Page 1

Title: **Database Design Appendix D Individual Assessment**

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Introduction to the Report

This file includes the individual task that has been competed for one of the requirement of the 30% database systems module. Containing all 3 tasks related to the conceptual design stage, logical design stage and physical design stage.

The conceptual design stage consists of the EERD diagram generated by QSEE SuperLite which has been made by identifying the entities by using the entity identifying rules as discussed on the Fundamental of Database module during level 4.

Logical design consists of various tasks ranging from identifying the entity names, reverse logical design, finding the foreign keys based on EERD as well as normalization to the third normal form.

Finally, the Physical design stage consists of SQL implemented code in the APEX Oracle. This implementation was based on the scott table provided in our university blackboard link and implemented our understanding of basic SQL statements, creating tables, the use of union and join statements & vertical and horizontal partitioning.

Page 4

Task 1: Conceptual Design

1.

Each holiday package is provided for a certain number of customers. Each holiday package is categorized as being of a specific type e.g. Beach, Winter Sun, Skiing and Adventure, each of which have specific, unique requirements. Each package will fall into one of two journey types, either

- Return flight to a single destination
- Return coach transport with two destinations.

Holidays may have a courier, although some do not. Where group bookings are made the company needs to record information about the member of the group who is the Group leader, i.e. the arranger of the holiday.

Nouns:

1. Holiday Package
2. Customers
3. Beach
4. Winter Sun
5. Skiing
6. Adventure
7. Journey Types
8. Return Flight
9. Return Coach
10. Destination
11. Courier
12. Group Booking
13. Company
14. Group Leader

2 &3.

Rules used to determine entities:

a. **The object should be important to the system**
b. **There should be attributes that can be associated with entity**
c. **More than one occurrence of the entity**
d. **It should not be an attribute of the entity**

Entity name: HOLIDAY PACKAGES

Attribute	packageID	*bookingID*	courierID	type	price	Customers_count
Occurrence	Hp1	Boo1	Cou1	beach	35,000	3
Occurrence	Hp2	Boo2	-	Skiing	15,000	7
Occurrence	Hp3	Boo3	Cou2	adventure	30,000	4

Entity name: BEACH

Attribute	packageID	destination_name
Occurrence	Hp1	Maldives
Occurrence		

Entity name: WINTER SUN

Attribute	packageID	destination_name
Occurrence		
Occurrence		

Entity name: SKIING

Attribute	packageID	destination_name
Occurrence	Hp2	Canada
Occurrence		

Entity name: ADVENTURE

Attribute	packageID	destination_name
Occurrence	Hp3	Brazil
Occurrence		

Entity name: CUSTOMERS

Attribute	customerID	*bookingID*	*groupLeaderID*	name	contactInfo	age	address
Occurrence	Cus1	Boo1	Cus1	Arya Tamang	9990001212	30	Kathmandu

Occurrence	Cus2	Boo2	Cus4	Bardan Rayamaji	9863849211	78	Toronto
Occurrence	Cus3	Boo1	Cus2	Prajjwal Rimal	9813643877	21	Vancouver
Occurrence	Cus4	Boo3		Rivash Rijal	9822791596	26	India

Entity name: GROUP BOOKINGS

Attribute	bookingID	*customerID*	*packageID*	groupleaderName
Occurrence	Boo1	Cus3	Hp1	Arya Tamang
Occurrence	Boo2		Hp2	Rivash Rijal
Occurrence	Boo3		Hp3	Bardan Rayamaji

Entity name: COURIER

Attribute	courierID	*packageID*	comapnyName	address
Occurrence	Cou1	Hp1	DHL	Sao Paulo
Occurrence	Cou2	Hp2	FEDEX	Quebec

Entity name: RETURN FLIGHT

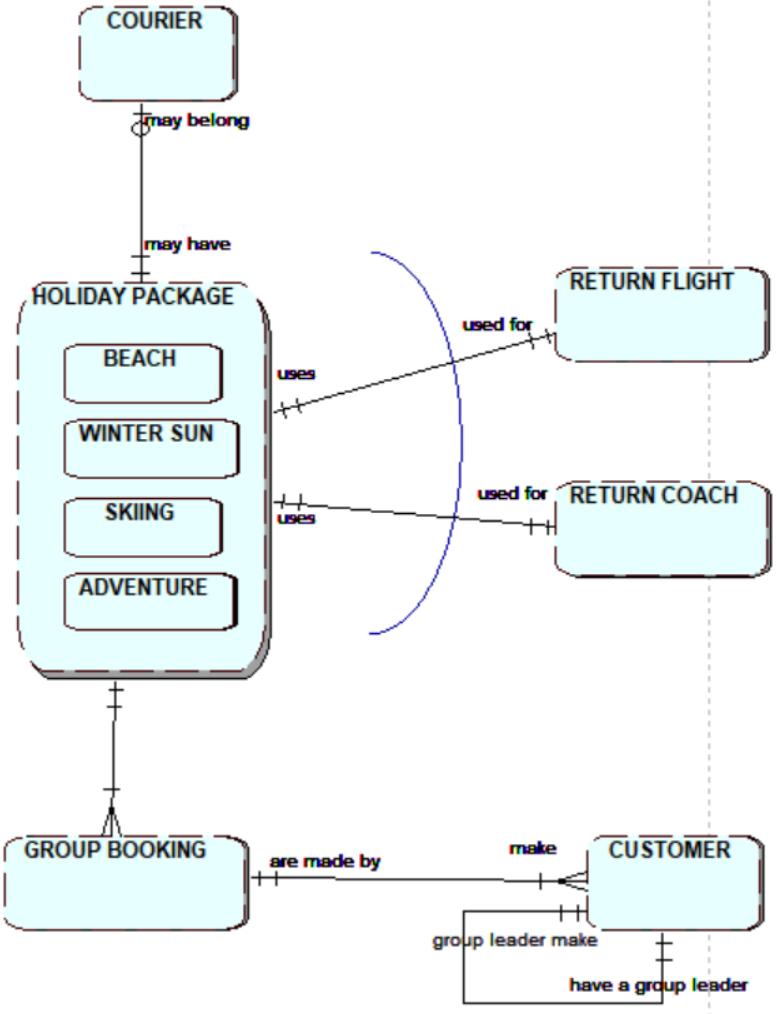
Attribute	flightID	*packageID*	flightCabin	destinations
Occurrence	Fi1	Hp3	Business	Sao Paulo
Occurrence				

Entity name: RETURN COACH

Attribute	coachID	*packageID*	coachBooking	destinations
Occurrence	Co1	Hp1	General	Quebec, Baffin Islands
Occurrence	Co2	Hp2	General	Toronto, Vancouver

4.

Entity Relationship Diagram



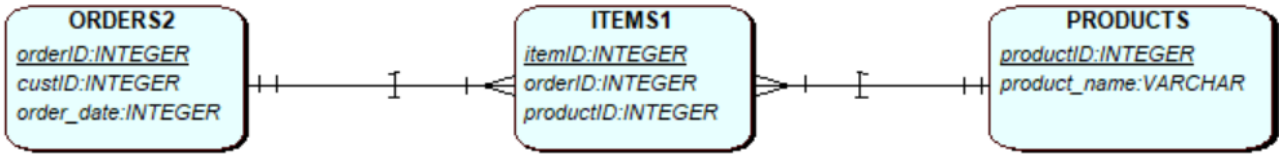
Task 2: Logical Design

A.

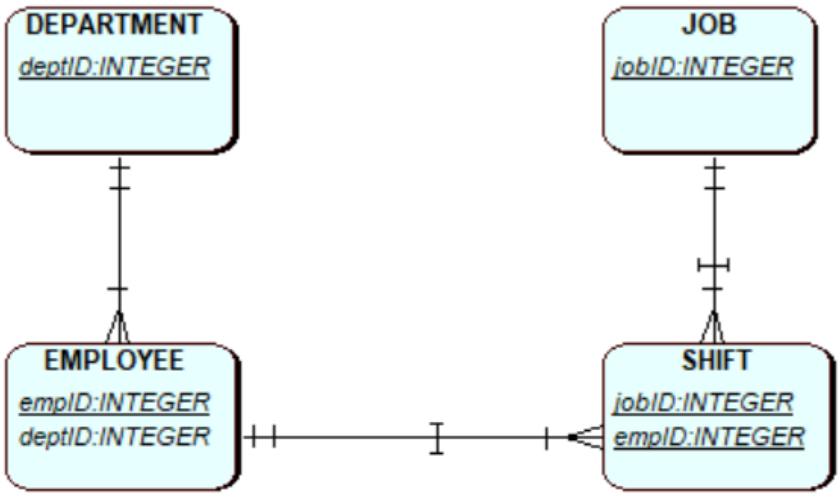
1.

2.

3.



4.



B.

Foreign key implemented by looking at the relationship cardinality

Task (**Task_id**, Task_Name)

Project (**Project_id**, Project_StartDate, Project_EndDate)

Project_Task (**PT_id, *Project_id***, *Consultant_id, Task_id*, Desc)

Consultant (**Consultant_id**, Name, Address, Phone)

Appointment **(Appointment_ref, *Consultant_id, Client_id*,** Date, Location)

Client (**Client_id**, Name, Address, Phone)

C.

"1NF: each row and column contain one and only one value, identify primary keys

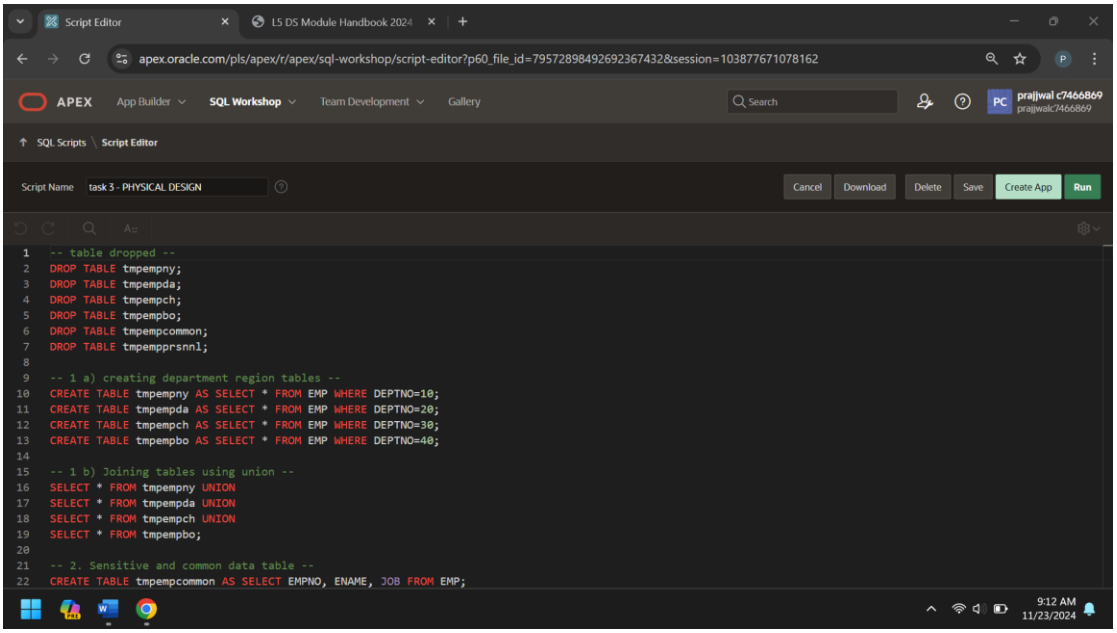
2NF: every non primary key attribute is fully functionally dependent on the primary key

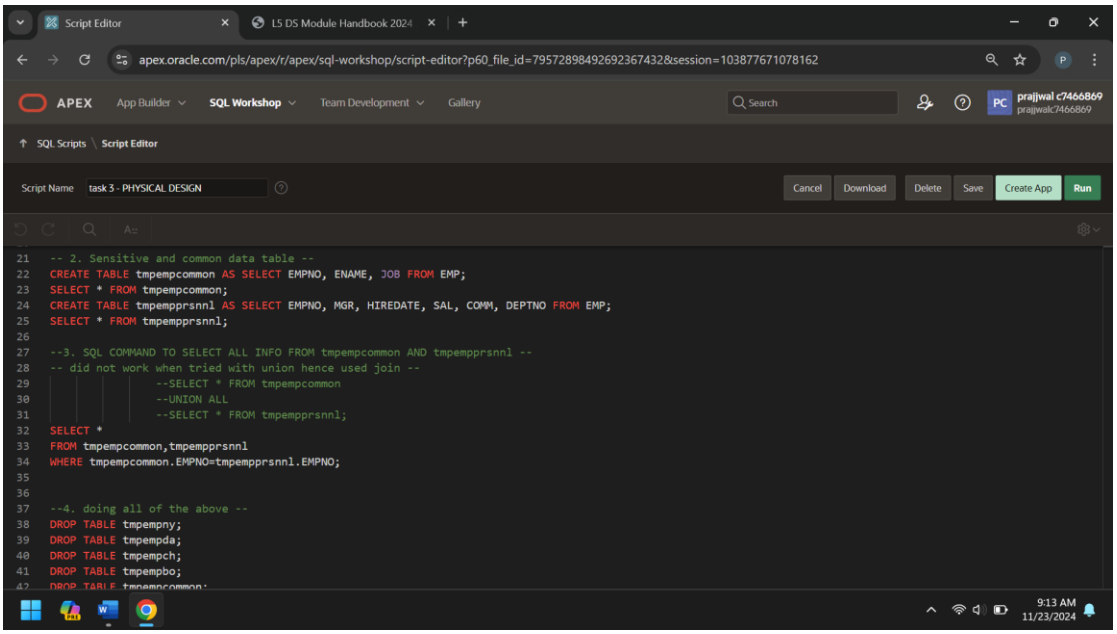
3NF: no non primary key attribute is transitively dependent on the primary key" (thomas Connolly, n.d.)

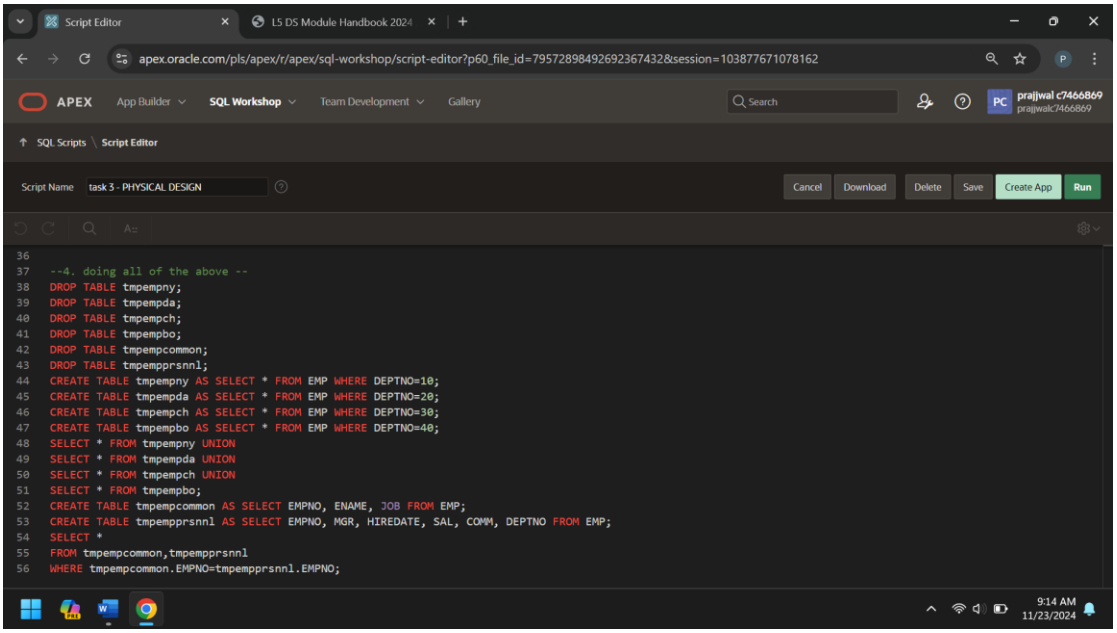
1nf was wrong, and since 1nf was incorrect by extension 2nf and 3nf were also incorrect. In 1nf Idate was labeled as the primary key, however this is wrong as I day is not a concrete unique value, hence the placement of Staff no as the primary key as staff number is unique for every staff.

UNF	1NF	2NF	3NF
Property No.	Property No.	Property No.	Property No.
Property Addr.	Property Addr.	Property Addr	Property Addr
Idate*			
Itime*	PropertyNo.	Property No.	Property No.
Comment*	Staff_no	Staff_no	Staff_no
Staff_no*	Itime	Idate	Idate
Sname*	Comment	Itime	Itime
Car_reg*	Idate	Comment	Comment
	Sname		
	Car_reg	Staff_no	Staff_no
		Sname	Sname
		Car_reg	Car_reg

Task 3: Physical Design







-- table dropped --

DROP TABLE tmpempny;

DROP TABLE tmpempda;

DROP TABLE tmpempch;

DROP TABLE tmpempbo;

DROP TABLE tmpempcommon;

DROP TABLE tmpempprsnnl;

-- 1 a) creating department region tables --

CREATE TABLE tmpempny AS SELECT * FROM EMP WHERE DEPTNO=10;

CREATE TABLE tmpempda AS SELECT * FROM EMP WHERE DEPTNO=20;

CREATE TABLE tmpempch AS SELECT * FROM EMP WHERE DEPTNO=30;

CREATE TABLE tmpempbo AS SELECT * FROM EMP WHERE DEPTNO=40;

-- 1 b) Joining tables using union --

SELECT * FROM tmpempny UNION

SELECT * FROM tmpempda UNION

SELECT * FROM tmpempch UNION

SELECT * FROM tmpempbo;

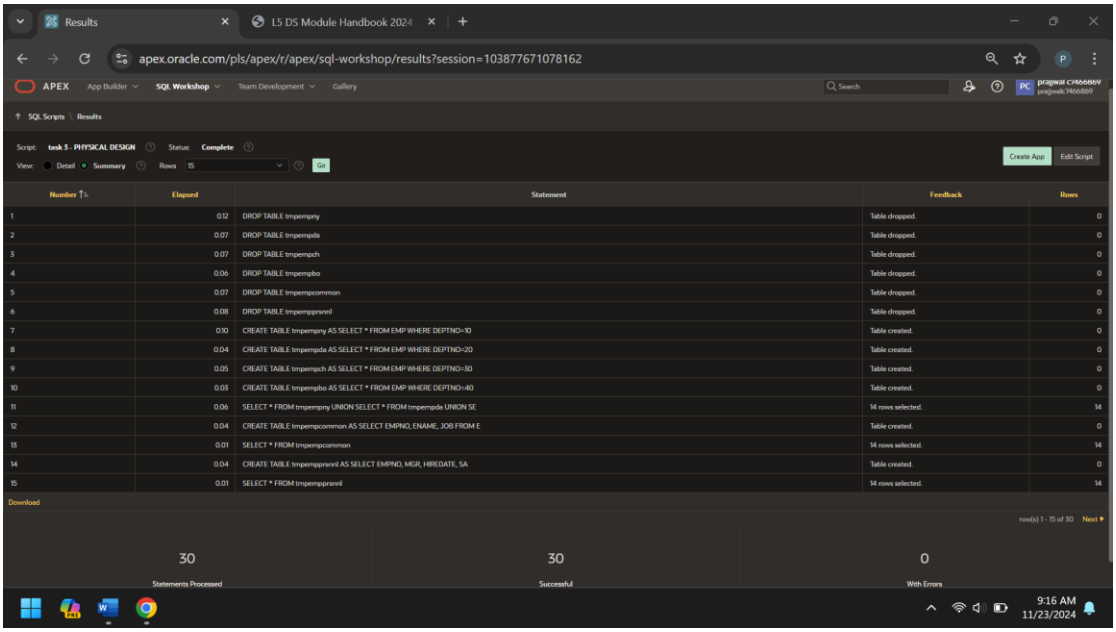
```
-- 2. Sensitive and common data table --
CREATE TABLE tmpempcommon AS SELECT EMPNO, ENAME, JOB FROM EMP;
SELECT * FROM tmpempcommon;
CREATE TABLE tmpempprsnnl AS SELECT EMPNO, MGR, HIREDATE, SAL, COMM, DEPTNO FROM
EMP;
SELECT * FROM tmpempprsnnl;

--3. SQL COMMAND TO SELECT ALL INFO FROM tmpempcommon AND tmpempprsnnl --
-- did not work when tried with union hence used join --
        --SELECT * FROM tmpempcommon
        --UNION ALL
        --SELECT * FROM tmpempprsnnl;
SELECT *
FROM tmpempcommon,tmpempprsnnl
WHERE tmpempcommon.EMPNO=tmpempprsnnl.EMPNO;


--4. doing all of the above --
DROP TABLE tmpempny;
DROP TABLE tmpempda;
DROP TABLE tmpempch;
DROP TABLE tmpempbo;
DROP TABLE tmpempcommon;
DROP TABLE tmpempprsnnl;
CREATE TABLE tmpempny AS SELECT * FROM EMP WHERE DEPTNO=10;
CREATE TABLE tmpempda AS SELECT * FROM EMP WHERE DEPTNO=20;
CREATE TABLE tmpempch AS SELECT * FROM EMP WHERE DEPTNO=30;
CREATE TABLE tmpempbo AS SELECT * FROM EMP WHERE DEPTNO=40;
SELECT * FROM tmpempny UNION
SELECT * FROM tmpempda UNION
SELECT * FROM tmpempch UNION
SELECT * FROM tmpempbo;
CREATE TABLE tmpempcommon AS SELECT EMPNO, ENAME, JOB FROM EMP;
```

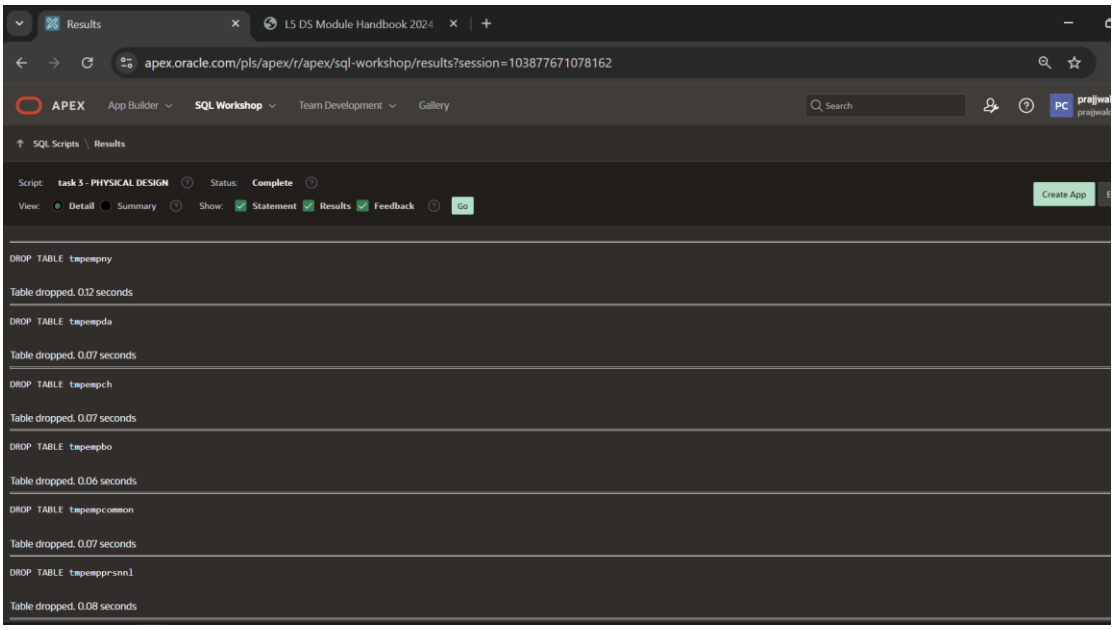
CREATE TABLE tmpempprsnnl AS SELECT EMPNO, MGR, HIREDATE, SAL, COMM, DEPTNO FROM EMP;

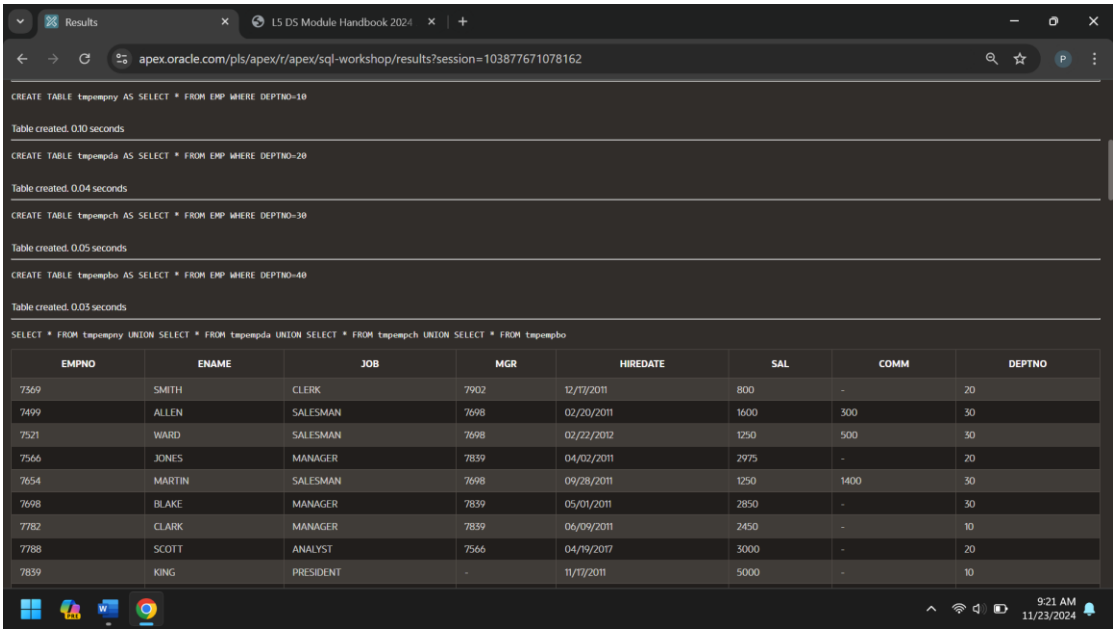
SELECT *

FROM tmpempcommon,tmpempprsnnlr

WHERE tmpempcommon.EMPNO=tmpempprsnnl.EMPNO;



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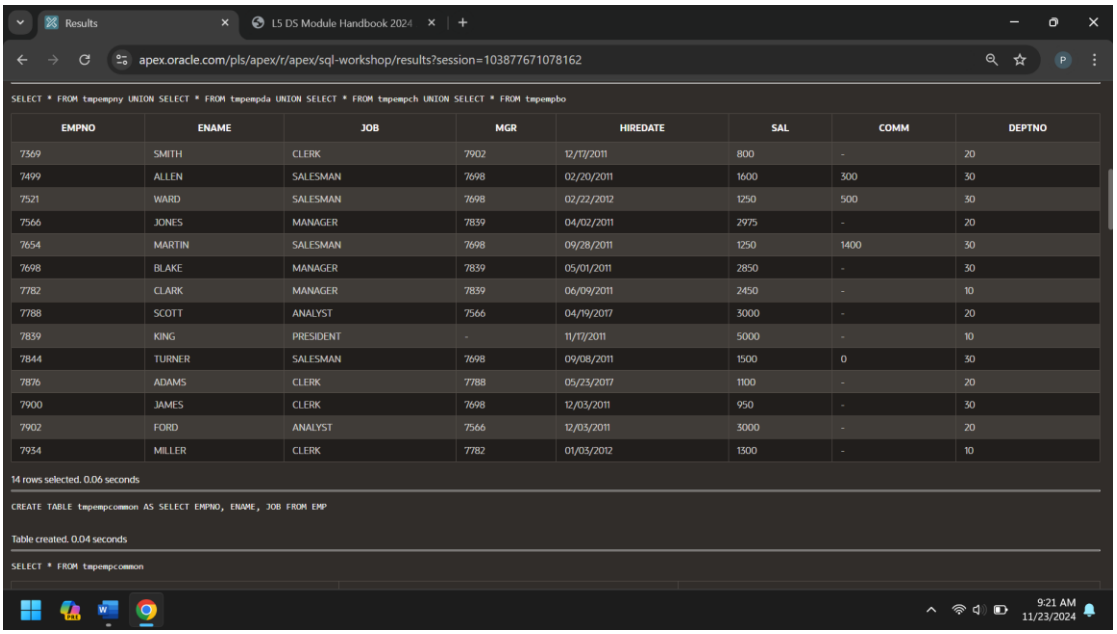
CREATE TABLE tmpempny AS SELECT * FROM EMP WHERE DEPTNO=10
Table created. 0.10 seconds
CREATE TABLE tmpempda AS SELECT * FROM EMP WHERE DEPTNO=20
Table created. 0.04 seconds
CREATE TABLE tmpempch AS SELECT * FROM EMP WHERE DEPTNO=30
Table created. 0.05 seconds
CREATE TABLE tmpempbo AS SELECT * FROM EMP WHERE DEPTNO=40
Table created. 0.03 seconds
SELECT * FROM tmpempny UNION SELECT * FROM tmpempda UNION SELECT * FROM tmpempch UNION SELECT * FROM tmpempbo
EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO
7369 SMITH CLERK 7902 12/17/2011 800 - 20
7499 ALLEN SALESMAN 7698 02/20/2011 1600 300 30
7521 WARD SALESMAN 7698 02/22/2012 1250 500 30
7566 JONES MANAGER 7839 04/02/2011 2975 - 20
7654 MARTIN SALESMAN 7698 09/28/2011 1250 1400 30
7698 BLAKE MANAGER 7839 05/01/2011 2850 - 30
7782 CLARK MANAGER 7839 06/09/2011 2450 - 10
7788 SCOTT ANALYST 7566 04/19/2017 3000 - 20
7839 KING PRESIDENT - 11/17/2011 5000 - 10
9:21 AM
11/23/2024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SELECT * FROM tmpempny UNION SELECT * FROM tmpempda UNION SELECT * FROM tmpempch UNION SELECT * FROM tmpempbo
EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO
7369 SMITH CLERK 7902 12/17/2011 800 - 20
7499 ALLEN SALESMAN 7698 02/20/2011 1600 300 30
7521 WARD SALESMAN 7698 02/22/2012 1250 500 30
7566 JONES MANAGER 7839 04/02/2011 2975 - 20
7654 MARTIN SALESMAN 7698 09/28/2011 1250 1400 30
7698 BLAKE MANAGER 7839 05/01/2011 2850 - 30
7782 CLARK MANAGER 7839 06/09/2011 2450 - 10
7788 SCOTT ANALYST 7566 04/19/2017 3000 - 20
7839 KING PRESIDENT - 11/17/2011 5000 - 10
7844 TURNER SALESMAN 7698 09/08/2011 1500 0 30
7876 ADAMS CLERK 7788 05/23/2017 1100 - 20
7900 JAMES CLERK 7698 12/03/2011 950 - 30
7902 FORD ANALYST 7566 12/03/2011 3000 - 20
7934 MILLER CLERK 7782 01/03/2012 1300 - 10
14 rows selected. 0.06 seconds
CREATE TABLE tmpempcommon AS SELECT EMPNO, ENAME, JOB FROM EMP
Table created. 0.04 seconds
SELECT * FROM tmpempcommon
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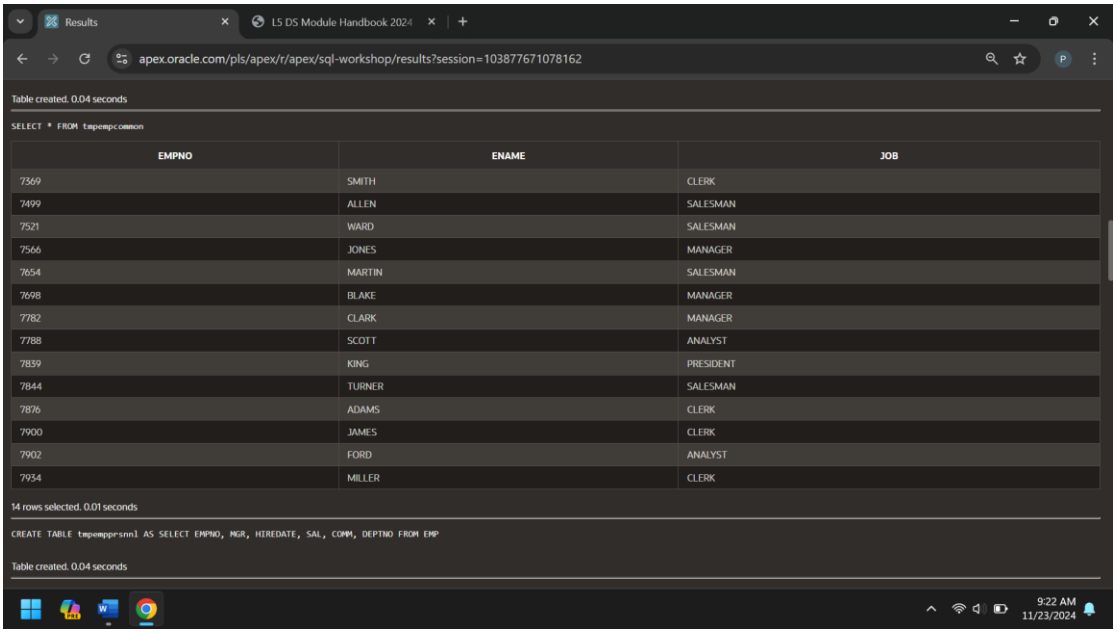

Results | L5 DS Module Handbook 2024

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Table created. 0.04 seconds

```
SELECT * FROM tmpempcommon
```

EMPNO	ENAME	JOB
7369	SMITH	CLERK
7499	ALLEN	SALESMAN
7521	WARD	SALESMAN
7566	JONES	MANAGER
7654	MARTIN	SALESMAN
7698	BLAKE	MANAGER
7782	CLARK	MANAGER
7788	SCOTT	ANALYST
7839	KING	PRESIDENT
7844	TURNER	SALESMAN
7876	ADAMS	CLERK
7900	JAMES	CLERK
7902	FORD	ANALYST
7934	MILLER	CLERK

14 rows selected. 0.01 seconds

```
CREATE TABLE tmpemppprsnnl AS SELECT EMPNO, MGR, HIREDATE, SAL, COMM, DEPTNO FROM EMP
```

Table created. 0.04 seconds

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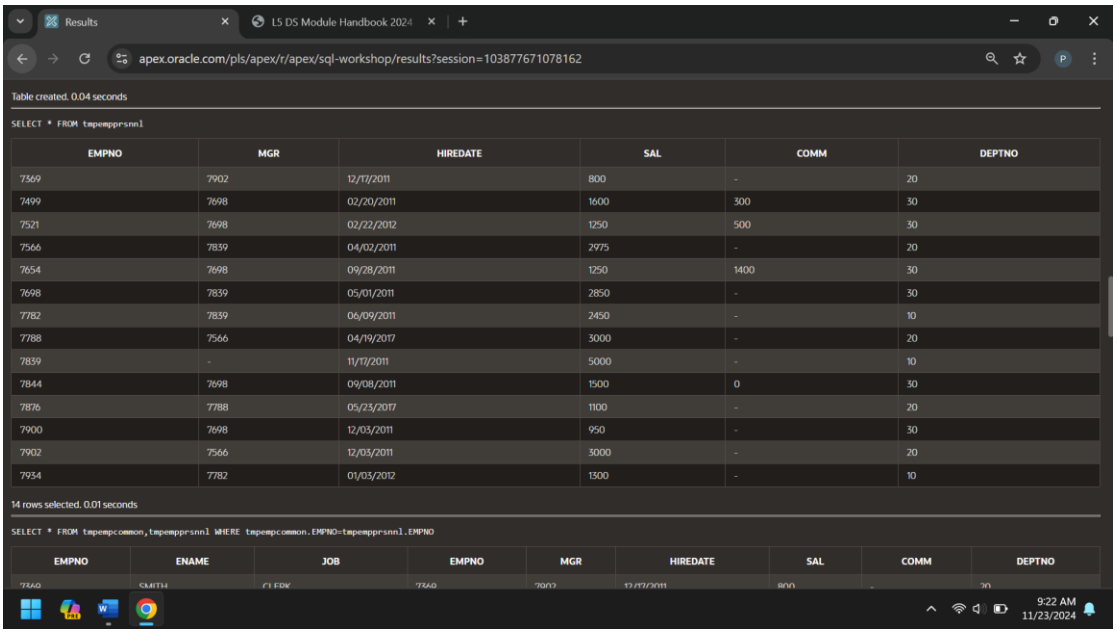

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Table created. 0.04 seconds

```
SELECT * FROM tmpemppprsnnl
```

EMPNO	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	7902	12/17/2011	800	-	20
7499	7698	02/20/2011	1600	300	30
7521	7698	02/22/2012	1250	500	30
7566	7839	04/02/2011	2975	-	20
7654	7698	09/28/2011	1250	1400	30
7698	7839	05/01/2011	2850	-	30
7782	7839	06/09/2011	2450	-	10
7788	7566	04/19/2017	3000	-	20
7839	-	11/17/2011	5000	-	10
7844	7698	09/08/2011	1500	0	30
7876	7788	05/23/2017	1100	-	20
7900	7698	12/03/2011	950	-	30
7902	7566	12/03/2011	3000	-	20
7934	7782	01/03/2012	1300	-	10

14 rows selected. 0.01 seconds

```
SELECT * FROM tmpempcommon,tmpemppprsnnl WHERE tmpempcommon.EMPNO=tmpemppprsnnl.EMPNO
```

EMPNO	ENAME	JOB	EMPNO	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7369	7902	12/17/2011	800	-	20

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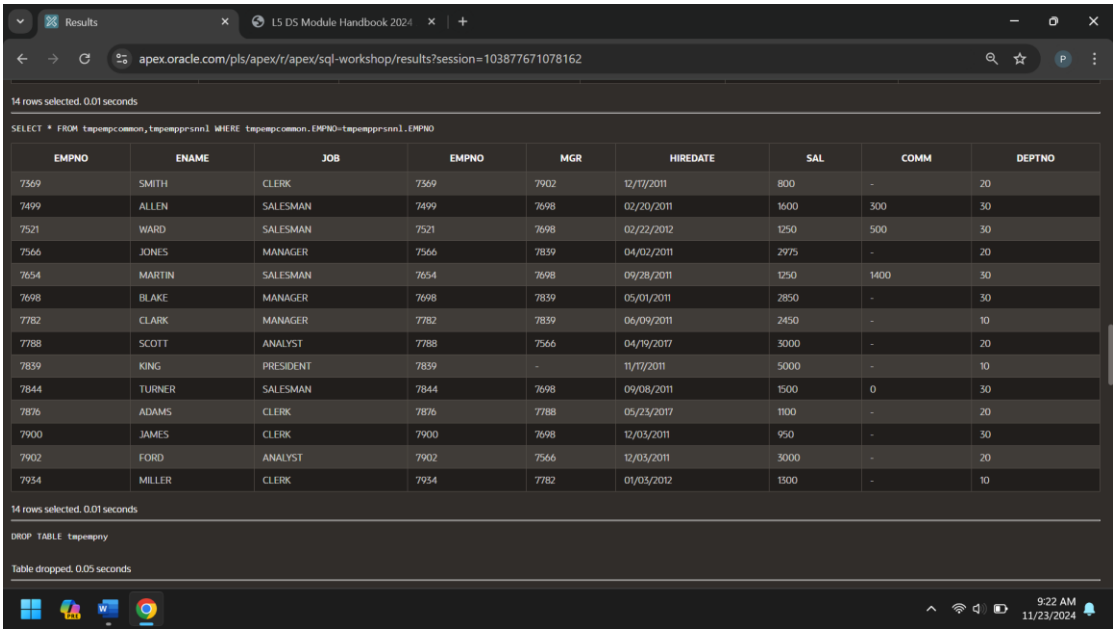
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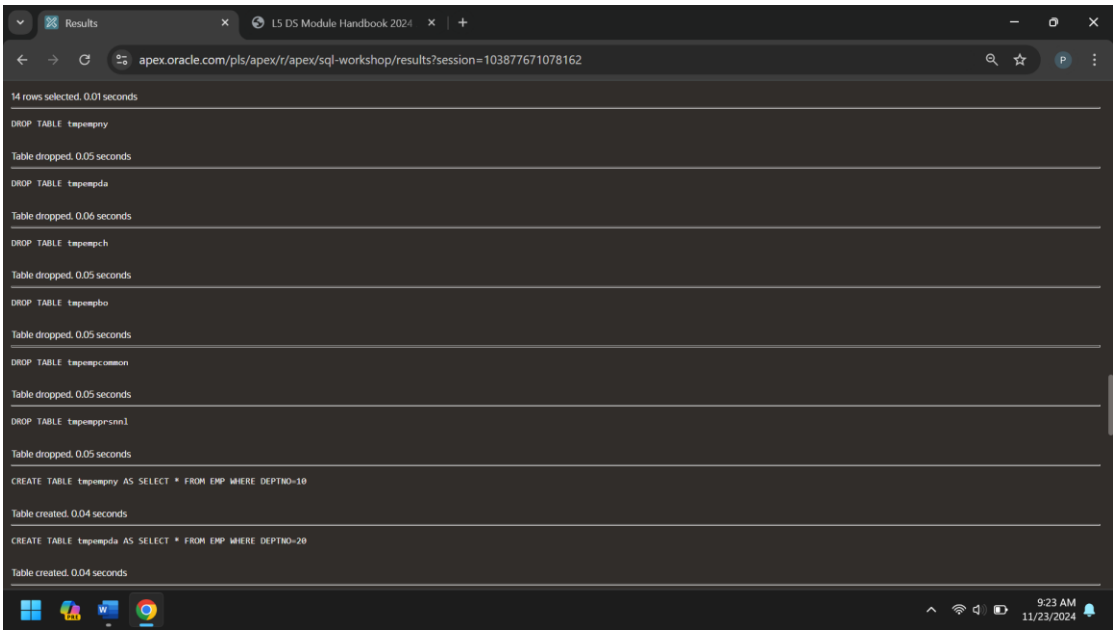
14 rows selected. 0.01 seconds
SELECT * FROM tmpempcommon,tmpempprsnnl WHERE tmpempcommon.EMPNO=tmpempprsnnl.EMPNO
EMPNO ENAME JOB EMPNO MGR HIREDATE SAL COMM DEPTNO
7369 SMITH CLERK 7369 7902 12/17/2011 800 - 20
7499 ALLEN SALESMAN 7499 7698 02/20/2011 1600 300 30
7521 WARD SALESMAN 7521 7698 02/22/2012 1250 500 30
7566 JONES MANAGER 7566 7839 04/02/2011 2975 - 20
7654 MARTIN SALESMAN 7654 7698 09/28/2011 1250 1400 30
7698 BLAKE MANAGER 7698 7839 05/01/2011 2850 - 30
7782 CLARK MANAGER 7782 7839 06/09/2011 2450 - 10
7788 SCOTT ANALYST 7788 7566 04/19/2017 3000 - 20
7839 KING PRESIDENT 7839 - 11/17/2011 5000 - 10
7844 TURNER SALESMAN 7844 7698 09/08/2011 1500 0 30
7876 ADAMS CLERK 7876 7788 05/23/2017 1100 - 20
7900 JAMES CLERK 7900 7698 12/03/2011 950 - 30
7902 FORD ANALYST 7902 7566 12/03/2011 3000 - 20
7934 MILLER CLERK 7934 7782 01/03/2012 1300 - 10
14 rows selected. 0.01 seconds
DROP TABLE tmpempny
Table dropped. 0.05 seconds
9:22 AM
11/23/2024


Results
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14 rows selected. 0.01 seconds
DROP TABLE tmpempny
Table dropped. 0.05 seconds
DROP TABLE tmpempda
Table dropped. 0.06 seconds
DROP TABLE tmpempch
Table dropped. 0.05 seconds
DROP TABLE tmpempbo
Table dropped. 0.05 seconds
DROP TABLE tmpempcommon
Table dropped. 0.05 seconds
DROP TABLE tmpempprsnnl
Table dropped. 0.05 seconds
CREATE TABLE tmpempny AS SELECT * FROM EMP WHERE DEPTNO=10
Table created. 0.04 seconds
CREATE TABLE tmpempda AS SELECT * FROM EMP WHERE DEPTNO=20
Table created. 0.04 seconds
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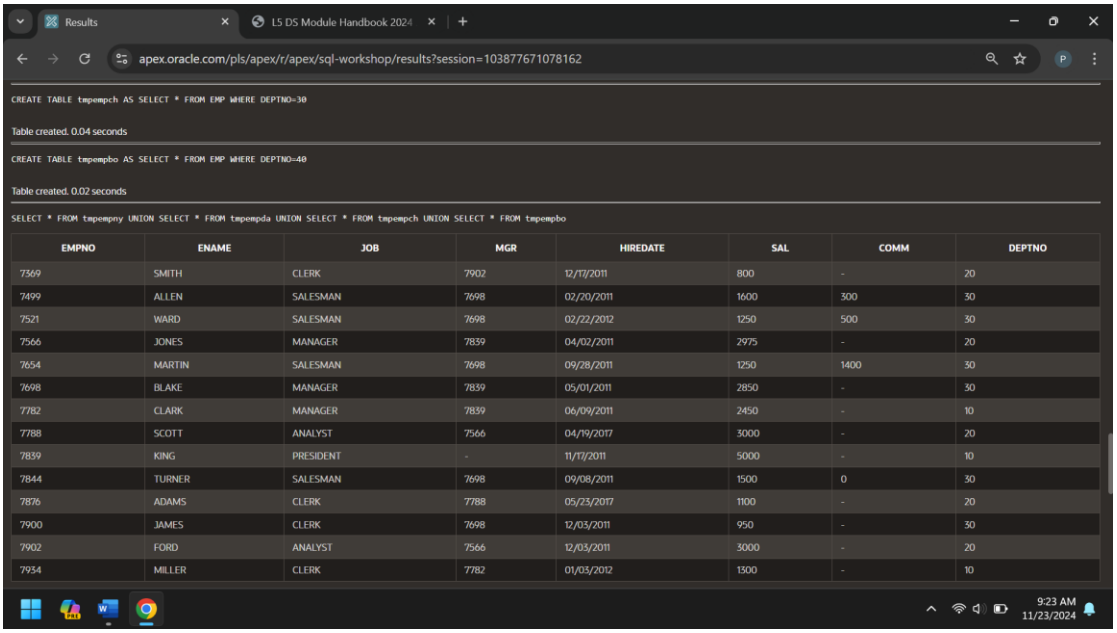
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CREATE TABLE tmpempch AS SELECT * FROM EMP WHERE DEPTNO=30
Table created. 0.04 seconds
CREATE TABLE tmpempbo AS SELECT * FROM EMP WHERE DEPTNO=40
Table created. 0.02 seconds
SELECT * FROM tmpempny UNION SELECT * FROM tmpempda UNION SELECT * FROM tmpempch UNION SELECT * FROM tmpempbo
EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO
7369 SMITH CLERK 7902 12/17/2011 800 - 20
7499 ALLEN SALESMAN 7698 02/20/2011 1600 300 30
7521 WARD SALESMAN 7698 02/22/2012 1250 500 30
7566 JONES MANAGER 7839 04/02/2011 2975 - 20
7654 MARTIN SALESMAN 7698 09/28/2011 1250 1400 30
7698 BLAKE MANAGER 7839 05/01/2011 2850 - 30
7782 CLARK MANAGER 7839 06/09/2011 2450 - 10
7788 SCOTT ANALYST 7566 04/19/2017 3000 - 20
7839 KING PRESIDENT - 11/17/2011 5000 - 10
7844 TURNER SALESMAN 7698 09/08/2011 1500 0 30
7876 ADAMS CLERK 7788 05/23/2017 1100 - 20
7900 JAMES CLERK 7698 12/03/2011 950 - 30
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7934 MILLER CLERK 7782 01/03/2012 1300 - 10
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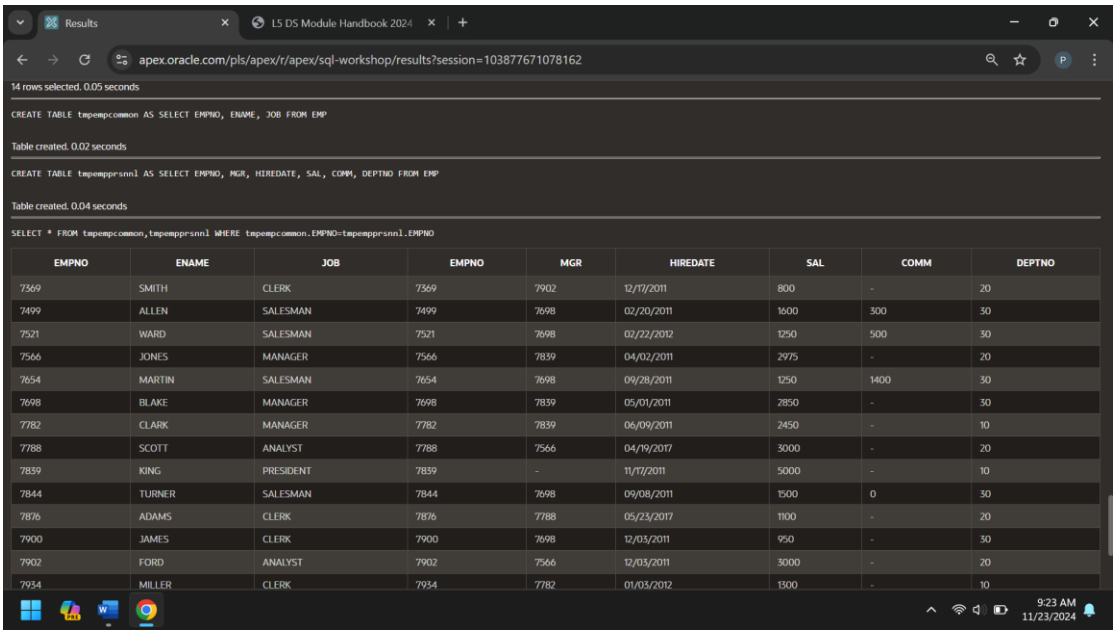
11/23/2024


Results
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14 rows selected. 0.05 seconds
CREATE TABLE tmpempcommon AS SELECT EMPNO, ENAME, JOB FROM EMP
Table created. 0.02 seconds
CREATE TABLE tmpempprsnnl AS SELECT EMPNO, MGR, HIREDATE, SAL, COMM, DEPTNO FROM EMP
Table created. 0.04 seconds
SELECT * FROM tmpempcommon,tmpempprsnnl WHERE tmpempcommon.EMPNO=tmpempprsnnl.EMPNO
EMPNO ENAME JOB EMPNO MGR HIREDATE SAL COMM DEPTNO
7369 SMITH CLERK 7369 7902 12/17/2011 800 - 20
7499 ALLEN SALESMAN 7499 7698 02/20/2011 1600 300 30
7521 WARD SALESMAN 7521 7698 02/22/2012 1250 500 30
7566 JONES MANAGER 7566 7839 04/02/2011 2975 - 20
7654 MARTIN SALESMAN 7654 7698 09/28/2011 1250 1400 30
7698 BLAKE MANAGER 7698 7839 05/01/2011 2850 - 30
7782 CLARK MANAGER 7782 7839 06/09/2011 2450 - 10
7788 SCOTT ANALYST 7788 7566 04/19/2017 3000 - 20
7839 KING PRESIDENT 7839 - 11/17/2011 5000 - 10
7844 TURNER SALESMAN 7844 7698 09/08/2011 1500 0 30
7876 ADAMS CLERK 7876 7788 05/23/2017 1100 - 20
7900 JAMES CLERK 7900 7698 12/03/2011 950 - 30
7902 FORD ANALYST 7902 7566 12/03/2011 3000 - 20
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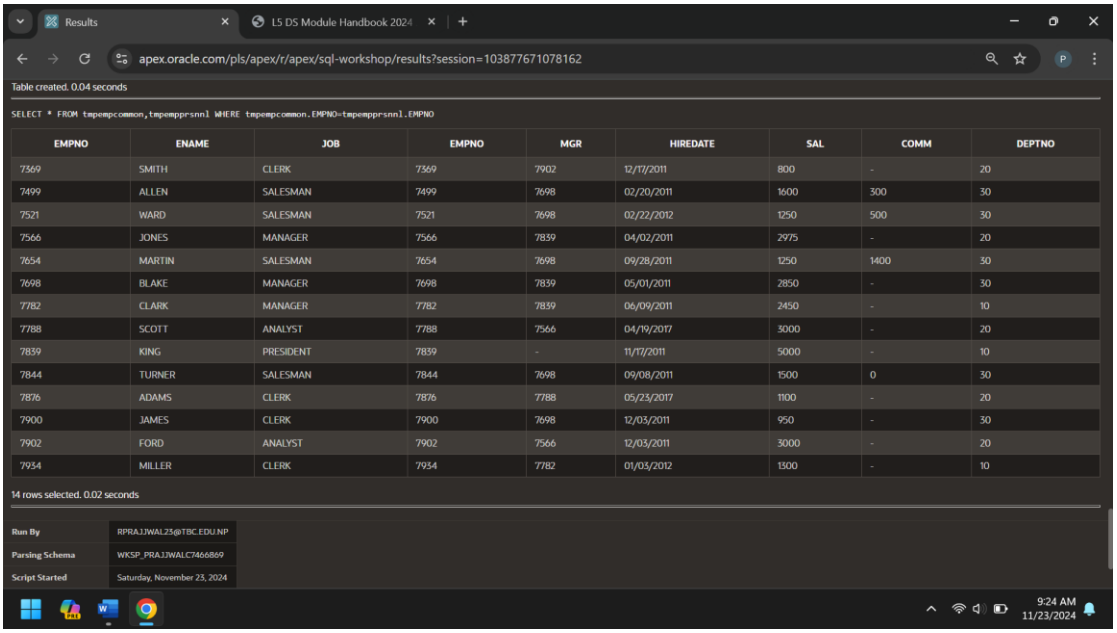
11/23/2024


Results
L5 DS Module Handbook 2024
apex.oracle.com/pls/apex/r/apex/sql-workshop/results?session=103877671078162
Table created. 0.04 seconds
SELECT * FROM tmpempcommon,tmpemppr snnl WHERE tmpempcommon.EMPNO=tmpemppr snnl.EMPNO
EMPNO ENAME JOB EMPNO MGR HIREDATE SAL COMM DEPTNO
7369 SMITH CLERK 7369 7902 12/17/2011 800 - 20
7499 ALLEN SALESMAN 7499 7698 02/20/2011 1600 300 30
7521 WARD SALESMAN 7521 7698 02/22/2012 1250 500 30
7566 JONES MANAGER 7566 7839 04/02/2011 2975 - 20
7654 MARTIN SALESMAN 7654 7698 09/28/2011 1250 1400 30
7698 BLAKE MANAGER 7698 7839 05/01/2011 2850 - 30
7782 CLARK MANAGER 7782 7839 06/09/2011 2450 - 10
7788 SCOTT ANALYST 7788 7566 04/19/2017 3000 - 20
7839 KING PRESIDENT 7839 - 11/17/2011 5000 - 10
7844 TURNER SALESMAN 7844 7698 09/08/2011 1500 0 30
7876 ADAMS CLERK 7876 7788 05/23/2017 1100 - 20
7900 JAMES CLERK 7900 7698 12/03/2011 950 - 30
7902 FORD ANALYST 7902 7566 12/03/2011 3000 - 20
7934 MILLER CLERK 7934 7782 01/03/2012 1300 - 10
14 rows selected. 0.02 seconds
Run By RPRAJJWAL23@TBC.EDU.NP
Parsing Schema WKSP_PRAJJWALC7466869
Script Started Saturday, November 23, 2024
9:24 AM
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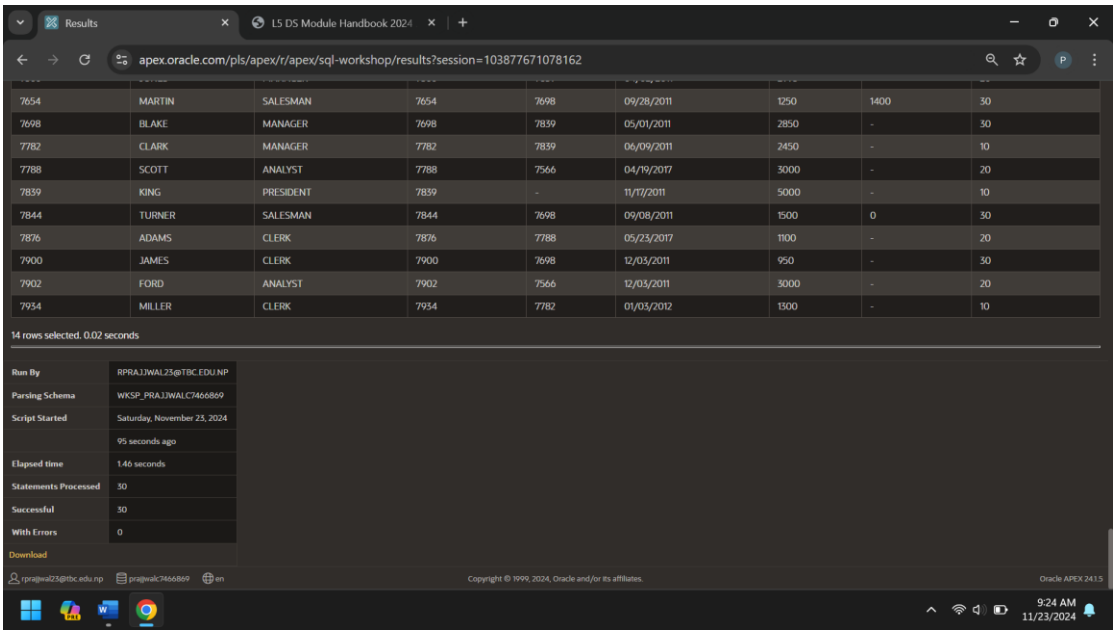
Results
L5 DS Module Handbook 2024
apex.oracle.com/pls/apex/r/apex/sql-workshop/results?session=103877671078162
7654 MARTIN SALESMAN 7654 7698 09/28/2011 1250 1400 30
7698 BLAKE MANAGER 7698 7839 05/01/2011 2850 - 30
7782 CLARK MANAGER 7782 7839 06/09/2011 2450 - 10
7788 SCOTT ANALYST 7788 7566 04/19/2017 3000 - 20
7839 KING PRESIDENT 7839 - 11/17/2011 5000 - 10
7844 TURNER SALESMAN 7844 7698 09/08/2011 1500 0 30
7876 ADAMS CLERK 7876 7788 05/23/2017 1100 - 20
7900 JAMES CLERK 7900 7698 12/03/2011 950 - 30
7902 FORD ANALYST 7902 7566 12/03/2011 3000 - 20
7934 MILLER CLERK 7934 7782 01/03/2012 1300 - 10
14 rows selected. 0.02 seconds
Run By RPRAJJWAL23@TBC.EDU.NP
Parsing Schema WKSP_PRAJJWALC7466869
Script Started Saturday, November 23, 2024
95 seconds ago
Elapsed time 1.46 seconds
Statements Processed 30
Successful 30
With Errors 0
Download
rpraj@wal23@tbc.edu.np
praj@walc7466869
en
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Oracle APEX 24.1.5
9:24 AM
11/23/2024

References

Geeks, G. f., n.d. *geeksforgeeks.* [Online]
Available at: https://www.geeksforgeeks.org/introduction-of-database-normalization/
[Accessed 23 November 2024].

Leeds Beckett University. (2024). Entity Relationship Modeling. *COMP416 - Fundamentals of Databases (Module Code: 14797)*. Available at: https://my.leedsbeckett.ac.uk/webapps/blackboard/execute/content/file?cmd=view&content_id=_4991214_1&course_id=_166533_1 (Accessed: 24 November 2024).

thomas Connolly, C. B., n.d. *Datbase Systems A Practical Approach To Design, Implementation and Management.* Fourth Edition ed. s.l.:Pearson Education, Ltd..

w3schools, n.d. *w3schools.* [Online]
Available at: https://www.w3schools.com/sql/sql_join.asp
[Accessed 21 November 2024].

Leeds Beckett University (2024) *COMP560 - Database Systems - 14800 - AUT - 202410*. Available at: https://my.leedsbeckett.ac.uk/ultra/courses/_174548_1/cl/outline (Accessed: 25 November 2024).

Appendix H – Originality and Use of Generative Artificial Intelligence (GAI) Statement

I understand that to use the work and ideas of others, including generative AI output, without full acknowledgement, is academic unfair practice.

I confirm that this coursework submission is all my own, original work and that all sources, summaries, paraphrases and quotes are fully referenced as required by the LBU Academic Regulations.

DECLARATION OF GENERATIVE AI USE (This is an example, you can modify, adapt, delete as appropriate):

I did use Generative AI technology in the development, writing, or editing of this assignment. I have included a copy of the reference used, and the output generated in the Appendix section. If you have any concerns about whether you have used generative AI tools (in)correctly, please seek advice before submitting your assignment from academic staff responsible for the assessment that this submission relates to. The shaded boxes are examples to help you with completing this section.

Numbering	Generative AI Tool (e.g. ChatGPT)	How generative AI Tool was used	Reference
1	ChatGPT 4	in simple terms explain to me how to conduct database normalization up to the third normal form	OpenAI. (2024). ChatGPT (Feb 22 version) [Large language model]. https://chat.openai.com/chat Output: **Database normalization is a process to organize a database into a structure that reduces redundancy and improves data integrity. Here's a simple explanation of how to normalize a database up to the Third Normal Form (3NF):** **Step 1: Understand the Data** • **Write down all the data you need and think of it in terms of a table with columns (attributes) and rows (records).** • **Identify what the data represents (e.g., customers, orders, products).** **Step 2: First Normal Form (1NF)** **Goal: Eliminate duplicate columns and ensure each column contains only atomic (indivisible) values.** 1. **Ensure each cell in the table has a single value.** ○ **Bad example: A "Phone Numbers" column containing "123-456, 789-012".** ○ **Fix: Split into separate rows or create a separate table for**

			phone numbers. 2. Ensure each column contains values of the same type. ○ Example: A "Date" column should only have dates, not names or amounts. 3. Ensure the table has a unique identifier (Primary Key). ○ Add a column that uniquely identifies each row, like CustomerID.
			Step 3: Second Normal Form (2NF) Goal: Eliminate partial dependency. A column should depend on the entire primary key, not just part of it. 1. Start with a 1NF table. 2. Remove partial dependencies: ○ If the primary key is made of multiple columns, make sure all non-key columns depend on the entire primary key. ○ Example: In a table where the primary key is OrderID + ProductID, if "CustomerName" only depends on OrderID, move it to a separate table. 3. Create separate tables for related data and use foreign keys. ○ Example: Split a single table into Orders and Products.
			Step 4: Third Normal Form (3NF) Goal: Eliminate transitive dependency. Non-key columns should depend only on the primary key, not other non-key columns. 1. Start with a 2NF table. 2. Remove transitive dependencies: ○ Example: In a table with OrderID, CustomerID, and CustomerAddress, if CustomerAddress depends on CustomerID (not OrderID), move CustomerAddress to a separate Customers table.
			Final Example Starting Table: OrderID ProductID ProductName CustomerID CustomerName CustomerAddress 1NF:

			• **Split multi-valued attributes (e.g., one product per row).** • **Add a primary key like OrderID + ProductID.** **2NF:** • **Create separate tables for Products and Customers.** ○ **Products: ProductID, ProductName.** ○ **Customers: CustomerID, CustomerName, CustomerAddress.** **3NF:** • **Ensure no transitive dependencies. Move CustomerAddress to the Customers table since it depends on CustomerID.** **Resulting Tables** 1. **Orders: OrderID, CustomerID, ProductID** 2. **Products: ProductID, ProductName** 3. **Customers: CustomerID, CustomerName, CustomerAddress** **By this point, your database is organized, redundant data is minimized, and relationships are clearly defined!** **5**