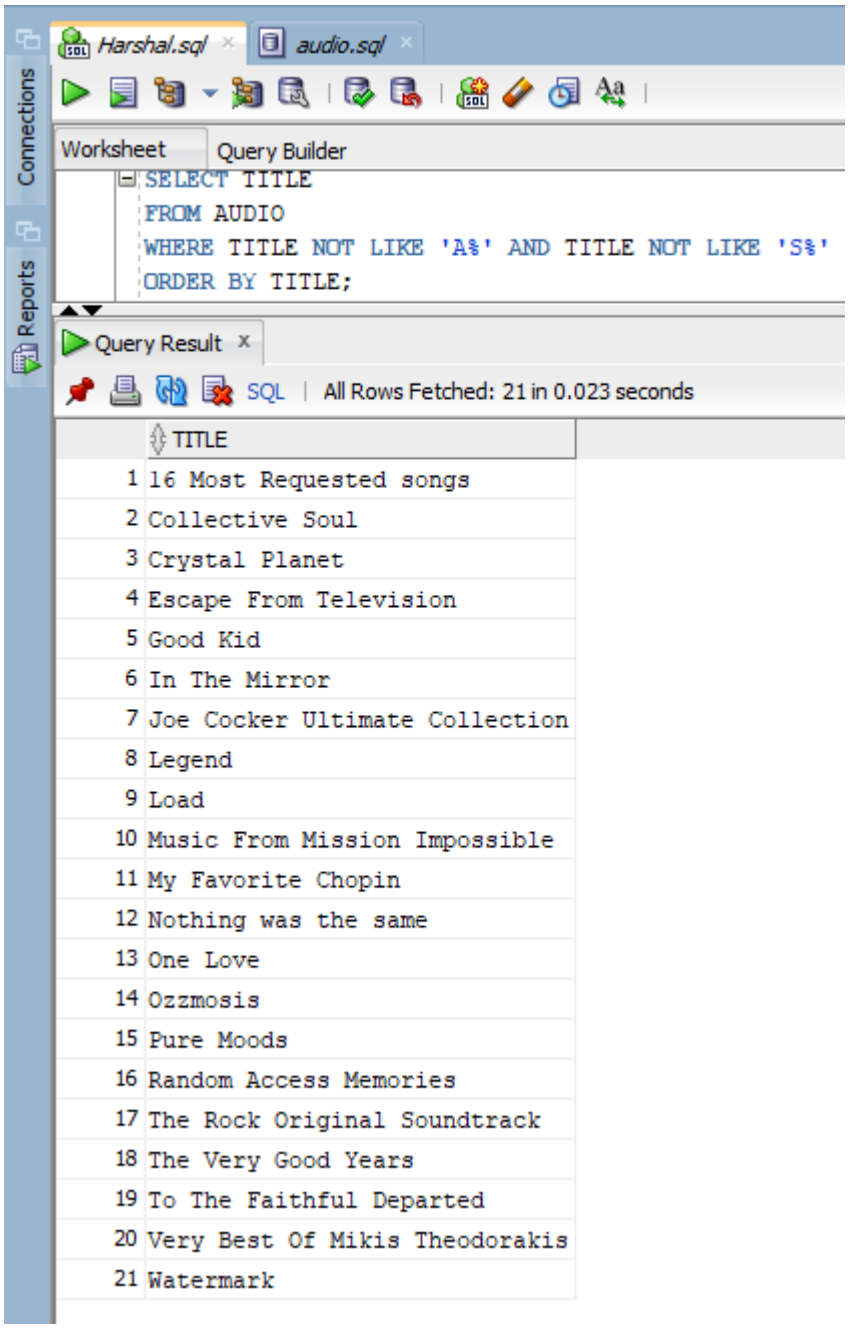
New Query 4:



	TITLE
1	16 Most Requested songs
2	Collective Soul
3	Crystal Planet
4	Escape From Television
5	Good Kid
6	In The Mirror
7	Joe Cocker Ultimate Collection
8	Legend
9	Load
10	Music From Mission Impossible
11	My Favorite Chopin
12	Nothing was the same
13	One Love
14	Ozzmosis
15	Pure Moods
16	Random Access Memories
17	The Rock Original Soundtrack
18	The Very Good Years
19	To The Faithful Departed
20	Very Best Of Mikis Theodorakis
21	Watermark

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Project 4: More Table Queries

Step 1: Create Database Query

```
SELECT TITLE, PRICE
FROM AUDIO
WHERE PRICE > 13.00
ORDER BY PRICE;
```

Query Result

SQL | All Rows Fetched: 12 in 0.025 seconds

	TITLE	PRICE
1	To The Faithful Departed	13.45
2	Nothing was the same	13.59
3	Pure Moods	13.95
4	Crystal Planet	13.95
5	Sheryl Crow	13.95
6	All Mixed Up	13.95
7	Aquarium	14.99
8	Very Best Of Mikis Theodorakis	15.99
9	Good Kid	19.54
10	Legend	19.54
11	Anthology 3	23.95
12	One Love	29.69

Step 2: Run the Next Database Query

```
SELECT TITLE
FROM AUDIO
WHERE TITLE LIKE 'S%';
```

Query Result

SQL | All Rows Fetched: 2 in 0.02 seconds

	TITLE
1	Sheryl Crow
2	Shepherd Moons

Step 3: Change to the SQL View

Displaying ARTISTS starting with letter M

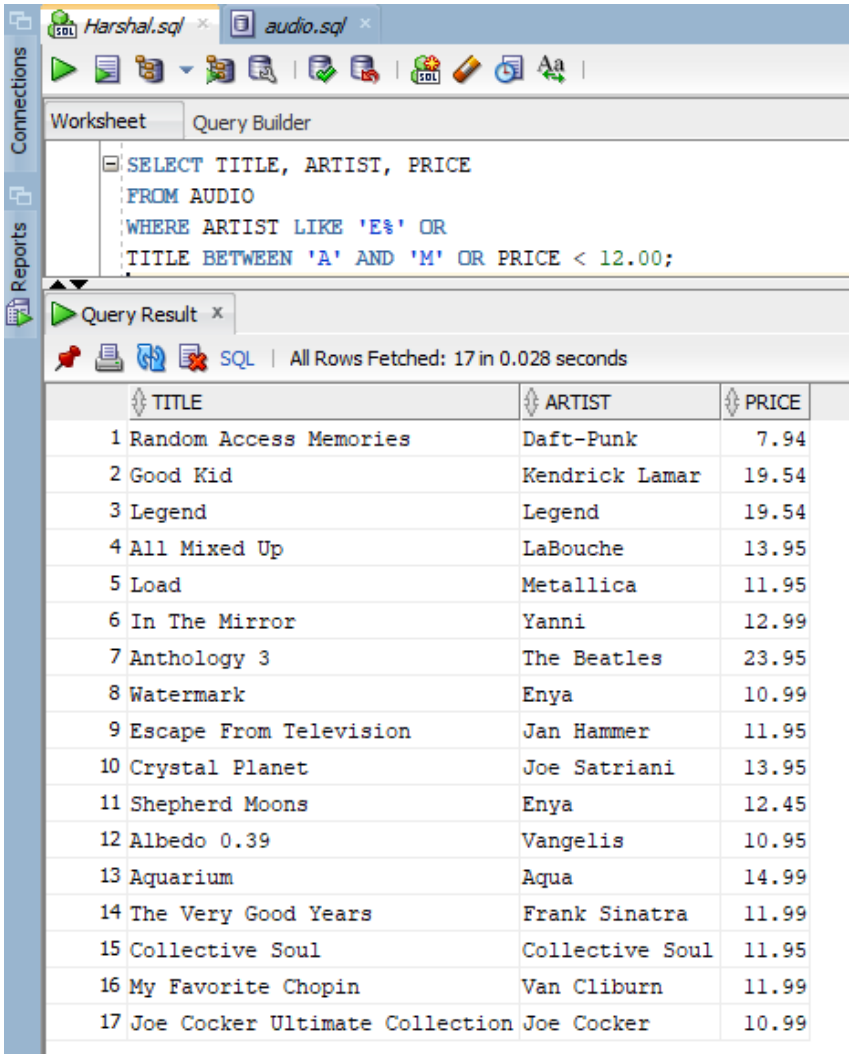
```
SELECT TITLE, ARTIST
FROM AUDIO
WHERE ARTIST LIKE 'M%';
```

Query Result

SQL | All Rows Fetched: 2 in 0.018 seconds

	TITLE	ARTIST
1	Load	Metallica
2	Very Best Of Mikis Theodorakis	Mikis Theodorakis

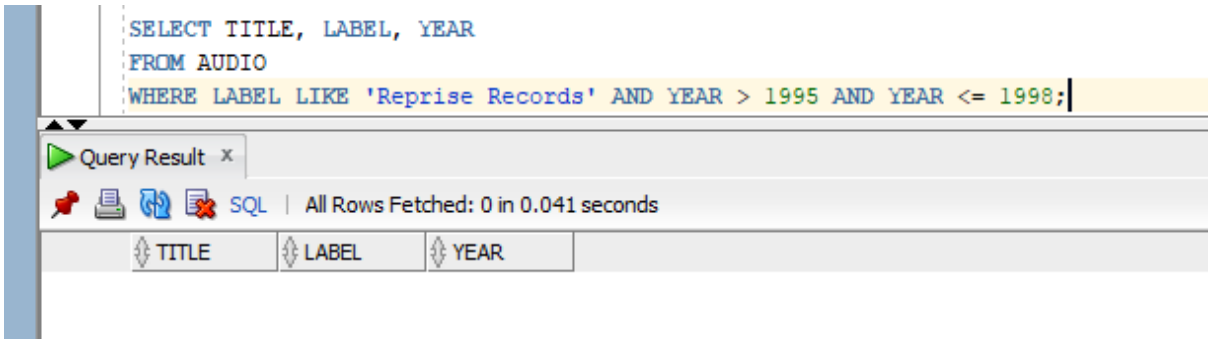
Displaying ARTIST with starting letter E or Title between A and M or Price less than 12



	TITLE	ARTIST	PRICE
1	Random Access Memories	Daft-Punk	7.94
2	Good Kid	Kendrick Lamar	19.54
3	Legend	Legend	19.54
4	All Mixed Up	LaBouche	13.95
5	Load	Metallica	11.95
6	In The Mirror	Yanni	12.99
7	Anthology 3	The Beatles	23.95
8	Watermark	Enya	10.99
9	Escape From Television	Jan Hammer	11.95
10	Crystal Planet	Joe Satriani	13.95
11	Shepherd Moons	Enya	12.45
12	Albedo 0.39	Vangelis	10.95
13	Aquarium	Aqua	14.99
14	The Very Good Years	Frank Sinatra	11.99
15	Collective Soul	Collective Soul	11.95
16	My Favorite Chopin	Van Cliburn	11.99
17	Joe Cocker Ultimate Collection	Joe Cocker	10.99

Project 5: “AND” vs “OR”

Query One:



Theres no output for the following query.

Query Two:

```
SELECT TITLE, LABEL, YEAR
FROM AUDIO
WHERE LABEL LIKE 'Reprise Records' OR YEAR >= 1995 AND YEAR <= 1998
ORDER BY TITLE, LABEL, YEAR;
```

Query Result

SQL | All Rows Fetched: 16 in 0.075 seconds

	TITLE	LABEL	YEAR
1	All Mixed Up	RCA	1996
2	Anthology 3	Apple	1996
3	Aquarium	MCA Records	1997
4	Collective Soul	Atlantic Recording	1995
5	Crystal Planet	Epic Records	1998
6	In The Mirror	Windham Hill	1997
7	Load	Elektra	1996
8	Music From Mission Impossible	Hip-O Records	1996
9	Ozzmosis	Epic	1995
10	Shepherd Moons	Reprise Records	1992
11	Sheryl Crow	A&M	1996
12	The Rock Original Soundtrack	Hollywood	1996
13	The Very Good Years	Reprise Records	1991
14	To The Faithful Departed	Island	1996
15	Very Best Of Mikis Theodorakis	FM Records	1997
16	Watermark	Reprise Records	1988

Query Three:

Worksheet | Query Builder

```
SELECT TITLE, ARTIST, LABEL
FROM AUDIO
WHERE ARTIST NOT LIKE 'L%' AND LABEL LIKE 'A%'
ORDER BY TITLE, LABEL, ARTIST;
```

Query Result | SQL | All Rows Fetched: 4 in 0.029 seconds

	TITLE	ARTIST	LABEL
1	Anthology 3	The Beatles	Apple
2	Collective Soul	Collective Soul	Atlantic Recording
3	Good Kid	Kendrick Lamar	Aftermath
4	Sheryl Crow	Sheryl Crow	A&M

Query Four:

```
SELECT *
FROM AUDIO
WHERE NUM_ID > 22;
```

Query Result | SQL | All Rows Fetched: 5 in 0.03 seconds

	NUM_ID	TITLE	ARTIST	LABEL	YEAR	PRICE
1	23	Random Access Memories	Daft-Punk	Sony	2013	7.94
2	24	Good Kid	Kendrick Lamar	Aftermath	2013	19.54
3	25	Nothing was the same	Drake	Republic Records	2013	13.59
4	26	Legend	Legend	Republic Records	2022	19.54
5	27	One Love	Harshal	Broadcast Music	2023	29.69

Project 6: SQL Developer Questions

1. What are at least 4 errors that may occur when creating and populating a database table?
   ➔ This answer depends on individual mistakes/complications but some of them can be:
   - Syntax Errors
   - Constraint Errors
   - Range Error
   - Data Type Mismatch errors
   - Network Errors or issues while populating
   - Typing wrong logical operators

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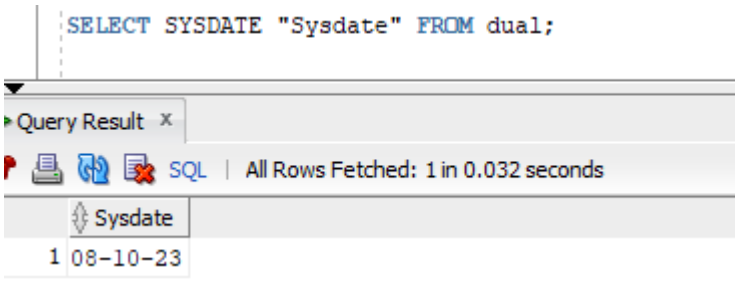
2. What is a null value for a field and when does it occur?
   ➔ A NULL value in a table in a SQL database means there's no clear or definite data in that spot. It's like saying, "I don't know" or "there's nothing here" in the database. It's not the same as leaving a space empty or putting a zero there.
   In SQL, NULL values can show up in different situations. For instance, when a column doesn't have a rule that says it must have data (NOT NULL), when a table is made with a default NULL value, when someone deliberately puts NULL in a column, or when a calculation or function doesn't have a clear result. Whenever something should be in the database, but it's not, NULL is used to show that. It's not like having an empty space or putting a zero there.

3. What effect does a null value have when calculating the average value for a numeric field (like salary) ?
   ➔ In SQL, when you want to find the average of numbers, like salaries, the database usually doesn't count the empty or missing values (NULL). It only looks at the numbers that are there, not the ones that are missing, to calculate the average. This way, the average is only calculated from the numbers you have, not the ones you don't have.

4. What will / should a user be able to do if the table becomes corrupted?
   ➔ If a table gets messed up, people should first notice the problem and understand what it means. To make sure the data is safe, they should bring back the table from a backup if they have one. Before trying to fix it, they can use the tools in SQL Developer to get data from the messed-up table. The way to fix it might be different depending on which database system they're using, like Oracle, MySQL, or Microsoft SQL Server. People should talk to the database boss and check the database's instructions for more help

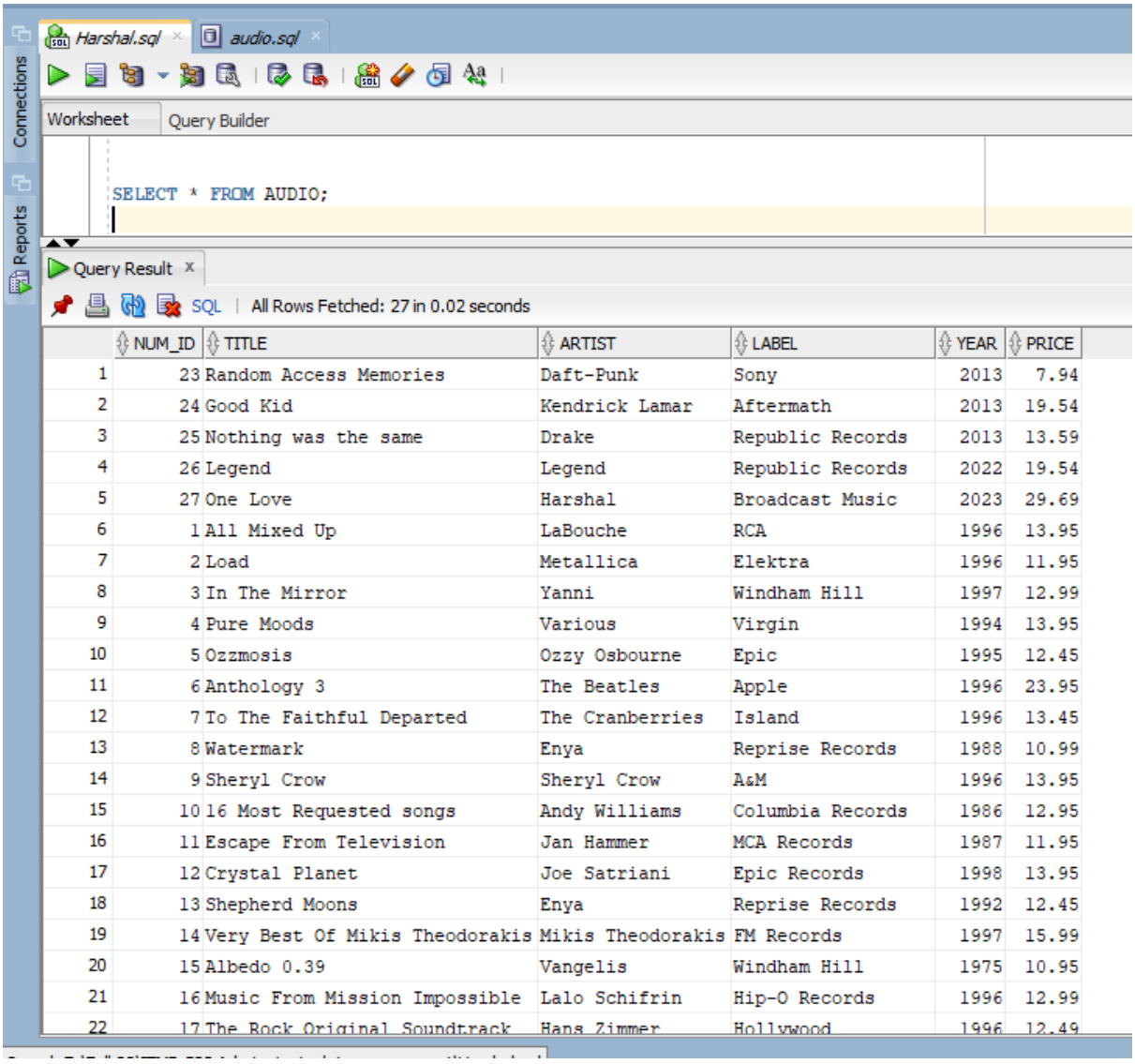
5. SQL Developer Menu Icons
   ➔ .a) SYSDATE:
   The built-in function SYSDATE in SQL Developer receives the current date and time from the database server's system clock. The timestamping of records during insertion or update operations, date-based query filtering, and establishing default values for timestamp columns are all common uses of this method. The current system timestamp may be easily included in SQL queries, enabling users to deal with real-time data and efficiently handle temporal elements of their databases.



➔ b&c) Output of each and every button and their meaning:

Run Statement:

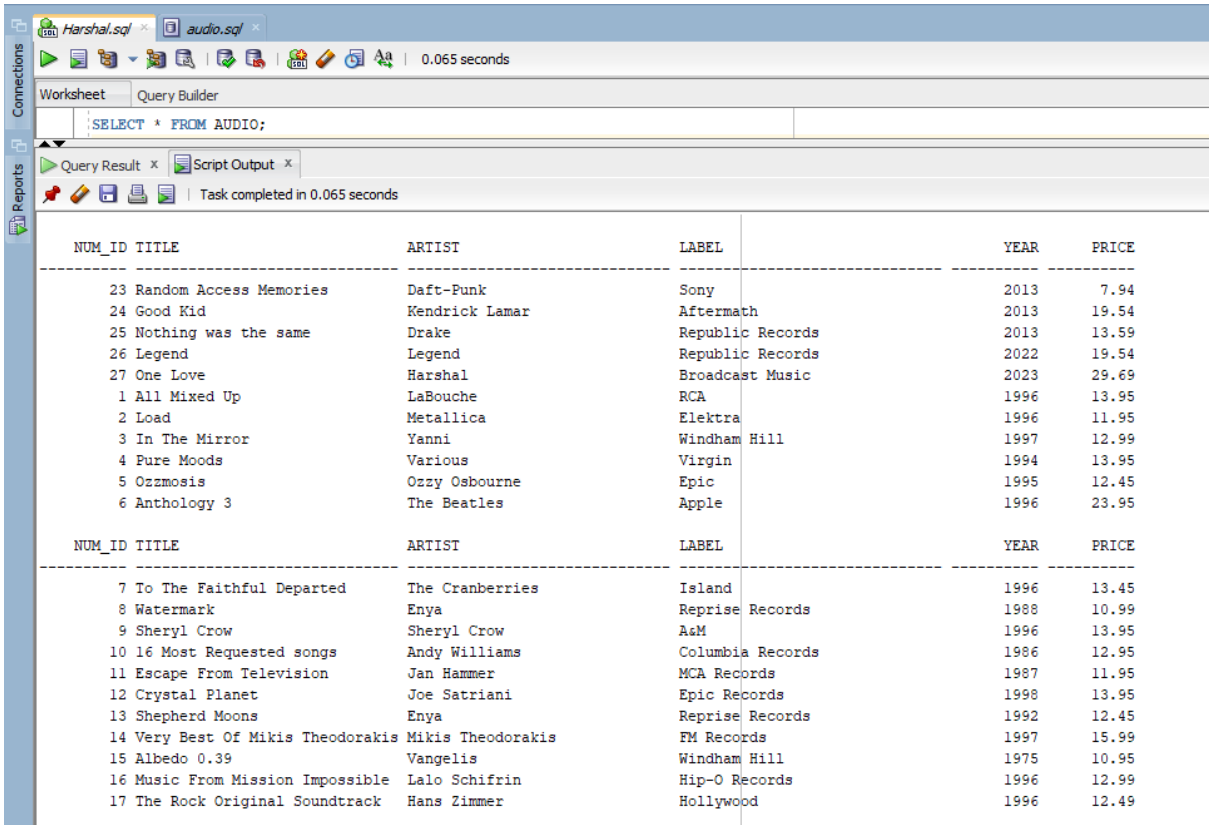
Users can conduct queries, changes, or any other SQL command against the connected database by using the Run Statement, which executes the SQL statement or code block that is presently chosen.



	NUM_ID	TITLE	ARTIST	LABEL	YEAR	PRICE
1	23	Random Access Memories	Daft-Punk	Sony	2013	7.94
2	24	Good Kid	Kendrick Lamar	Aftermath	2013	19.54
3	25	Nothing was the same	Drake	Republic Records	2013	13.59
4	26	Legend	Legend	Republic Records	2022	19.54
5	27	One Love	Harshal	Broadcast Music	2023	29.69
6	1	All Mixed Up	LaBouche	RCA	1996	13.95
7	2	Load	Metallica	Elektra	1996	11.95
8	3	In The Mirror	Yanni	Windham Hill	1997	12.99
9	4	Pure Moods	Various	Virgin	1994	13.95
10	5	Ozzmosis	Ozzy Osbourne	Epic	1995	12.45
11	6	Anthology 3	The Beatles	Apple	1996	23.95
12	7	To The Faithful Departed	The Cranberries	Island	1996	13.45
13	8	Watermark	Enya	Reprise Records	1988	10.99
14	9	Sheryl Crow	Sheryl Crow	A&M	1996	13.95
15	10	16 Most Requested songs	Andy Williams	Columbia Records	1986	12.95
16	11	Escape From Television	Jan Hammer	MCA Records	1987	11.95
17	12	Crystal Planet	Joe Satriani	Epic Records	1998	13.95
18	13	Shepherd Moons	Enya	Reprise Records	1992	12.45
19	14	Very Best Of Mikis Theodorakis	Mikis Theodorakis	FM Records	1997	15.99
20	15	Albedo 0.39	Vangelis	Windham Hill	1975	10.95
21	16	Music From Mission Impossible	Lalo Schifrin	Hip-O Records	1996	12.99
22	17	The Rock Original Soundtrack	Hans Zimmer	Hollywood	1996	12.49

Run Script:

An whole SQL script file comprising several SQL statements may be run using the Run Script command. It enables users to execute a series of instructions, produce database objects, or instantly fill tables with data from a single file.



NUM_ID	TITLE	ARTIST	LABEL	YEAR	PRICE
23	Random Access Memories	Daft-Punk	Sony	2013	7.94
24	Good Kid	Kendrick Lamar	Aftermath	2013	19.54
25	Nothing was the same	Drake	Republic Records	2013	13.59
26	Legend	Legend	Republic Records	2022	19.54
27	One Love	Harshal	Broadcast Music	2023	29.69
1	All Mixed Up	LaBouche	RCA	1996	13.95
2	Load	Metallica	Elektra	1996	11.95
3	In The Mirror	Yanni	Windham Hill	1997	12.99
4	Pure Moods	Various	Virgin	1994	13.95
5	Ozzmosis	Ozzy Osbourne	Epic	1995	12.45
6	Anthology 3	The Beatles	Apple	1996	23.95

NUM_ID	TITLE	ARTIST	LABEL	YEAR	PRICE
7	To The Faithful Departed	The Cranberries	Island	1996	13.45
8	Watermark	Enya	Reprise Records	1988	10.99
9	Sheryl Crow	Sheryl Crow	A&M	1996	13.95
10	16 Most Requested songs	Andy Williams	Columbia Records	1986	12.95
11	Escape From Television	Jan Hammer	MCA Records	1987	11.95
12	Crystal Planet	Joe Satriani	Epic Records	1998	13.95
13	Shepherd Moons	Enya	Reprise Records	1992	12.45
14	Very Best Of Mikis Theodorakis	Mikis Theodorakis	FM Records	1997	15.99
15	Albedo 0.39	Vangelis	Windham Hill	1975	10.95
16	Music From Mission Impossible	Lalo Schifrin	Hip-O Records	1996	12.99
17	The Rock Original Soundtrack	Hans Zimmer	Hollywood	1996	12.49

NUM_ID	TITLE	ARTIST	LABEL	YEAR	PRICE
18	Aquarium	Aqua	MCA Records	1997	14.99
19	The Very Good Years	Frank Sinatra	Reprise Records	1991	11.99
20	Collective Soul	Collective Soul	Atlantic Recording	1995	11.95
21	My Favorite Chopin	Van Cliburn	RCA Victor	1961	11.99
22	Joe Cocker Ultimate Collection	Joe Cocker	Hip-O Records	2004	10.99

27 rows selected.

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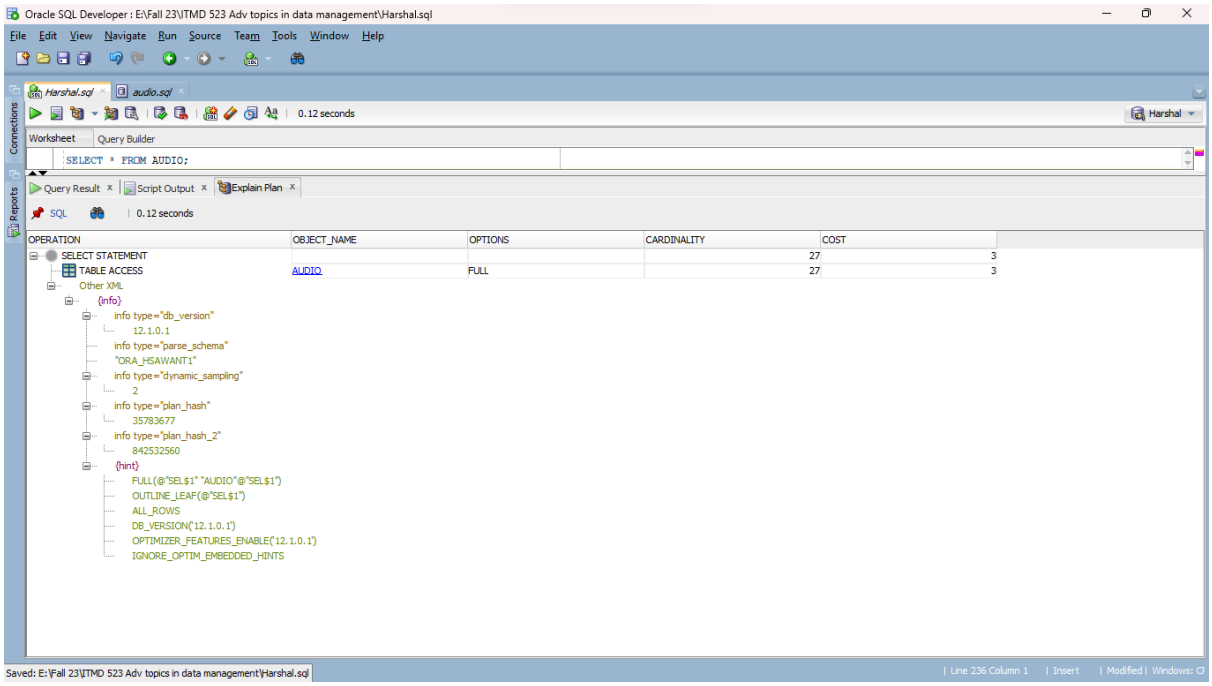
Explain Plan:

Explain A SQL statement's execution plan is generated and shown by Plan. It assists in query performance optimisation by giving users insights into how the database engine will handle the query, revealing details about indexes, joins, and other processes.



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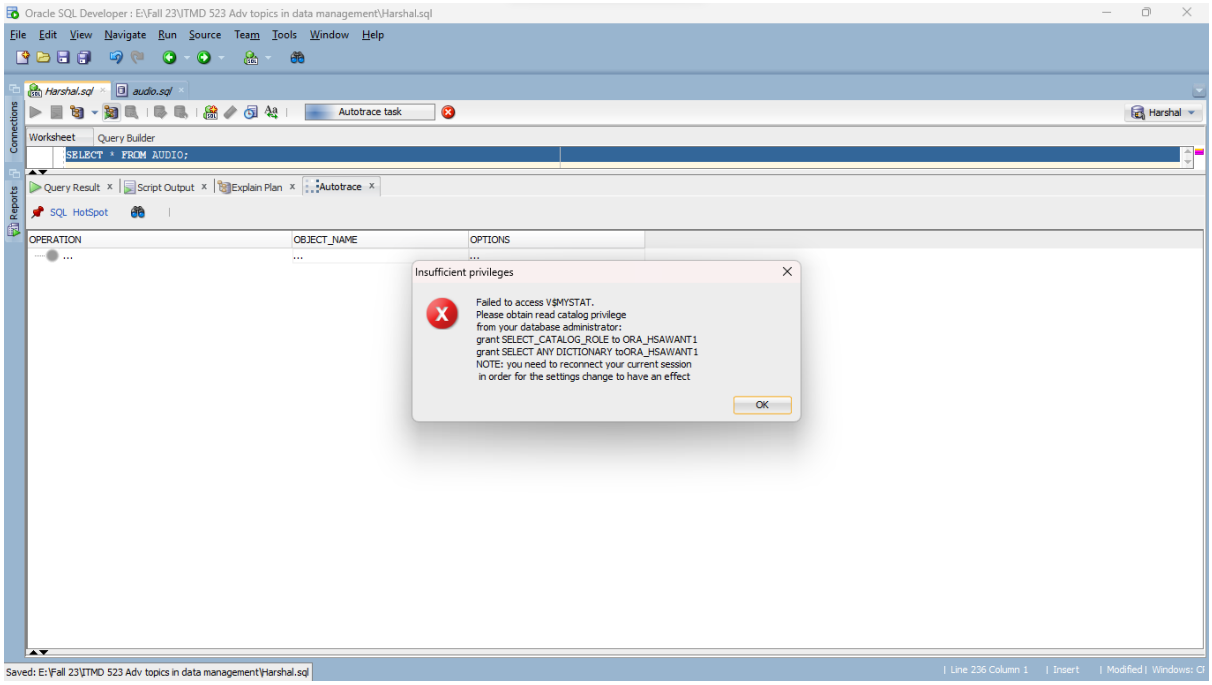
Autotrace:

The number of rows handled and the execution time may both be quickly generated and shown for a SQL query using Autotrace. By giving useful information about the query's resource utilization and efficiency, it assists users in analyzing and optimizing query performance. The error notice "Insufficient privileges" indicates that the user account 'ORA_HSAWANT1' attempting to access the Autotrace tool in SQL Developer does not have the required permissions to perform the requested action. The error message in this case shows that there was a problem accessing an object or schema with the name "V4MYSTAT." To resolve this issue, a database administrator must provide the user "ORA_HSAWANT1" the required permissions. You may ensure that the user has access to the features and the SQL Developer Autotrace tool by providing the necessary permissions.



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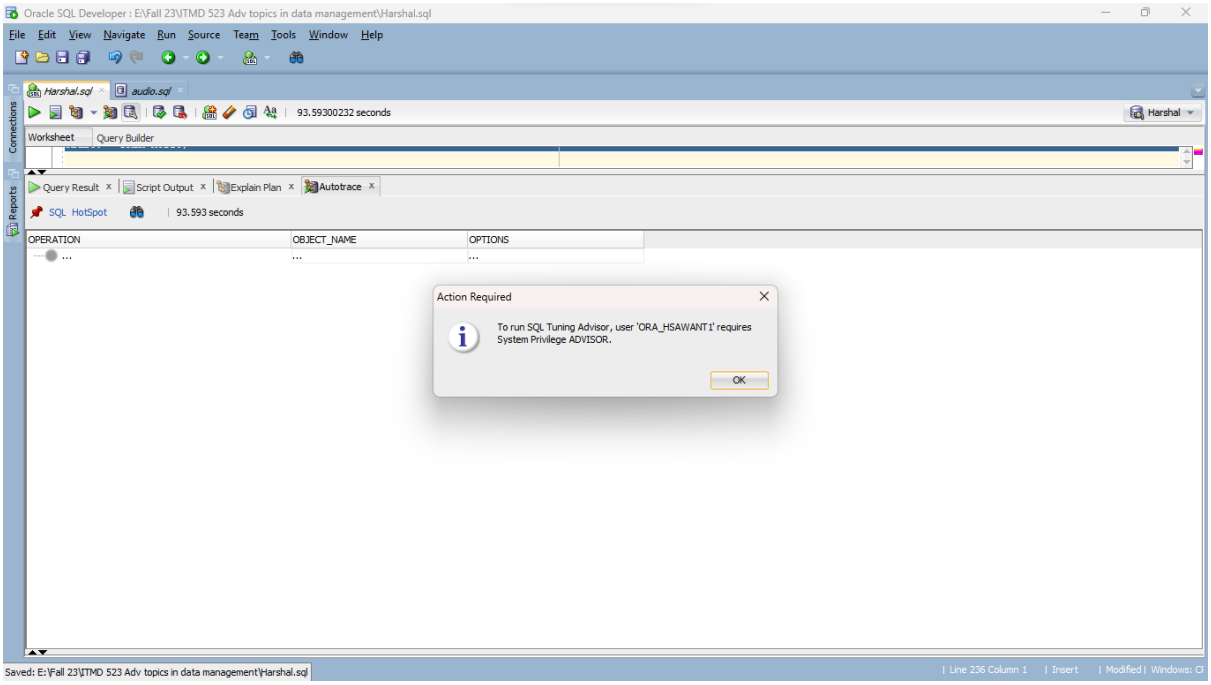
SQL Tuning Advisor:

SQL Tuning Advisor tool analyzes SQL statements and provides recommendations for improving their performance. It offers suggestions such as creating indexes, restructuring queries, or using different optimization techniques, helping users optimize their SQL code for better database performance. The error message "Action required: To run SQL Tuning advisor, user 'ORA_HSAWANT1' requires System Privilege ADVISOR" indicates that the user is unable to perform SQL tuning operations because they lack the necessary system privilege, 'ADVISOR'.



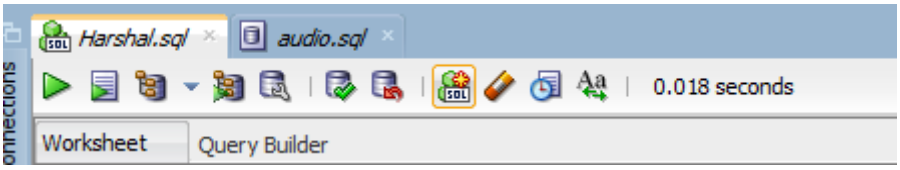
Commit:

Any modifications performed during the ongoing database transaction are saved permanently by using the commit command. When clicked, the transaction is terminated, making all modifications permanent and available to other users.

Rollback:

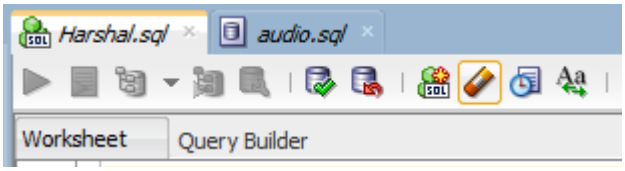
Any modifications made during the current database transaction can be undone with rollback. When selected, it undoes any changes performed during the transaction, restoring the database to its initial state and, in essence, canceling the transaction.

There was no specific output for rollback, except the time taken for completing rollback.



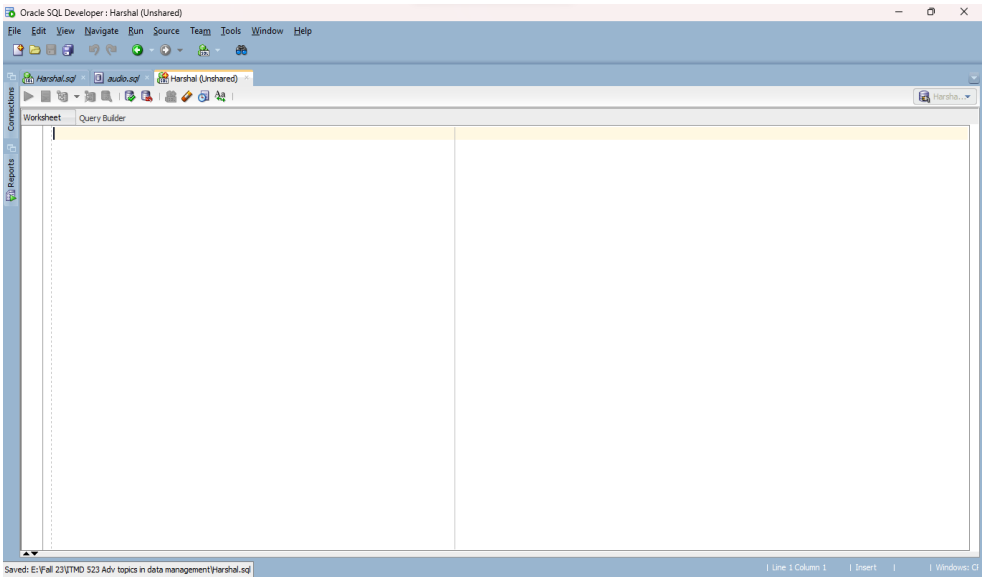
Clear:

The SQL Worksheet's contents may be cleared with the Clear command, enabling users to start again or undo past queries and operations. It offers a speedy method to clear the workspace and type fresh SQL instructions or statements over empty text fields.



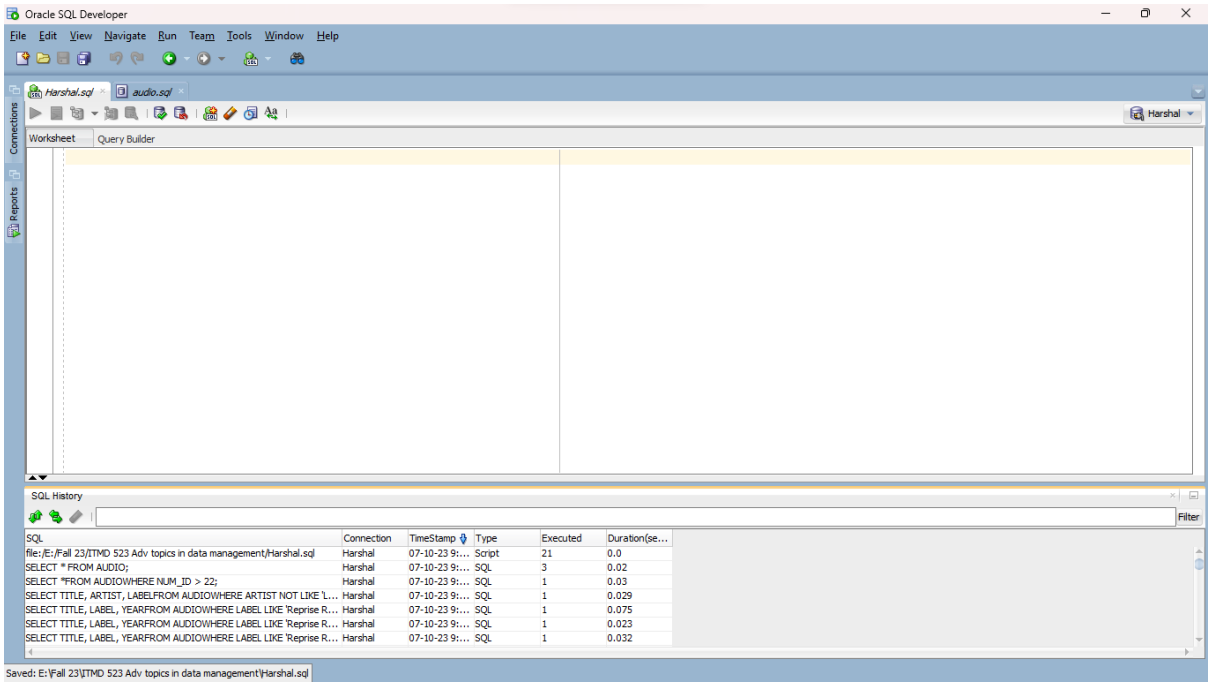
Unshared SQL Worksheet:

Unshared SQL Worksheet enables users to launch a fresh SQL Worksheet that runs independently of other worksheets, allowing several queries or activities to be executed concurrently without interfering with one another. For coordinating many database activities within a single SQL Developer session, this capability is quite helpful.



SQL History:

Users may examine, modify, and repeat earlier queries using the list of previously performed SQL statements that SQL History gives. It makes it easier for users to re-execute frequently used or updated SQL statements and keeps track of their query history.



To UPPER/LOWER/INITCAP:

The UPPER, LOWER, and INITCAP functions change how the letters in a text column look.

UPPER makes all letters BIG/uppercase.

LOWER makes all letters small/lowercase.

INITCAP makes the first letter in each word uppercase and the rest lower.