

Creating and Managing Tables

EX_NO:1

DATE:

1.Create the DEPT table based on the DEPARTMENT following the table instance chart below. Confirm that the table is created.

Column name	ID	NAME
Key Type		
Nulls/Unique		
FK table		
FK column		
Data Type	Number	Varchar2
Length	7	25

QUERY:

```
Create table DEPT(dept_id number(7),name varchar2(25));
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected. Below it, 'SQL Workshop' is active. The main area is titled 'SQL Commands'. The schema is set to 'WKSP_050DBMS'. A single line of SQL code is entered: 'create table DEPT (dept_id number(7) not null, Name varchar2(20));'. The 'Run' button is visible at the bottom right of the command input field. At the bottom of the page, the results section shows the message 'Table created.' and a execution time of '0.04 seconds'. The footer includes copyright information for Oracle and links to euphoria and en.

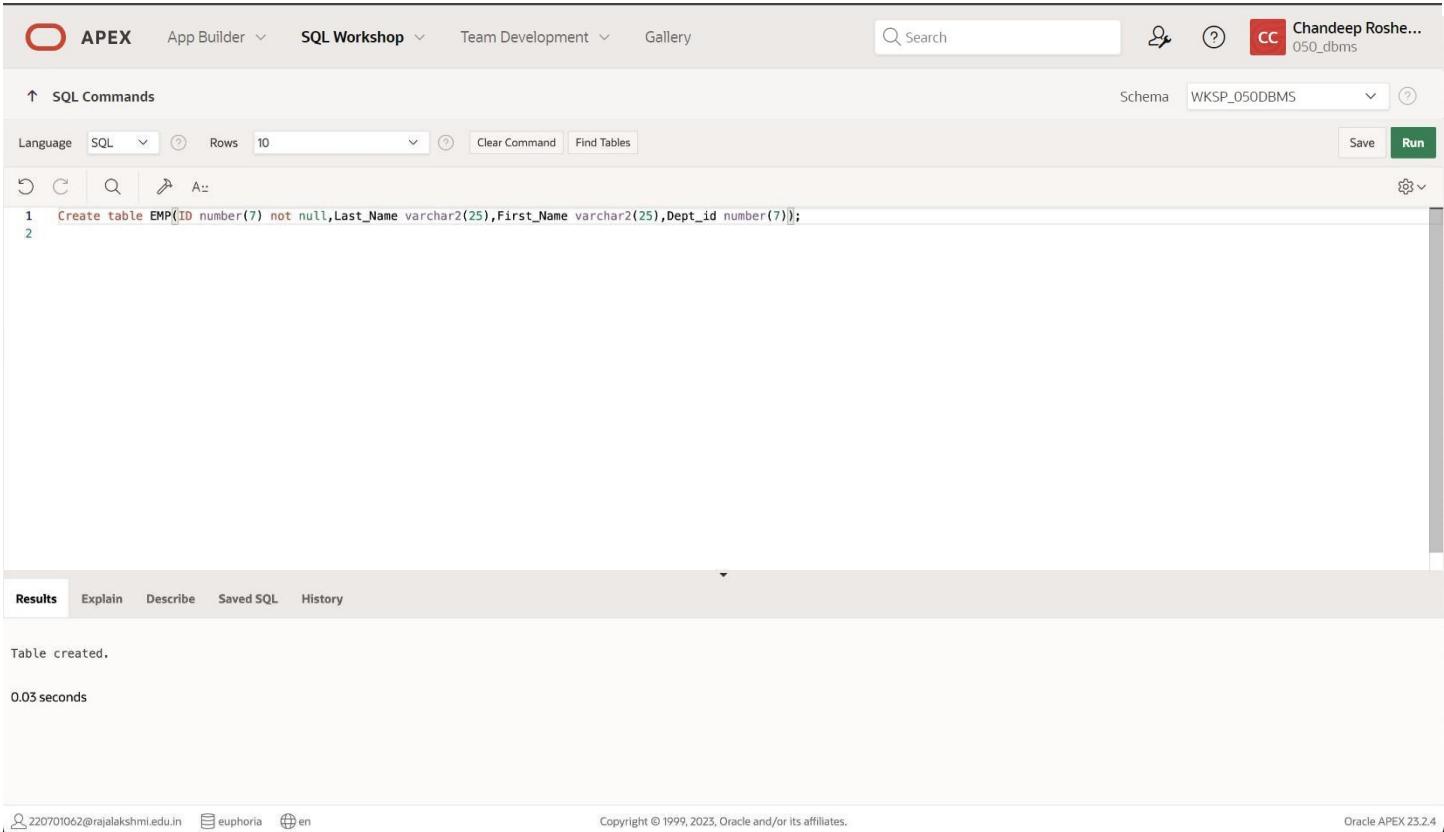
2.Create the EMP table based on the following instance chart. Confirm that the table is created.

Column name	ID	LAST_NAME	FIRST_NAME	DEPT_ID
Key Type				
Nulls/Unique				
FK table				
FK column				
Data Type	Number	Varchar2	Varchar2	Number
Length	7	25	25	7

QUERY:

Create table EMP(dept_id number(7) not null,Last_Name varchar2(25),First_Name varchar2(25),Dept_id number(7));

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. In the SQL Commands tab, the following SQL code is entered:

```

1 Create table EMP(ID number(7) not null,Last_Name varchar2(25),First_Name varchar2(25),Dept_id number(7));
2

```

The 'Run' button is highlighted in green at the top right of the editor area. Below the editor, the 'Results' tab is selected. The output pane displays the message "Table created." and "0.03 seconds". At the bottom, there are footer links for user profile, session status, copyright notice, and version information.

3.Modify the EMP table to allow for longer employee last names. Confirm the modification.(Hint: Increase the size to 50)

QUERY:

```
Alter table EMP modify(Last_Name varchar2(50));
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile for 'Chandeep Roshe... 050_dbms' are also present. The main workspace is titled 'SQL Commands' and contains the following content:

```
1 Alter table EMP modify(Last_Name varchar2(50));
```

Below the command, the results tab is selected, showing the output:

```
Table altered.
```

Execution details indicate it took 0.04 seconds. The bottom of the screen displays copyright information for Oracle and the APEX version.

4.Create the EMPLOYEES2 table based on the structure of EMPLOYEES table. Include Only the Employee_id, First_name, Last_name, Salary and Dept_id columns. Name the columns Id, First_name, Last_name, salary and Dept_id respectively.

QUERY:

Create table EMPLOYEES2(emp_id number(7),first_name varchar2(25),Last_name

varchar2(25),Salary int(8,2),Dept_id number(7)); **OUTPUT:**

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected. The main area is titled 'SQL Commands'. The schema is set to 'WKSP_050DBMS'. A single SQL command is entered in the text area:

```
1 Create table EMPLOYEES2(emp_id number(7),first_name varchar2(25),Last_name varchar2(25),Salary int(8,2),Dept_id number(7));
```

The 'Results' tab is selected at the bottom. The output shows:

Table created.
0.04 seconds

At the bottom left, there are user profile icons for '220701062@rajalakshmi.edu.in', 'euphoria', and 'en'. At the bottom right, it says 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and 'Oracle APEX 23.2.4'.

QUERY:

Drop table EMP;

OUTPUT:

↑ SQL Commands

Language SQL Rows 10 Clear Command Find Tables

Schema

WKSP_050DBMS

Save Run

A..

1 Drop table EMP;

2 |

Results Explain Describe Saved SQL History

Table dropped.

0.09 seconds

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Oracle APEX 23.2.4

6.Rename the EMPLOYEES2 table as EMP. QUERY:

Rename EMPLOYEES2 to EMP;

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are tabs for 'APEX', 'App Builder', 'SQL Workshop' (which is selected), 'Team Development', and 'Gallery'. A search bar and user information ('Chandee... 050_dbms') are also at the top. The main area is titled 'SQL Commands' and contains a code editor with the following content:

```
1 Rename EMPLOYEES2 to EMP;
2
```

Below the code editor, there are buttons for 'Save' and 'Run'. The results tab is selected, showing the output of the command:

```
Statement processed.
```

Execution time: 0.05 seconds

At the bottom, there are footer links for '220701062@rajalakshmi.edu.in', 'euphoria', and 'en'. The copyright notice 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and the version 'Oracle APEX 23.2.4' are also present.

7.Add a comment on DEPT and EMP tables. Confirm the modification by describing the table.

QUERY:

comment on table DEPT is 'Department info'; comment
on table EMP is 'Employee info';

OUTPUT:

APEX App Builder SQL Workshop Team Development Gallery Search Chandee Roshe... 050_dbms

SQL Commands Schema WKSP_050DBMS Save Run

Language SQL Rows 10 Clear Command Find Tables

comment on table DEPT is 'Department info';

Statement processed.

0.01 seconds

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8.Drop the First_name column from the EMP table and confirm it.

QUERY:

APEX App Builder SQL Workshop Team Development Gallery Search Chandee Roshe... 050_dbms

SQL Commands Schema WKSP_050DBMS Save Run

Language SQL Rows 10 Clear Command Find Tables

Alter table EMP drop column first_name;

Table altered.

0.06 seconds

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Alter table EMP drop column first_name;

OUTPUT:

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

MANIPULATING DATA

EX_NO:2

DATE:

1.Create MY_EMPLOYEE table with the following structure

NAME	NULL?	TYPE
ID	Not null	Number(4)
Last_name		Varchar(25)
First_name		Varchar(25)
Userid		Varchar(25)

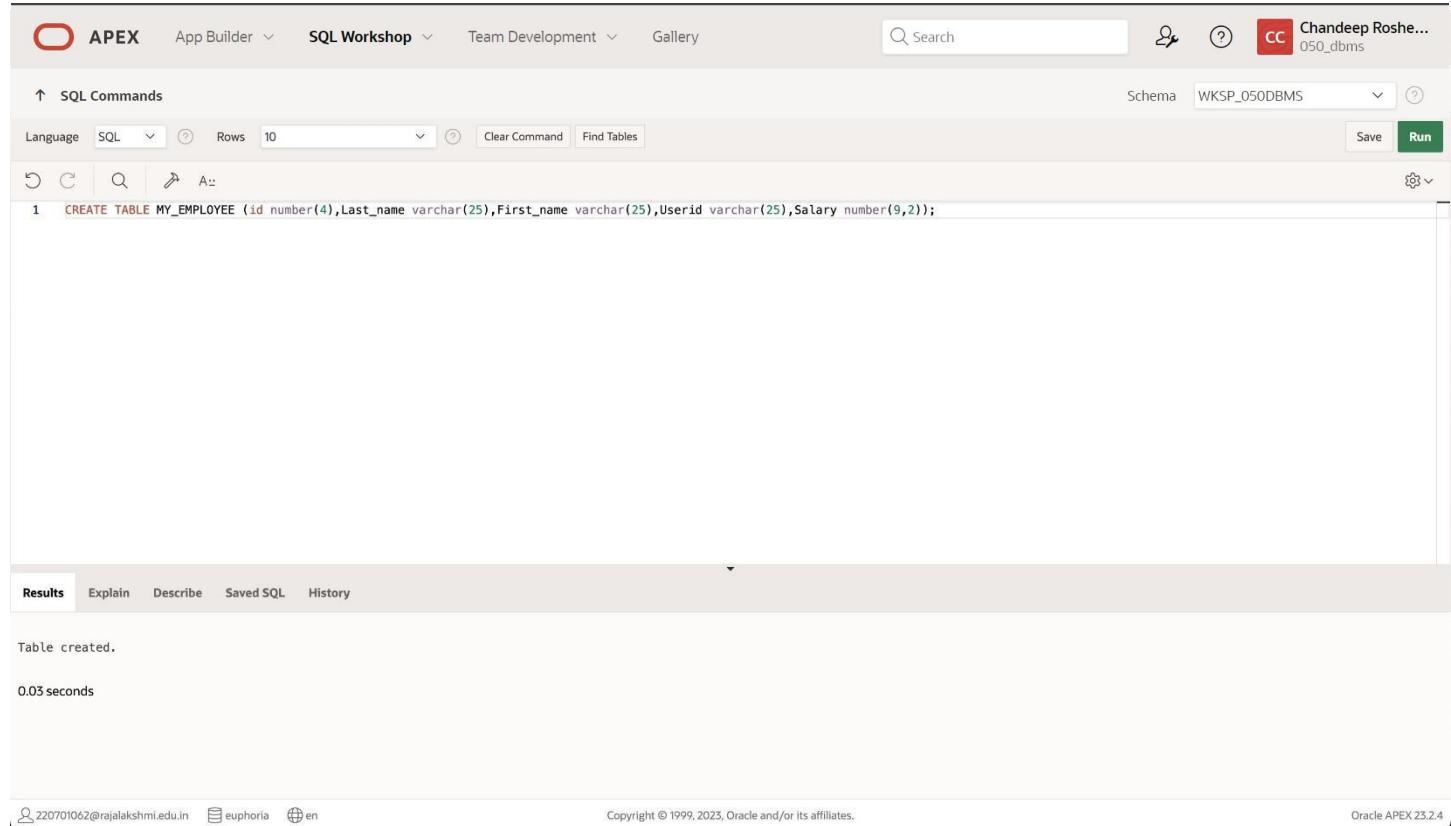
Salary		Number(9,2)
--------	--	-------------

QUERY:

CREATE TABLE MY_EMPLOYEE (id number(4),Last_name

varchar(25),First_name varchar(25),Userid varchar(25),Salary number(9,2);

OUTPUT



The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected. The main area is titled 'SQL Commands'. A single line of SQL code is entered in the command input field:

```
1 CREATE TABLE MY_EMPLOYEE (id number(4),Last_name varchar(25),First_name varchar(25),Userid varchar(25),Salary number(9,2));
```

Below the command, the 'Results' tab is active, showing the output of the query:

```
Table created.
```

At the bottom of the results, it says '0.03 seconds' and includes copyright information: 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and 'Oracle APEX 23.2.4'.

2.Add the first and second rows data to MY_EMPLOYEE table from the following sample data.

ID	Last_name	First_name	Userid	salary
1	Patel	Ralph	rpatel	895
2	Dancs	Betty	bdancs	860
3	Biri	Ben	bbiri	1100
4	Newman	Chad	Cnewman	750
5	Ropebur	Audrey	aropebur	1550

QUERY:

insert into MY_EMPLOYEE values(1,'Patel','Ralph','rpatel',895); insert

into MY_EMPLOYEE values(2,'Danes','Betty','bdanes',860); OUTPUT:

↑ SQL Commands

Language SQL Rows 10 Clear Command Find Tables

Schema

WKSP_050DBMS

Save

Run

 1 insert into MY_EMPLOYEE values(1,'Patel','Ralph','rpatel',895);
2**Results** Explain Describe Saved SQL History

1 row(s) inserted.

0.04 seconds

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Oracle APEX 23.2.4

3. Display the table with values.**QUERY:****select * from MY_EMPLOYEE;****OUTPUT:**

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user information for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL Commands section contains a code editor with the following SQL query:

```
1 select * from MY_EMPLOYEE;
2
```

Below the code editor, there are several icons for operations like Run, Save, and Find Tables. The Results tab is selected, showing the output of the query:

ID	LAST_NAME	FIRST_NAME	USERID	SALARY
1	Patel	Ralph	rpatel	895
2	Danes	Betty	bdanes	860

Below the table, it says "2 rows returned in 0.03 seconds" and has a "Download" link. At the bottom of the page, there are footer links for 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2023, Oracle and/or its affiliates, and Oracle APEX 23.2.4.

4. Populate the next two rows of data from the sample data. Concatenate the first letter of the first_name with the first seven characters of the last_name to produce Userid.

QUERY:

```
insert into MY_EMPLOYEE values (3,'Biri','Ben','bbiri',1100); insert
into MY_EMPLOYEE values (4,'Newman','Chad','Cnewman',750);
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, a user icon for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL Commands tab is selected, showing a single command: "insert into MY_EMPLOYEE values (4,'Newman','Chad','Cnewman',750);". The interface includes various icons for copy, clear, search, and refresh. Below the command input, a "History" tab is active, displaying a list of previous queries and operations. The history entries are as follows:

Date	Query	Schema
2 weeks ago	update MY_EMPLOYEE set Salary=1000 where Salary<=900; select * from MY_EMPLOYEE;	WKSP_EUPHORIA
2 weeks ago	update MY_EMPLOYEE set Salary=1000 where Salary<=900;	WKSP_EUPHORIA
2 weeks ago	update MY_EMPLOYEE set Last_Name='Drexler' where ID=3;	WKSP_EUPHORIA
2 weeks ago	update table MY_EMPLOYEE set Last_Name='Drexler' where ID=3;	WKSP_EUPHORIA
2 weeks ago	select * from MY_EMPLOYEE;	WKSP_EUPHORIA
2 weeks ago	insert into MY_EMPLOYEE values (4,'Newman','Chad','Cnewman',750);	WKSP_EUPHORIA

5. Make the data additions permanent.

QUERY:

`select * from MY_EMPLOYEE;` OUTPUT:

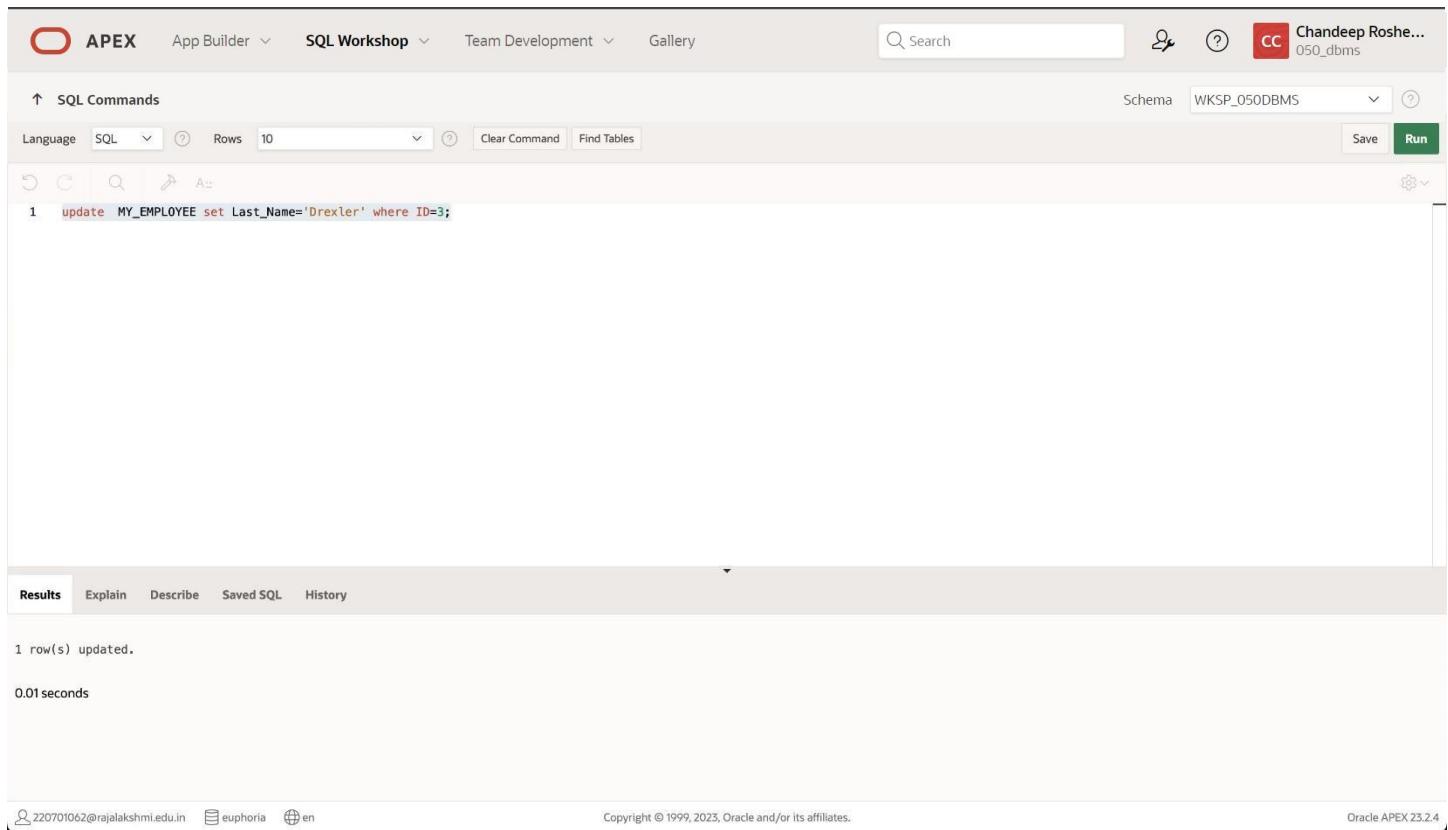
6. Change the last name of employee 3 to Drexler.

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, a user icon for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL Commands tab is selected, showing the query "select * from MY_EMPLOYEE;". The interface includes various icons for copy, clear, search, and refresh. Below the command input, a "Results" tab is active, displaying the data from the MY_EMPLOYEE table. The table has columns: ID, LAST_NAME, FIRST_NAME, USERID, and SALARY. The data is as follows:

ID	LAST_NAME	FIRST_NAME	USERID	SALARY
1	Patel	Ralph	rpatel	895
3	Biri	Ben	bbiri	1100
2	Danes	Betty	bdanes	860

At the bottom, it says "3 rows returned in 0.00 seconds" and has a "Download" link. The footer contains the copyright notice "Copyright © 1999, 2023, Oracle and/or its affiliates." and the version "Oracle APEX 23.2.4".

QUERY: update MY_EMPLOYEE set Last_Name='Drexler'
where ID=3; OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are tabs for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user information for Chandep Roshe... are also at the top. Below the tabs, there's a toolbar with icons for SQL, Rows, Clear Command, and Find Tables. The main area contains the SQL command: `update MY_EMPLOYEE set Last_Name='Drexler' where ID=3;`. The results section shows the output: "1 row(s) updated." and "0.01 seconds". The bottom of the screen displays copyright information for Oracle and the APEX version.

7.Change the salary to 1000 for all the employees with a salary less than 900.

QUERY:

update MY_EMPLOYEE set Salary=1000 where Salary<=900;

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user information for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL tab is selected in the language dropdown, with rows set to 10. The main area contains the following SQL command:

```
1 update MY_EMPLOYEE set Salary=1000 where Salary<=900;
```

Below the command, the Results tab is selected, showing the output:

```
2 row(s) updated.
```

Execution time: 0.01 seconds

At the bottom, there are footer links for 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2023, Oracle and/or its affiliates, and Oracle APEX 23.2.4.

**8.Delete Betty dances from MY_EMPLOYEE table. QUERY:
delete from MY_EMPLOYEE where First_Name='Betty';
OUTPUT:**

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user information for 'Chandeep Roshe...', and a schema dropdown set to 'WKSP_050DBMS'. Below the header, the SQL Commands section contains a command to delete a row from the 'MY_EMPLOYEE' table where 'First_Name' is 'Betty'. The results section shows the output: '1 row(s) deleted.' and a execution time of '0.01 seconds'. The bottom of the page includes copyright information and a link to Oracle APEX 23.2.4.

```
1 | Delete from MY_EMPLOYEE where First_Name='Betty';
```

Results Explain Describe Saved SQL History

1 row(s) deleted.
0.01 seconds

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9.Empty the fourth row of the emp table.

QUERY:

delete from MY_EMPLOYEE where ID=4; OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The setup is identical to the previous screenshot, with the schema set to 'WKSP_050DBMS'. The SQL Commands section contains a command to delete a row from the 'MY_EMPLOYEE' table where 'ID' is 4. The results section shows the output: '0 row(s) deleted.' and a execution time of '0.01 seconds'. This indicates that the delete operation failed because the row with ID 4 is a primary key and cannot be deleted.

```
1 | delete from MY_EMPLOYEE where ID=4;
```

Results Explain Describe Saved SQL History

0 row(s) deleted.
0.01 seconds

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Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT: INCLUDING CONSTRAINTS

EX_NO:3

DATE:

1.Add a table-level PRIMARY KEY constraint to the EMP table on the ID column.The constraint should be named at creation. Name the constraint my_emp_id_pk.

QUERY:

```
create table EMP(id number(6),last_name varchar2(25),email
varchar2(25),salary number(8,2),constraint my_emp_id_pk primary key(id));
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user information for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL tab is selected in the language dropdown, and the rows dropdown is set to 10. There are buttons for Clear Command and Find Tables. The main area contains a code editor with the following SQL command:

```
1 create table EMP(id number(6),last_name varchar2(25),email varchar2(25),salary number(8,2),constraint my_emp_id_pk primary key(id));
```

Below the code editor, there is a toolbar with icons for Undo, Redo, Search, and Paste. The results section is currently active, showing the output of the query:

Table created.
0.05 seconds

At the bottom, there are footer links for 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2023, Oracle and/or its affiliates, and Oracle APEX 23.2.4.

2. Create a PRIMARY KEY constraint to the DEPT table using the ID column. The constraint should be named at creation. Name the constraint my_dept_id_pk.

QUERY:

```
create table DEPT(id number(6),last_name varchar2(25) not null,first_name varchar2(25) not null,email varchar2(25),constraint my_dept_id_pk primary key(id));
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user information for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL Workshop toolbar includes Language (SQL), Rows (10), Clear Command, Find Tables, Save, and Run buttons. The main area contains a code editor with the following SQL command:

```
1 create table DEPT(id number(6),last_name varchar2(25) not null,first_name varchar2(25) not null,email varchar2(25),constraint my_dept_id_pk primary key(id));
```

Below the code editor, there is a toolbar with icons for refresh, search, and other operations. The results tab is selected, showing the output of the query:

Table created.
0.05 seconds

3.Add a column DEPT_ID to the EMP table. Add a foreign key reference on the EMP table that ensures that the employee is not assigned to nonexistent department. Name the constraint my_emp_dept_id_fk.

QUERY:

alter table EMP add dept_id number(5); alter table EMP add constraint my_emp_dept_id_fk foreign key(dept_id) references EMP(id); OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user profile information for Chandeep Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL tab is selected in the language dropdown, and the rows dropdown is set to 10. There are buttons for Clear Command and Find Tables. The main area contains a code editor with the following SQL command:

```
1 alter table EMP add constraint my_emp_dept_id_fk foreign key(dept_id) references EMP(id);
```

Below the code editor, there are several icons for navigating through the results. The results panel is currently active, showing the output of the query:

Table altered.
0.06 seconds

4. Modify the EMP table. Add a COMMISSION column of NUMBER data type, precision 2, scale 2. Add a constraint to the commission column that ensures that a commission value is greater than zero.

QUERY:

alter table EMP add commision number(5) check (commision>0); **OUTPUT:**

↑ SQL Commands

Schema: WKSP_050DBMS

Save Run

Language: SQL Rows: 10 Clear Command Find Tables



1 alter table EMP add commision number(5) check (commision>0);



Results Explain Describe Saved SQL History

Table altered.

0.06 seconds

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Oracle APEX 23.2.4

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

Writing Basic SQL SELECT Statements

EX_NO:4

DATE:

1. The following statement executes successfully.

Identify the Errors

```
SELECT employee_id, last_name  
sal*12 ANNUAL SALARY FROM  
employees;
```

QUERY:

```
Select employee_id, last_name, sal*12 as ANNUALSALARY from EMPLOYEES;
```

2. Show the structure of departments the table. Select all the data from it.

QUERY: desc

```
DEPARTMENTS; select *  
from DEPARTMENTS;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. The right side shows a user profile for 'Chandep Roshe... 050_dbms'. The main area is titled 'SQL Commands' with a sub-section 'desc DEPARTMENTS;'. The SQL editor has 'Language' set to 'SQL', 'Rows' to '10', and buttons for 'Clear Command' and 'Find Tables'. Below the editor is a results grid for the 'DEPARTMENTS' table, with columns: Table, Column, Data Type, Length, Precision, Scale, Primary Key, Nullable, Default, and Comment. The grid shows three rows: ID (NUMBER, 4, 0, Primary Key, Nullable), LAST_NAME (VARCHAR2, 25, -), and SALARY (NUMBER, 5, 0, Primary Key, Nullable).

3. Create a query to display the last name, job code, hire date, and employee number for each employee, with employee number appearing first.

QUERY: select employee_number, last_name, job_code, hire_date from EMPLOYEES; OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are tabs for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user information for Chandep Roshe... are also at the top. Below the tabs, there's a toolbar with icons for SQL Commands, Language (SQL selected), Rows (set to 10), Clear Command, Find Tables, Save, and Run. The main area contains the SQL command: `select employee_number, last_name, job_code, hire_date from EMPLOYEES;`. The Results tab is selected, showing a table with four columns: EMPLOYEE_NUMBER, LAST_NAME, JOB_CODE, and HIRE_DATE. The data returned is:

	EMPLOYEE_NUMBER	LAST_NAME	JOB_CODE	HIRE_DATE
1		adam	123	05/10/2020
2		eve	234	02/20/2021
3		joe	345	03/11/2024

Below the table, it says "3 rows returned in 0.01 seconds". The bottom of the page includes copyright information: Copyright © 1999, 2023, Oracle and/or its affiliates. and Oracle APEX 23.2.4.

4. Provide an alias STARTDATE for the hire date.

QUERY: select hire_date as START_DATE from EMPLOYEES;

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are tabs for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. On the right, there's a search bar, user information for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL editor contains the following code:

```
1 select hire_date as START_DATE from EMPLOYEES;
```

The results section shows the output:

START_DATE
05/10/2020
02/20/2021
03/11/2024

Below the results, it says "3 rows returned in 0.01 seconds" and has a "Download" link. The bottom of the page includes copyright information and a footer.

5. Create a query to display unique job codes from the employee table.

QUERY:

select distinct job_code from EMPLOYEES;

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are tabs for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. On the right, there's a search bar, user information for Chandee Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL editor contains the following code:

```
1 select distinct job_code from EMPLOYEES;
```

The results section shows the output:

JOB_CODE
345
234
123

Below the results, it says "3 rows returned in 0.00 seconds" and has a "Download" link. The bottom of the page includes copyright information and a footer.

OUTPUT:

6.Display the last name concatenated with the job ID , separated by a comma and space, and name the column EMPLOYEE and TITLE.

QUERY:

```
select last_name ||' , '|| job_code as "EMPLOYEE and TITLE" from EMPLOYEES;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there's a user profile for 'Chandeep Roshe...' and a schema dropdown set to 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains the following SQL code:

```
1 select last_name ||' , '|| job_code as "EMPLOYEE and TITLE" from EMPLOYEES;
```

Below the code, the results tab is selected, showing the output:

EMPLOYEE and TITLE
adam , 123
eve , 234
joe , 345

At the bottom of the results pane, it says '3 rows returned in 0.01 seconds' and has a 'Download' link. The footer of the page includes copyright information for Oracle and links for user profile, language, and help.

7.Create a query to display all the data from the employees table. Separate each column by a comma. Name the column THE_OUTPUT.

QUERY:

```
select last_name ||' , '|| job_code ||' , '|| employee_number ||' , '|| hire_date as "The Output" from EMPLOYEES;
```

OUTPUT:

APEX App Builder SQL Workshop Team Development Gallery Search Chandee Roshe... 050 dbms

SQL Commands Schema WKSP_050DBMS Save Run

Language SQL Rows 10 Clear Command Find Tables

```
1 select last_name ||' , '|| job_code ||' , '||employee_number||' , '|| hire_date as "The Output" from EMPLOYEES;
```

Results Explain Describe Saved SQL History

The Output

```
adam , 123 , 1 , 05/10/2020
eve , 234 , 2 , 02/20/2021
joe , 345 , 3 , 03/11/2024
```

3 rows returned in 0.01 seconds Download

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Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

~~RESTRICTING AND SORTING DATA~~

EX.NO.5 DATE:

Find the Solution for the following:

1. Create a query to display the last name and salary of employees earning more than 12000.

QUERY:

Select last_name ,Salary from EMP;

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected, along with 'SQL Workshop'. The schema is set to 'WKSP_050DBMS'. The SQL command entered is 'Select last_name ,Salary from EMP;'. The results section displays the following data:

LAST_NAME	SALARY
Adam	12000
Joel	12000
Henry	2000
Min	30000
eve	10000

Below the table, it says '5 rows returned in 0.01 seconds'. The bottom of the page includes copyright information and links for 'Download', 'euphoria', and 'en'.

- 2.Create a query to display the employee last name and department number for employee number 176.

QUERY:

Select last_name, dept_id from EMP where e_id=176; OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user information for Chanddeep Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL Commands section contains a command to select last_name and dept_id from the EMP table where emp_id = 176. The results section shows one row: Adam with dept_id 13. The footer includes copyright information and the Oracle APEX version.

```

1 Select last_name, dept_id from EMP where emp_id=176
2

```

LAST_NAME	DEPT_ID
Adam	13

1 rows returned in 0.00 seconds Download

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3.Create a query to display the last name and salary of employees whose salary is not in the range of 5000 and 12000. (hints: not between)

QUERY:

```

SELECT last_name , dept_id from EMP Where Salary
NOT BETWEEN 5000 AND 12000;

```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The SQL Commands section contains a query to select last_name and dept_id from the EMP table where salary is not between 5000 and 12000. The results section shows two rows: Henry with dept_id 12 and Min with dept_id 23. The footer includes copyright information and the Oracle APEX version.

```

1 SELECT last_name , dept_id from EMP
2 Where Salary NOT BETWEEN 5000 AND 12000;
3

```

LAST_NAME	DEPT_ID
Henry	12
Min	23

2 rows returned in 0.00 seconds Download

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4. Display the employee last name, job ID, and start date of employees hired between February 20,1998 and May 1,1998.order the query in ascending order by start date.(hints: between)

QUERY:

```
Select last_name, emp_id, hire_date from EMP where hire_date
between 'February 20,1998' AND 'May 1,1998'.
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. The right side shows a profile picture for 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main area has tabs for 'SQL Commands' and 'Results'. Under 'SQL Commands', the query is displayed:

```
1 Select last_name, emp_id, hire_date from EMP
2 where hire_date between 'February 20,1998' AND 'May 1,1998';
3
4
```

Under 'Results', the output is a table:

LAST_NAME	EMP_ID	HIRE_DATE
Adam	176	02/21/1998
Joel	170	04/20/1998

Below the table, it says '2 rows returned in 0.01 seconds' and there is a 'Download' link. At the bottom, it shows the user '220701062@rajalakshmi.edu.in', the session status 'euphoria', the language 'en', and the copyright notice 'Copyright © 1999, 2023, Oracle and/or its affiliates.' The bottom right corner indicates 'Oracle APEX 23.2.4'.

5. Display the last name and department number of all employees in departments 20 and 50 in alphabetical order by name.(hints: in, orderby)

QUERY:

```
Select last_name,Salary from EMP where (Salary BETWEEN 5000 AND 12000) AND
(dept_id IN(20,50)) order by last_name AS EMPLOYEE, MONTHLY SALARY;
```

OUTP

6. Display the last name and hire date of every employee who was hired in 1994.(hints: like)

QUERY:

```
Select last_name ,hire_date from EMPLOYEE where hire_date like '%1994';
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are tabs for App Builder, SQL Workshop (selected), Team Development, and Gallery. On the right, there is a search bar, a user icon for Chanddeep Roshe..., and a schema dropdown set to WKSP_050DBMS. Below the header, the SQL Commands section contains the following code:

```
1 Select last_name ,hire_date from EMPLOYEE where hire_date like '%1994';
2
```

Below the code, the Results tab is selected, showing the output of the query:

LAST_NAME	HIRE_DATE
Min	09/30/1994

Below the table, it says "1 rows returned in 0.00 seconds" and has a "Download" link. At the bottom of the page, there are footer links for 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2023, Oracle and/or its affiliates, and Oracle APEX 23.2.4.

7. Display the last name and job title of all employees who do not have a manager.(hints: is null)

QUERY:

```
Select last_name ,job_title from EMPLOYEE where manager_id is NULL;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are navigation links for App Builder, SQL Workshop, Team Development, and Gallery. On the right, there is a search bar, user profile information for 'Chandeep Roshe...', and a schema dropdown set to 'WKSP_050DBMS'. Below the header, the 'SQL Commands' tab is selected. The SQL editor contains the following code:

```

1 Select last_name ,Salary,commision from EMPLOYEE where commision is not null order by Salary,commision DESC;
2

```

Below the editor, the 'Results' tab is selected, showing the output of the query:

LAST_NAME	SALARY	COMMISION
Henry	2000	1000
eve	10000	5000
Adam	12000	3000
Joel	12000	500

4 rows returned in 0.01 seconds [Download](#)

At the bottom, there are footer links for user profile, euphoria, and en, along with copyright information: Copyright © 1999, 2023, Oracle and/or its affiliates. and Oracle APEX 23.2.4.

8. Display the last name, salary, and commission for all employees who earn commissions. Sort data in descending order of salary and commissions.(hints: is not nul,orderby)

QUERY:

Select last_name ,Salary,commission from EMPLOYEE where commission is not null order by Salary,commission DESC; OUTPUT:

9. Display the last name of all employees where the third letter of the name is a.(hints:like)

QUERY:

Select last_name from EMPLOYEE where last_name LIKE '_A%';

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected. Below it, 'SQL Workshop' is active. The main area is titled 'SQL Commands'. The schema is set to 'WKSP_050DBMS'. A search bar and user profile 'Chandeep Roshe...' are visible. The SQL editor contains the following code:

```
1 Select last_name from EMPLOYEE where last_name LIKE '_A%';
```

The results tab shows the message 'no data found'.

10. Display the last name of all employees who have an a and an e in their last name.(hints:
like)

QUERY:

**Select last_name ,job_title ,Salary from EMPLOYEE where last_name LIKE '%A%' AND
last_name LIKE '%E%'; OUTPUT:**

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected. Below it, 'SQL Workshop' is active. The main area is titled 'SQL Commands'. The schema is set to 'WKSP_050DBMS'. A search bar and user profile 'Chandeep Roshe...' are visible. The SQL editor contains the following code:

```
1 Select last_name ,job_title ,Salary from EMPLOYEE where last_name LIKE '%A%' AND last_name LIKE '%E%';
```

The results tab shows the message 'no data found'.

11. Display the last name and job and salary for all employees whose job is sales representative or stock clerk and whose salary is not equal to 2500 ,3500 or 7000.(hints:in,not in)

QUERY:

```
Select last_name AS "EMPLOYEE",Salary AS "MONTHLY SALARY" from EMPLOYEE  
where (Salary BETWEEN 5000 AND 12000) AND (dept_id IN(20,50)) order by last_name ;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there's a search bar, a user profile for 'Chandeep Roshe...', and a schema dropdown set to 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains the following SQL code:

```
1 Select last_name AS "EMPLOYEE",Salary AS "MONTHLY SALARY" from EMPLOYEE where (Salary BETWEEN 5000 AND 12000) AND (dept_id IN(20,50)) order by last_name ;  
2  
3  
4  
5
```

Below the code, the 'Results' tab is selected, showing the output of the query:

EMPLOYEE	MONTHLY SALARY
eva	10000

The results table indicates 1 row returned in 0.00 seconds. At the bottom of the page, there are footer links for 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2023, Oracle and/or its affiliates, and Oracle APEX 23.2.4.

1. Display the last name, salary, and commission for all employees whose commission amount is 20%.(hints:use predicate logic)

QUERY:

```
Select last_name ,Salary,commission from EMPLOYEE where commission=Salary*0.20;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, the user is in the 'SQL Workshop' section. The main area is titled 'SQL Commands'. A query is entered in the command editor:

```
1 Select last_name ,Salary,commision from EMPLOYEE where commision=Salary*.20;
2
```

The results tab is selected, displaying the output of the query:

LAST_NAME	SALARY	COMMISION
Adam	12000	2400

Below the table, it says '1 rows returned in 0.01 seconds' and has a 'Download' link.

At the bottom, there are user profile icons and copyright information: 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and 'Oracle APEX 23.2.4'.

Evaluation Procedure

Marks awarded

Query(5)

Execution (5)

Viva(5)

Total (15)

Faculty Signature

SINGLE ROW FUNCTIONS

EX.NO.6.

DATE:

Find the Solution for the following:

1. Write a query to display the current date. Label the column Date.

QUERY:

SELECT SYSDATE AS "DATE" FROM DUAL;

The screenshot shows the Oracle APEX interface with the SQL Workshop tab selected. In the query editor, the command `SELECT SYSDATE AS "DATE" FROM DUAL;` is entered. The results pane displays a single row with the column `SYSDATE` containing the value `03/09/2024`. The status bar at the bottom indicates "2 rows returned in 0.02 seconds".

2. The HR department needs a report to display the employee number, last name, salary, and increased by 15.5% (expressed as a whole number) for each employee. Label the column New Salary.

QUERY:

**SELECT emp_number, last_name, Salary, Salary+(15.5/100*Salary) "NEW SALARY"
From EMP;**

OUTPUT:

The screenshot shows the Oracle APEX interface with the SQL Workshop tab selected. In the query editor, the command `SELECT emp_number, last_name, salary, salary+(salary*15.5/100) "New Salary" from EMP;` is entered. The results pane displays two rows of data with columns `EMP_NUMBER`, `LAST_NAME`, `SALARY`, and `New Salary`. The data is as follows:

EMP_NUMBER	LAST_NAME	SALARY	New Salary
123	adam	12000	13860
234	eve	10000	11550

The status bar at the bottom indicates "2 rows returned in 0.02 seconds".

3 .Modify your query lab_03_02.sql to add a column that subtracts the old salary from the new salary. Label the column Increase.

QUERY:

**Select emp_number, last_name, Salary, Salary+(Salary*15/100))-Salary "Increase"
From EMP;**

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. The right side shows the user 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main area has tabs for 'SQL Commands' and 'Results'. The SQL command entered is:

```
1 SELECT emp_number , last_name , salary , (salary+(salary *15/100))-salary "Increase"
2 from emp;
```

The results tab displays the following data:

EMP_NUMBER	LAST_NAME	SALARY	Increase
123	adam	12000	1800
234	eve	10000	1500

2 rows returned in 0.01 seconds. There is a 'Download' button at the bottom.

4. Write a query that displays the last name (with the first letter uppercase and all other letters lowercase) and the length of the last name for all employees whose name starts with the letters J, A, or M. Give each column an appropriate label. Sort the results by the employees' last names.

QUERY:

**Select initcap(last_name) "Name", length(last_name) "Length of Name" from
EMP**

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. The right side shows the user 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main area has tabs for 'SQL Commands' and 'Results'. The SQL command entered is:

```
1 Select initcap(last_name) "Name", length(last_name) "Length of Name"
2 from EMP
3 where last_name like 'J%' or last_name like 'A%' or last_name like 'M%'
4 order by last_name;
```

The results tab displays the following data:

Name	Length of Name
Adam	4
Joel	4

2 rows returned in 0.01 seconds. There is a 'Download' button at the bottom.

where last_name like 'J%' or last_name like 'A%' or last_name like 'M%' order by last_name; OUTPUT:

5.Rewrite the query so that the user is prompted to enter a letter that starts the last name.For example, if the user enters H when prompted for a letter ,then the output should show all employees whose last name starts with the letter H.

QUERY:

```
select initcap(last_name) "Name", length(last_name) "Length of Name" from EMP  
where last_name like '&name%' order by last_name;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. At the top, there are tabs for App Builder, SQL Workshop (which is selected), Team Development, and Gallery. On the right, there's a search bar, a user profile icon, and a red button for 'Chandeep Roshe... 050_dbms'. Below the tabs, there are buttons for Language (SQL), Rows (10), Clear Command, Find Tables, Save, and Run. The main area contains the following SQL code:

```
1 select initcap(last_name) "Name", length(last_name) "Length of Name"  
2 from EMP  
3 where last_name like 'H%'  
4 order by last_name;  
5
```

Below the code, there are tabs for Results, Explain, Describe, Saved SQL, and History. The Results tab is selected, showing a single row of data:

Name	Length of Name
Henry	5

At the bottom left, it says '1 rows returned in 0.01 seconds' and has a 'Download' link. At the bottom right, it says 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and 'Oracle APEX 23.2.4'.

5. The HR department wants to find the length of employment for each employee. For each employee, display the last name and calculate the number of months between today and the date on which the employee was hired. Label the column MONTHS_WORKED. Order your results by the number of months employed. Round the number of months up to the closest whole number.

QUERY: `select last_name, round(months_between(sysdate,hire_date),0)`

Months_worked from EMP order by 2; OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. On the right, there's a search bar, user information for 'Chandeep Roshe...', and a schema dropdown set to 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains the following SQL code:

```
1 select last_name, round(months_between(sysdate,hire_date),0) Months_worked
2 from EMP order by 2;
```

Below the code, the 'Results' tab is selected, displaying the output in a grid format:

LAST_NAME	MONTHS_WORKED
Henry	175
eve	228
Adam	229
min	233
Joel	358

At the bottom of the results pane, it says '5 rows returned in 0.01 seconds' and provides download options. The footer includes copyright information for Oracle and the APEX version 'Oracle APEX 23.2.4'.

7. Create a report that produces the following for each employee:

<employee last name> earns <salary> monthly but wants <3 times salary>. Label the column Dream Salaries.

QUERY:

`Select last_name||' earns $'||salary||' monthly but wants $'||salary*3 "Dream Salary" from EMP; OUTPUT`

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for App Builder, SQL Workshop, Team Development, and Gallery. The user is signed in as Chandee Roshe... (050_dbms). The SQL Commands tab is active, displaying the following SQL code:

```
1 select last_name, hire_date, to_char((next_day(hire_date,'Monday')),'fmday," the "ddspth "of" month,yyyy') "REVIEW" from EMP;
```

The results section shows a table with three columns: LAST_NAME, HIRE_DATE, and REVIEW. The data is as follows:

LAST_NAME	HIRE_DATE	REVIEW
Adam	02/11/2005	monday, the fourteenth of february,2005
Joel	05/20/1994	monday, the twenty-third of may,1994
Henry	08/11/2009	monday, the seventeenth of august,2009
min	09/30/2004	monday, the fourth of october,2004
eve	03/11/2005	monday, the fourteenth of march,2005

Below the table, it says "5 rows returned in 0.00 seconds". The bottom of the page includes copyright information and a link to Oracle APEX 23.2.4.

8. Create a query to display the last name and salary for all employees. Format the salary to be 15 characters long, left-padded with the \$ symbol. Label the column SALARY.

QUERY:

Select last_name, lpad(salary,15,'\$')

Salary from EMP; OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for App Builder, SQL Workshop, Team Development, and Gallery. The user is signed in as Chandee Roshe... (050_dbms). The SQL Commands tab is active, displaying the following SQL code:

```
1 Select last_name, lpad(salary,15,'$') Salary
2 from emp;
3 |
```

The results section shows a table with two columns: LAST_NAME and SALARY. The data is as follows:

LAST_NAME	SALARY
Adam	\$\$\$\$\$\$\$\$\$\$12000
Joel	\$\$\$\$\$\$\$\$\$\$12000
Henry	\$\$\$\$\$\$\$\$\$\$20000
min	\$\$\$\$\$\$\$\$\$\$30000
eve	\$\$\$\$\$\$\$\$\$\$10000

Below the table, it says "5 rows returned in 0.01 seconds". The bottom of the page includes copyright information and a link to Oracle APEX 23.2.4.

9. Display each employee's last name, hire date, and salary review date, which is the first Monday after six months of service. Label the column REVIEW. Format the dates to appear in the format similar to "Monday, the Thirty-First of July, 2000."

QUERY:

select last_name, hire_date, to_char((next_day(hire_date,'Monday')),'fmday," the "ddspth "of" month,yyyy') "REVIEW" from EMP;

OUTPUT

10.Display the last name, hire date, and day of the week on which the employee started. Label the column DAY. Order the results by the day of the week, star'ng with Monday.

QUERY:

Select Last_name, hire_date, to_char(hire_date,'Day') "Day" from EMP order by to_char(hire_date-1,'d') **OUTPUT:**

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The right side shows a user profile for 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main area is titled 'SQL Commands' with a search bar and a 'Run' button. The code entered is:

```
1 Select Last_name, hire_date, to_char(hire_date,'Day') "Day"
2 From EMP
3 Order by to_char(hire_date-1,'d')
```

The results section displays the output of the query:

LAST_NAME	HIRE_DATE	Day
Henry	08/11/2009	Tuesday
min	09/30/2004	Thursday
Joel	05/20/1994	Friday
eve	03/11/2005	Friday
Adam	02/11/2005	Friday

Below the results, it says '5 rows returned in 0.01 seconds'. The bottom of the page includes copyright information and a footer for Oracle APEX 23.2.4.

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

DISPLAYING DATA FROM MULTIPLE TABLES

EX_NO:7

DATE:

1. Write a query to display the last name, department number, and department name for all employees.

QUERY:

```
Select e.emp_id,e.last_name,d.dept_id from employee e,department d where d.dept_id=e.dept_id;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The query entered is:

```
1 select e.emp_id,e.last_name,d.dept_id from employee e ,department d where d.dept_id=e.dept_id;
```

The results section displays the following data:

EMP_ID	LAST_NAME	DEPT_ID
176	Adam	123

1 rows returned in 0.05 seconds

2. Create a unique listing of all jobs that are in department 80. Include the location of the department in the output.

QUERY:

```
SELECT DISTINCT job_id, loc_id FROM employee e, department d WHERE e.dept_id = d.dept_id AND e.dept_id = 80;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The query entered is:

```
1 SELECT DISTINCT job_id, loc_id
2   FROM employee, department
3  WHERE e.dept_id = d.dept_id
4    AND e.dept_id = 80;
```

The results section displays the following data:

JOB_ID	LOC_ID
11	32
62	11
65	2

3 rows returned in 0.01 seconds

3. Write a query to display the employee last name, department name, location ID, and city of all employees who earn a commission

QUERY:

```
SELECT e.last_name, d.dept_name, d.loc_id, l.city FROM employee e, department d, locations l WHERE e.dept_id = d.dept_id AND d.loc_id = l.loc_id AND e.commission IS NOT NULL;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the SQL Commands pane, the following SQL code is entered:

```
1 SELECT e.last_name, d.dept_name, d.loc_id, l.city
2   FROM employee e, department d, locations l
3  WHERE e.dept_id = d.dept_id
4  AND
5    d.loc_id = l.loc_id
6  AND e.commission IS NOT NULL;
```

In the Results pane, the output is displayed as a table:

LAST_NAME	DEPT_NAME	LOC_ID	CITY
Adam	marketing	2	PALAYAMKOTTAI
Joel	BETA TESTER	11	TVL
Henry	developer	11	TVL

3 rows returned in 0.02 seconds

4. Display the employee last name and department name for all employees who have an a(lowercase) in their last names.

QUERY:

```
SELECT last_name, dept_name FROM employee e, department d WHERE e.dept_id = d.dept_id AND last_name LIKE '%a%';
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the SQL Commands pane, the following SQL code is entered:

```
1 select last_name,dept_name from employee e, department d where e.dept_id=d.dept_id and last_name like '%a%';
```

In the Results pane, the output is displayed as a table:

LAST_NAME	DEPT_NAME
Adams	BETA TESTER
Adam	marketing

2 rows returned in 0.00 seconds

5. Write a query to display the last name, job, department number, and department name for all employees who work in Toronto.

QUERY:

```
SELECT e.last_name, e.job_id, e.dept_id, d.dept_name FROM employee e JOIN department d ON (e.dept_id = d.dept_id) JOIN locations l ON (d.loc_id = l.loc_id) WHERE LOWER(l.city) = 'toronto';
```

OUTPUT:

The screenshot shows the Oracle APEX interface with the SQL Workshop tab selected. The query is displayed in the command editor:

```
1 SELECT e.last_name, e.job_id, e.dept_id, d.dept_name
2   FROM employee e JOIN department d ON (e.dept_id = d.dept_id)
3     JOIN locations l ON (d.loc_id = l.loc_id)
4   WHERE LOWER(l.city) = 'toronto';
```

The results section shows one row:

LAST_NAME	JOB_ID	DEPT_ID	DEPT_NAME
Henry	11	80	developer

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6. Display the employee last name and employee number along with their manager's last name and manager number. Label the columns Employee, Emp#, Manager, and Mgr#, Respectively

QUERY:

```
SELECT e.last_name "Employee", e.employee_id "EMP#", m.last_name "Manager", m.employee_id "Mgr#"
FROM employee e join managers m ON (e.mgr_id = m.emp_id);
```

OUTPUT:

The screenshot shows the Oracle APEX interface with the SQL Workshop tab selected. The query is displayed in the command editor:

```
1 SELECT e.last_name "Employee", e.employee_id "EMP#",
2       m.last_name "Manager", m.employee_id "Mgr#"
3     FROM employee e join managers m
4       ON (e.mgr_id = m.emp_id);
```

The results section shows three rows:

Employee	EMP#	Manager	Mgr#
Adam	176	daisy	62
Adam	176	eve	62
Joe	234	king	11

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7. Modify lab4_6.sql to display all employees including King, who has no manager. Order the results by the employee number.

QUERY:

```
SELECT e.last_name "Employee", e.emp_id "EMP#", m.last_name "Manager", m.emp_id "Mgr#"  
FROM employee e LEFT OUTER JOIN managers m ON (e.mgr_id = m.emp_id);
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The SQL Commands tab contains the query:

```
1 SELECT e.last_name "Employee", e.emp_id "EMP#",  
2       m.last_name "Manager", m.emp_id "Mgr#"  
3 FROM employee e  
4   LEFT OUTER JOIN managers m  
5     ON (e.mgr_id = m.emp_id);
```

The Results tab displays the output:

Employee	EMP#	Manager	Mgr#
dklyns	170	-	-
Adam	176	-	-
Joe	234	-	-
Mia	46	-	-
Eva	170	-	-

Rows returned in 0.02 seconds

8. Create a query that displays employee last names, department numbers, and all the employees who work in the same department as a given employee. Give each column an appropriate label

QUERY:

```
SELECT e.dept_id department, e.last_name employee, c.last_name colleague FROM employee e JOIN  
employee c ON (e.dept_id = c.dept_id) WHERE e.emp_id <> c.emp_id ORDER BY e.dept_id, e.last_name,  
c.last_name;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The SQL Commands tab contains the query:

```
1 SELECT e.dept_id department, e.last_name employee,  
2       c.last_name colleague  
3 FROM employee e JOIN employee c  
4   ON (e.dept_id = c.dept_id)  
5 WHERE e.emp_id <> c.emp_id  
6 ORDER BY e.dept_id, e.last_name, c.last_name;
```

The Results tab displays the output:

no data found

9. Show the structure of the JOB_GRADES table. Create a query that displays the name, job, department name, salary, and grade for all employees

QUERY:

```
SELECT e.last_name, e.job_id, d.dept_name, e.salary, j.grade_lvl FROM employee e JOIN department d  
ON (e.dept_id = d.dept_id) JOIN Grade j  
ON (e.salary BETWEEN j.lowest_sal AND j.highest_sal);
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. The search bar contains 'Chandee...'. The schema dropdown is set to 'WKSP_050DBMS'. The main area has tabs for 'Language' (set to 'SQL'), 'Rows' (set to 10), 'Clear Command', and 'Find Tables'. Below these are icons for 'Save' and 'Run'. The SQL command window contains the following code:

```
1 SELECT e.dept_id department, e.last_name employee,  
2       c.last_name colleague  
3  FROM employee e JOIN employee c  
4  WHERE e.dept_id = c.dept_id  
5  ORDER BY e.dept_id, e.last_name, c.last_name;
```

The results tab is selected, showing the message 'no data found'. The bottom footer includes the URL '22070102@njalakshmi.edu.in', the session name 'euphoria', and the environment 'en'. Copyright information 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and the version 'Oracle APEX 23.2.4' are also present.

10. Create a query to display the name and hire date of any employee hired after employee Davies.

QUERY:

```
SELECT e.last_name, e.hire_date FROM employee e, employee davies WHERE davies.last_name = 'Davies'  
AND davies.hire_date < e.hire_date;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. The search bar contains 'Chandee...'. The schema dropdown is set to 'WKSP_050DBMS'. The main area has tabs for 'Language' (set to 'SQL'), 'Rows' (set to 10), 'Clear Command', and 'Find Tables'. Below these are icons for 'Save' and 'Run'. The SQL command window contains the following code:

```
1 SELECT e.last_name, e.hire_date  
2  FROM employee e, employee davies  
3 WHERE davies.last_name = 'Davies'  
4  AND davies.hire_date < e.hire_date;
```

The results tab is selected, showing the message 'no data found'. The bottom footer includes the URL '22070102@njalakshmi.edu.in', the session name 'euphoria', and the environment 'en'. Copyright information 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and the version 'Oracle APEX 23.2.4' are also present.

11. Display the names and hire dates for all employees who were hired before their managers, along with their manager's names and hire dates. Label the columns Employee, Emp Hired, Manager, and Mgr Hired, respectively.

QUERY:

```
SELECT e.last_name, e.hire_date, m.last_name, m.hire_date    FROM employee e, managers m    WHERE e.mgr_id = m.emp_id AND e.hire_date < m.hire_date;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. The right side shows a user profile for 'Chandeep Roshe..'. The main area has tabs for SQL Commands, Results, Explain, Describe, Saved SQL, and History. The SQL Commands tab displays the following query:

```
1 SELECT e.last_name, e.hire_date, m.last_name, m.hire_date
2   FROM employee e, managers m
3  WHERE e.mgr_id = m.emp_id
4    AND e.hire_date < m.hire_date;
5
```

The Results tab shows the output of the query:

LAST_NAME	HIRE_DATE	LAST_NAME	HIRE_DATE
Adam	02/21/1998	daisy	11/03/2005

Below the table, it says '1 rows returned in 0.01 seconds' and provides download options. The bottom of the page includes copyright information and a footer for Oracle APEX 23.2.4.

Evaluation Procedure	Marks awarded
Query(5)	

Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

AGGREGATING DATA USING GROUP FUNCTIONS

EX_NO:8

DATE:

1. Group functions work across many rows to produce one result per group. True/False

TRUE

2. Group functions include nulls in calculations.

True/False

FALSE

3.The WHERE clause restricts rows prior to inclusion in a group calculation.
True/False

FALSE

4.Find the highest, lowest, sum, and average salary of all employees. Label the columns Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest whole number

QUERY:

```
SELECT ROUND(MAX(salary),0) "Maximum",ROUND(MIN(salary),0)  
"Minimum",ROUND(SUM(salary),0) "Sum",ROUND(AVG(salary),0) "Average" FROM employee;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user information for 'Chandeep Roshe...' are also present. The main workspace is titled 'SQL Commands' and contains the following SQL code:

```
1 SELECT ROUND(MAX(salary),0) "Maximum",  
2 ROUND(MIN(salary),0) "Minimum",  
3 ROUND(SUM(salary),0) "Sum",  
4 ROUND(AVG(salary),0) "Average"  
5 FROM employee;
```

Below the code, the 'Results' tab is selected, displaying the output:

Maximum	Minimum	Sum	Average
30000	2000	66000	13200

The results section notes '1 rows returned in 0.00 seconds' and includes a 'Download' link. The bottom of the page shows user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and the software version (Oracle APEX 25.2.4).

5.Modify the above query to display the minimum, maximum, sum, and average salary for each job type.

QUERY:

```
SELECT job_id, ROUND(MAX(salary),0) "Maximum",
       ROUND(MIN(salary),0) "Minimum",
       ROUND(SUM(salary),0) "Sum",
       ROUND(AVG(salary),0) "Average"
  FROM employee
 GROUP BY job_id;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. The right side shows a user profile for Chandee Roshe... (050_dbms). The main area has tabs for SQL Commands, Results, Explain, Describe, Saved SQL, and History. The SQL Commands tab displays the query code with line numbers 1 through 6. The Results tab shows the output in a grid format:

JOB_ID	Maximum	Minimum	Sum	Average
62	12000	12000	12000	12000
63	12000	12000	12000	12000
11	2000	2000	2000	2000
-	30000	10000	40000	20000

Below the grid, it says "4 rows returned in 0.01 seconds" and there is a "Download" link. The bottom footer includes user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and version information (Oracle APEX 23.2.4).

6. Write a query to display the number of people with the same job. Generalize the query so that the user in the HR department is prompted for a job title.

QUERY:

```
SELECT job_id, COUNT(*)
```

```
FROM employee
```

```
GROUP BY job_id;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile are also present. The main workspace is titled 'SQL Commands' and contains the following SQL code:

```
1 SELECT job_id, COUNT(*)
2 FROM employee
3 GROUP BY job_id;
```

The results section displays the output of the query:

JOB_ID	COUNT(*)
62	1
63	1
11	1
-	2

Below the results, it says '4 rows returned in 0.01 seconds' and provides a 'Download' link. The bottom footer includes copyright information and the version 'Oracle APEX 23.2.4'.

7.Determine the number of managers without listing them. Label the column Number of Managers. Hint:
Use the MANAGER_ID column to determine the number of managers.

QUERY:

```
SELECT COUNT(DISTINCT mgr_id) "Number of Managers" FROM employee;
```

OUTPUT:

The screenshot shows the Oracle APEX interface with the SQL Workshop module selected. In the SQL Commands section, the query `SELECT COUNT(DISTINCT mgr_id) "Number of Managers" FROM employee;` is entered. The Results tab is selected, displaying the output: `3`. Below the results, it says `1 rows returned in 0.01 seconds`.

Number of Managers	
3	

1 rows returned in 0.01 seconds Download

8.Find the difference between the highest and lowest salaries. Label the column DIFFERENCE

QUERY:

```
SELECT MAX(salary) - MIN(salary) DIFFERENCE FROM employee;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile information for 'Chandeep Roshe...' are also present. The main workspace is titled 'SQL Commands' and contains the following content:

Language: SQL | Rows: 10 | Clear Command | Find Tables | Schema: WKSP_050DBMS | Save | Run

SQL command entered:

```
1 SELECT MAX(salary) - MIN(salary) DIFFERENCE FROM employee;
```

The results section shows the output of the query:

DIFFERENCE
28000

1 rows returned in 0.00 seconds | Download

At the bottom of the page, there are footer links for user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and system information (Oracle APEX 23.2.4).

9.Create a report to display the manager number and the salary of the lowest-paid employee for that manager. Exclude anyone whose manager is not known. Exclude any groups where the minimum salary is \$6,000 or less. Sort the output in descending order of salary.

QUERY:

```
SELECT mgr_id, MIN(salary)FROM employee
```

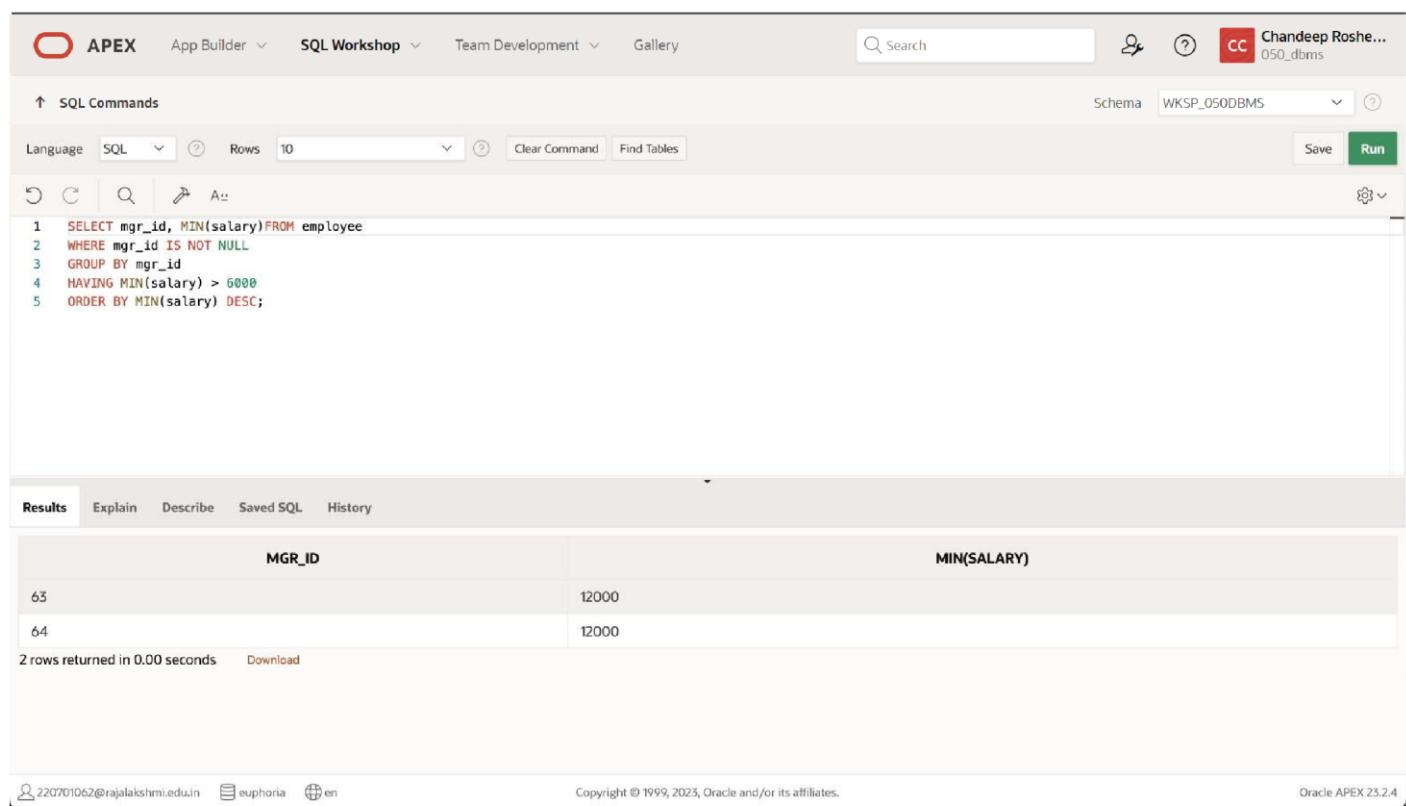
```
WHERE mgr_id IS NOT NULL
```

```
GROUP BY mgr_id
```

```
HAVING MIN(salary) > 6000
```

```
ORDER BY MIN(salary) DESC;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for App Builder, SQL Workshop, Team Development, and Gallery. The user's name, Chandee Roshe..., is displayed along with a profile icon. The main workspace is titled "SQL Commands". The SQL code entered is:

```
1 SELECT mgr_id, MIN(salary)FROM employee
2 WHERE mgr_id IS NOT NULL
3 GROUP BY mgr_id
4 HAVING MIN(salary) > 6000
5 ORDER BY MIN(salary) DESC;
```

The "Results" tab is selected, displaying the query results in a table:

MGR_ID	MIN(SALARY)
63	12000
64	12000

Below the table, it says "2 rows returned in 0.00 seconds" and there is a "Download" link. At the bottom of the page, there are footer links for 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2023, Oracle and/or its affiliates., and Oracle APEX 23.2.4.

10.Create a query to display the total number of employees and, of that total, the number of employees hired in 1995, 1996, 1997, and 1998. Create appropriate column headings

QUERY:

```
SELECT COUNT(*) total,SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1995,1,0))"1995",
      SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1996,1,0))"1996",
      SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1997,1,0))"1997",
      SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1998,1,0))"1998"FROM employee;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile information ('Chandee Roshe... 050_dbms') are also present. The main workspace displays the SQL command entered by the user:

```
1 SELECT COUNT(*) total,SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1995,1,0))"1995",
2 SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1996,1,0))"1996",
3 SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1997,1,0))"1997",
4 SUM(DECODE(TO_CHAR(hire_date, 'YYYY'),1998,1,0))"1998"FROM employee;
```

The results section shows the output of the query:

TOTAL	1995	1996	1997	1998
5	0	0	0	2

Below the results, it says "1 rows returned in 0.01 seconds" and provides a "Download" link.

The bottom of the page includes footer links for 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2025, Oracle and/or its affiliates, and Oracle APEX 25.2.4.

11.Create a matrix query to display the job, the salary for that job based on department number, and the total salary for that job, for departments 20, 50, 80, and 90, giving each column an appropriate heading

QUERY:

```
SELECT job_id "Job",
       SUM(DECODE(department_id , 20, salary)) "Dept 20",
       SUM(DECODE(department_id , 50, salary)) "Dept 50",
       SUM(DECODE(department_id , 80, salary)) "Dept 80",
       SUM(DECODE(department_id , 90, salary)) "Dept 90",SUM(salary) "Total"FROM employee
GROUP BY job_id;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user information for 'Chandeep Roshe...' are also present. The main workspace displays the SQL command entered by the user:

```
1 SELECT job_id "Job",
2    SUM(DECODE(dept_id , 20, salary)) "Dept 20",
3    SUM(DECODE(dept_id , 50, salary)) "Dept 50",
4    SUM(DECODE(dept_id , 80, salary)) "Dept 80",
5    SUM(DECODE(dept_id , 90, salary)) "Dept 90",SUM(salary) "Total"FROM employee
6 GROUP BY job_id;
```

Below the command, the 'Results' tab is selected, showing the output of the query:

Job	Dept 20	Dept 50	Dept 80	Dept 90	Total
62	-	-	-	-	12000
63	-	-	-	-	12000
11	-	-	2000	-	2000
-	-	-	-	-	40000

At the bottom of the results pane, it says '4 rows returned in 0.01 seconds' and provides download options.

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12. Write a query to display each department's name, location, number of employees, and the average salary for all the employees in that department. Label the column name-Location, Number of people, and salary respectively. Round the average salary to two decimal places.

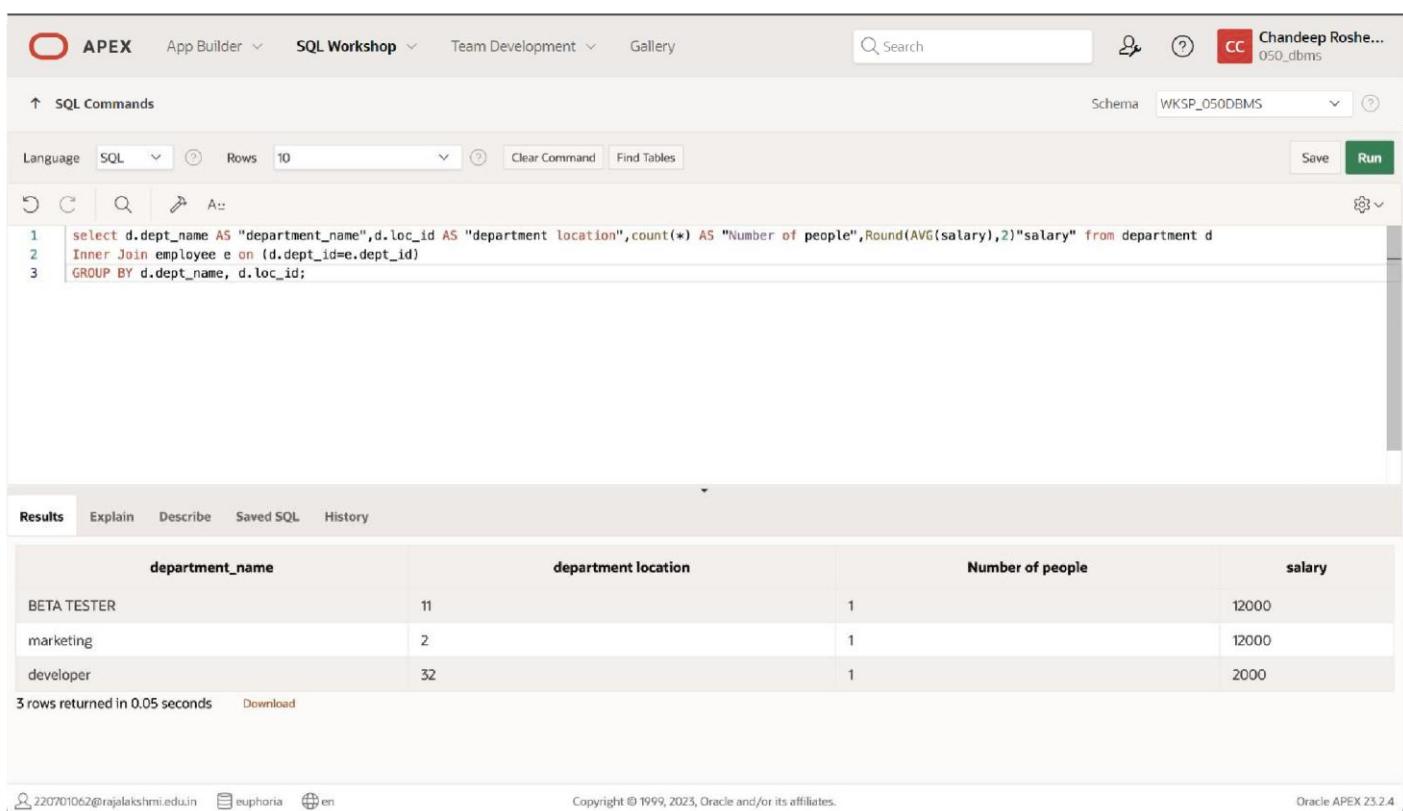
QUERY:

```
select d.dept_name AS "department_name",d.loc_id AS "department location",count(*) AS "Number of people",Round(AVG(salary),2)"salary" from department d
```

Inner Join employee e on (d.dept_id=e.dept_id)

GROUP BY d.dept_name, d.loc_id;

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The SQL command entered is:

```
1 select d.dept_name AS "department_name",d.loc_id AS "department location",count(*) AS "Number of people",Round(AVG(salary),2)"salary" from department d
2 Inner Join employee e on (d.dept_id=e.dept_id)
3 GROUP BY d.dept_name, d.loc_id;
```

The Results tab displays the output:

department_name	department location	Number of people	salary
BETA TESTER	11	1	12000
marketing	2	1	12000
developer	32	1	2000

3 rows returned in 0.05 seconds [Download](#)

At the bottom, the footer includes: 220701062@rajalakshmi.edu.in euphoria en Copyright © 1999, 2023, Oracle and/or its affiliates. Oracle APEX 23.2.4

Evaluation Procedure	Marks awarded
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

SUB-QUERIES

EX.NO:9

DATE:

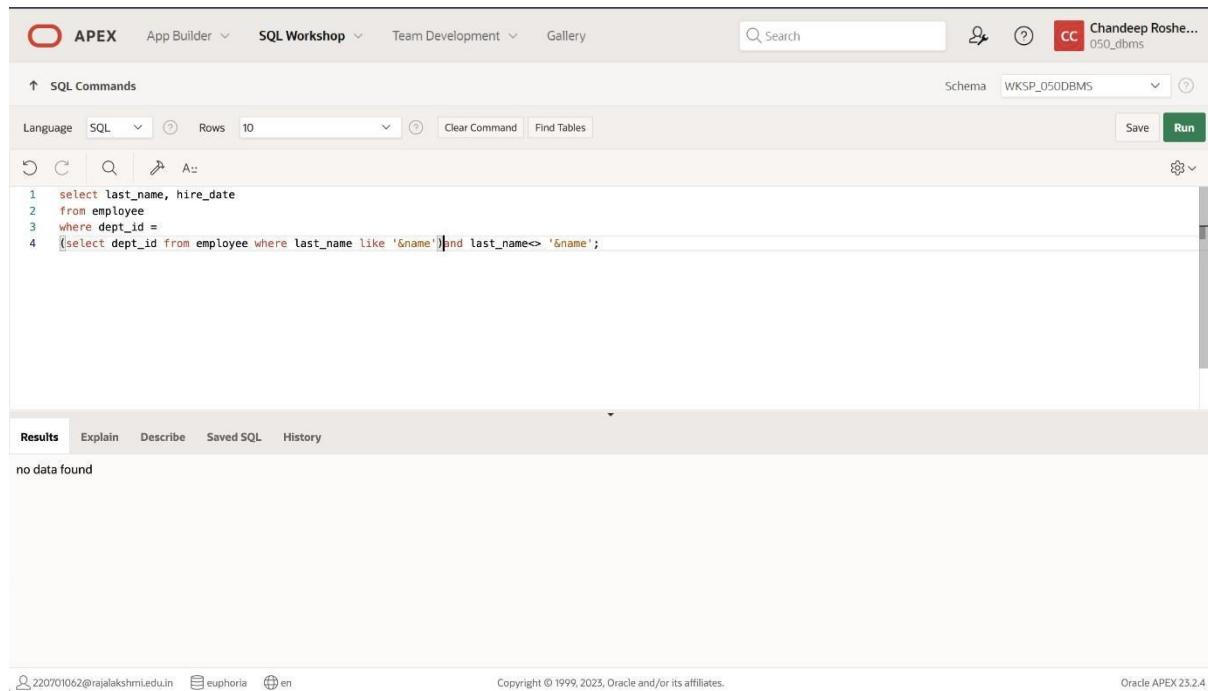
Find the Solution for the following:

1. The HR department needs a query that prompts the user for an employee last name. The query then displays the last name and hire date of any employee in the same department as the employee whose name they supply (excluding that employee). For example, if the user enters Zlotkey, find all employees who work with Zlotkey (excluding Zlotkey).

QUERY:

```
select last_name, hire_date  
from employee where  
dept_id =  
(select dept_id from employee where last_name like '&name')and  
last_name<>'&name';
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. On the right, there are user profile icons and the text "Chandeep Roshe... 050_dbms". The main workspace is titled "SQL Commands". The query editor contains the following code:

```
1 select last_name, hire_date  
2   from employee  
3  where dept_id =  
4  (select dept_id from employee where last_name like '&name')and last_name<>'&name';
```

The "Results" tab is selected at the bottom. The output area displays the message "no data found". At the very bottom of the page, there are footer links for user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2025, Oracle and/or its affiliates.), and the software version (Oracle APEX 23.2.4).

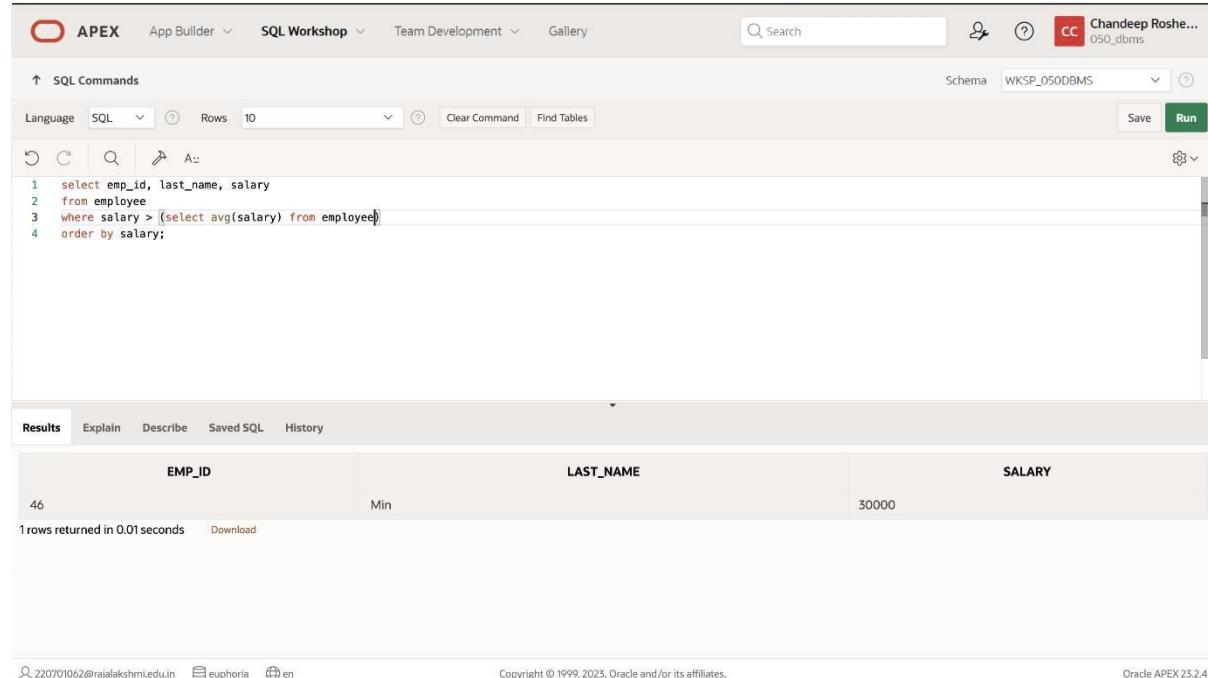
2.

Create a report that displays the employee number, last name, and salary of all employees who earn more than the average salary. Sort the results in order of ascending salary.

QUERY:

```
select emp_id, last_name, salary from employee  
where salary > (select avg(salary) from employee)  
order by salary;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The right side of the header shows the user's name, Chandeep Roshe..., and the schema, WKSP_050DBMS. Below the header, the main area has tabs for SQL Commands and Results. The SQL Commands tab contains the query code. The Results tab displays the output in a grid format with columns: EMP_ID, LAST_NAME, and SALARY. One row is shown, with EMP_ID 46, LAST_NAME Min, and SALARY 30000. At the bottom of the results grid, it says "1 rows returned in 0.01 seconds". The footer of the page includes copyright information for Oracle and the APEX version, Oracle APEX 23.2.4.

EMP_ID	LAST_NAME	SALARY
46	Min	30000

3 .Write a query that displays the employee number and last name of all employees who work in a department with any employee whose last name contains a u.

QUERY:

```
select employee_id, last_name  
from employees  
where dept_id in (select dept_id from employees where last_name like  
'%u%');
```

OUTPUT:

The screenshot shows the Oracle APEX interface with the SQL Workshop tab selected. In the SQL Commands pane, the following query is entered:

```
1 select emp_id, last_name
2 from employee
3 where dept_id in (select dept_id from employee where last_name like '%u%');
```

In the Results pane, the output is displayed as a table:

EMP_ID	LAST_NAME
170	puma

Below the table, it says "1 rows returned in 0.01 seconds".

3. The HR department needs a report that displays the last name, department number, and job ID of all employees whose department location ID is 1700.

QUERY:

```
select last_name, dept_id, job_id from employees where dept_id in
(select dept_id from department where loc_id =1700);
```

OUTPUT:

The screenshot shows the Oracle APEX interface with the SQL Workshop tab selected. In the SQL Commands pane, the following query is entered:

```
1 select last_name, dept_id, job_id
2 from employee
3 where dept_id in (select dept_id from department where loc_id =1700);
```

In the Results pane, the output is displayed as a table:

LAST_NAME	DEPT_ID	JOB_ID
Joe	80	11

Below the table, it says "1 rows returned in 0.01 seconds".

4. Create a report for HR that displays the last name and salary of every employee who reports to King.

QUERY:

```
select last_name, salary from
employees
where manager_no in (select employee_id from employees where
last_name='King');
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected. Below it, tabs for 'App Builder', 'SQL Workshop' (which is currently active), 'Team Development', and 'Gallery' are visible. On the right side of the header, there's a search bar, a help icon, and a user profile for 'Chandeep Roshe... 050_dbms'. The main workspace is titled 'SQL Commands'. It contains a code editor with the following SQL query:

```
1 select last_name, salary
2 from employee
3 where mgr_id in (select emp_id from employee where last_name='King');
```

Below the code editor, there are buttons for 'Save' and 'Run'. The results tab is selected, showing the output of the query:

LAST_NAME	SALARY
king	12000

Below the table, it says '1 rows returned in 0.01 seconds' and has a 'Download' link. At the bottom of the page, there are footer links for 'euphoria' and 'en', and copyright information: 'Copyright © 1999, 2023, Oracle and/or its affiliates.' and 'Oracle APEX 23.2.4'.

5. Create a report for HR that displays the department number, last name, and job ID for every employee in the Executive department.

QUERY:

```
select dept_id, last_name, job_id from employees where dept_id in
(select dept_id from department where dept_name = 'Executive');
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there are user profile icons for Chandeepr Roshe... and 050_dbms, along with a search bar and a help icon. The main area is titled "SQL Commands" with a "Run" button. The code entered is:

```
1 select dept_id, last_name, job_id
2 from employee
3 where dept_id in (select dept_id from department where dept_name = 'Executive');
4
```

The results tab is selected, displaying the following data:

DEPT_ID	LAST_NAME	JOB_ID
80	Joe	11

Below the table, it says "1 rows returned in 0.00 seconds". The bottom of the screen shows user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and version (Oracle APEX 23.2.4).

6. Modify the query 3 to display the employee number, last name, and salary of all employees who earn more than the average salary and who work in a department with any employee whose last name contains a u.

QUERY:

```
select employee_id, last_name, salary
from employees
```

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there are user profile icons for Chandeepr Roshe... and 050_dbms, along with a search bar and a help icon. The main area is titled "SQL Commands" with a "Run" button. The code entered is:

```
1 select emp_id, last_name, salary
2 from employee
3 where salary > (select avg(salary) from employee) and
4 dept_id in (select dept_id from employee where last_name like '%u%');
5
```

The results tab is selected, displaying the following data:

EMP_ID	LAST_NAME	SALARY
170	puma	20000

Below the table, it says "1 rows returned in 0.01 seconds". The bottom of the screen shows user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and version (Oracle APEX 23.2.4).

**where salary > (select avg(salary) from employees) and
dept_id in (select dept_id from employees where last_name like '%u%');**

OUTPUT:

Evaluation Procedure	Marks Awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

USING THE SET OPERATORS

EX.NO:10

DATE:

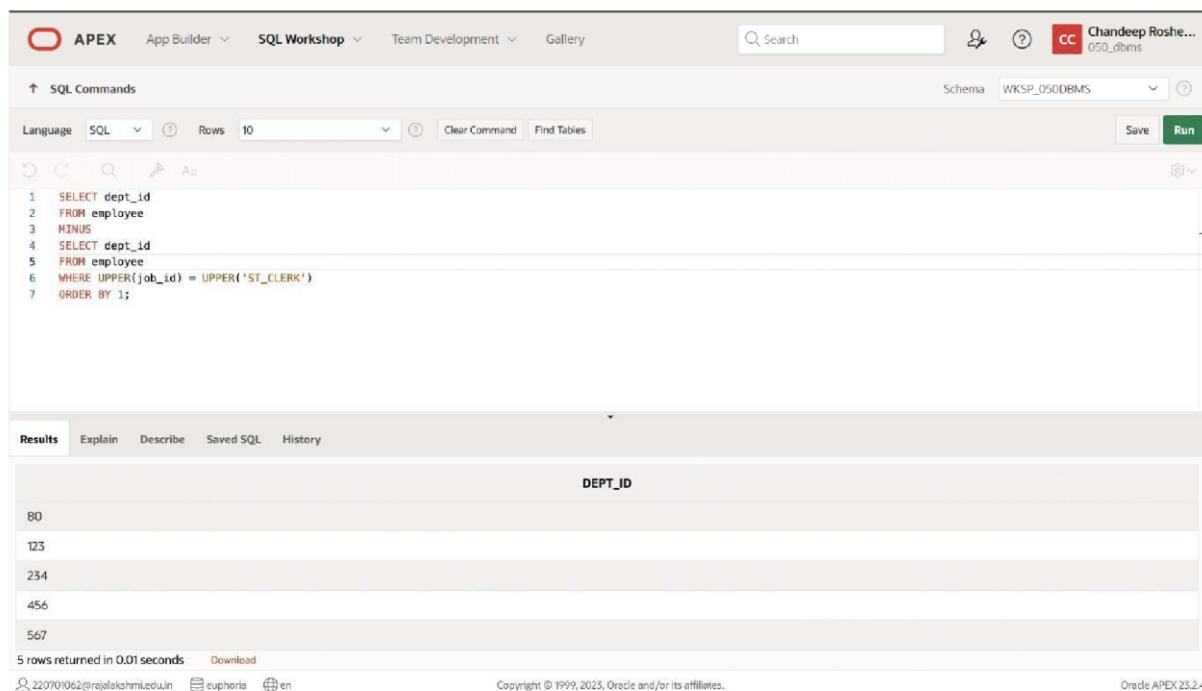
Find the Solution for the following:

1. The HR department needs a list of department IDs for departments that do not contain the job ID ST_CLERK. Use set operators to create this report.

QUERY:

```
SELECT dept_id
FROM department
MINUS
SELECT dept_id
FROM employees
WHERE job_id = 'st_clerk';
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for App Builder, SQL Workshop, Team Development, and Gallery, along with a search bar and user profile information. The main workspace is titled 'SQL Commands' and contains the following SQL code:

```
1 SELECT dept_id
2 FROM employee
3 MINUS
4 SELECT dept_id
5 FROM employee
6 WHERE UPPER(job_id) = UPPER('ST_CLERK')
7 ORDER BY 1;
```

The 'Results' tab is selected, displaying the output of the query:

DEPT_ID
80
123
234
456
567

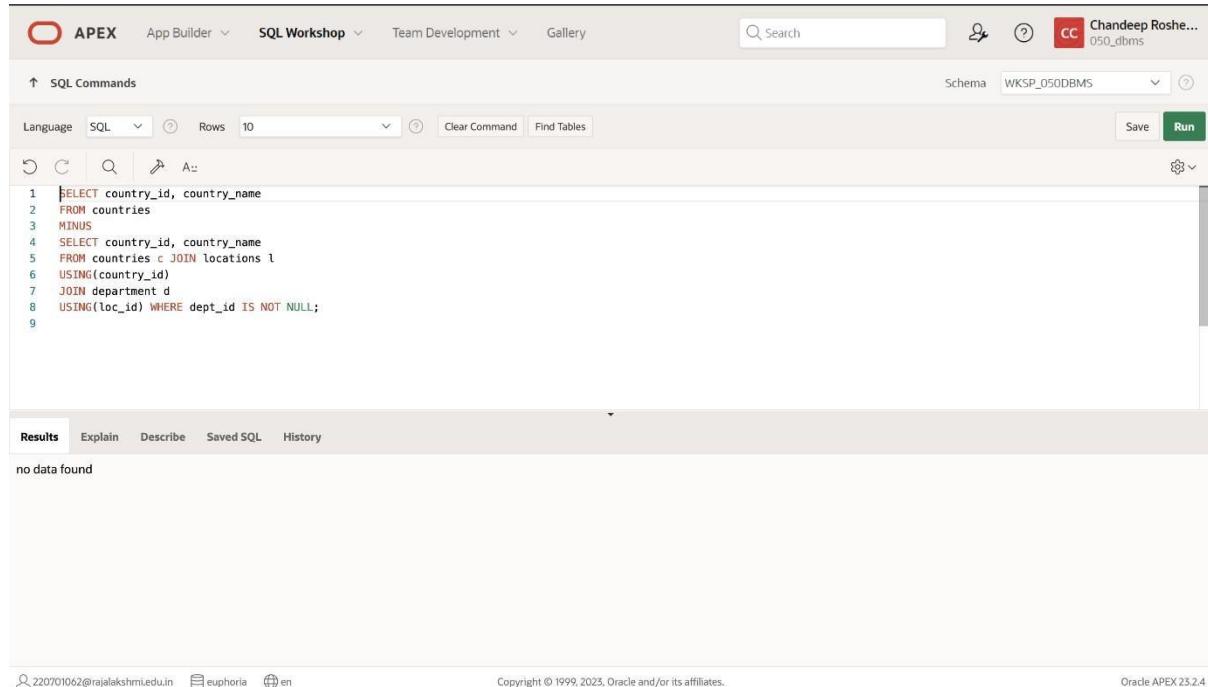
Below the results, it says '5 rows returned in 0.01 seconds'. The bottom of the screen shows copyright information for Oracle and the APEX version.

2. The HR department needs a list of countries that have no departments located in them. Display the country ID and the name of the countries. Use set operators to create this report.

QUERY:

```
SELECT country_id, country_name  
FROM countries  
MINUS  
SELECT l.country_id, c.country_name  
FROM locations l, countries c WHERE  
l.country_id = c.country_id;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. On the right, there's a search bar, user information for 'Chandep Roshe...', and a schema dropdown set to 'WKSP_050DBMS'. The main workspace displays the SQL query:

```
1 SELECT country_id, country_name  
2 FROM countries  
3 MINUS  
4 SELECT country_id, country_name  
5 FROM countries c JOIN locations l  
6 USING(country_id)  
7 JOIN department d  
8 USING(loc_id) WHERE dept_id IS NOT NULL;  
9
```

The results tab is selected, showing the message "no data found". At the bottom, the footer includes user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and the version (Oracle APEX 23.2.4).

2. Produce a list of jobs for departments 10, 50, and 20, in that order. Display job ID and department ID using set operators.

QUERY:

```
SELECT DISTINCT job_no, dept_id  
FROM employees  
WHERE dept_id = 10
```

UNION ALL

```
SELECT DISTINCT job_no, dept_id  
FROM employees  
WHERE dept_id = 50
```

UNION ALL

SELECT DISTINCT job_no, dept_id
FROM employees WHERE dept_id
= 20; **OUTPUT:**

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. A search bar and user profile are also present. The main area is titled "SQL Commands" and shows the following SQL code:

```
1 SELECT DISTINCT job_id, dept_id
2 FROM employee
3 WHERE dept_id = 10 UNION ALL
4 SELECT DISTINCT job_id, dept_id
5 FROM employee
6 WHERE dept_id = 50 UNION ALL
7 SELECT DISTINCT job_id, dept_id
8 FROM employee
9 WHERE dept_id = 20;
```

Below the code, there are tabs for "Results", "Explain", "Describe", "Saved SQL", and "History". The "Results" tab is selected, displaying the output in a grid format:

JOB_ID	DEPT_ID
62	10
63	50
11	20

Below the grid, it says "3 rows returned in 0.01 seconds" and has a "Download" link. At the bottom of the page, there are footer links for user profile, euphoria, and en, along with copyright information: "Copyright © 1999, 2025, Oracle and/or its affiliates." and "Oracle APEX 23.2.4".

4. Create a report that lists the employee IDs and job IDs of those employees who currently have a job title that is the same as their job title when they were initially hired by the company (that is, they changed jobs but have now gone back to doing their original job).

QUERY:

```
SELECT employee_id, job_no
FROM employees
INTERSECT
SELECT employee_id, job_no
FROM job_history;
```

OUTPUT:

```

1  SELECT emp_id, job_id
2  FROM employee INTERSECT
3  SELECT emp_id, job_id
4  FROM job_histories
5  ORDER BY 1;

```

EMP_ID	JOB_ID
170	63
176	62

2 rows returned in 0.01 seconds [Download](#)

5. The HR department needs a report with the following specifications:

- Last name and department ID of all the employees from the EMPLOYEES table, regardless of whether or not they belong to a department.
 - Department ID and department name of all the departments from the DEPARTMENTS table, regardless of whether or not they have employees working in them
- Write a compound query to accomplish this.

QUERY:

```

SELECT last_name,dept_id,TO_CHAR(null)
FROM employees
UNION
SELECT TO_CHAR(null),dept_id,dept_name
FROM department; OUTPUT:

```

APEX App Builder SQL Workshop Team Development Gallery Search Chandeep Roshe... 050_dbms

↑ SQL Commands Schema WKSP_050DBMS

Language SQL Rows 10 Clear Command Find Tables Save Run

```
1 SELECT last_name, dept_id, TO_CHAR('null')
2 FROM employee UNION
3 SELECT TO_CHAR('null'), dept_id, dept_name
4 FROM department
5 ORDER BY 1;
```

Results Explain Describe Saved SQL History

LAST_NAME	DEPT_ID	TO_CHAR('NULL')
Adam	10	null
Joe	20	null
Min	456	null
davies	567	null
null	80	Executive
null	123	marketing

220701062@rajalakshmi.edu.in euphoria en Copyright © 1999, 2023, Oracle and/or its affiliates. Oracle APEX 23.2.4

Marks awarded

Evaluation Procedure

Query(5)

Execution (5)

Viva(5)

Total (15)

Faculty Signature

RESULT:

CREATING VIEWS

EX_NO:11

DATE:

1.) Create a view called EMPLOYEE_VU based on the employee numbers, employee names and department numbers from the EMPLOYEES table. Change the heading for the employee name to EMPLOYEE.

QUERY:

```
CREATE OR REPLACE VIEW employees_vu AS SELECT employee_id, last_name employee,  
department_id FROM employees;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile are also present. The main workspace is titled 'SQL Commands' and contains a code editor with the following SQL statement:

```
1 CREATE OR REPLACE VIEW employees_vu AS SELECT employee_id, last_name employee, department_id FROM employees;
```

Below the code editor, there are tabs for Results, Explain, Describe, Saved SQL, and History. The Results tab is selected, displaying the message "View created." and a timestamp "0.03 seconds". At the bottom of the page, footer information includes email addresses (220701062@rajalakshmi.edu.in, euphoria, en), a copyright notice (Copyright © 1999, 2025, Oracle and/or its affiliates.), and the version "Oracle APEX 23.2.4".

2.) Display the contents of the EMPLOYEES_VU view.

QUERY:

```
select * from employees_vu;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile information for 'Chandeep Roshe...' are also present. The main workspace is titled 'SQL Commands' and contains a single line of SQL code: 'select * from employees_vu;'. The results tab is selected, displaying a table with four columns: EMPLOYEE_ID, EMPLOYEE, and DEPARTMENT_ID. The data rows are: 176 (Adam, 10), 170 (puma, 50), 234 (Joe, 20), and 46 (Min, 456). The bottom of the screen shows copyright information for Oracle and the APEX version.

EMPLOYEE_ID	EMPLOYEE	DEPARTMENT_ID
176	Adam	10
170	puma	50
234	Joe	20
46	Min	456

3.)Select the view name and text from the USER_VIEWS data dictionary views

QUERY:

```
SELECT view_name, text FROM user_views;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile information ('Chandeep Roshe... 050_dbms') are also present. The main workspace is titled 'SQL Commands' and contains the executed SQL query. The results tab is selected, displaying two rows of data from the USER_VIEWS view.

VIEW_NAME	TEXT
EMPLOYEES_VU	SELECT employee_id, last_name employee, department_id FROM employees
VIEW_D_SONGS	SELECT d_songs.id, d_songs.title "Song Title", d_songs.artist, d_songs.type_code from d_songs INNER JOIN d_types ON d_songs.type_code = d_types.code where d_types.description = 'New Age'

2 rows returned in 0.03 seconds [Download](#)

Footer information includes: 220701062@rajalakshmi.edu.in, euphoria, en, Copyright © 1999, 2023, Oracle and/or its affiliates., and Oracle APEX 23.2.4.

4.) Using your EMPLOYEES_VU view, enter a query to display all employees names and department

QUERY:

```
SELECT employee, department_id FROM employees_vu;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user information for 'Chandep Roshe...' are also present. The main workspace displays the SQL command entered:

```
1 SELECT employee, department_id FROM employees_vu;
```

Below the command, there are tabs for Results, Explain, Describe, Saved SQL, and History. The Results tab is selected, showing the output of the query:

EMPLOYEE	DEPARTMENT_ID
Adam	10
puma	50
Joe	20
Min	456

At the bottom left, there are user profile icons and the email address 220701062@rajalakshmi.edu.in. The bottom right corner indicates the version Oracle APEX 23.2.4.

5.)Create a view named DEPT50 that contains the employee number, employee last names and department numbers for all employees in department 50.Label the view columns EMPNO, EMPLOYEE and DEPTNO. Do not allow an employee to be reassigned to another department through the view.

QUERY:

```
CREATE VIEW dept50 AS SELECT employee_id empno, last_name employee, department_id deptno
FROM employees WHERE department_id = 50 WITH CHECK OPTION CONSTRAINT emp_dept_50;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. A search bar and user profile are also present. The main area is titled 'SQL Commands' with a schema dropdown set to 'WKSP_050DBMS'. The SQL editor contains the following code:

```
1 CREATE VIEW dept50 AS
2 SELECT employee_id empno, last_name employee, department_id deptno FROM employees
3 WHERE department_id = 50 WITH CHECK OPTION CONSTRAINT emp_dept_50;
```

Below the editor, there are tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab is selected, displaying the message 'View created.' and '0.02 seconds'. At the bottom, user information and copyright details are shown.



6.)

Display the structure and contents of the DEPT50 view.

QUERY:

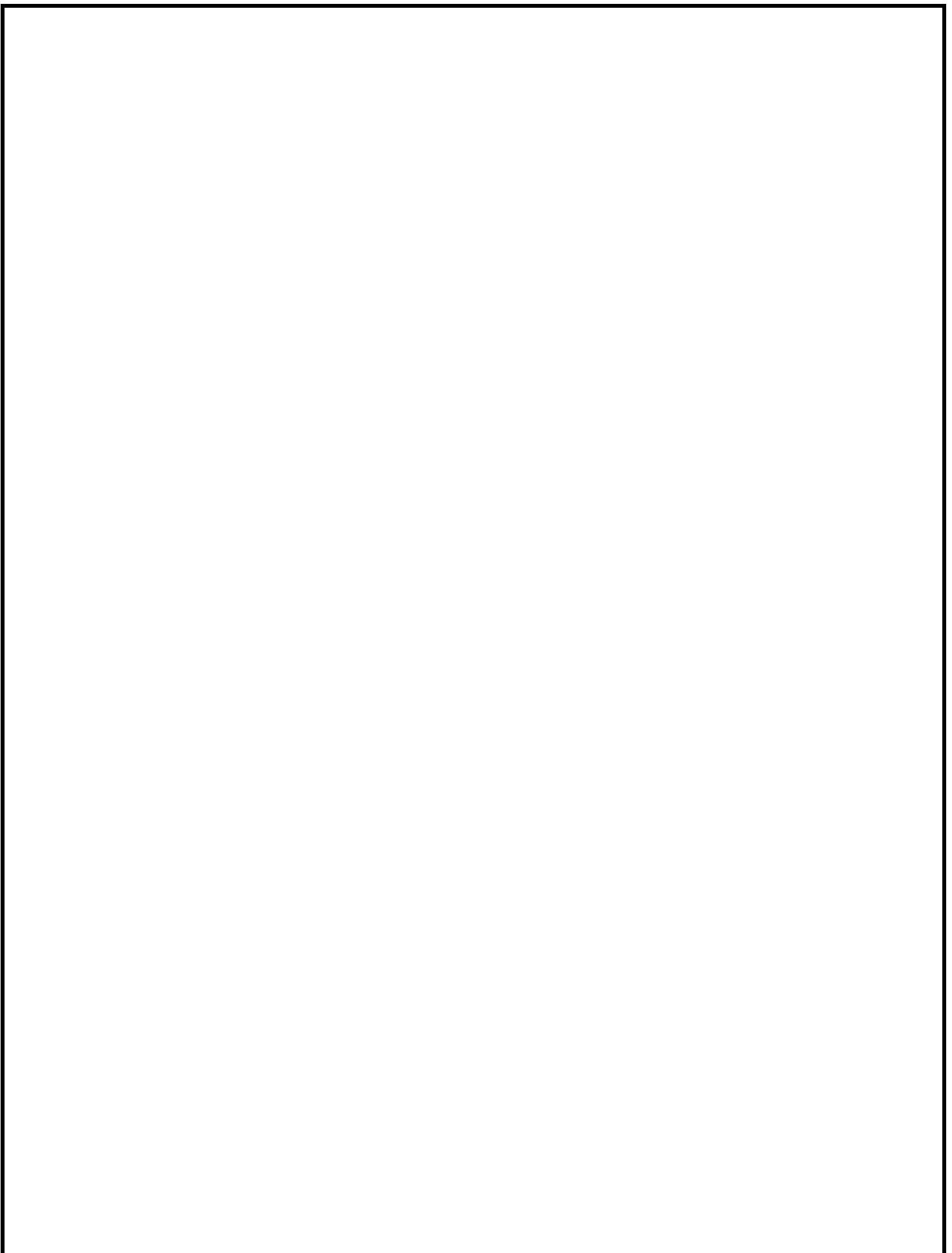
Describe dept50;

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The user is signed in as Chandee Roshe... (050_dbms). The main workspace is titled "SQL Commands". The SQL editor contains the command "1 Describe dept50;". Below the editor, the results tab is selected, showing the structure of the DEPT50 view. The results table has the following columns: Table, Column, Data Type, Length, Precision, Scale, Primary Key, Nullable, Default, and Comment. The data for the DEPT50 view is as follows:

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DEPT50	EMPNO	NUMBER	-	7	0	-	✓	-	-
	EMPLOYEE	VARCHAR2	25	-	-	-	✓	-	-
	DEPTNO	NUMBER	-	6	0	-	✓	-	-

At the bottom of the interface, there are footer links for Results, Explain, Describe (selected), Saved SQL, History, Object Type (VIEW), Object (DEPT50), and various language and copyright information.





7.)

Attempt to reassign Matos to department 80

QUERY:

```
UPDATE dept50 SET deptno=80 WHERE employee='Matos';
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile are also present. The main area is titled 'SQL Commands' and contains a text input field with the following SQL command:

```
1 UPDATE dept50 SET deptno=80 WHERE employee='Matos';
```

Below the command, the results tab is selected, showing the output of the query:

0 row(s) updated.
0.01 seconds

At the bottom, footer information includes the email 220701062@rajalakshmi.edu.in, the euphoria logo, and the copyright notice Copyright © 1999, 2023, Oracle and/or its affiliates. Oracle APEX 23.2.4.

8.)

Create a view called SALARY_VU based on the employee last names, department names, salaries, and salary grades for all employees. Use the Employees, DEPARTMENTS and JOB_GRADE tables. Label the column Employee, Department, salary, and Grade respectively.

QUERY:

```
create or replace view salary_vu as select e.last_name "Employee",d.dept_name Department,
e.salary "Salary",j.grade_level "Grades" from employees e,departments d,job_grade j where
e.department_id=d.dept_id and e.salary between j.lowest_sal and j.highest_sal;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile are also present. The main workspace is titled 'SQL Commands' and contains the following SQL code:

```
1 create or replace view salary_vu as select e.last_name "Employee",d.dept_name Department,
2 e.salary "Salary",j.grade_level "Grades"
3 from employees e,departments d,job_grade j where e.department_id=d.dept_id and e.salary
4 between j.lowest_sal and j.highest_sal;
```

Below the code, the results tab is selected, showing the message 'View created.' and a execution time of '0.02 seconds'. The bottom footer includes user information (220701062@rajalakshmi.edu.in, euphoria, en) and copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates). The version 'Oracle APEX 23.2.2' is also mentioned.

RESULT:

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

INTRO TO CONSTRAINTS: NOT NULL AND UNIQUE CONSTRAINTS

EX-NO : 12

DATE:

Global Fast Foods has been very successful this past year and has opened several new stores. They need to add a table to their database to store information about each of their store's locations. The owners want to make sure that all entries have an identification number, date opened, address, and city and that no other entry in the table can have the same email address. Based on this information, answer the following questions about the `global_locations` table. Use the table for your answers.

Global Fast Foods global_locations Table						
NAME	TYPE	LENGTH	PRECISION	SCALE	NULLABLE	DEFAULT
Id						
name						
date_opened						
address						
city						
zip/postal code						
phone						
email						
manager_id						
Emergency contact						

1. What is a “constraint” as it relates to data integrity?

Ans:

Database can be as reliable as the data in it, and database rules are implemented as Constraint to maintain data integrity.

2. What are the limitations of constraints that may be applied at the column level and at the table level?

Ans:

- Constraints referring to more than one column are defined at Table Level.
- NOT NULL constraint must be defined at column level as per ANSI/ISO SQL standard.

3. Why is it important to give meaningful names to constraints?

Ans:

- If a constraint is violated in a SQL statement execution, it is easy to identify the cause with user-named constraints.
- It is easy to alter names/drop constraint.

4. Based on the information provided by the owners, choose a datatype for each column. Indicate the length, precision, and scale for each NUMBER datatype.

Ans:

Global Fast Foods global_locations Table						
NAME	TYPE	DataType	LENGTH	PRECISION	SCALE	NULLABLE
id	pk	NUMBER	6	0		No
name		VARCHAR2	50			
date_opened		DATE				No
address		VARCHAR2	50			No
city		VARCHAR2	30			No
zip_postal_code		VARCHAR2	12			
phone		VARCHAR2	20			
email	uk	VARCHAR2	75			
manager_id		NUMBER	6	0		
emergency_contact		VARCHAR2	20			

5. Use “(nullable)” to indicate those columns that can have null values.

Ans:

Global Fast Foods global_locations Table						
NAME	TYPE	DataType	LENGTH	PRECISION	SCALE	NULLABLE
id	pk	NUMBER	6	0		No
name		VARCHAR2	50			Yes
date_opened		DATE				No
address		VARCHAR2	50			No
city		VARCHAR2	30			No
zip_postal_code		VARCHAR2	12			Yes
phone		VARCHAR2	20			Yes
email	uk	VARCHAR2	75			Yes

manager_id		NUMBER	6	0		Yes
emergency_contact		VARCHAR2	20			Yes

6. Write the CREATE TABLE statement for the Global Fast Foods locations table to define the constraints at the column level.



Ans:

```
CREATE TABLE f_global_locations
( id NUMBER(6,0) CONSTRAINT f_gln_id_pk PRIMARY KEY , name
VARCHAR2(50), date_opened DATE CONSTRAINT f_gln_dt_opened_nn NOT
NULL ENABLE, address VARCHAR2(50) CONSTRAINT f_gln_add_nn NOT
NULL ENABLE, city VARCHAR2(30) CONSTRAINT f_gln_city_nn NOT
NULL ENABLE, zip_postal_code VARCHAR2(12), phone VARCHAR2(20),
email VARCHAR2(75) CONSTRAINT f_gln_email_uk UNIQUE, manager_id
NUMBER(6,0), emergency_contact VARCHAR2(20)
);
```

7. Execute the CREATE TABLE statement in Oracle Application Express.

Ans:

Table Created.

8. Execute a DESCRIBE command to view the Table Summary information.

Ans:

```
DESCRIBE f_global_locations;
```

9. Rewrite the CREATE TABLE statement for the Global Fast Foods locations table to define the UNIQUE constraints at the table level. Do not execute this statement.

NAME	TYPE	LENGTH	PRECISION	SCALE	NULLABLE	DEFAULT
id	number	4				
loc_name	varchar2	20			X	
	date					
address	varchar2	30				
city	varchar2	20				
zip_postal	varchar2	20			X	
phone	varchar2	15			X	
email	varchar2	80			X	
manager_id	number	4			X	
contact	varchar2	40			X	

Ans:

```
CREATE TABLE f_global_locations
( id NUMBER(6,0) CONSTRAINT f_gln_id_pk PRIMARY KEY , name
VARCHAR2(50), date_opened DATE CONSTRAINT f_gln_dt_opened_nn
NOT NULL ENABLE, address VARCHAR2(50) CONSTRAINT f_gln_add_nn
NOT NULL ENABLE, city VARCHAR2(30) CONSTRAINT f_gln_city_nn
NOT NULL ENABLE, zip_postal_code VARCHAR2(12), phone
VARCHAR2(20), email VARCHAR2(75) ,
manager_id NUMBER(6,0), emergency_contact VARCHAR2(20),
CONSTRAINT f_gln_email_uk UNIQUE(email)
);
```

PRIMARY KEY, FOREIGN KEY, AND CHECK CONSTRAINTS

1. What is the purpose of a
 - PRIMARY KEY
 - FOREIGN KEY
 - CHECK CONSTRAINT

Ans:

a. PRIMARY KEY

Uniquely identify each row in table.

b. FOREIGN KEY

Referential integrity constraint links back parent table's primary/unique key to child table's column.

c. CHECK CONSTRAINT

Explicitly define condition to be met by each row's fields. This condition must be returned as true or unknown.

2. Using the column information for the animals table below, name constraints where applicable at the table level, otherwise name them at the column level. Define the primary key (animal_id). The license_tag_number must be unique. The admit_date and vaccination_date columns cannot contain null values.

Ans:

animal_id NUMBER(6) - **PRIMARY KEY**
name VARCHAR2(25) license_tag_number
NUMBER(10) - **UNIQUE** admit_date DATE -
NOT NULL adoption_id NUMBER(5),
vaccination_date DATE -**NOT NULL**

3. Create the animals table. Write the syntax you will use to create the table.

Ans:

```
CREATE TABLE animals
( animal_id NUMBER(6,0) CONSTRAINT anl_anl_id_pk PRIMARY KEY ,
name VARCHAR2(25),
license_tag_number NUMBER(10,0) CONSTRAINT anl_1_tag_num_uk
UNIQUE, admit_date DATE CONSTRAINT anl_adt_dat_nn NOT NULL
ENABLE, adoption_id NUMBER(5,0), vaccination_date DATE
CONSTRAINT anl_vcc_dat_nn NOT NULL ENABLE
);
```

-
4. Enter one row into the table. Execute a SELECT * statement to verify your input. Refer to the graphic below for input.

ANIMAL_ID	NAME	LICENSE_TAG_NUMBER	ADMIT_DATE	ADOPTION_ID	VACCINATION_DATE
101	Spot	35540	10-Oct-2004	205	12-Oct-2004

Ans:

```
INSERT INTO animals (animal_id, name, license_tag_number, admit_date, adoption_id, vaccination_date) VALUES( 101, 'Spot', 35540, TO_DATE('10-Oct-2004', 'DDMonYYYY'), 205, TO_DATE('12-Oct-2004', 'DD-Mon-YYYY'));
```

```
SELECT * FROM animals;
```

5. Write the syntax to create a foreign key (adoption_id) in the animals table that has a corresponding primary-key reference in the adoptions table. Show both the column-level and table-level syntax. Note that because you have not actually created an adoptions table, no adoption_id primary key exists, so the foreign key cannot be added to the animals table.

Ans:

COLUMN LEVEL STATEMENT:

```
ALTER TABLE animals MODIFY ( adoption_id NUMBER(5,0) CONSTRAINT  
anl_adopt_id_fk REFERENCES adoptions(id) ENABLE );
```

TABLE LEVEL STATEMENT:

```
ALTER TABLE animals ADD CONSTRAINT anl_adopt_id_fk FOREIGN KEY  
(adoption_id) REFERENCES adoptions(id) ENABLE;
```

6. What is the effect of setting the foreign key in the ANIMAL table as:

a. ON DELETE CASCADE

```
ALTER TABLE animals ADD CONSTRAINT anl_adopt_id_fk FOREIGN KEY  
(adoption_id) REFERENCES adoptions(id) ON DELETE CASCADE ENABLE ;
```

b. ON DELETE SET NULL

```
ALTER TABLE animals ADD CONSTRAINT anl_adopt_id_fk FOREIGN KEY  
(adoption_id) REFERENCES adoptions(id) ON DELETE SET NULL ENABLE ;
```

7. What are the restrictions on defining a CHECK constraint?

Ans:

- I cannot specify check constraint for a view however in this case I could use WITH CHECK OPTION clause
- I am restricted to columns from self table and fields in self row.
- I cannot use subqueries and scalar subquery expressions.

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT :

INTRO TO CONSTRAINTS: NOT NULL AND UNIQUE CONSTRAINTS

EX-NO : 12

DATE:

Global Fast Foods has been very successful this past year and has opened several new stores. They need to add a table to their database to store information about each of their store's locations. The owners want to make sure that all entries have an identification number, date opened, address, and city and that no other entry in the table can have the same email address. Based on this information, answer the following questions about the `global_locations` table. Use the table for your answers.

Global Fast Foods global_locations Table						
NAME	TYPE	LENGTH	PRECISION	SCALE	NULLABLE	DEFAULT
Id						
name						
date_opened						
address						
city						
zip/postal code						
phone						
email						
manager_id						
Emergency contact						

1. What is a “constraint” as it relates to data integrity?

Ans:

Database can be as reliable as the data in it, and database rules are implemented as Constraint to maintain data integrity.

2. What are the limitations of constraints that may be applied at the column level and at the table level?

Ans:

- Constraints referring to more than one column are defined at Table Level.
- NOT NULL constraint must be defined at column level as per ANSI/ISO SQL standard.

3. Why is it important to give meaningful names to constraints?

Ans:

- If a constraint is violated in a SQL statement execution, it is easy to identify the cause with user-named constraints.
- It is easy to alter names/drop constraint.

4. Based on the information provided by the owners, choose a datatype for each column. Indicate the length, precision, and scale for each NUMBER datatype.

Ans:

Global Fast Foods global_locations Table						
NAME	TYPE	DataType	LENGTH	PRECISION	SCALE	NULLABLE
id	pk	NUMBER	6	0		No
name		VARCHAR2	50			
date_opened		DATE				No
address		VARCHAR2	50			No
city		VARCHAR2	30			No
zip_postal_code		VARCHAR2	12			
phone		VARCHAR2	20			
email	uk	VARCHAR2	75			
manager_id		NUMBER	6	0		
emergency_contact		VARCHAR2	20			

5. Use “(nullable)” to indicate those columns that can have null values.

Ans:

Global Fast Foods global_locations Table						
NAME	TYPE	DataType	LENGTH	PRECISION	SCALE	NULLABLE
id	pk	NUMBER	6	0		No
name		VARCHAR2	50			Yes
date_opened		DATE				No
address		VARCHAR2	50			No
city		VARCHAR2	30			No
zip_postal_code		VARCHAR2	12			Yes
phone		VARCHAR2	20			Yes
email	uk	VARCHAR2	75			Yes

manager_id		NUMBER	6	0		Yes
emergency_contact		VARCHAR2	20			Yes

6. Write the CREATE TABLE statement for the Global Fast Foods locations table to define the constraints at the column level.

Ans:

```
CREATE TABLE f_global_locations
( id NUMBER(6,0) CONSTRAINT f_gln_id_pk PRIMARY KEY , name
VARCHAR2(50), date_opened DATE CONSTRAINT f_gln_dt_opened_nn NOT
NULL ENABLE, address VARCHAR2(50) CONSTRAINT f_gln_add_nn NOT
NULL ENABLE, city VARCHAR2(30) CONSTRAINT f_gln_city_nn NOT
NULL ENABLE, zip_postal_code VARCHAR2(12), phone VARCHAR2(20),
email VARCHAR2(75) CONSTRAINT f_gln_email_uk UNIQUE,
manager_id NUMBER(6,0), emergency_contact VARCHAR2(20)
);
```

7. Execute the CREATE TABLE statement in Oracle Application Express.

Ans:

Table Created.

8. Execute a DESCRIBE command to view the Table Summary information.

Ans:

```
DESCRIBE f_global_locations;
```

9. Rewrite the CREATE TABLE statement for the Global Fast Foods locations table to define the UNIQUE constraints at the table level. Do not execute this statement.

NAME	TYPE	LENGTH	PRECISION	SCALE	NULLABLE	DEFAULT
id	number	4				
loc_name	varchar2	20			X	
	date					
address	varchar2	30				
city	varchar2	20				
zip_postal	varchar2	20			X	
phone	varchar2	15			X	
email	varchar2	80			X	
manager_id	number	4			X	
contact	varchar2	40			X	

Ans:

```
CREATE TABLE f_global_locations
( id NUMBER(6,0) CONSTRAINT f_gln_id_pk PRIMARY KEY , name
VARCHAR2(50), date_opened DATE CONSTRAINT f_gln_dt_opened_nn
NOT NULL ENABLE, address VARCHAR2(50) CONSTRAINT f_gln_add_nn
NOT NULL ENABLE, city VARCHAR2(30) CONSTRAINT f_gln_city_nn
NOT NULL ENABLE, zip_postal_code VARCHAR2(12), phone
VARCHAR2(20), email VARCHAR2(75) ,
manager_id NUMBER(6,0), emergency_contact VARCHAR2(20),
CONSTRAINT f_gln_email_uk UNIQUE(email)
);
```

PRIMARY KEY, FOREIGN KEY, AND CHECK CONSTRAINTS

1. What is the purpose of a
 - PRIMARY KEY
 - FOREIGN KEY
 - CHECK CONSTRAINT

Ans:

a. PRIMARY KEY

Uniquely identify each row in table.

b. FOREIGN KEY

Referential integrity constraint links back parent table's primary/unique key to child table's column.

c. CHECK CONSTRAINT

Explicitly define condition to be met by each row's fields. This condition must be returned as true or unknown.

2. Using the column information for the animals table below, name constraints where applicable at the table level, otherwise name them at the column level. Define the primary key (animal_id). The license_tag_number must be unique. The admit_date and vaccination_date columns cannot contain null values.

Ans:

animal_id NUMBER(6) - **PRIMARY KEY**
name VARCHAR2(25) license_tag_number
NUMBER(10) - **UNIQUE** admit_date DATE -
NOT NULL adoption_id NUMBER(5),
vaccination_date DATE -**NOT NULL**

3. Create the animals table. Write the syntax you will use to create the table.

Ans:

```
CREATE TABLE animals
( animal_id NUMBER(6,0) CONSTRAINT anl_anl_id_pk PRIMARY KEY ,
  name VARCHAR2(25),
  license_tag_number NUMBER(10,0) CONSTRAINT anl_l_tag_num_uk
  UNIQUE, admit_date DATE CONSTRAINT anl_adt_dat_nn NOT NULL
  ENABLE, adoption_id NUMBER(5,0), vaccination_date DATE
  CONSTRAINT anl_vcc_dat_nn NOT NULL ENABLE
);
```


4. Enter one row into the table. Execute a SELECT * statement to verify your input. Refer to the graphic below for input.

ANIMAL_ID	NAME	LICENSE_TAG_NUMBER	ADMIT_DATE	ADOPTION_ID	VACCINATION_DATE
101	Spot	35540	10-Oct-2004	205	12-Oct-2004

Ans:

```
INSERT INTO animals (animal_id, name, license_tag_number, admit_date, adoption_id, vaccination_date) VALUES( 101, 'Spot', 35540, TO_DATE('10-Oct-2004', 'DDMonYYYY'), 205, TO_DATE('12-Oct-2004', 'DD-Mon-YYYY'));  SELECT * FROM animals;
```

5. Write the syntax to create a foreign key (adoption_id) in the animals table that has a corresponding primary-key reference in the adoptions table. Show both the column-level and table-level syntax. Note that because you have not actually created an adoptions table, no adoption_id primary key exists, so the foreign key cannot be added to the animals table.

Ans:

COLUMN LEVEL STATEMENT:

```
ALTER TABLE animals MODIFY ( adoption_id NUMBER(5,0) CONSTRAINT anl_adopt_id_fk REFERENCES adoptions(id) ENABLE );  TABLE LEVEL STATEMENT:
```

```
ALTER TABLE animals ADD CONSTRAINT anl_adopt_id_fk FOREIGN KEY (adoption_id) REFERENCES adoptions(id) ENABLE;
```

6. What is the effect of setting the foreign key in the ANIMAL table as:

a. ON DELETE CASCADE

ALTER TABLE animals ADD CONSTRAINT anl_adopt_id_fk FOREIGN KEY
(adoption_id) REFERENCES adoptions(id) ON DELETE CASCADE ENABLE ; **b. ON
DELETE SET NULL**

ALTER TABLE animals ADD CONSTRAINT anl_adopt_id_fk FOREIGN KEY
(adoption_id) REFERENCES adoptions(id) ON DELETE SET NULL ENABLE ;

7. What are the restrictions on defining a CHECK constraint?

Ans:

- I cannot specify check constraint for a view however in this case I could use WITH CHECK OPTION clause
- I am restricted to columns from self table and fields in self row.
- I cannot use subqueries and scalar subquery expressions.

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	

Faculty Signature	
-------------------	--

RESULT :

EXERCISE 13

Creating Views

1. What are three uses for a view from a DBA's perspective?
 - Restrict access and display selective columns
 - Reduce complexity of queries from other internal systems. So, providing a way to view same data in a different manner.
 - Let the app code rely on views and allow the internal implementation of tables to be modified later.
2. Create a simple view called view_d_songs that contains the ID, title and artist from the DJs on Demand table for each "New Age" type code. In the subquery, use the alias "Song Title" for the title column.

```
CREATE VIEW view_d_songs AS
SELECT d_songs.id, d_songs.title "Song Title", d_songs.artist from
d_songs INNER JOIN d_types ON d_songs.type_code = d_types.code where
d_types.description = 'New Age';
```

3. SELECT * FROM view_d_songs. What was returned?

The screenshot shows a database query results interface. At the top, there are tabs: 'Results' (which is selected), 'Explain', 'Describe', 'Saved SQL', and 'History'. Below the tabs is a table with three columns: 'ID', 'Song Title', and 'ARTIST'. The first row has ID 47, Song Title 'Hurrah for Today', and ARTIST 'The Jubilant Trio'. The second row has ID 49, Song Title 'Lets Celebrate', and ARTIST 'The Celebrants'. At the bottom left, it says '2 rows returned in 0.00 seconds'. At the bottom right, there is a 'Download' button.

ID	Song Title	ARTIST
47	Hurrah for Today	The Jubilant Trio
49	Lets Celebrate	The Celebrants

4. REPLACE view_d_songs. Add type_code to the column list. Use aliases for all columns. Or use alias after the CREATE statement as shown.

```
CREATE OR REPLACE VIEW view_d_songs AS
SELECT d_songs.id, d_songs.title "Song Title", d_songs.artist, d_songs.type_code from
d_songs INNER JOIN d_types ON d_songs.type_code = d_types.code where
d_types.description = 'New Age';
```

5. Jason Tsang, the disk jockey for DJs on Demand, needs a list of the past events and those planned for the coming months so he can make arrangements for each event's equipment setup. As the company manager, you do not want him to have access to the price that clients paid for their events. Create a view for Jason to use that displays the name of the event, the event date, and the theme description. Use aliases for each column name.

```
CREATE OR REPLACE VIEW view_d_events_pkgs AS
SELECT evt.name "Name of Event", TO_CHAR(evt.event_date, 'dd-Month-yyyy') "Event date", thm.description
"Theme description"
FROM d_events evt INNER JOIN d_themes thm ON evt.theme_code = thm.code WHERE evt.event_date
<= ADD_MONTHS(SYSDATE,1);
```

6. It is company policy that only upper-level management be allowed access to individual employee salaries. The department managers, however, need to know the minimum, maximum, and average salaries, grouped by department. Use the Oracle database to prepare a view that displays the needed information for department managers.

```
CREATE OR REPLACE VIEW view_min_max_avg_dpt_salary ("Department Id", "Department Name",  
"Max Salary", "Min Salary", "Average Salary") AS  
SELECT dpt.department_id, dpt.department_name, MAX(NVL(emp.salary,0)),  
MIN(NVL(emp.salary,0)), ROUND(AVG(NVL(emp.salary,0)),2)  
FROM departments dpt LEFT OUTER JOIN employees emp ON dpt.department_id =  
emp.department_id  
GROUP BY (dpt.department_id, dpt.department_name);
```

DML Operations and Views

Use the DESCRIBE statement to verify that you have tables named copy_d_songs, copy_d_events, copy_d_cds, and copy_d_clients in your schema. If you don't, write a query to create a copy of each.

1. Query the data dictionary USER_UPDATABLE_COLUMNS to make sure the columns in the base tables will allow UPDATE, INSERT, or DELETE. All table names in the data dictionary are stored in uppercase.

```
SELECT owner, table_name, column_name, updatable,insertable, deletable  
FROM user_updatable_columns WHERE LOWER(table_name) = 'copy_d_songs';
```

```
SELECT owner, table_name, column_name, updatable,insertable, deletable  
FROM user_updatable_columns WHERE LOWER(table_name) = 'copy_d_events';
```

```
SELECT owner, table_name, column_name, updatable,insertable, deletable  
FROM user_updatable_columns WHERE LOWER(table_name) = 'copy_d_cds';
```

2. Use the CREATE or REPLACE option to create a view of *all* the columns in the copy_d_songs table called view_copy_d_songs.

```
CREATE OR REPLACE VIEW view_copy_d_songs AS  
SELECT *  
FROM copy_d_songs;
```

```
SELECT * FROM view_copy_d_songs;
```

3. Use view_copy_d_songs to INSERT the following data into the underlying copy_d_songs table. Execute a SELECT * from copy_d_songs to verify your DML command. See the graphic.

ID	TITLE	DURATION	ARTIST	TYPE_CODE
88	Mello Jello	2	The What	4

```
INSERT INTO view_copy_d_songs(id,title,duration,artist,type_code) VALUES(88,'Mello Jello','2 min','The What',4);
```

4. Create a view based on the DJs on Demand COPY_D_CDS table. Name the view read_copy_d_cds. Select all columns to be included in the view. Add a WHERE clause to restrict the year to 2000. Add the WITH READ ONLY option.

```
CREATE OR REPLACE VIEW read_copy_d_cds AS
```

```
SELECT *  
FROM copy_d_cds  
WHERE year = '2000'  
WITH READ ONLY ;
```

```
SELECT * FROM read_copy_d_cds;
```

5. Using the read_copy_d_cds view, execute a DELETE FROM read_copy_d_cds WHERE cd_number = 90;

ORA-42399: cannot perform a DML operation on a read-only view

6. Use REPLACE to modify read_copy_d_cds. Replace the READ ONLY option with WITH CHECK OPTION CONSTRAINT ck_read_copy_d_cds. Execute a SELECT * statement to verify that the view exists.

```
CREATE OR REPLACE VIEW read_copy_d_cds AS SELECT
```

```
*  
FROM copy_d_cds  
WHERE year = '2000'  
WITH CHECK OPTION CONSTRAINT ck_read_copy_d_cds;
```

7. Use the read_copy_d_cds view to delete any CD of year 2000 from the underlying copy_d_cds.

```
DELETE FROM read_copy_d_cds WHERE year  
= '2000';
```

8. Use the read_copy_d_cds view to delete cd_number 90 from the underlying copy_d_cds table.

```
DELETE FROM read_copy_d_cds  
WHERE cd_number = 90;
```

9. Use the read_copy_d_cds view to delete year 2001 records.

```
DELETE FROM read_copy_d_cds WHERE year  
= '2001';
```

10. Execute a SELECT * statement for the base table copy_d_cds. What rows were deleted?

Only the one in problem 7 above, not the one in 8 and 9

- 11.What are the restrictions on modifying data through a view?

DELETE,INSERT,MODIFY restricted if it contains:

Group functions

GROUP BY CLAUSE DISTINCT pseudocolumn

ROWNUM Keyword

12. What is Moore's Law? Do you consider that it will continue to apply indefinitely? Support your opinion with research from the internet.

It roughly predicted that computing power nearly doubles every year. But Moore also said in 2005 that as per nature of exponential functions, this trend may not continue forever.

13. What is the "singularity" in terms of computing?

Singularity is the hypothesis that the invention of artificial superintelligence will abruptly trigger runaway technological growth, resulting in unfathomable changes to human civilization

Managing Views

1. Create a view from the copy_d_songs table called view_copy_d_songs that includes only the title and artist. Execute a SELECT * statement to verify that the view exists.

```
CREATE OR REPLACE VIEW view_copy_d_songs AS  
SELECT title, artist  
FROM copy_d_songs;
```

```
SELECT * FROM view_copy_d_songs;
```

2. Issue a DROP view_copy_d_songs. Execute a SELECT * statement to verify that the view has been deleted.

```
DROP VIEW view_copy_d_songs;  
SELECT * FROM view_copy_d_songs;
```

ORA-00942: table or view does not exist

3. Create a query that selects the last name and salary from the Oracle database. Rank the salaries from highest to lowest for the top three employees.

```
SELECT * FROM  
(SELECT last_name, salary FROM employees ORDER BY salary DESC) WHERE ROWNUM  
<= 3;
```

4. Construct an inline view from the Oracle database that lists the last name, salary, department ID, and maximum salary for each department. Hint: One query will need to calculate maximum salary by department ID.

```
SELECT empm.last_name, empm.salary, dptmx.department_id FROM
(SELECT dpt.department_id, MAX(NVL(emp.salary,0)) max_dpt_sal
FROM departments dpt LEFT OUTER JOIN employees emp ON dpt.department_id =
emp.department_id
GROUP BY dpt.department_id) dptmx LEFT OUTER JOIN employees empm ON
dptmx.department_id = empm.department_id WHERE NVL(empm.salary,0) = dptmx.max_dpt_sal;
```

5. Create a query that will return the staff members of Global Fast Foods ranked by salary from lowest to highest.

```
SELECT ROWNUM, last_name, salary
FROM
(SELECT * FROM f_staffs ORDER BY SALARY);
```

Indexes and Synonyms

1. What is an index and what is it used for?

Definition: These are schema objects which make retrieval of rows from table faster.

Purpose: An index provides direct and fast access to row in table. They provide indexed path to locate data quickly, so hereby reduce necessity of heavy disk input/output operations.

2. What is a ROWID, and how is it used?

Indexes use ROWID's (base 64 string representation of the row address containing block identifier, row location in the block and the database file identifier) which is the fastest way to access any particular row.

3. When will an index be created automatically?

Primary key/unique key use already existing unique index but if index is not present already, it is created while applying unique/primary key constraint.

-
4. Create a nonunique index (foreign key) for the DJs on Demand column (cd_number) in the D_TRACK_LISTINGS table. Use the Oracle Application Express SQL Workshop Data Browser to confirm that the index was created.

**CREATE INDEX d_tlg_cd_number_fk_i
on d_track_listings (cd_number);**

5. Use the join statement to display the indexes and uniqueness that exist in the data dictionary for the DJs on Demand D_SONGS table.

```
SELECT ucm.index_name, ucm.column_name, ucm.column_position, uix.uniqueness  
FROM user_indexes uix INNER JOIN user_ind_columns ucm ON uix.index_name = ucm.index_name  
WHERE ucm.table_name = 'D_SONGS';
```

6. Use a SELECT statement to display the index_name, table_name, and uniqueness from the data dictionary USER_INDEXES for the DJs on Demand D_EVENTS table.

```
SELECT index_name, table_name,uniqueness FROM user_indexes where table_name = 'D_EVENTS';
```

7. Write a query to create a synonym called dj_tracks for the DJs on Demand d_track_listings table.

CREATE SYNONYM dj_tracks FOR d_track_listings;

8. Create a function-based index for the last_name column in DJs on Demand D_PARTNERS table that makes it possible not to have to capitalize the table name for searches. Write a SELECT statement that would use this index.

```
CREATE INDEX d_ptr_last_name_idx  
ON d_partners(LOWER(last_name));
```

9. Create a synonym for the D_TRACK_LISTINGS table. Confirm that it has been created by querying the data dictionary.

```
CREATE SYNONYM dj_tracks2 FOR d_track_listings;
```

```
SELECT * FROM user_synonyms WHERE table_NAME = UPPER('d_track_listings');
```

10. Drop the synonym that you created in question

```
DROP SYNONYM dj_tracks2;
```



Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

OTHER DATABASE OBJECTS

EX_NO:14

DATE:

1.) Create a sequence to be used with the primary key column of the DEPT table. The sequence should start at 200 and have a maximum value of 1000. Have your sequence increment by ten numbers. Name the sequence DEPT_ID_SEQ

QUERY:

```
CREATE SEQUENCE dept_id_seq START WITH 200 INCREMENT BY 10 MAXVALUE 1000;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile information ('Chandeep Roshe... 050_dbms') are also present. The main workspace is titled 'SQL Commands' and contains a SQL editor with the following content:

```
1 CREATE SEQUENCE dept_id_seq START WITH 200 INCREMENT BY 10 MAXVALUE 1000;
```

Below the editor, there are buttons for Language (SQL), Rows (10), Clear Command, Find Tables, Save, and Run. The results tab is selected, showing the output of the command:

Sequence created.
0.01 seconds

At the bottom, footer information includes email (220701062@rajalakshmi.edu.in), a link to euphoria, and language settings (en). Copyright information (Copyright © 1999, 2025, Oracle and/or its affiliates) and the version (Oracle APEX 25.2.4) are also displayed.

2.) Write a query in a script to display the following information about your sequences: sequence name, maximum value, increment size, and last number **QUERY:**

SELECT sequence_name, max_value, increment_by, last_number FROM user_sequences; **OUTPUT:**

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The right side of the header shows the user's name, Chandee Roshe..., and the schema, WKSP_050DBMS. The main workspace is titled "SQL Commands" and contains the following SQL code:

```
1 SELECT sequence_name, max_value, increment_by, last_number FROM user_sequences;
```

Below the code, the "Results" tab is selected, displaying the output of the query:

SEQUENCE_NAME	MAX_VALUE	INCREMENT_BY	LAST_NUMBER
DEPT_ID_SEQ	1000	10	200

The results table shows one row with the following data: SEQUENCE_NAME is DEPT_ID_SEQ, MAX_VALUE is 1000, INCREMENT_BY is 10, and LAST_NUMBER is 200. A note at the bottom left indicates "1 rows returned in 0.01 seconds". The bottom right corner of the page shows the copyright notice "Copyright © 1999, 2023, Oracle and/or its affiliates." and the version "Oracle APEX 23.2.4".

Write a script to insert two rows into the DEPT table. Name your script lab12_3.sql. Be sure to use the sequence you created for the ID column. Add two departments named Education and Administration.

Confirm your additions. Run the commands in your script.

QUERY:

INSERT INTO dept VALUES (dept_id_seq.nextval, 'Education');

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface, identical to the previous one but with a different query. The top navigation bar and user information are the same. The main workspace contains the following SQL code:

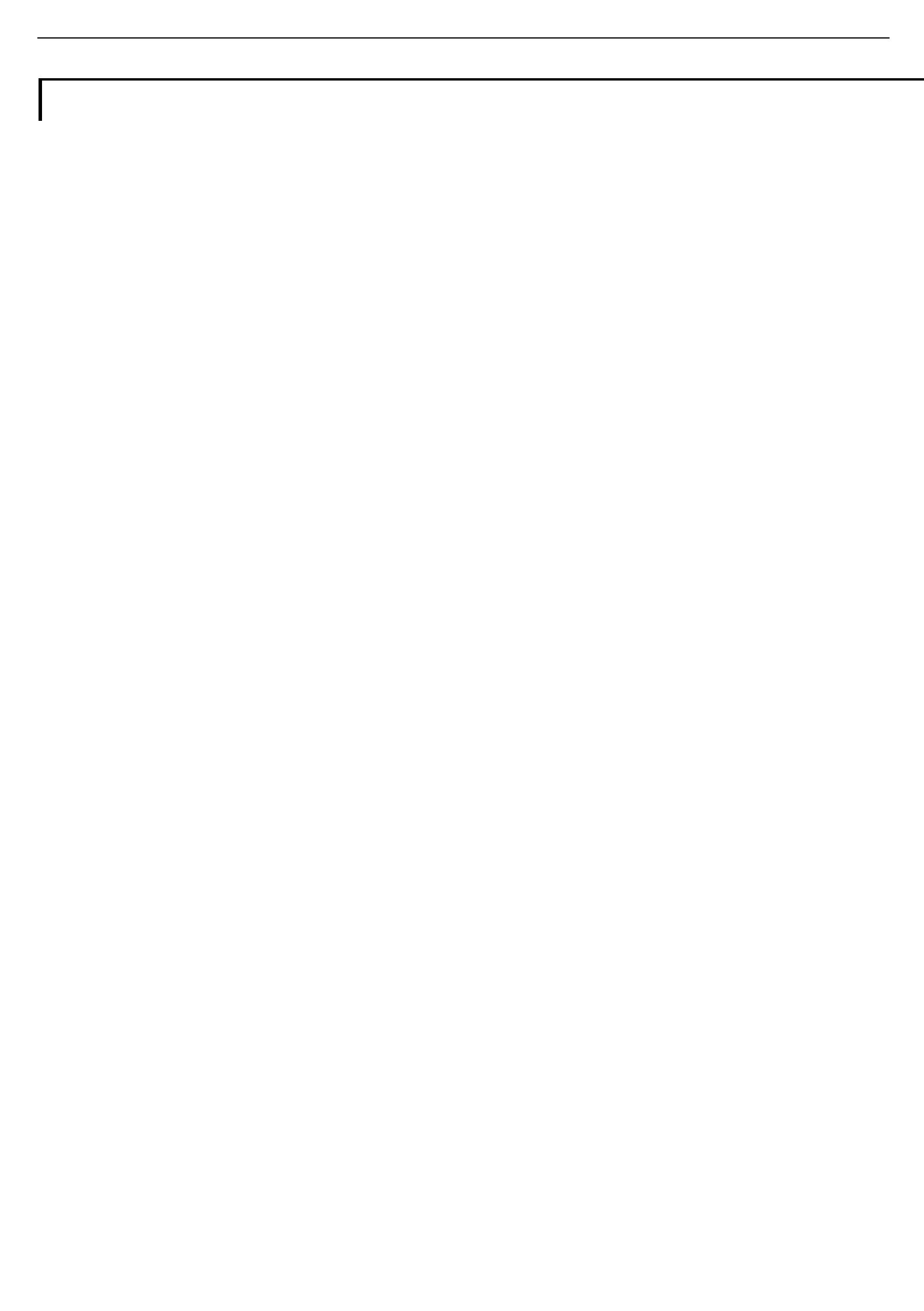
```
1 INSERT INTO dept VALUES (dept_id_seq.nextval, 'Education');
```

The "Results" tab is selected, and the output area displays an error message in a yellow box:

Error at line 1/13: ORA-00947: not enough values

1. INSERT INTO dept VALUES (dept_id_seq.nextval, 'Education');

At the bottom left, it says "0.01 seconds". The bottom right corner shows the copyright notice and version.



4.)Create a nonunique index on the foreign key column (DEPT_ID) in the EMP table.

QUERY:

```
CREATE INDEX emp_dept_id_idx ON EMPLOYEES (department_id);
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. The right side of the top bar shows the user 'Chandee Roshe...' and the schema 'WKSP_050DBMS'. Below the top bar is a toolbar with icons for search, refresh, and run. The main area is titled 'SQL Commands' with a dropdown for 'Language' set to 'SQL'. The command entered is 'CREATE INDEX emp_dept_id_idx ON EMPLOYEES (department_id);'. The results tab at the bottom shows the output: 'Index created.' and '0.03 seconds'. The footer includes copyright information for Oracle and the APEX version '23.2.4'.

5.)Display the indexes and uniqueness that exist in the data dictionary for the EMP table.

QUERY:

```
SELECT index_name,table_name,uniqueness FROM user_indexes WHERE table_name='EMPLOYEES';
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar and schema selection are identical to the previous screenshot. The main area displays the query 'SELECT index_name,table_name,uniqueness FROM user_indexes WHERE table_name='EMPLOYEES';'. The results tab shows a table with three columns: 'INDEX_NAME', 'TABLE_NAME', and 'UNIQUENESS'. The single row returned is 'EMP_DEPT_ID_IDX', 'EMPLOYEES', and 'NONUNIQUE'. The footer includes copyright information for Oracle and the APEX version '23.2.4'.

INDEX_NAME	TABLE_NAME	UNIQUENESS
EMP_DEPT_ID_IDX	EMPLOYEES	NONUNIQUE

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	

Faculty Signature	

RESULT:

CONTROLLING USER ACCESS

EX_NO:15

DATE:

1. What privilege should a user be given to log on to the Oracle Server? Is this a system or an object privilege?

The CREATE SESSION system privilege

2. What privilege should a user be given to create tables?

The CREATE TABLE privilege

3. If you create a table, who can pass along privileges to other users on your table?

You can, or anyone you have given those privileges to by using the WITH GRANT OPTION.

4. You are the DBA. You are creating many users who require the same system privileges. What should you use to make your job easier?

Create a role containing the system privileges and grant the role to the users

5. What command do you use to change your password?

The ALTER USER statement

6. Grant another user access to your DEPARTMENTS table. Have the user grant you query access to his or her DEPARTMENTS table.

Team 2 executes the GRANT statement. GRANT select ON departments TO <user1>;

Team 1 executes the GRANT statement. GRANT select ON departments TO <user2>;

7. Query all the rows in your DEPARTMENTS table.

SELECT * FROM departments;

8. Add a new row to your DEPARTMENTS table. Team 1 should add Education as department number 500. Team 2 should add Human Resources department number 510. Query the other team's table.

Team 1 executes this INSERT statement. INSERT INTO departments(department_id, department_name) VALUES (500, 'Education'); COMMIT;

Team 2 executes this INSERT statement. INSERT INTO departments(department_id, department_name) VALUES (510, 'Administration'); COMMIT;

9. Query the USER_TABLES data dictionary to see information about the tables that you own. SELECT table_name FROM user_tables;

10. Revoke the SELECT privilege on your table from the other team.

Team 1 revokes the privilege.

```
REVOKE select  
ON departments  
FROM user2;
```

Team 2 revokes the privilege.

```
REVOKE select  
ON departments  
FROM user1;
```

11. Remove the row you inserted into the DEPARTMENTS table in step 8 and save the changes.

Team 1 executes this INSERT statement.

```
DELETE FROM departments  
WHERE department_id = 500;  
COMMIT;
```

Team 2 executes this INSERT statement.

```
DELETE FROM departments  
WHERE department_id = 510;  
COMMIT;
```

<u>Evaluation Procedure</u>	<u>Marks awarded</u>
<u>Practice Evaluation (5)</u>	
<u>Viva(5)</u>	
<u>Total (10)</u>	
<u>Faculty Signature</u>	

RESULT:

PL/SQL

CONTROL STRUCTURES

EX_NO:

DATE:

1.) Write a PL/SQL block to calculate the incentive of an employee whose ID is 110.

QUERY:

```
DECLARE
incentive NUMBER(8,2);
BEGIN
SELECT salary*0.12 INTO incentive
FROM employees
WHERE employee_id = 110;
DBMS_OUTPUT.PUT_LINE('Incentive = ' || TO_CHAR(incentive));
END;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. The right side of the header shows the user 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains a code editor with the following PL/SQL block:

```
1  DECLARE
2    incentive NUMBER(8,2);
3  BEGIN
4    SELECT salary*0.12 INTO incentive
5    FROM employees
6    WHERE employee_id = 110;
7    DBMS_OUTPUT.PUT_LINE('Incentive = ' || TO_CHAR(incentive));
8  END;
9
```

Below the code editor, there are tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab is selected, displaying the output of the executed query:

```
Incentive = 1440
Statement processed.
```

At the bottom of the page, there are footer links for user information (220701062@rajalakshmi.edu.in, euphoria, en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and version information (Oracle APEX 23.2.4).

2.)

Write a PL/SQL block to show an invalid case-insensitive reference to a quoted and without quoted user-defined identifier

QUERY:

```
DECLARE
WELCOME varchar2(10) := 'welcome';
BEGIN
DBMS_Output.Put_Line("Welcome");
END;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user information for 'Chandeep Roshe...' are also present. The main workspace is titled 'SQL Commands' and shows the following PL/SQL code:

```
1  DECLARE
2  WELCOME varchar2(10) := 'welcome';
3  BEGIN
4  DBMS_OUTPUT.PUT_LINE('Welcome');
5  END;
6
```

Below the code, there are tabs for Results, Explain, Describe, Saved SQL, and History. The Results tab is selected, displaying the output:

```
Welcome
Statement processed.
```

Execution time is listed as 0.01 seconds. At the bottom, footer information includes the user's email (220701062@rajalakshmi.edu.in), session name (euphoria), language (en), copyright notice (Copyright © 1999, 2023, Oracle and/or its affiliates.), and the APEX version (Oracle APEX 23.2.4).

3.)

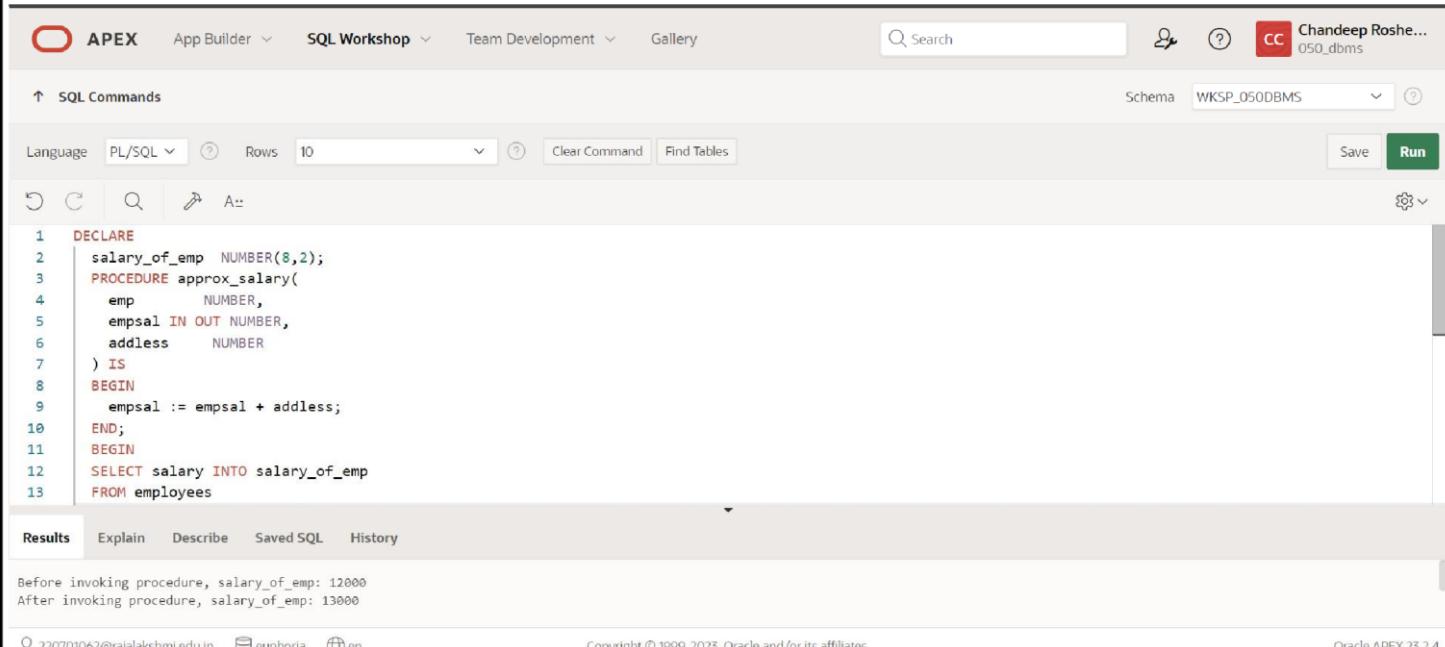
Write a PL/SQL block to adjust the salary of the employee whose ID 122.

QUERY:

```
DECLARE
    salary_of_emp NUMBER(8,2);
PROCEDURE approx_salary (
    emp      NUMBER,
    empsal IN OUT NUMBER,
    addless  NUMBER
) IS
BEGIN
    empsal := empsal + addless;
END;

BEGIN
    SELECT salary INTO salary_of_emp
    FROM employees
    WHERE employee_id = 122;
    DBMS_OUTPUT.PUT_LINE
    ('Before invoking procedure, salary_of_emp: ' || salary_of_emp);
    approx_salary (100, salary_of_emp, 1000);
    DBMS_OUTPUT.PUT_LINE
    ('After invoking procedure, salary_of_emp: ' || salary_of_emp);
END;
/
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (which is selected), Team Development, and Gallery. A search bar and user information for 'Chandeep Roshe...' are also present. The main workspace displays the PL/SQL code from the previous section. Below the code, the 'Results' tab is active, showing the output of the executed procedure. The output indicates the initial salary of 12000 and the adjusted salary of 13000 after the procedure is invoked.

```
1  DECLARE
2      salary_of_emp NUMBER(8,2);
3  PROCEDURE approx_salary(
4      emp      NUMBER,
5      empsal IN OUT NUMBER,
6      addless  NUMBER
7  ) IS
8  BEGIN
9      empsal := empsal + addless;
10
11
12  SELECT salary INTO salary_of_emp
13  FROM employees
```

Before invoking procedure, salary_of_emp: 12000
After invoking procedure, salary_of_emp: 13000

4.)

Write a PL/SQL block to create a procedure using the "IS [NOT] NULL Operator" and show AND operator returns TRUE if and only if both operands are TRUE.

QUERY:

```
CREATE OR REPLACE PROCEDURE pri_bool(
  boo_name  VARCHAR2,
  boo_val   BOOLEAN
) IS
BEGIN
  IF boo_val IS NULL THEN
    DBMS_OUTPUT.PUT_LINE( boo_name || ' = NULL');
  ELSIF boo_val = TRUE THEN
    DBMS_OUTPUT.PUT_LINE( boo_name || ' = TRUE');
  ELSE
    DBMS_OUTPUT.PUT_LINE( boo_name || ' = FALSE');
  END IF;
END;
/
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. The right side of the header shows the user's name, Chandeep Roshe..., and the schema, WKSP_050DBMS. Below the header is a search bar and a toolbar with various icons. The main workspace is titled 'SQL Commands' and contains the PL/SQL code for the 'pri_bool' procedure. The code is syntax-highlighted, showing keywords like 'CREATE', 'OR REPLACE', 'PROCEDURE', 'IS', 'BEGIN', 'IF', 'THEN', 'ELSIF', 'ELSE', 'DBMS_OUTPUT.PUT_LINE', and 'END IF'. The code is numbered from 1 to 14. At the bottom of the workspace, there are tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The status bar at the bottom displays the message 'Procedure created.', the execution time '0.02 seconds', the user information '220701062@rajalakshmi.edu.in euphoria en', the copyright notice 'Copyright © 1999, 2023, Oracle and/or its affiliates.', and the version 'Oracle APEX 23.2.4'.

```
3  boo_val  BOOLEAN
4  ) IS
5  BEGIN
6    IF boo_val IS NULL THEN
7      DBMS_OUTPUT.PUT_LINE( boo_name || ' = NULL');
8    ELSIF boo_val = TRUE THEN
9      DBMS_OUTPUT.PUT_LINE( boo_name || ' = TRUE');
10   ELSE
11     DBMS_OUTPUT.PUT_LINE( boo_name || ' = FALSE');
12   END IF;
13 END;
14
```

5.)

Write a PL/SQL block to describe the usage of LIKE operator including wildcard characters and escape character.

QUERY:

DECLARE

PROCEDURE pat_match (

test_string VARCHAR2,

pattern VARCHAR2

) IS

BEGIN

IF test_string LIKE pattern THEN

DBMS_OUTPUT.PUT_LINE ('TRUE');

ELSE

DBMS_OUTPUT.PUT_LINE ('FALSE');

END IF;

END;

BEGIN

pat_match('Blweate', 'B%a_e');

pat_match('Blweate', 'B%A_E');

END;

/

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. In the top navigation bar, 'APEX' is selected. Below it, 'SQL Workshop' is active. The main area contains the following PL/SQL code:

```
7  IF test_string LIKE pattern THEN
8  | DBMS_OUTPUT.PUT_LINE ('TRUE');
9  ELSE
10 | DBMS_OUTPUT.PUT_LINE ('FALSE');
11 END IF;
12
13 BEGIN
14   pat_match('Blweate', 'B%a_e');
15   pat_match('Blweate', 'B%A_E');
16
17
```

The code is run, and the results are displayed in the 'Results' tab:

Result
TRUE
FALSE

Below the results, a message states "Statement processed."

6.)

Write a PL/SQL program to arrange the number of two variable in such a way that the small number will store in num_small variable and large number will store in num_large variable

QUERY:

DECLARE

num_small NUMBER := 8;

num_large NUMBER := 5;

num_temp NUMBER;

BEGIN

IF num_small > num_large THEN

num_temp := num_small;

num_small := num_large;

num_large := num_temp;

END IF;

DBMS_OUTPUT.PUT_LINE ('num_small = '||num_small);

DBMS_OUTPUT.PUT_LINE ('num_large = '||num_large);

END;

/

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The SQL Workshop tab is selected. The main area displays a PL/SQL code editor with the following content:

```
6
7  IF num_small > num_large THEN
8    num_temp := num_small;
9    num_small := num_large;
10   num_large := num_temp;
11 END IF;
12
13 DBMS_OUTPUT.PUT_LINE ('num_small = '||num_small);
14 DBMS_OUTPUT.PUT_LINE ('num_large = '||num_large);
15
16
```

The code is executed, and the results are shown in the Results tab:

```
num_small = 5
num_large = 8

Statement processed.
```

At the bottom, user information and copyright details are visible:

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7.)

Write a PL/SQL procedure to calculate the incentive on a target achieved and display the message either the record updated or not.

QUERY:

```
DECLARE
  PROCEDURE test1
  (
    sal_achieve NUMBER,
    target_qty NUMBER,
    emp_id NUMBER
  )
  IS
    incentive NUMBER := 0;
    updated VARCHAR2(3) := 'No';
  BEGIN
    IF sal_achieve > (target_qty + 200) THEN
      incentive := (sal_achieve - target_qty)/4;
      UPDATE employees
        SET salary = salary + incentive
      WHERE employee_id = emp_id;
      updated := 'Yes';
    END IF;
    DBMS_OUTPUT.PUT_LINE (
      'Table updated? ' || updated || ',' ||
      'incentive = ' || incentive || '.'
    );
  END test1; BEGIN
  test1(2300, 2000,
  144); test1(3600,
  3000, 145);
  END;
```

OUTPUT:

9.)

```

APEX App Builder SQL Workshop Team Development Gallery Search
Schema: WKSP_050DBMS Save Run
SQL Commands Language: PL/SQL Rows: 10 Clear Command Find Tables
WHERE employees_id = emp_id;
    updated := 'Yes';
END IF;
DBMS_OUTPUT.PUT_LINE (
    'Table updated? ' || updated || ', ' ||
    'incentive = ' || incentive || '.'
);
END test1;
BEGIN
    test1(2300, 2000, 144);
    test1(3600, 3000, 145);
END.

```

Results Explain Describe Saved SQL History

Table updated? Yes, incentive = 75.
Table updated? Yes, incentive = 150.
1 row(s) updated.

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8.) Write a PL/SQL procedure to calculate incentive achieved according to the specific sale limit

QUERY:

DECLARE

```

PROCEDURE test1 (sal_achieve NUMBER)
IS
    incentive NUMBER := 0;
BEGIN
    IF sal_achieve > 44000 THEN
        incentive := 1800;
    ELSIF sal_achieve > 32000 THEN
        incentive := 800;
    ELSE
        incentive := 500;
    END IF;
    DBMS_OUTPUT.NEW_LINE;
    DBMS_OUTPUT.PUT_LINE (
        'Sale achieved : ' || sal_achieve || ', incentive : ' || incentive || ''
    );
END test1;
BEGIN
    test1(45000);
    test1(36000);
    test1(28000);
END;
/

```

11.)

Write a PL/SQL program to count number of employees in department 50 and check whether this department have any vacancies or not. There are 45 vacancies in this department.

QUERY:

SET SERVEROUTPUT ON

DECLARE

tot_emp NUMBER;

get dep id NUMBER;

BEGIN

get dep id := 80;

SELECT Count(*)

INTO tot.emp

DM employees e

join departments d

ON e.department_id = d.department_id

```
WHERE e.department_id = get_dep_id;
```

ut.Put_line ('The empl

||To_char(

F tot_emp >= 45 THEN

dbm

```
ELSE
    dbms_output.Put_line ('There are '||to_char(45-tot_emp)||' vacancies in department'||dept_desc_id);
```

st_dep_

END

L
1

OUTPUT:

The screenshot shows the Oracle SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. A search bar and user profile are also present. The main area is titled 'SQL Commands' and contains a code editor with the following PL/SQL script:

```
6 BEGIN
7     get_dep_id := 80;
8     SELECT Count(*)
9     INTO tot_emp
10    FROM employees e
11      join departments d
12        | ON e.department_id = d.department_id
13   WHERE e.department_id = get_dep_id;
14   dbms_output.Put_line ('The employees are in the department'||get_dep_id||' is: '
15                         ||To_char(tot_emp));
16   IF tot_emp >= 45 THEN
17       dbms_output.Put_line ('There are no vacancies in the department'||get_dep_id);
18   ELSE
19       dbms_output.Put_line ('There are vacancies in the department'||get_dep_id);
20   END IF;
21END;
```

The code editor has syntax highlighting for PL/SQL keywords and comments. Below the code editor are buttons for 'Language' (PL/SQL), 'Rows' (set to 10), 'Clear Command', 'Find Tables', 'Save', and 'Run'. The schema is set to 'WKSP_050DBMS'. The bottom navigation bar includes 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'.

Error at line 1/5: ORA-00922: missing or invalid option

12.)

Write a PL/SQL program to count number of employees in a specific department and check whether this department have any vacancies or not. If any vacancies, how many vacancies are in that department.

QUERY:

DECLARE

```
tot_emp NUMBER;
```

```
    get_dep_id NUMBER;
```

BEGIN

```
get_dep_id := 80;
```

```
SELECT Count(*)
```

```
INTO tot_emp
```

```
FROM employees e
```

```
    join departments d
```

```
        ON e.department_id = d.dept_id
```

```
WHERE e.department_id = get_dep_id;
```

```
dbms_output.Put_line ('The employees are in the department'||get_dep_id||' is: '  
    ||To_char(tot_emp));
```

```
IF tot_emp >= 45 THEN
```

```
    dbms_output.Put_line ('There are no vacancies in the department'||get_dep_id);
```

```
ELSE
```

```
    dbms_output.Put_line ('There are'||to_char(45-tot_emp)||' vacancies in department'||  
get_dep_id );
```

```
END IF;
```

```
END;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The right side of the header shows the user 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains a PL/SQL editor with numbered lines of code. Lines 7 through 17 are visible, representing the PL/SQL block. The code uses the 'dbms_output.Put_line' command to print results. The bottom section of the interface shows the 'Results' tab, which displays the output of the executed code. The output text is:
The employees are in the department 80 is: 0
There are 45 vacancies in department 80
Statement processed.

```
7  SELECT Count(*)  
8  INTO tot_emp  
9  FROM employees e  
10  join departments d  
11  | ON e.department_id = d.department_id  
12  WHERE e.department_id = get_dep_id;  
13  
14  dbms_output.Put_line ('The employees are in the department'||get_dep_id||' is: '  
15  | ||To_char(tot_emp));  
16  
17  IF tot_emp >= 45 THEN
```

13.)

Write a PL/SQL program to display the employee IDs, names, job titles, hire dates, and salaries of all employees

QUERY:

DECLARE

v_employee_id employees.employee_id%TYPE;

v_full_name employees.first_name%TYPE;

v_job_id employees.job_id%TYPE;

v_hire_date employees.hire_date%TYPE;

v_salary employees.salary%TYPE;

CURSOR c_employees IS

```
SELECT employee_id, first_name || ' ' || last_name AS full_name, job_id, hire_date, salary
FROM employees;
```

BEGIN

DBMS_OUTPUT.PUT_LINE('Employee ID | Full Name | Job Title | Hire Date | Salary');

DBMS_OUTPUT.PUT_LINE('-----');

OPEN c_employees;

FETCH c_employees INTO v_employee_id, v_full_name, v_job_id, v_hire_date, v_salary;

WHILE c_employees%FOUND LOOP

```
DBMS_OUTPUT.PUT_LINE(v_employee_id || ' ' || v_full_name || ' ' || v_job_id || ' ' ||
v_hire_date || ' ' || v_salary);
```

```
FETCH c_employees INTO v_employee_id, v_full_name, v_job_id, v_hire_date, v_salary;
```

END LOOP;

CLOSE c_employees;

END;

OUTPUT:

```
1  DECLARE
2  v_employee_id employees.employee_id%TYPE;
3  v_full_name employees.first_name%TYPE;
4  v_job_id employees.job_id%TYPE;
5  v_hire_date employees.hire_date%TYPE;
6  v_salary employees.salary%TYPE;
7  CURSOR c_employees IS
8    SELECT employee_id, first_name || ' ' || last_name AS full_name, job_id, hire_date, salary
9    FROM employees;
10 BEGIN
11   DBMS_OUTPUT.PUT_LINE('Employee ID | Full Name | Job Title | Hire Date | Salary');
12   DBMS_OUTPUT.PUT_LINE('-----');
13   OPEN c_employees;
```

Results Explain Describe Saved SQL History

Error at line 2/25: ORA-06550: line 2, column 25:
PLS-00302: component 'EMPLOYEE_ID' must be declared
ORA-06512: at "SYS.WWV_DRMS_S01_APEX_230700", line 801

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14.)

Write a PL/SQL program to display the employee IDs, names, and department names of all employees.

QUERY:

DECLARE

```
CURSOR emp_cursor IS
  SELECT e.employee_id, e.first_name, m.first_name AS manager_name
    FROM employees e
   LEFT JOIN employees m ON e.manager_id = m.employee_id;
emp_record emp_cursor%ROWTYPE;
BEGIN
  OPEN emp_cursor;
  FETCH emp_cursor INTO emp_record;
  WHILE emp_cursor%FOUND LOOP
    DBMS_OUTPUT.PUT_LINE('Employee ID: ' || emp_record.employee_id);
    DBMS_OUTPUT.PUT_LINE('Employee Name: ' || emp_record.first_name);
    DBMS_OUTPUT.PUT_LINE('Manager Name: ' || emp_record.manager_name);
    DBMS_OUTPUT.PUT_LINE('-----');
    FETCH emp_cursor INTO emp_record;
  END LOOP;
  CLOSE emp_cursor;
END;
```

OUTPUT:

The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. The right side of the header shows the user 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains a PL/SQL editor with the code from the previous section. Below the editor, the 'Results' tab is selected, displaying the output: 'Job ID: 62' and 'Minimum Salary:'. The bottom of the screen shows standard APEX footer information including copyright notice and version 'Oracle APEX 23.2.4'.

```
6 BEGIN
7   OPEN job_cursor;
8   FETCH job_cursor INTO job_record;
9   WHILE job_cursor%FOUND LOOP
10     DBMS_OUTPUT.PUT_LINE('Job ID: ' || job_record.job_id);
11     DBMS_OUTPUT.PUT_LINE('Minimum Salary: ' || job_record.lowest_sal);
12     DBMS_OUTPUT.PUT_LINE('-----');
13     FETCH job_cursor INTO job_record;
14   END LOOP;
15   CLOSE job_cursor;
16 END;
```

Results Explain Describe Saved SQL History

Job ID: 62
Minimum Salary:

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Oracle APEX 23.2.4

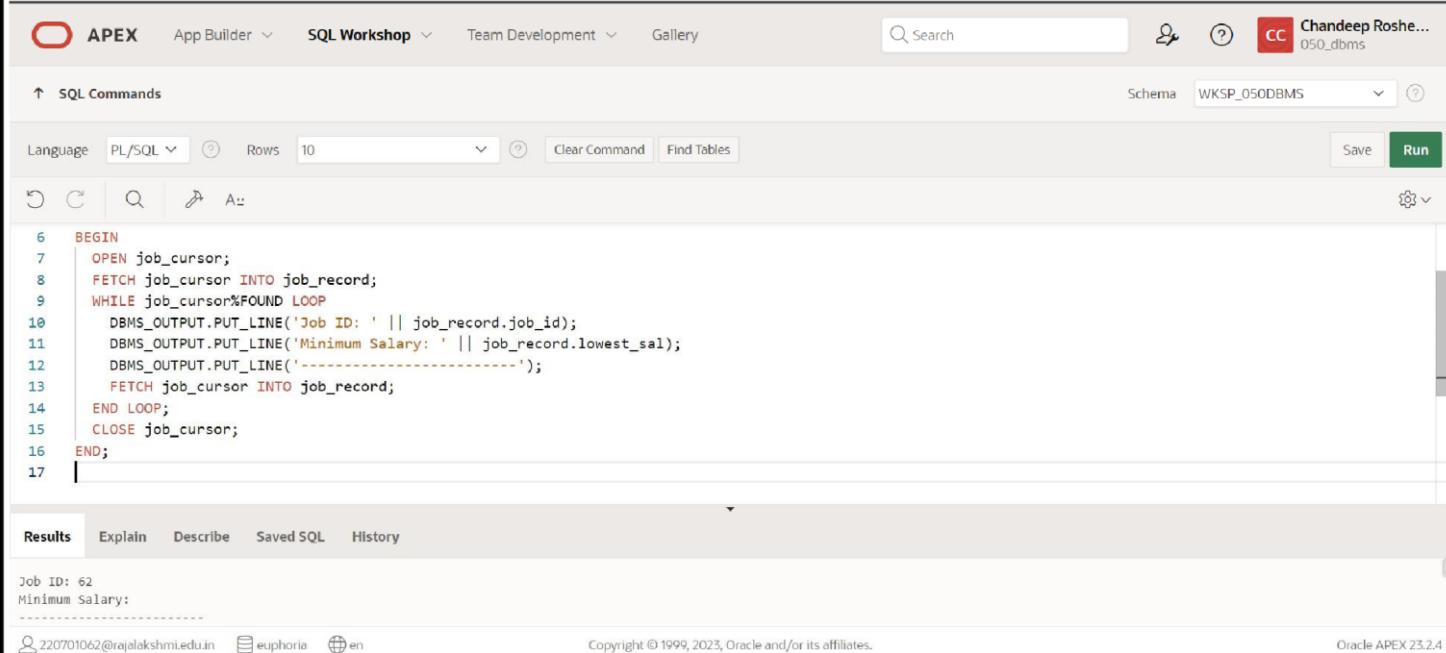
15.)

Write a PL/SQL program to display the job IDs, titles, and minimum salaries of all jobs

QUERY:

```
DECLARE
CURSOR job_cursor IS
SELECT e.job_id, j.lowest_sal
FROM job_grade j,employees e;
job_record job_cursor%ROWTYPE;
BEGIN
OPEN job_cursor;
FETCH job_cursor INTO job_record;
WHILE job_cursor%FOUND LOOP
DBMS_OUTPUT.PUT_LINE('Job ID: ' || job_record.job_id);
DBMS_OUTPUT.PUT_LINE('Minimum Salary: ' || job_record.lowest_sal);
DBMS_OUTPUT.PUT_LINE('-----');
FETCH job_cursor INTO job_record;
END LOOP;
CLOSE job_cursor;
END;
/
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop (selected), Team Development, and Gallery. A search bar and user profile are also present. The main workspace is titled 'SQL Commands' and contains the PL/SQL code from the previous block. The code is numbered 6 to 17. The 'Run' button is visible at the bottom right of the command input area. Below the code, the 'Results' tab is selected, showing the output of the executed query. The output displays the Job ID and Minimum Salary for the job with ID 62.

```
6 BEGIN
7   OPEN job_cursor;
8   FETCH job_cursor INTO job_record;
9   WHILE job_cursor%FOUND LOOP
10     DBMS_OUTPUT.PUT_LINE('Job ID: ' || job_record.job_id);
11     DBMS_OUTPUT.PUT_LINE('Minimum Salary: ' || job_record.lowest_sal);
12     DBMS_OUTPUT.PUT_LINE('-----');
13     FETCH job_cursor INTO job_record;
14   END LOOP;
15   CLOSE job_cursor;
16 END;
17 |
```

Results	Explain	Describe	Saved SQL	History
Job ID: 62 Minimum Salary:				

Job ID: 62
Minimum Salary:

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16.)

Write a PL/SQL program to display the employee IDs, names, and job history start dates of all employees.

QUERY:

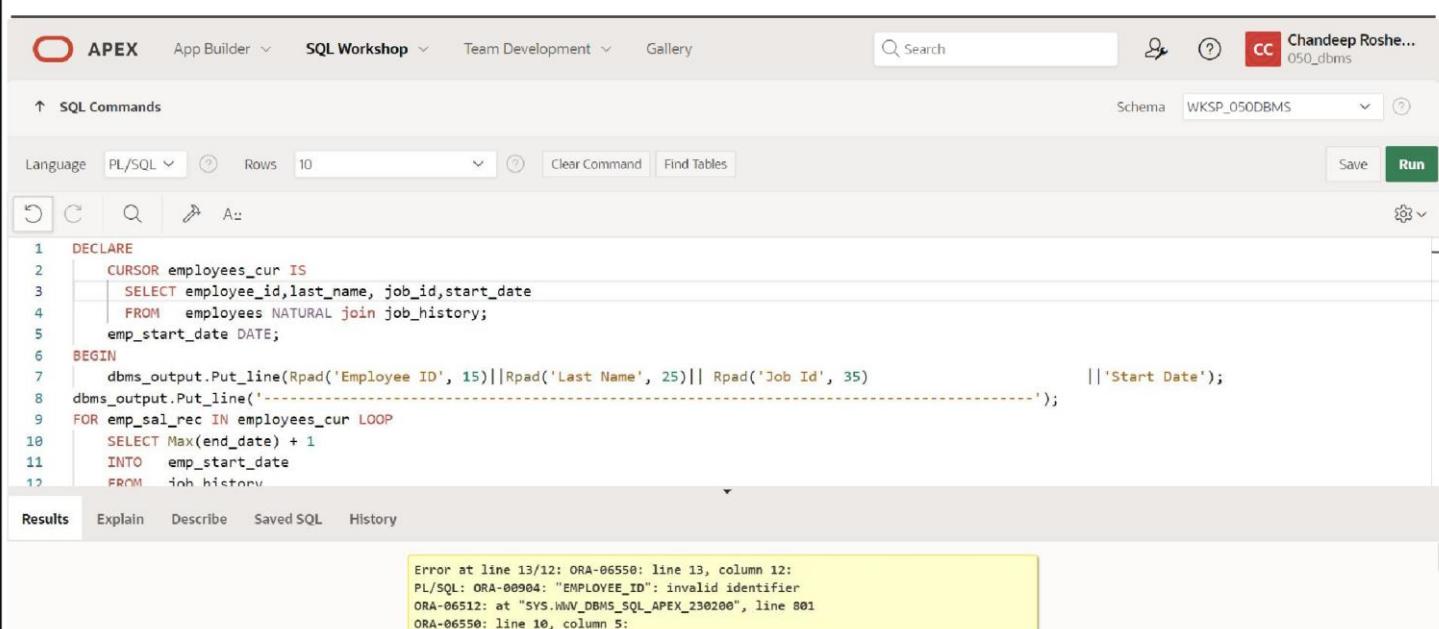
DECLARE

```
CURSOR employees_cur IS
  SELECT employee_id, last_name, job_id, start_date
  FROM employees NATURAL JOIN job_history;
  emp_start_date DATE;

BEGIN
  dbms_output.Put_line(Rpad('Employee ID', 15) || Rpad('Last Name', 25) || Rpad('Job Id', 35)
  || 'Start Date');
  dbms_output.Put_line('-----');

  FOR emp_sal_rec IN employees_cur LOOP
    -- find out most recent end_date in job_history
    SELECT Max(end_date) + 1
    INTO emp_start_date
    FROM job_history
    WHERE employee_id = emp_sal_rec.employee_id;
    IF emp_start_date IS NULL THEN
      emp_start_date := emp_sal_rec.start_date;
    END IF;
    dbms_output.Put_line(Rpad(emp_sal_rec.employee_id, 15)
      || Rpad(emp_sal_rec.last_name, 25)
      || Rpad(emp_sal_rec.job_id, 35)
      || To_char(emp_start_date, 'dd-mon-yyyy'));
  END LOOP;
END;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The user is connected to the schema 'Chandeep Roshe... 050_dbms'. The SQL editor window displays the PL/SQL code provided above. The code is numbered from 1 to 17. Line 13 contains the error message: 'Error at line 13/12: ORA-06550: line 13, column 12: PL/SQL: ORA-00994: "EMPLOYEE_ID": invalid identifier ORA-06512: at "SYS.00V_DBMS_SQL_APEX_230200", line 801 ORA-06550: line 10, column 5;'. The bottom of the screen shows the Oracle APEX footer with copyright information and version 23.2.4.

```
1  DECLARE
2    CURSOR employees_cur IS
3      SELECT employee_id, last_name, job_id, start_date
4      FROM employees NATURAL JOIN job_history;
5      emp_start_date DATE;
6
7      dbms_output.Put_line(Rpad('Employee ID', 15) || Rpad('Last Name', 25) || Rpad('Job Id', 35)
8      || 'Start Date');
9  FOR emp_sal_rec IN employees_cur LOOP
10    SELECT Max(end_date) + 1
11    INTO emp_start_date
12    FROM job_history
13
14
15
16
17
```

Error at line 13/12: ORA-06550: line 13, column 12:
PL/SQL: ORA-00994: "EMPLOYEE_ID": invalid identifier
ORA-06512: at "SYS.00V_DBMS_SQL_APEX_230200", line 801
ORA-06550: line 10, column 5;

17.)

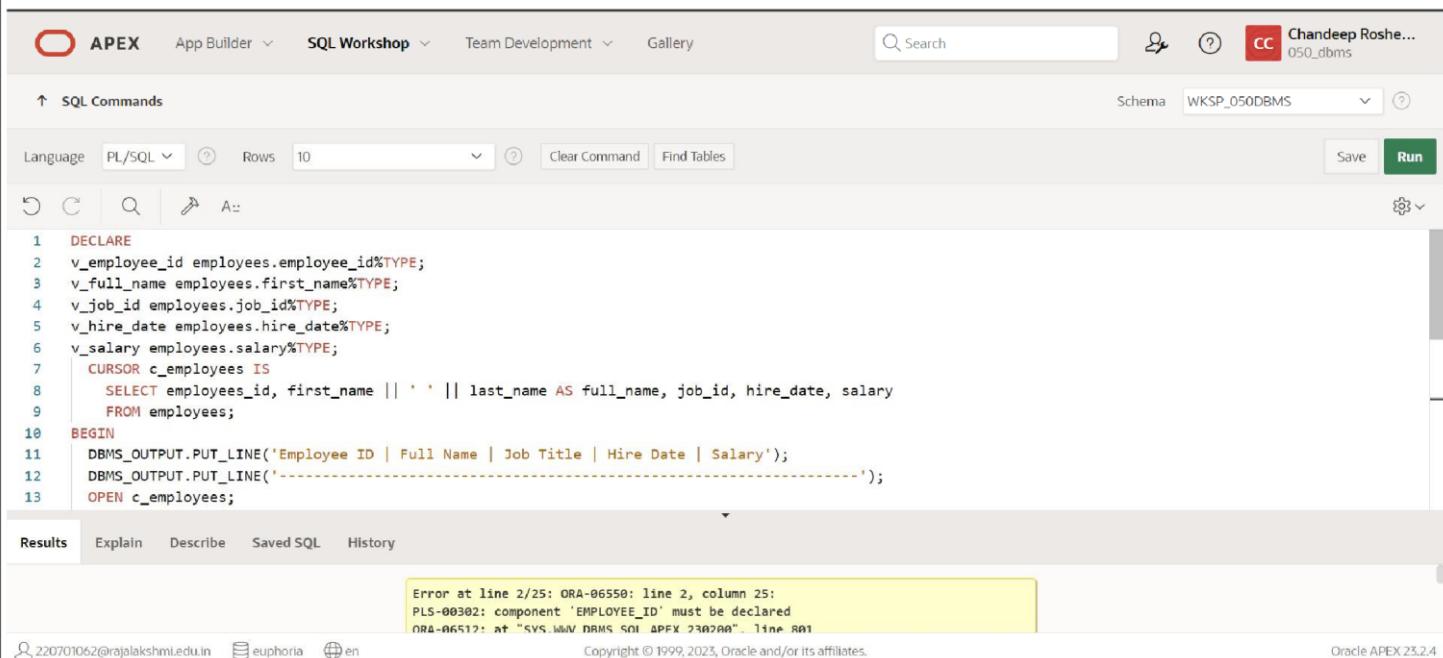
Write a PL/SQL program to display the employee IDs, names, and job history end dates of all employees.

QUERY:

DECLARE

```
v_employee_id employees.employee_id%TYPE;
v_first_name employees.last_name%TYPE;
v_end_date job_history.end_date%TYPE;
CURSOR c_employees IS
  SELECT e.employee_id, e.first_name, jh.end_date
    FROM employees e
   JOIN job_history jh ON e.employee_id = jh.employee_id;
BEGIN
  OPEN c_employees;
  FETCH c_employees INTO v_employee_id, v_first_name, v_end_date;
  WHILE c_employees%FOUND LOOP
    DBMS_OUTPUT.PUT_LINE('Employee ID: ' || v_employee_id);
    DBMS_OUTPUT.PUT_LINE('Employee Name: ' || v_first_name);
    DBMS_OUTPUT.PUT_LINE('End Date: ' || v_end_date);
    DBMS_OUTPUT.PUT_LINE('-----');
    FETCH c_employees INTO v_employee_id, v_first_name, v_end_date;
  END LOOP;
  CLOSE c_employees;
END;
```

OUTPUT:



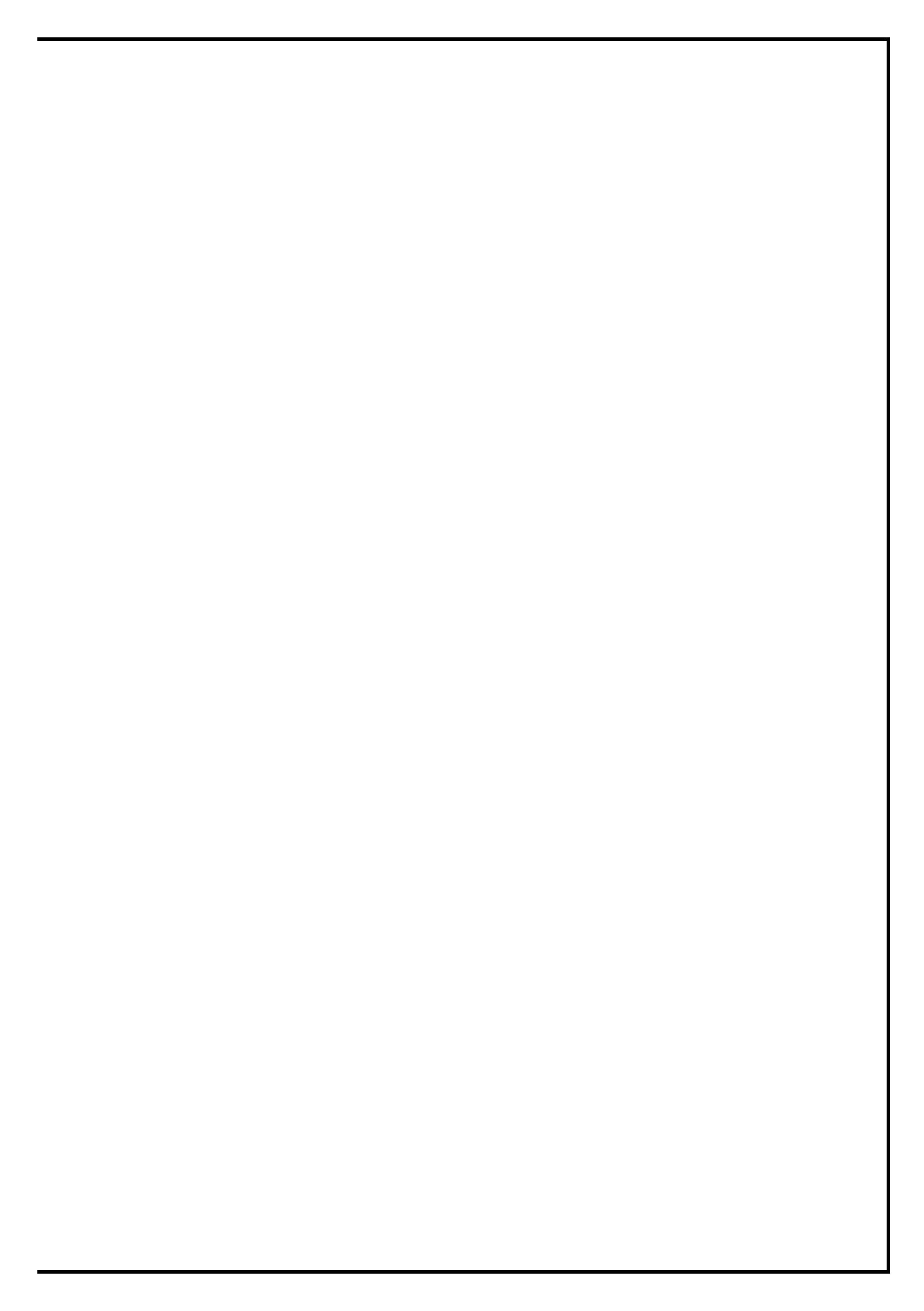
The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The user is identified as Chandee Roshe... 050_dbms. The SQL Commands tab is selected. The SQL editor contains the PL/SQL code provided above. The code has syntax highlighting and line numbers. An error message is displayed in a yellow box at the bottom of the editor:

```
Error at line 2/25: ORA-06550: line 2, column 25:
PLS-00302: component 'EMPLOYEE_ID' must be declared
ORA-06512: at "SYS.WWV_DRMS_S01_APFX_230200", line 801
```

The bottom of the screen shows the Oracle APEX footer with copyright information and version 23.2.4.

Evaluation Procedure	Marks awarded			
Query(5)				
Execution (5)				
Viva(5)				
	<table border="1"> <tr> <td></td> <td>Faculty Signature</td> <td></td> </tr> </table>		Faculty Signature	
	Faculty Signature			
Total (15)				

RESULT:





```
CREATE OR REPLACE PROCEDURE get_book_info (
```

```
p_book_id IN NUMBER,  p_title
IN OUT VARCHAR2,  p_author OUT
VARCHAR2,
p_year_published OUT NUMBER
) AS
BEGIN
  SELECT title, author, year_published INTO p_title, p_author, p_year_published
  FROM books
  WHERE book_id = p_book_id;
```

```
  p_title := p_title || '- Retrieved';
EXCEPTION
  WHEN NO_DATA_FOUND THEN
    p_title := NULL;
  p_author := NULL;
  p_year_published := NULL;
END;
```

```
DECLARE
  v_book_id NUMBER := 1;  v_title
VARCHAR2(100);  v_author
VARCHAR2(100);
v_year_published NUMBER; BEGIN
  v_title := 'Initial Title';

  get_book_info(p_book_id => v_book_id, p_title => v_title, p_author => v_author,
p_year_published => v_year_published);
```

```
  DBMS_OUTPUT.PUT_LINE('Title: ' || v_title);
  DBMS_OUTPUT.PUT_LINE('Author: ' || v_author);
  DBMS_OUTPUT.PUT_LINE('Year Published: ' || v_year_published); END;
```

OUTPUT:



Faculty Signature

RESULT:





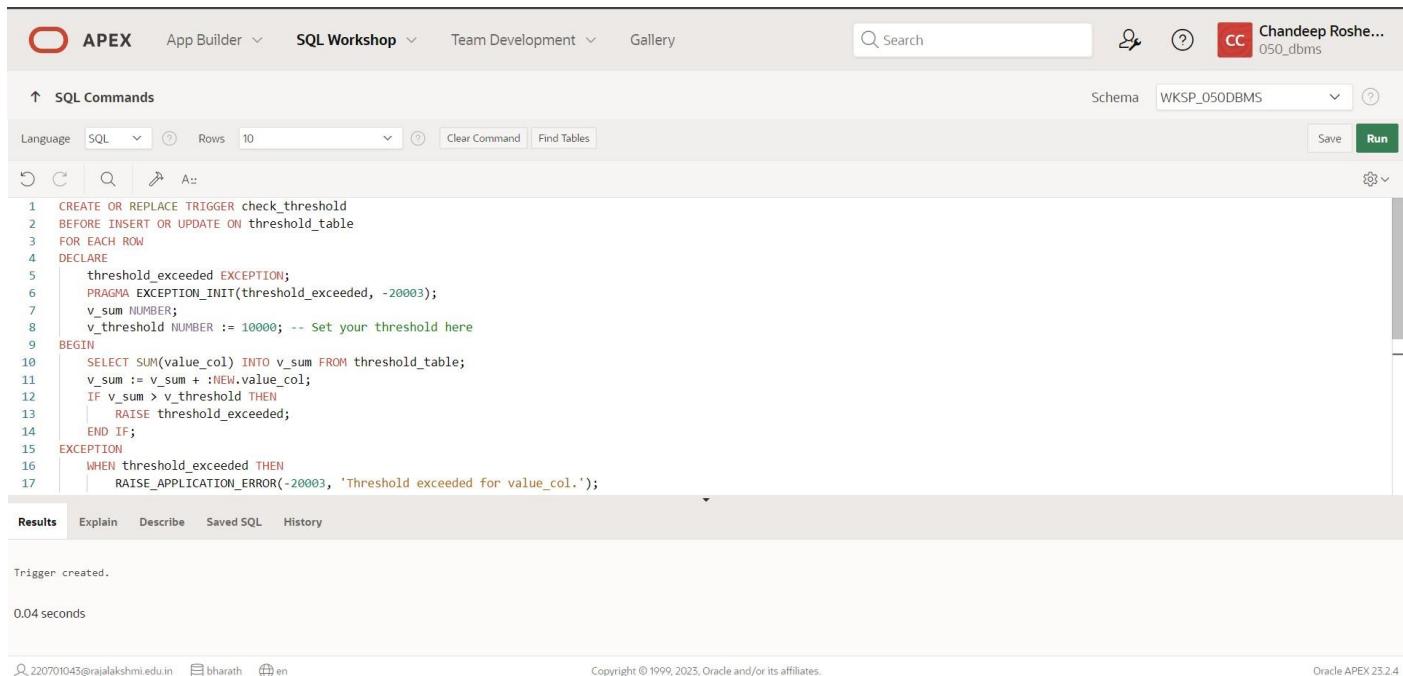
3.)

Write a code in PL/SQL to create a trigger that restricts the insertion of new rows if the total of a column's values exceeds a certain threshold

QUERY:

```
CREATE OR REPLACE TRIGGER check_threshold
BEFORE INSERT OR UPDATE ON threshold_table
FOR EACH ROW
DECLARE
    threshold_exceeded EXCEPTION;
    PRAGMA EXCEPTION_INIT(threshold_exceeded, -20003);
    v_sum NUMBER;
    v_threshold NUMBER := 10000; -- Set your threshold here
BEGIN
    SELECT SUM(value_col) INTO v_sum FROM threshold_table;
    v_sum := v_sum + :NEW.value_col;
    IF v_sum > v_threshold THEN
        RAISE threshold_exceeded;
    END IF;
EXCEPTION
    WHEN threshold_exceeded THEN
        RAISE_APPLICATION_ERROR(-20003, 'Threshold exceeded for value_col.');
END;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. A search bar and user profile information for 'Chandep Ros...' are also present. The main workspace is titled 'SQL Commands' and contains the PL/SQL code for the trigger. The code is syntax-highlighted, with keywords in blue and identifiers in green. The bottom section displays the results of the command execution, showing 'Trigger created.' and a execution time of '0.04 seconds'. The footer includes copyright information for Oracle and the APEX version.

```
1 CREATE OR REPLACE TRIGGER check_threshold
2 BEFORE INSERT OR UPDATE ON threshold_table
3 FOR EACH ROW
4 DECLARE
5     threshold_exceeded EXCEPTION;
6     PRAGMA EXCEPTION_INIT(threshold_exceeded, -20003);
7     v_sum NUMBER;
8     v_threshold NUMBER := 10000; -- Set your threshold here
9 BEGIN
10    SELECT SUM(value_col) INTO v_sum FROM threshold_table;
11    v_sum := v_sum + :NEW.value_col;
12    IF v_sum > v_threshold THEN
13        RAISE threshold_exceeded;
14    END IF;
15 EXCEPTION
16    WHEN threshold_exceeded THEN
17        RAISE_APPLICATION_ERROR(-20003, 'Threshold exceeded for value_col.');
```

Results Explain Describe Saved SQL History

Trigger created.
0.04 seconds

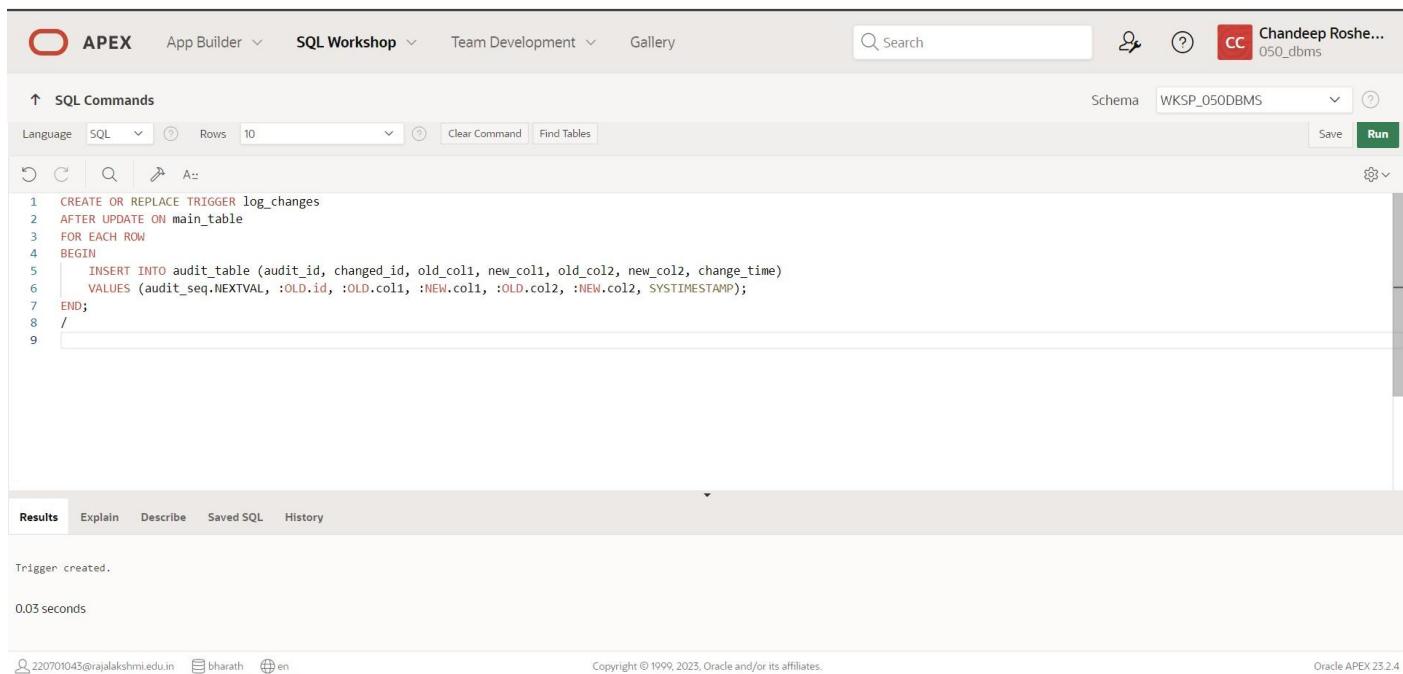
220701043@rajalakshmi.edu.in bharath en Copyright © 1999, 2023, Oracle and/or its affiliates. Oracle APEX 23.2.4

4.) Write a code in PL/SQL to design a trigger that captures changes made to specific columns and logs them in an audit table.

QUERY:

```
CREATE OR REPLACE TRIGGER log_changes
AFTER UPDATE ON main_table
FOR EACH ROW
BEGIN
    INSERT INTO audit_table (audit_id, changed_id, old_col1, new_col1, old_col2, new_col2,
change_time)
    VALUES (audit_seq.NEXTVAL, :OLD.id, :OLD.col1, :NEW.col1, :OLD.col2, :NEW.col2,
SYSTIMESTAMP);
END;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The user is signed in as Chandee Roshe... (050_dbms). The SQL Commands tab is selected, showing the trigger creation code. The code is as follows:

```
1 CREATE OR REPLACE TRIGGER log_changes
2 AFTER UPDATE ON main_table
3 FOR EACH ROW
4 BEGIN
5     INSERT INTO audit_table (audit_id, changed_id, old_col1, new_col1, old_col2, new_col2, change_time)
6     VALUES (audit_seq.NEXTVAL, :OLD.id, :OLD.col1, :NEW.col1, :OLD.col2, :NEW.col2, SYSTIMESTAMP);
7 END;
8 /
9 
```

Below the code, the Results tab is active, displaying the message "Trigger created." and a execution time of "0.03 seconds". The bottom footer includes copyright information for Oracle and the APEX version.

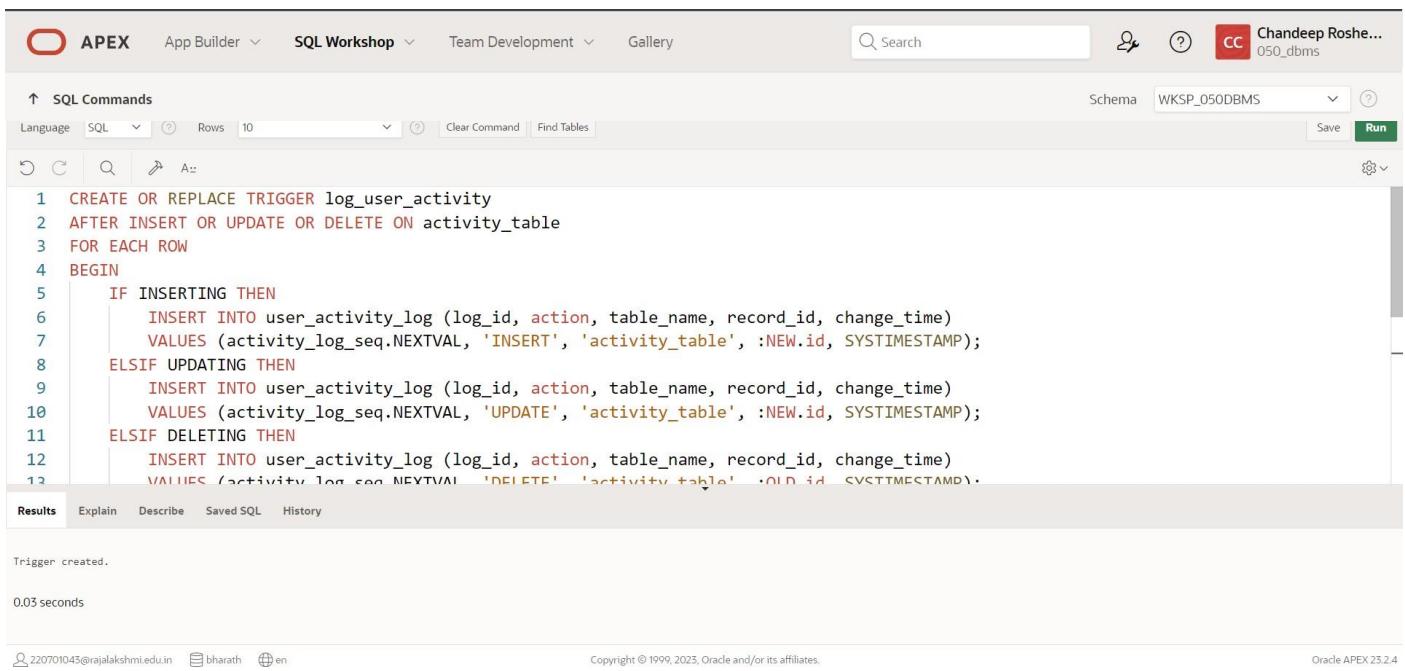
5.)

Write a code in PL/SQL to implement a trigger that records user activity (inserts, updates, deletes) in an audit log for a given set of tables.

QUERY:

```
CREATE OR REPLACE TRIGGER log_user_activity
AFTER INSERT OR UPDATE OR DELETE ON activity_table
FOR EACH ROW
BEGIN
    IF INSERTING THEN
        INSERT INTO user_activity_log (log_id, action, table_name, record_id, change_time)
        VALUES (activity_log_seq.NEXTVAL, 'INSERT', 'activity_table', :NEW.id, SYSTIMESTAMP);
    ELSIF UPDATING THEN
        INSERT INTO user_activity_log (log_id, action, table_name, record_id, change_time)
        VALUES (activity_log_seq.NEXTVAL, 'UPDATE', 'activity_table', :NEW.id,
SYSTIMESTAMP);
    ELSIF DELETING THEN
        INSERT INTO user_activity_log (log_id, action, table_name, record_id, change_time)
        VALUES (activity_log_seq.NEXTVAL, 'DELETE', 'activity_table', :OLD.id, SYSTIMESTAMP);
    END IF;
END;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. The right side of the header shows the user 'Chandeep Roshe...' and the schema 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains the PL/SQL code for the trigger. The code is numbered from 1 to 12. The 'Results' tab at the bottom is selected, showing the message 'Trigger created.' and a execution time of '0.03 seconds'. The bottom footer includes copyright information for Oracle and the APEX version 'Oracle APEX 23.2.4'.

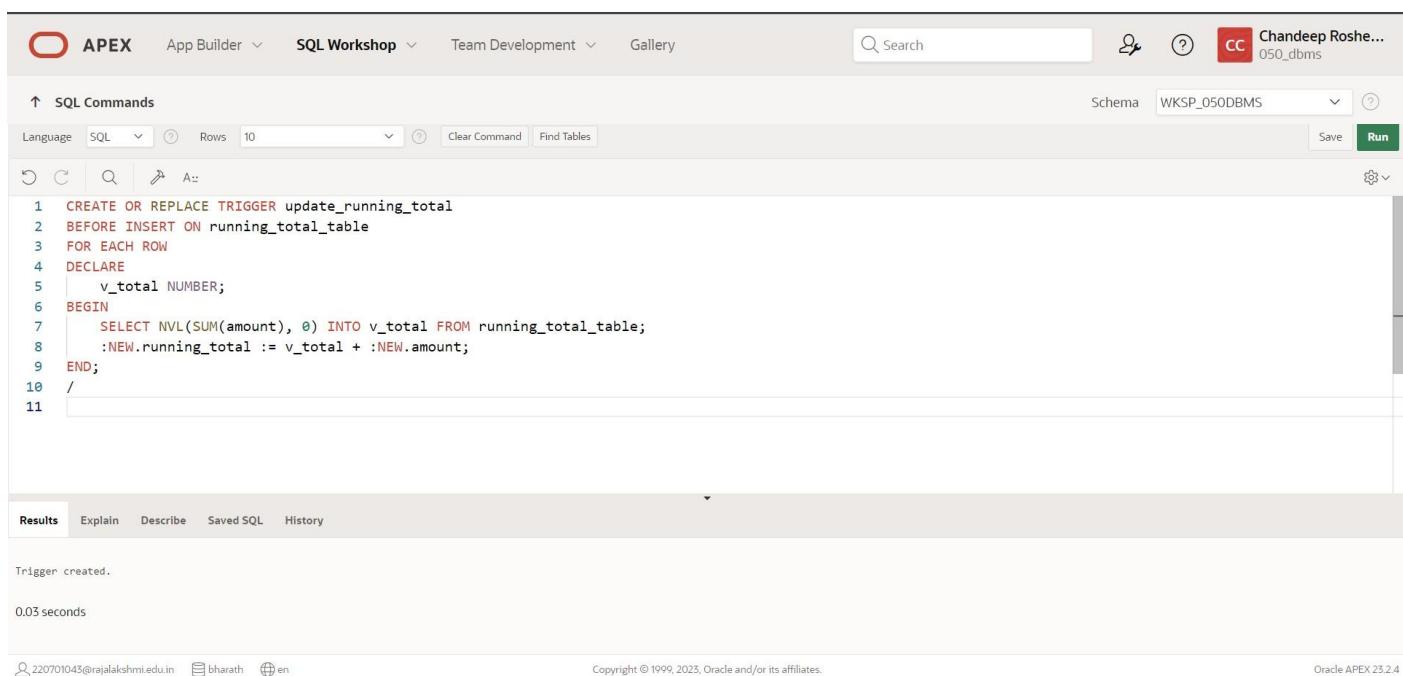
```
1 CREATE OR REPLACE TRIGGER log_user_activity
2 AFTER INSERT OR UPDATE OR DELETE ON activity_table
3 FOR EACH ROW
4 BEGIN
5     IF INSERTING THEN
6         INSERT INTO user_activity_log (log_id, action, table_name, record_id, change_time)
7         VALUES (activity_log_seq.NEXTVAL, 'INSERT', 'activity_table', :NEW.id, SYSTIMESTAMP);
8     ELSIF UPDATING THEN
9         INSERT INTO user_activity_log (log_id, action, table_name, record_id, change_time)
10        VALUES (activity_log_seq.NEXTVAL, 'UPDATE', 'activity_table', :NEW.id, SYSTIMESTAMP);
11    ELSIF DELETING THEN
12        INSERT INTO user_activity_log (log_id, action, table_name, record_id, change_time)
13        VALUES (activity_log_seq.NEXTVAL, 'DELETE', 'activity_table', :OLD.id, SYSTIMESTAMP);
```

6.) Write a code in PL/SQL to implement a trigger that automatically calculates and updates a running total column for a table whenever new rows are inserted

QUERY:

```
CREATE OR REPLACE TRIGGER update_running_total
BEFORE INSERT ON running_total_table
FOR EACH ROW
DECLARE
    v_total NUMBER;
BEGIN
    SELECT NVL(SUM(amount), 0) INTO v_total FROM running_total_table;
    :NEW.running_total := v_total + :NEW.amount;
END;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop' (selected), 'Team Development', and 'Gallery'. On the right, there's a search bar, a user icon for 'Chandeep Ros...', and a schema dropdown set to 'WKSP_050DBMS'. The main workspace is titled 'SQL Commands' and contains the PL/SQL code for the trigger. Below the code, the 'Results' tab is selected, showing the message 'Trigger created.' and a execution time of '0.05 seconds'. The bottom footer includes copyright information for Oracle and the APEX version.

```
1 CREATE OR REPLACE TRIGGER update_running_total
2 BEFORE INSERT ON running_total_table
3 FOR EACH ROW
4 DECLARE
5     v_total NUMBER;
6 BEGIN
7     SELECT NVL(SUM(amount), 0) INTO v_total FROM running_total_table;
8     :NEW.running_total := v_total + :NEW.amount;
9 END;
10 /
11 
```

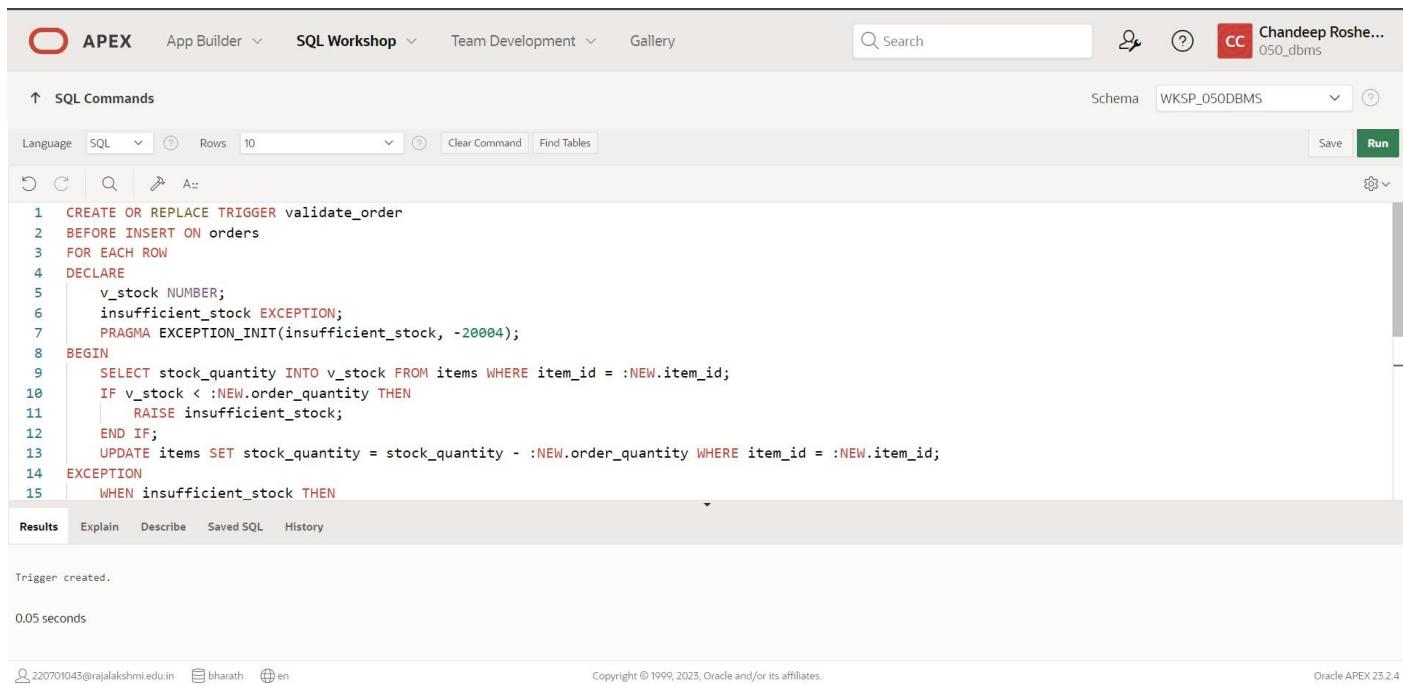
7.)

Write a code in PL/SQL to create a trigger that validates the availability of items before allowing an order to be placed, considering stock levels and pending orders

QUERY:

```
CREATE OR REPLACE TRIGGER validate_order
BEFORE INSERT ON orders
FOR EACH ROW
DECLARE
    v_stock NUMBER;
    insufficient_stock EXCEPTION;
    PRAGMA EXCEPTION_INIT(insufficient_stock, -20004);
BEGIN
    SELECT stock_quantity INTO v_stock FROM items WHERE item_id = :NEW.item_id;
    IF v_stock < :NEW.order_quantity THEN
        RAISE insufficient_stock;
    END IF;
    UPDATE items SET stock_quantity = stock_quantity - :NEW.order_quantity WHERE item_id
    = :NEW.item_id;
EXCEPTION
    WHEN insufficient_stock THEN
        RAISE_APPLICATION_ERROR(-20004, 'Insufficient stock for the item.');
END;
```

OUTPUT:



The screenshot shows the Oracle APEX SQL Workshop interface. The top navigation bar includes links for APEX, App Builder, SQL Workshop, Team Development, and Gallery. A search bar and user profile information for 'Chandee Roshe...' are also present. The main workspace is titled 'SQL Commands' and contains the PL/SQL code for the 'validate_order' trigger. The code is numbered from 1 to 15. The 'Results' tab at the bottom shows the message 'Trigger created.' and a execution time of '0.05 seconds'. The bottom footer includes copyright information for Oracle and the APEX version.

```
1 CREATE OR REPLACE TRIGGER validate_order
2 BEFORE INSERT ON orders
3 FOR EACH ROW
4 DECLARE
5     v_stock NUMBER;
6     insufficient_stock EXCEPTION;
7     PRAGMA EXCEPTION_INIT(insufficient_stock, -20004);
8 BEGIN
9     SELECT stock_quantity INTO v_stock FROM items WHERE item_id = :NEW.item_id;
10    IF v_stock < :NEW.order_quantity THEN
11        RAISE insufficient_stock;
12    END IF;
13    UPDATE items SET stock_quantity = stock_quantity - :NEW.order_quantity WHERE item_id = :NEW.item_id;
14 EXCEPTION
15    WHEN insufficient_stock THEN
```

RESULT:

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

MONGO DB

EX_NO: 19

DATE:

1.) Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which prepared dish except 'American' and 'Chinees' or restaurant's name begins with letter 'Wil'.

QUERY:

```
db.restaurants.find( { $or: [ { name: /^Wil/ }, { cuisine: { $nin: ['American', 'Chinese'] } } ], { restaurant_id: 1, name: 1, borough: 1, cuisine: 1 } );
```

OUTPUT:

```
.Chandeep Roshen_50>db.restaurants.find( { $or: [ { name: /^Wil/ }, { cuisine: { $nin: ['American', 'Chinese'] } } ], { restaurant_id: 1, name: 1, borough: 1, cuisine: 1 } );
[ {
  _id: ObjectId('664f3c798752f54dc3cdcf7'),
  borough: 'Bronx',
  cuisine: 'Bakery',
  name: 'Morris Park Bake Shop',
  restaurant_id: '30075445'
}
]Chandeep Roshen_50>
```

2.) Write a MongoDB query to find the restaurant Id, name, and grades for those restaurants which achieved a grade of "A" and scored 11 on an ISODate "2014-08-11T00:00:00Z" among many of survey dates.

QUERY:

```
db.restaurants.find( { grades: { $elemMatch: { grade: "A", score: 11, date: ISODate("2014-08-11T00:00:00Z") } } }, { restaurant_id: 1, name: 1, grades: 1 } );
```

OUTPUT:

```
.Chandeep Roshen_50>db.restaurants.find( { grades: { $elemMatch: { grade: "A", score: 11, date: ISODate("2014-08-11T00:00:00Z") } } }, { restaurant_id: 1, name: 1, grades: 1 } );
[ ]
.Chandeep Roshen_50>
```

3.) Write a MongoDB query to find the restaurant Id, name and grades for those restaurants where the 2nd element of grades array contains a grade of "A" and score 9 on an ISODate "2014-08-11T00:00:00Z".

QUERY:

```
db.restaurants.find( {"grades.1.grade": "A", "grades.1.score": 9, "grades.1.date": ISODate("2014-08-11T00:00:00Z") }, { restaurant_id: 1, name: 1, grades: 1 } );
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find( {"grades.1.grade": "A", "grades.1.score": 9, "grades.1.date": ISODate("2014-08-11T00:00:00Z") }, { restaurant_id: 1, name: 1, grades: 1 } );
.Chandeep_Roshen_50>
```

4.) Write a MongoDB query to find the restaurant Id, name, address and geographical location for those restaurants where 2nd element of coord array contains a value which is more than 42 and upto 52

QUERY:

```
db.restaurants.find({$and : [{"address.coord.1": {$gt : 42}}, {"address.coord.1": {$lte : 52}}]}, { _id:0, restaurant_id:1, name:1, address:1})
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({$and : [{"address.coord.1": {$gt : 42}}, {"address.coord.1": {$lte : 52}}]}, { _id:0, restaurant_id:1, name:1, address:1 })
.Chandeep_Roshen_50>
```

5.) Write a MongoDB query to arrange the name of the restaurants in ascending order along with all the columns.

QUERY:

```
db.restaurants.find({}, { _id: 0 }).sort({ name: 1 });
```

OUTPUT:

```
Chandep_Roshen_50> db.restaurants.find({}, { _id: 0 }).sort({ name: 1 })
[ {
  address: {
    building: '1007',
    coord: [ -73.856077, 40.848447 ],
    street: 'Morris Park Ave',
    zipcode: '10462'
  },
  borough: 'Bronx',
  cuisine: 'Bakery',
  grades: [
    {
      date: ISODate('2014-03-03T00:00:00.000Z'),
      grade: 'A',
      score: 2
    },
    {
      date: ISODate('2013-09-11T00:00:00.000Z'),
      grade: 'A',
      score: 6
    },
    {
      date: ISODate('2013-01-24T00:00:00.000Z'),
      grade: 'A',
      score: 10
    },
    {
      date: ISODate('2011-11-23T00:00:00.000Z'),
      grade: 'A',
      score: 9
    },
    {
      date: ISODate('2011-03-10T00:00:00.000Z'),
      grade: 'B',
      score: 14
    }
  ],
  name: 'Morris Park Bake Shop',
  restaurant_id: '30075445'
}
]
Chandep_Roshen_50>|
```

6.) Write a MongoDB query to arrange the name of the restaurants in descending along with all the columns.

QUERY:

```
db.restaurants.find({}, { _id: 0 }).sort({ name: -1 })
```

OUTPUT:

```
Chandep_Roshen_50> db.restaurants.find({}, { _id: 0 }).sort({ name: -1 })
[ {
  address: {
    building: '1007',
    coord: [ -73.856077, 40.848447 ],
    street: 'Morris Park Ave',
    zipcode: '10462'
  },
  borough: 'Bronx',
  cuisine: 'Bakery',
  grades: [
    {
      date: ISODate('2014-03-03T00:00:00.000Z'),
      grade: 'A',
      score: 2
    },
    {
      date: ISODate('2013-09-11T00:00:00.000Z'),
      grade: 'A',
      score: 6
    },
    {
      date: ISODate('2013-01-24T00:00:00.000Z'),
      grade: 'A',
      score: 10
    },
    {
      date: ISODate('2011-11-23T00:00:00.000Z'),
      grade: 'A',
      score: 9
    },
    {
      date: ISODate('2011-03-10T00:00:00.000Z'),
      grade: 'B',
      score: 14
    }
  ],
  name: 'Morris Park Bake Shop',
  restaurant_id: '30075445'
}
]
Chandep_Roshen_50>|
```

7.) Write a MongoDB query to arranged the name of the cuisine in ascending order and for that same cuisine borough should be in descending order.

QUERY:

```
db.restaurants.find({},{_id:0}).sort({cuisine:1,borough:-1})
```

OUTPUT:

```
Chandep Roshen_50> db.restaurants.find({},{_id:0}).sort({cuisine:1,borough:-1})
[{"address": {"building": "1007", "coord": [-73.856077, 40.848447], "street": "Morris Park Ave", "zipcode": "10462"}, "borough": "Bronx", "cuisine": "Bakery", "grades": [{"date": ISODate('2014-03-03T00:00:00.000Z'), "grade": "A", "score": 2}, {"date": ISODate('2013-09-11T00:00:00.000Z'), "grade": "A", "score": 6}, {"date": ISODate('2013-01-24T00:00:00.000Z'), "grade": "A", "score": 10}, {"date": ISODate('2011-11-23T00:00:00.000Z'), "grade": "A", "score": 9}, {"date": ISODate('2011-03-10T00:00:00.000Z'), "grade": "B", "score": 14}], "name": "Morris Park Bake Shop", "restaurant_id": "30075445"}]
BHARATH_KUMAR_43> |
```

8.) Write a MongoDB query to know whether all the addresses contains the street or not.

QUERY:

```
db.restaurants.find({ "address.street": { $exists: true, $ne: "" } })
```

OUTPUT:

```
Chandep Roshen_50> db.restaurants.find({ "address.street": { $exists: true, $ne: "" } })
[{"address": {"building": "1007", "coord": [-73.856077, 40.848447], "street": "Morris Park Ave", "zipcode": "10462"}, "borough": "Bronx", "cuisine": "Bakery", "grades": [{"date": ISODate('2014-03-03T00:00:00.000Z'), "grade": "A", "score": 2}, {"date": ISODate('2013-09-11T00:00:00.000Z'), "grade": "A", "score": 6}, {"date": ISODate('2013-01-24T00:00:00.000Z'), "grade": "A", "score": 10}, {"date": ISODate('2011-11-23T00:00:00.000Z'), "grade": "A", "score": 9}, {"date": ISODate('2011-03-10T00:00:00.000Z'), "grade": "B", "score": 14}], "name": "Morris Park Bake Shop", "restaurant_id": "30075445"}]
Chandep Roshen_50> |
```

9.) Write a MongoDB query which will select all documents in the restaurants collection where the coord field value is Double.

QUERY:

```
db.restaurants.find({ "address.coord": { $elemMatch: { $type: "double" } } })
```

OUTPUT:

```
Chandee Roshen_50> db.restaurants.find({ "address.coord": { $elemMatch: { $type: "double" } } })
[
  {
    _id: ObjectId('664f3c798752f54dc3cdcdf7'),
    address: {
      building: '1007',
      coord: [ -73.856077, 40.848447 ],
      street: 'Morris Park Ave',
      zipcode: '10462'
    },
    borough: 'Bronx',
    cuisine: 'Bakery',
    grades: [
      {
        date: ISODate('2014-03-03T00:00:00.000Z'),
        grade: 'A',
        score: 2
      },
      {
        date: ISODate('2013-09-11T00:00:00.000Z'),
        grade: 'A',
        score: 6
      },
      {
        date: ISODate('2013-01-24T00:00:00.000Z'),
        grade: 'A',
        score: 10
      },
      {
        date: ISODate('2011-11-23T00:00:00.000Z'),
        grade: 'A',
        score: 9
      },
      {
        date: ISODate('2011-03-10T00:00:00.000Z'),
        grade: 'B',
        score: 14
      }
    ],
    name: 'Morris Park Bake Shop',
    restaurant_id: '30075445'
  }
]
Chandee Roshen_50>|
```

10. Write a MongoDB query which will select the restaurant Id, name and grades for those restaurants which returns 0 as a remainder after dividing the score by 7.

QUERY:

```
db.restaurants.find({ "grades.score": { $mod: [7, 0] } }, { restaurant_id: 1, name: 1, grades: 1 });
```

OUTPUT:

```
Chandee Roshen_50> db.restaurants.find({ "grades.score": { $mod: [7, 0] } }, { restaurant_id: 1, name: 1, grades: 1 })
[
  {
    _id: ObjectId('664f3c798752f54dc3cdcdf7'),
    grades: [
      {
        date: ISODate('2014-03-03T00:00:00.000Z'),
        grade: 'A',
        score: 2
      },
      {
        date: ISODate('2013-09-11T00:00:00.000Z'),
        grade: 'A',
        score: 6
      },
      {
        date: ISODate('2013-01-24T00:00:00.000Z'),
        grade: 'A',
        score: 10
      },
      {
        date: ISODate('2011-11-23T00:00:00.000Z'),
        grade: 'A',
        score: 9
      },
      {
        date: ISODate('2011-03-10T00:00:00.000Z'),
        grade: 'B',
        score: 14
      }
    ],
    name: 'Morris Park Bake Shop',
    restaurant_id: '30075445'
  }
]
Chandee Roshen_50>|
```

11. Write a MongoDB query to find the restaurant name, borough, longitude and attitude and cuisine for those restaurants which contains 'mon' as three letters somewhere in its name.

QUERY:

```
db.restaurants.find({ name: /mon/i }, { name: 1, borough: 1, "address.coord": 1, cuisine: 1 })
```

OUTPUT:

```
Chandee Roshen_50> db.restaurants.find({ name: /mon/i }, { name: 1, borough: 1, "address.coord": 1, cuisine: 1 })  
Chandee Roshen_50>|
```

12. Write a MongoDB query to find the restaurant name, borough, longitude and latitude and cuisine for those restaurants which contain 'Mad' as first three letters of its name.

QUERY:

```
db.restaurants.find({ name: /^Mad/i }, { name: 1, borough: 1, "address.coord": 1, cuisine: 1 })
```

OUTPUT:

```
Chandee Roshen_50> db.restaurants.find({ name: /^Mad/i }, { name: 1, borough: 1, "address.coord": 1, cuisine: 1 })  
Chandee Roshen_50>|
```

13. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5.

QUERY:

```
db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } } })
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } } })
[ {
  _id: ObjectId('664f3c798752f54dc3cdcf7'),
  address: {
    building: '1007',
    coord: [ -73.856077, 40.848447 ],
    street: 'Morris Park Ave',
    zipcode: '10462'
  },
  borough: 'Bronx',
  cuisine: 'Bakery',
  grades: [
    {
      date: ISODate('2014-03-03T00:00:00.000Z'),
      grade: 'A',
      score: 2
    },
    {
      date: ISODate('2013-09-11T00:00:00.000Z'),
      grade: 'A',
      score: 6
    },
    {
      date: ISODate('2013-01-24T00:00:00.000Z'),
      grade: 'A',
      score: 10
    },
    {
      date: ISODate('2011-11-23T00:00:00.000Z'),
      grade: 'A',
      score: 9
    },
    {
      date: ISODate('2011-03-10T00:00:00.000Z'),
      grade: 'B',
      score: 14
    }
  ],
  name: 'Morris Park Bake Shop',
  restaurant_id: '30075445'
}
]
Chandeep_Roshen_50>
```

14. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan.

QUERY:

```
db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, "borough": "Manhattan" })
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, "borough": "Manhattan" })
Chandeep_Roshen_50>
```

15. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan or Brooklyn.

QUERY:

```
db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }] })
```

OUTPUT:

```
Chandeep Roshen_50> db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }] })
```

16. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan or Brooklyn, and their cuisine is not American.

QUERY:

```
db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $ne: "American" } })
```

OUTPUT:

```
Chandeep Roshen_50> db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $ne: "American" } })
```

17. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan or Brooklyn, and their cuisine is not American or Chinese.

QUERY:

```
db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $nin: ["American", "Chinese"] } })
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({ "grades": { $elemMatch: { "score": { $lt: 5 } } }, $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $nin: ["American", "Chinese"] } })  
Chandeep_Roshen_50>
```

18. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6.

QUERY:

```
db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }] })
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }] })  
[  
  {  
    _id: ObjectId('664f3c798752f54dc3cdcdf7'),  
    address: {  
      building: '1007',  
      coord: [-73.856077, 40.848447],  
      street: 'Morris Park Ave',  
      zipcode: '10462'  
    },  
    borough: 'Bronx',  
    cuisine: 'Bakery',  
    grades: [  
      {  
        date: ISODate('2014-03-03T00:00:00.000Z'),  
        grade: 'A',  
        score: 2  
      },  
      {  
        date: ISODate('2013-09-11T00:00:00.000Z'),  
        grade: 'A',  
        score: 6  
      },  
      {  
        date: ISODate('2013-01-24T00:00:00.000Z'),  
        grade: 'A',  
        score: 10  
      },  
      {  
        date: ISODate('2011-11-23T00:00:00.000Z'),  
        grade: 'A',  
        score: 9  
      },  
      {  
        date: ISODate('2011-03-10T00:00:00.000Z'),  
        grade: 'B',  
        score: 14  
      }  
    ],  
    name: 'Morris Park Bake Shop',  
    restaurant_id: '30075445'  
  }  
]  
Chandeep_Roshen_50>
```

19. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan.

QUERY:

```
db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], "borough": "Manhattan" })
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], "borough": "Manhattan" })  
Chandeep_Roshen_50>|
```

20. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn.

QUERY:

```
db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }] })
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }] })  
Chandeep_Roshen_50>|
```

21. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn, and their cuisine is not American.

QUERY:

```
db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $ne: "American" } })
```

OUTPUT:

```
Chandeep Roshen_50>db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $ne: "American" } })
```

22. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn, and their cuisine is not American or Chinese.

QUERY:

```
db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $nin: ["American", "Chinese"] } })
```

OUTPUT:

```
Chandeep Roshen_50>db.restaurants.find({ $and: [{ "grades.grade": "A", "grades.score": 2 }, { "grades.grade": "A", "grades.score": 6 }], $or: [{ "borough": "Manhattan" }, { "borough": "Brooklyn" }], "cuisine": { $nin: ["American", "Chinese"] } })
```

23. Write a MongoDB query to find the restaurants that have a grade with a score of 2 or a grade with a score of 6.

QUERY:

```
db.restaurants.find({ $or: [{ "grades.score": 2 }, { "grades.score": 6 }] })
```

OUTPUT:

```
Chandeep_Roshen_50> db.restaurants.find({ $or: [{ "grades.score": 2 }, { "grades.score": 6 }] })
[ {
  _id: ObjectId('664f3c798752f54dc3cdcdf7'),
  address: {
    building: '1007',
    coord: [ -73.856077, 40.848447 ],
    street: 'Morris Park Ave',
    zipcode: '10462'
  },
  borough: 'Bronx',
  cuisine: 'Bakery',
  grades: [
    {
      date: ISODate('2014-03-03T00:00:00.000Z'),
      grade: 'A',
      score: 2
    },
    {
      date: ISODate('2013-09-11T00:00:00.000Z'),
      grade: 'A',
      score: 6
    },
    {
      date: ISODate('2013-01-24T00:00:00.000Z'),
      grade: 'A',
      score: 10
    },
    {
      date: ISODate('2011-11-23T00:00:00.000Z'),
      grade: 'A',
      score: 9
    },
    {
      date: ISODate('2011-03-10T00:00:00.000Z'),
      grade: 'B',
      score: 14
    }
  ],
  name: 'Morris Park Bake Shop',
  restaurant_id: '30075445'
}
]
Chandeep_Roshen_50>
```

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	
Faculty Signature	

RESULT:

MONGO DB

EX_NO: 20

DATE:

- 1.) Find all movies with full information from the 'movies' collection that released in the year 1893.

QUERY:

```
db.movies.find({ year: 1893 })
```

OUTPUT:

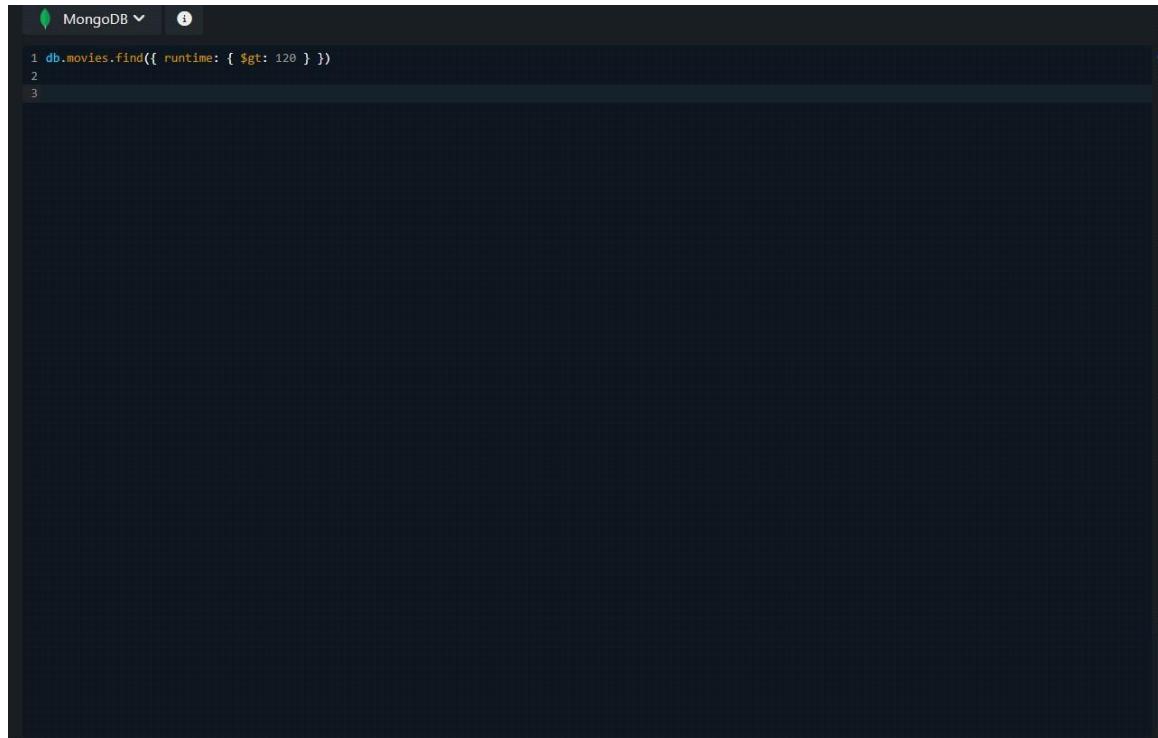
```
1 db.movies.find({ year: 1893 })
2
```

- 2.) Find all movies with full information from the 'movies' collection that have a runtime greater than 120 minutes.

QUERY:

```
db.movies.find({ runtime: { $gt: 120 } })
```

OUTPUT:

A screenshot of a MongoDB shell window. The title bar says "MongoDB". The main area contains the following text:

```
1 db.movies.find({ runtime: { $gt: 120 } })
```

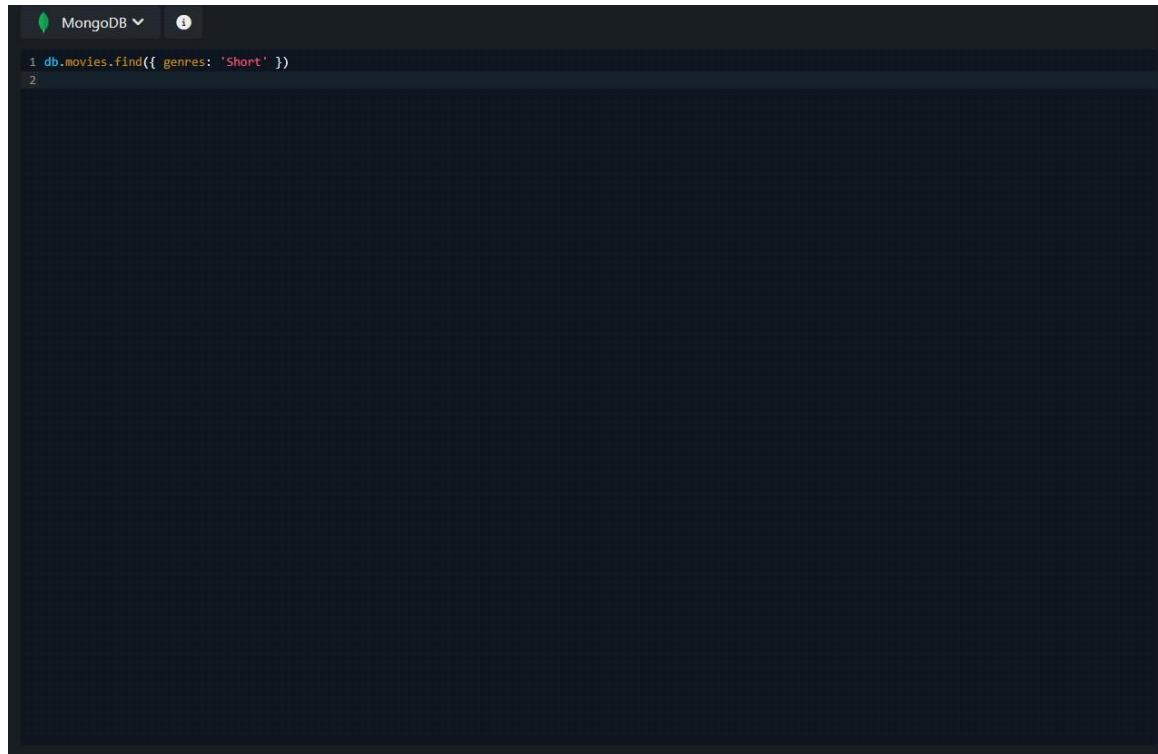
The numbers 1, 2, and 3 are aligned vertically to the left of the lines of text.

- 3.) Find all movies with full information from the 'movies' collection that have "Short" genre.

QUERY:

```
db.movies.find({ genres: 'Short' })
```

OUTPUT:



A screenshot of a MongoDB shell window. The title bar says "MongoDB". The main area contains the following text:

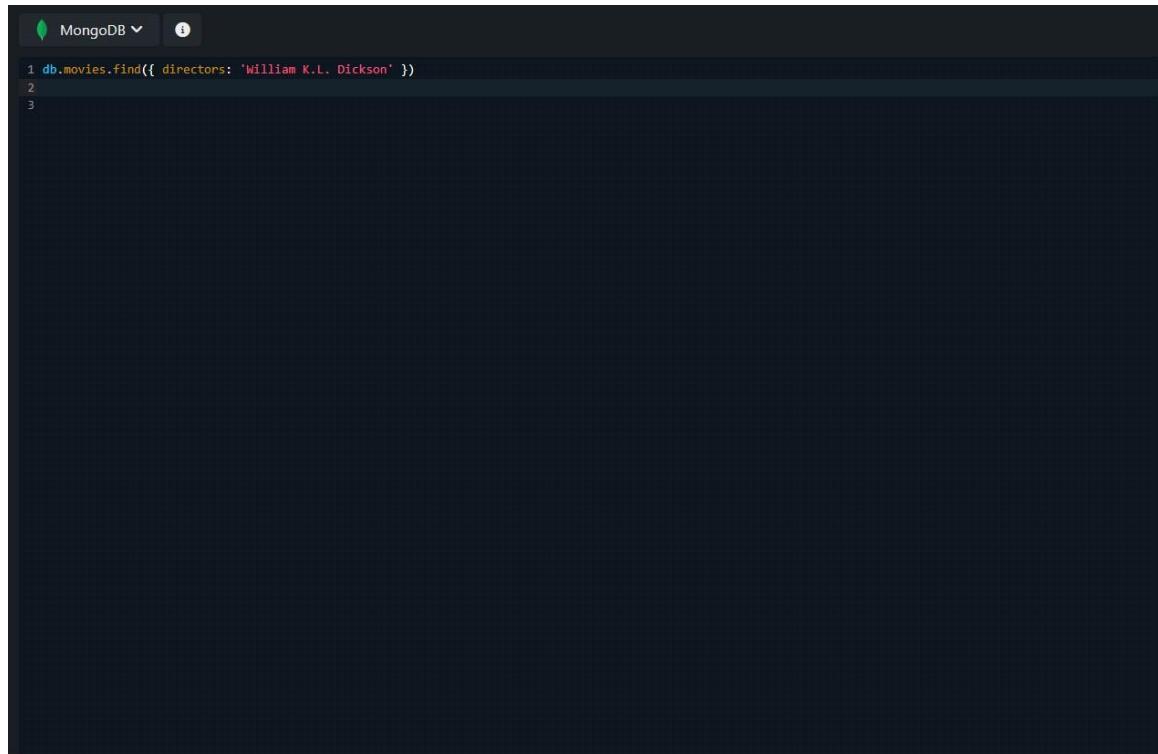
```
1 db.movies.find({ genres: 'Short' })  
2
```

- 4.) Retrieve all movies from the 'movies' collection that were directed by "William K.L. Dickson" and include complete information for each movie.**

QUERY:

```
db.movies.find({ directors: 'William K.L. Dickson' })
```

OUTPUT:



A screenshot of a MongoDB terminal window. The title bar says "MongoDB". The main area contains the following text:

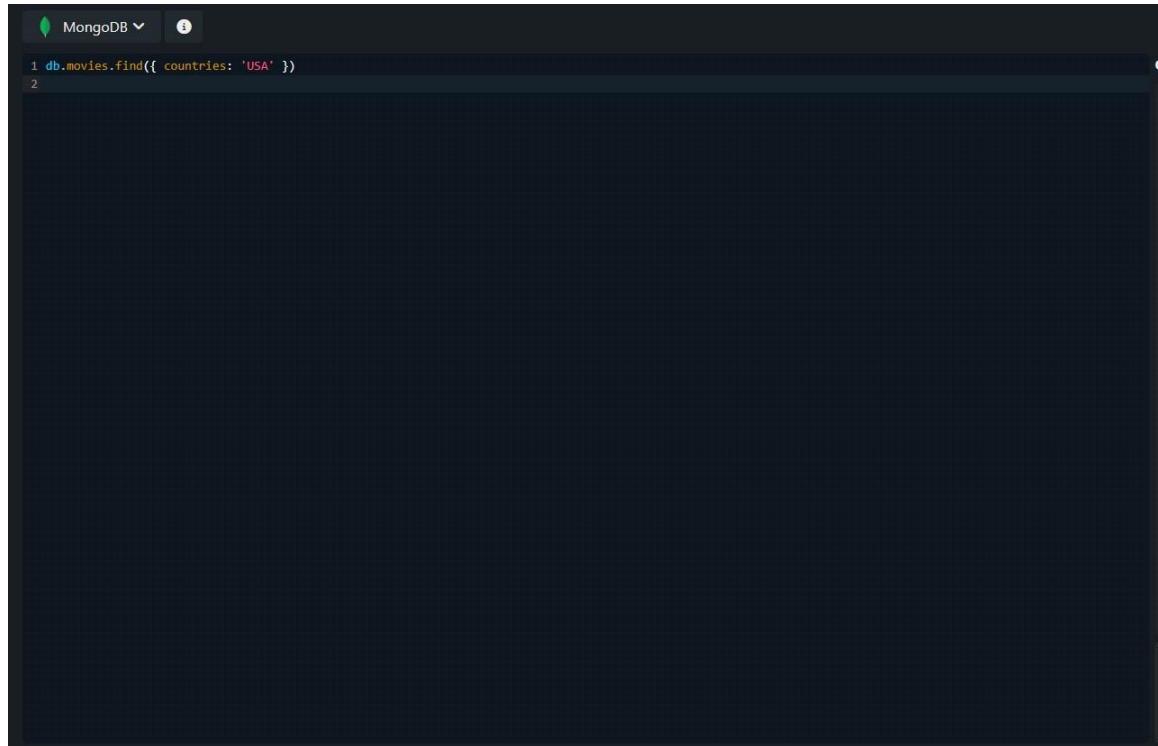
```
1 db.movies.find({ directors: 'William K.L. Dickson' })
```

- 5.) Retrieve all movies from the 'movies' collection that were released in the USA and include complete information for each movie.**

QUERY:

```
db.movies.find( { countries: 'USA' } )
```

OUTPUT:



A screenshot of a MongoDB terminal window. The title bar says "MongoDB". The main area contains the following text:

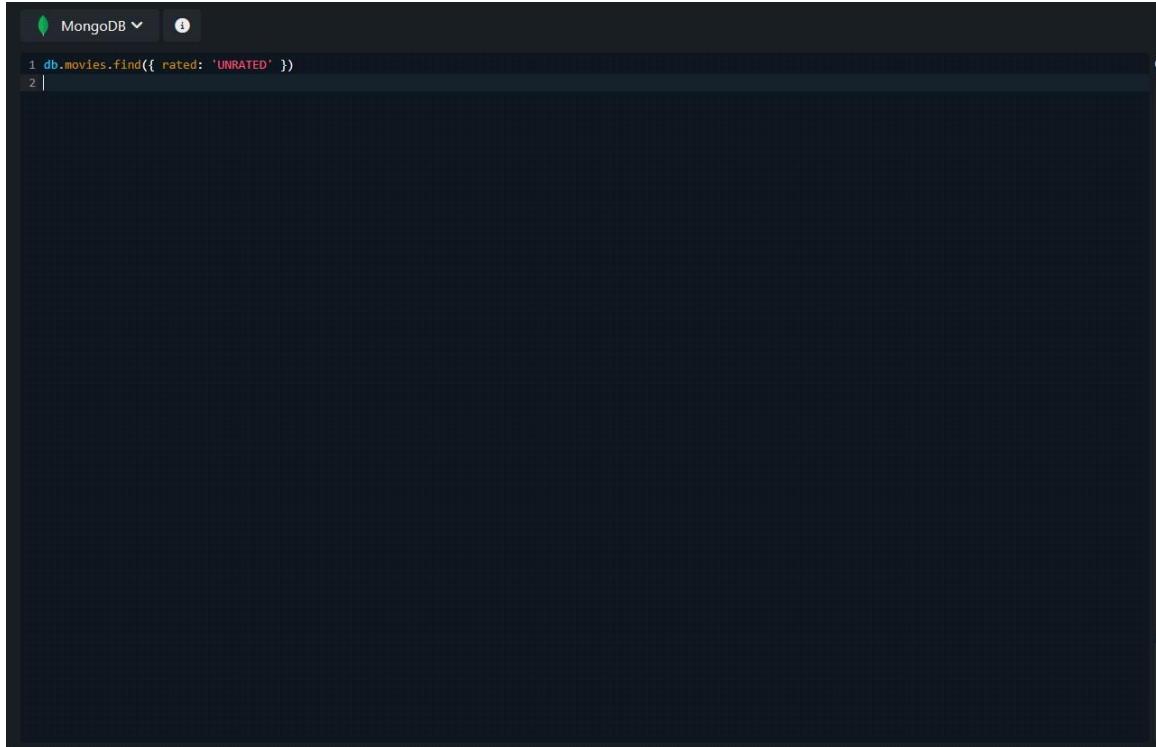
```
1 db.movies.find({ countries: 'USA' })  
2
```

- 6.) Retrieve all movies from the 'movies' collection that have complete information and are rated as "UNRATED".

QUERY:

```
db.movies.find( { rated: 'UNRATED' } )
```

OUTPUT:



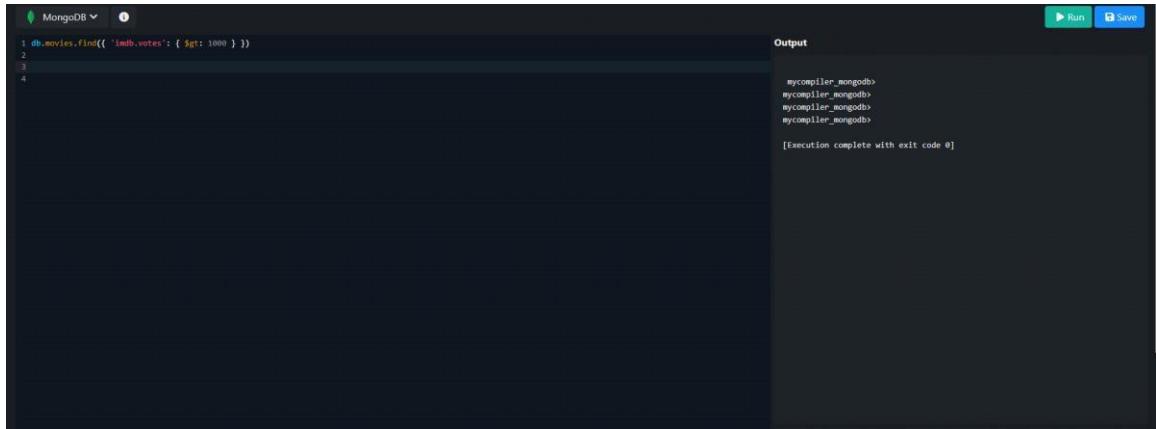
```
MongoDB
1 db.movies.find({ rated: 'UNRATED' })
2 |
```

- 7.) Retrieve all movies from the 'movies' collection that have complete information and have received more than 1000 votes on IMDb.

QUERY:

```
db.movies.find( { 'imdb.votes': { $gt: 1000 } } )
```

OUTPUT:



```
MongoDB
1 db.movies.find( { 'imdb.votes': { $gt: 1000 } } )
2
3
4
```

Output

```
mycompiler_mongodb>
mycompiler_mongodb>
mycompiler_mongodb>
mycompiler_mongodb>

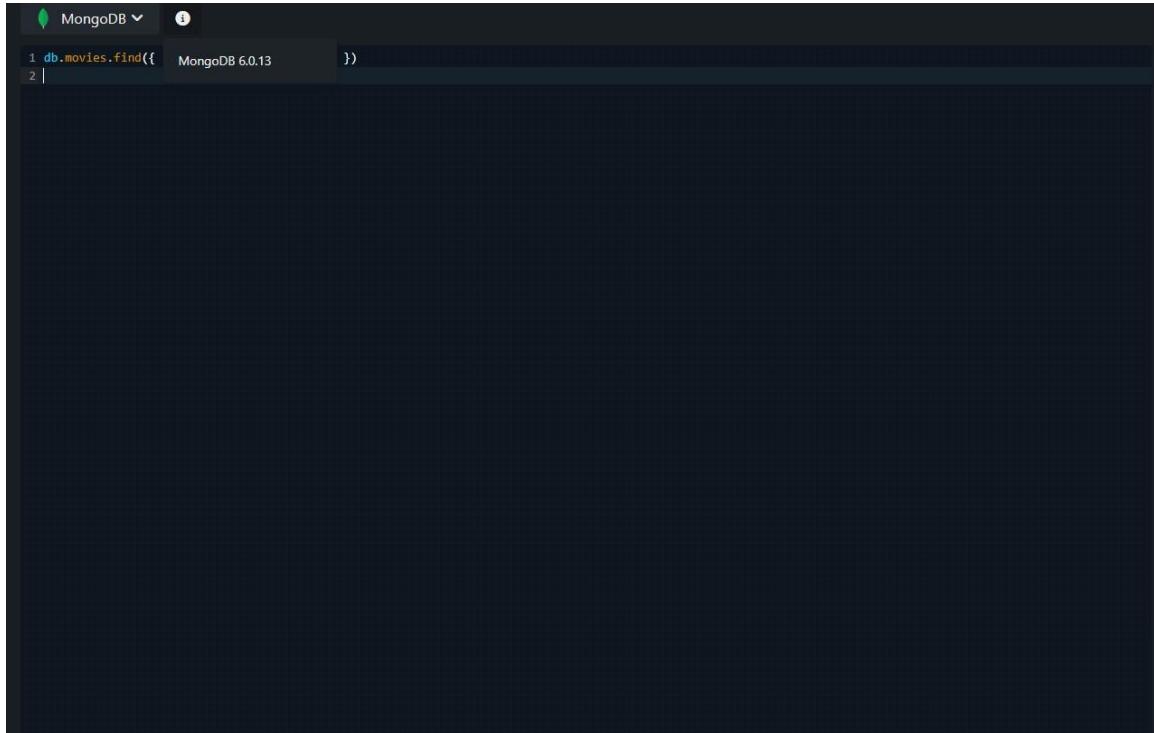
[Execution complete with exit code 0]
```

- 8.) Retrieve all movies from the 'movies' collection that have complete information and have an IMDb rating higher than 7.**

QUERY:

```
db.movies.find({ 'imdb.rating': { $gt: 7 } })
```

OUTPUT:

A screenshot of a MongoDB shell window. The title bar says "MongoDB". The main area shows a single line of code:
1 db.movies.find({ 'imdb.rating': { \$gt: 7 } })
2 |
The code is highlighted in orange and blue, indicating syntax.

The MongoDB shell interface shows a single line of code:

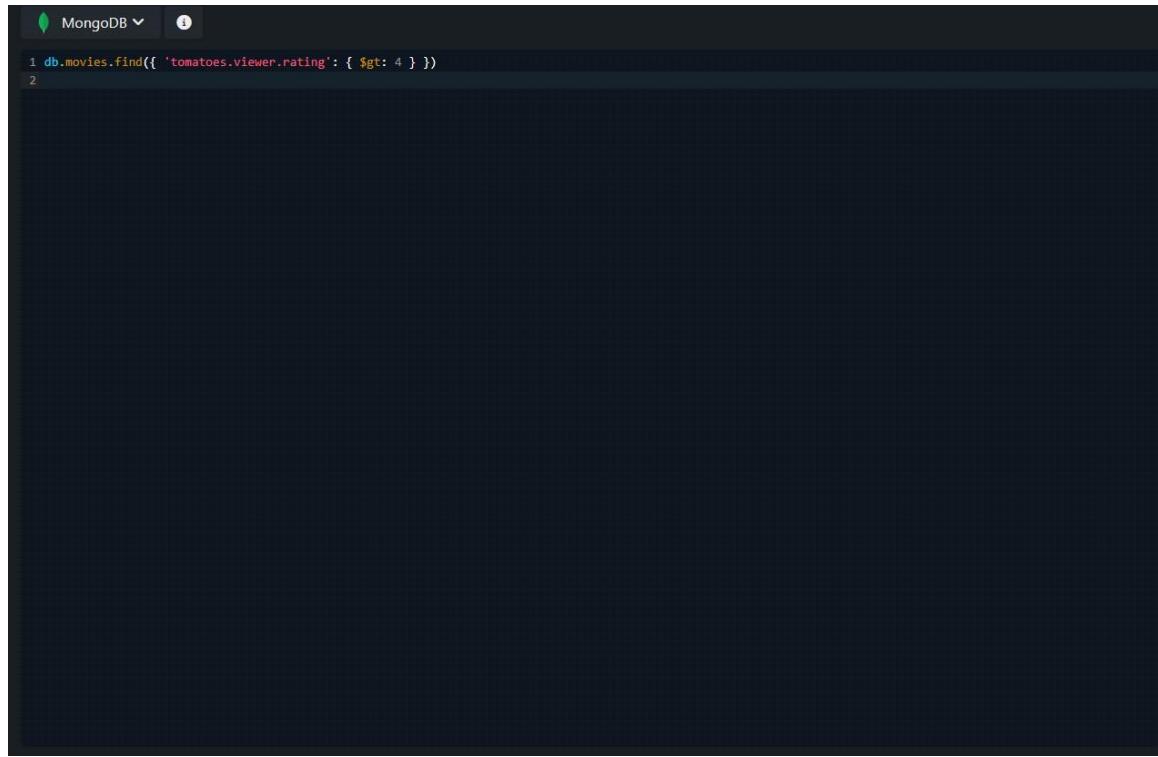
```
1 db.movies.find({ 'imdb.rating': { $gt: 7 } })  
2 |
```

- 9.) Retrieve all movies from the 'movies' collection that have complete information and have a viewer rating higher than 4 on Tomatoes.**

QUERY:

```
db.movies.find({ 'tomatoes.viewer.rating': { $gt: 4 } })
```

OUTPUT:



A screenshot of a MongoDB shell interface. The title bar says "MongoDB". The main area shows a single line of code:

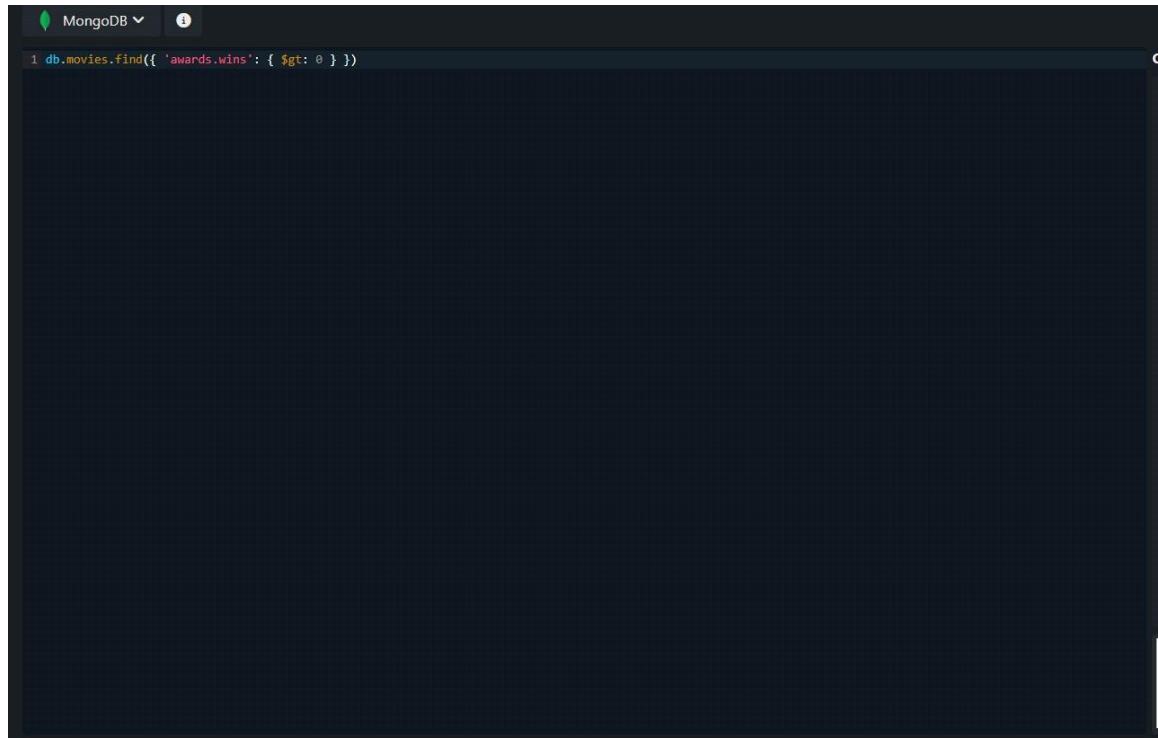
```
1 db.movies.find({ 'tomatoes.viewer.rating': { $gt: 4 } })
```

10.) Retrieve all movies from the 'movies' collection that have received an award.

QUERY:

```
db.movies.find({ 'awards.wins': { $gt: 0 } })
```

OUTPUT:

A screenshot of a MongoDB shell window. The title bar says "MongoDB". The command line shows the following query:

```
1 db.movies.find({ 'awards.wins': { $gt: 0 } })
```

The rest of the window is blank, indicating no results are currently displayed.

11.) Find all movies with title, languages, released, directors, writers, awards, year, genres, runtime, cast, countries from the 'movies' collection in MongoDB that have at least one nomination.

QUERY:

```
db.movies.find( { 'awards.nominations': { $gt: 0 } }, { title: 1, languages: 1, released: 1, directors: 1, writers: 1, awards: 1, year: 1, genres: 1, runtime: 1, cast: 1, countries: 1 } )
```

OUTPUT:

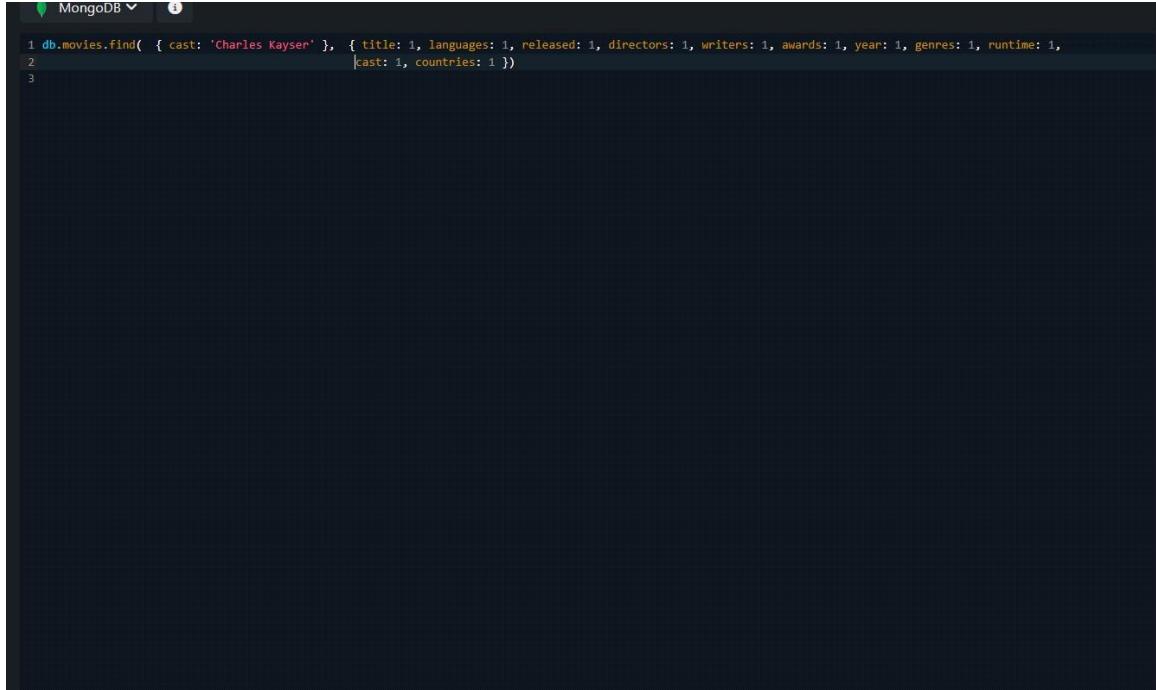
```
MongoDB>
1 db.movies.find( { 'awards.nominations': { $gt: 0 } }, { title: 1, languages: 1, released: 1, directors: 1, writers: 1, awards: 1, year: 1,
2                                         genres: 1, runtime: 1, cast: 1, countries: 1 })
3
```

12.) Find all movies with title, languages, released, directors, writers, awards, year, genres, runtime, cast, countries from the 'movies' collection in MongoDB with cast including "Charles Kayser".

QUERY:

```
db.movies.find( { cast: 'Charles Kayser' }, { title: 1, languages: 1, released: 1, directors: 1,
writers: 1, awards: 1, year: 1, genres: 1, runtime: 1, cast: 1, countries: 1 })
```

OUTPUT:

A screenshot of a MongoDB shell window. The title bar says "MongoDB". The code area contains three lines of MongoDB query language:

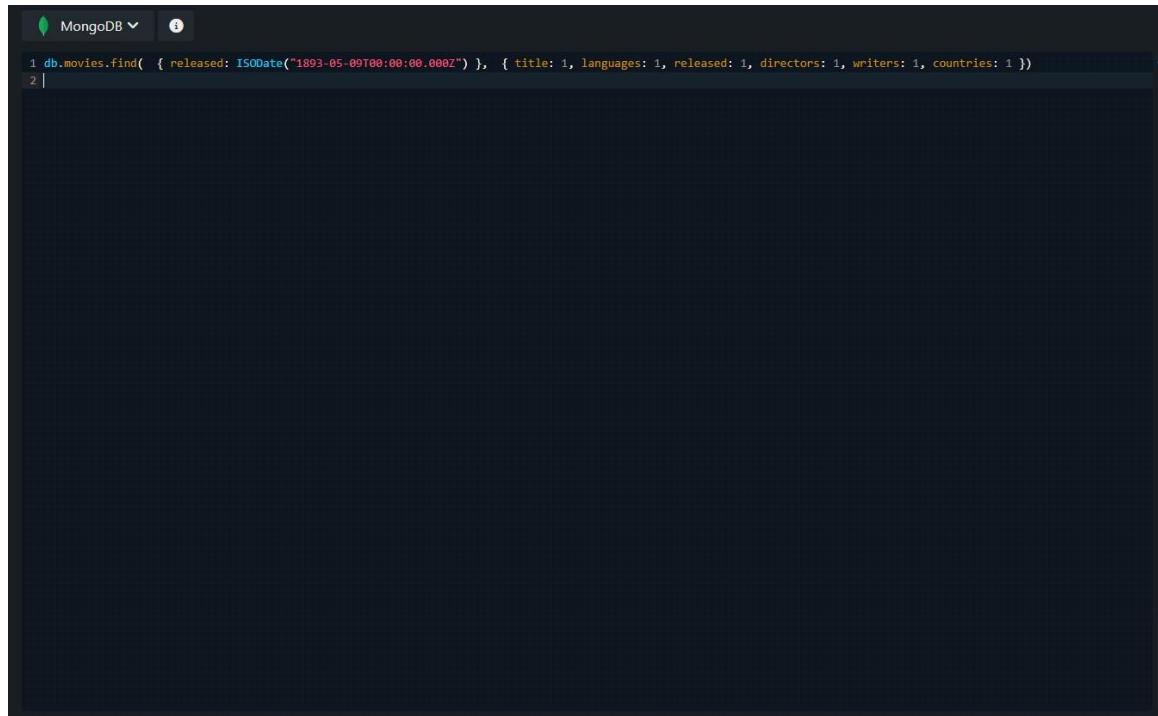
```
1 db.movies.find( { cast: 'Charles Kayser' }, { title: 1, languages: 1, released: 1, directors: 1, writers: 1, awards: 1, year: 1, genres: 1, runtime: 1,
2                                         |cast: 1, countries: 1 })
3
```

13.) Retrieve all movies with title, languages, released, directors, writers, countries from the 'movies' collection in MongoDB that released on May 9, 1893.

QUERY:

```
db.movies.find( { released: ISODate("1893-05-09T00:00:00.000Z") }, { title: 1, languages: 1,
released: 1, directors: 1, writers: 1, countries: 1 })
```

OUTPUT:



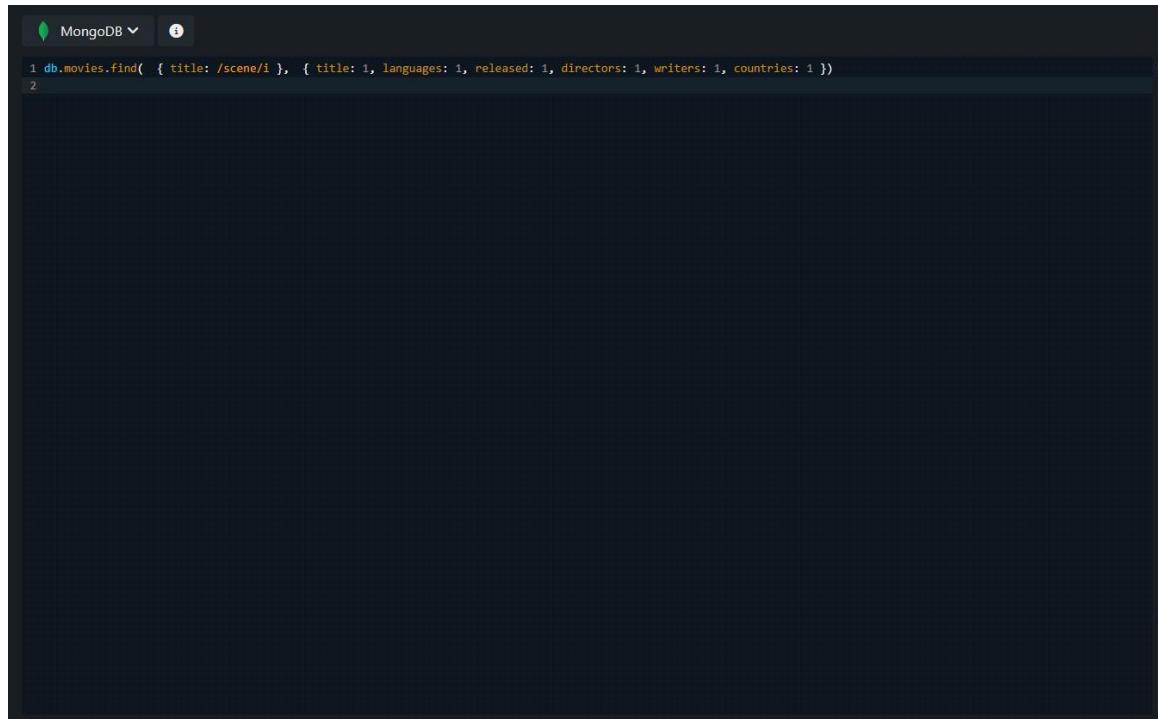
```
MongoDB 
1 db.movies.find( { released: ISODate("1893-05-09T00:00:00.000Z") }, { title: 1, languages: 1, released: 1, directors: 1, writers: 1, countries: 1 } )
2 |
```

14.) Retrieve all movies with title, languages, released, directors, writers, countries from the 'movies' collection in MongoDB that have a word "scene" in the title.

QUERY:

```
db.movies.find( { title: /scene/i }, { title: 1, languages: 1, released: 1, directors: 1, writers: 1, countries: 1 } )
```

OUTPUT:



A screenshot of a MongoDB terminal window. The title bar says "MongoDB". The main area shows a single line of code:

```
1 db.movies.find( { title: /scene/i }, { title: 1, languages: 1, released: 1, directors: 1, writers: 1, countries: 1 })
```

Evaluation Procedure	Marks awarded
Query(5)	
Execution (5)	
Viva(5)	
Total (15)	

Faculty Signature	
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RESULT: