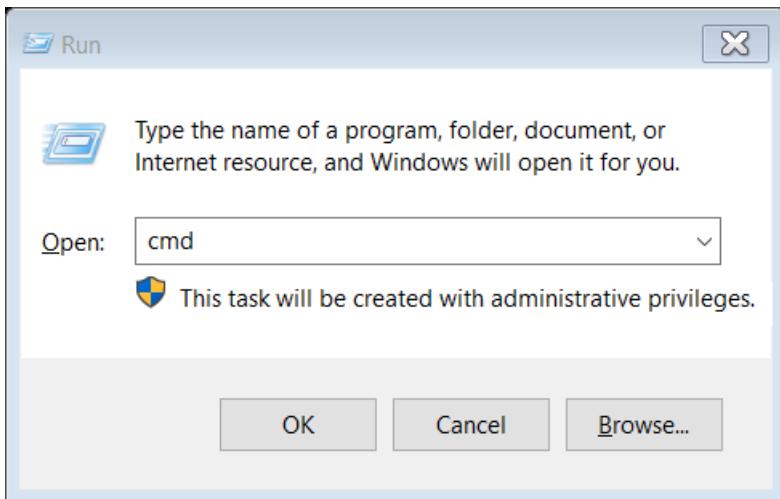


## Design of Databases using DDL Commands

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

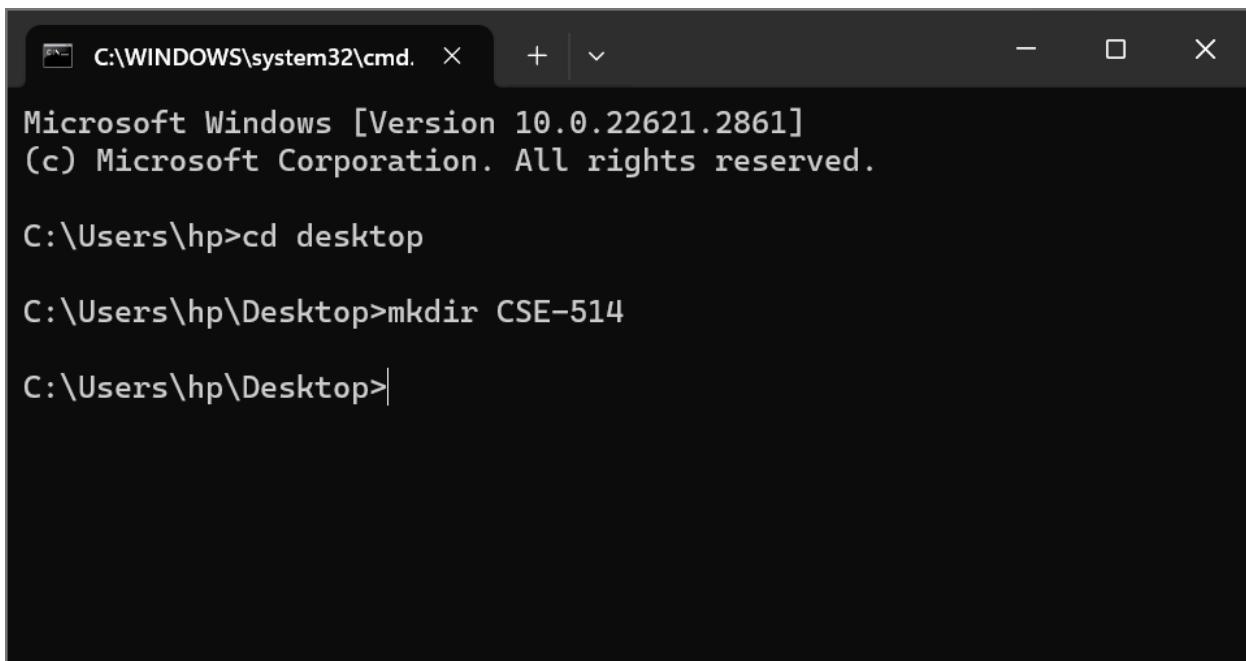
C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the command "cd desktop" being run and the directory changing to "C:\Users\hp\Desktop". The command prompt prompt is "C:\Users\hp\Desktop>".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.

## Design of Databases using DDL Commands



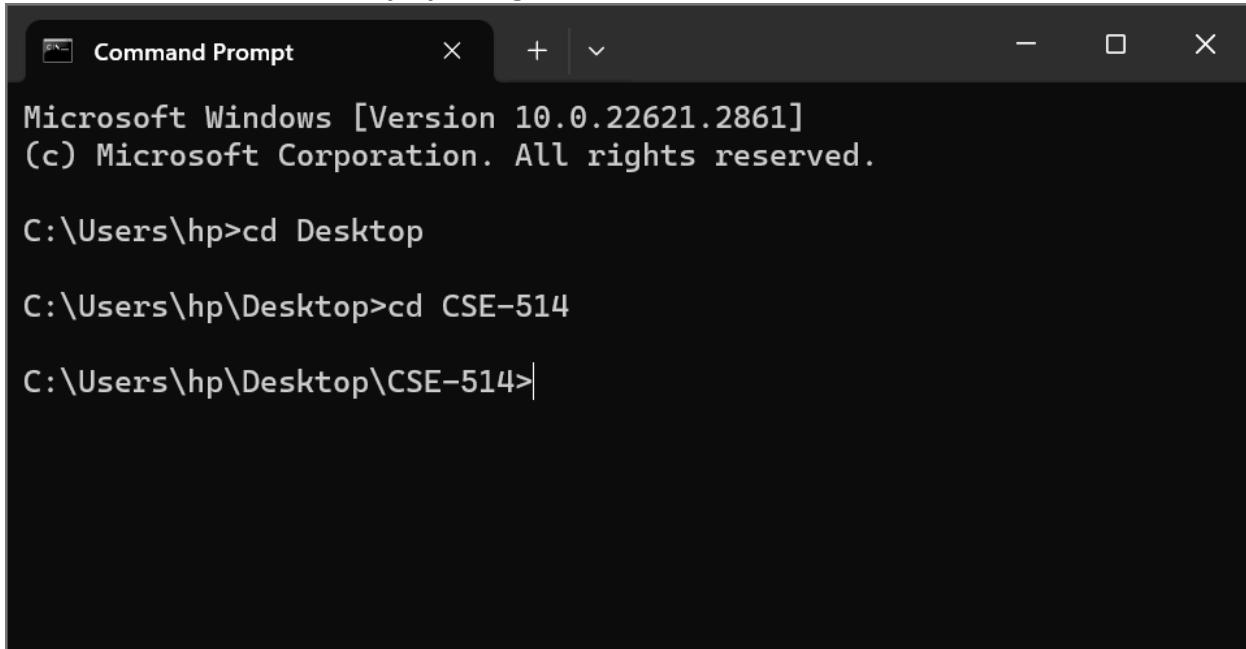
```
C:\WINDOWS\system32\cmd. x + v
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt x + v
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login,, Type sqlplus command enter username and password when system is prompted.

## Design of Databases using DDL Commands

### 6. CREATE TABLE:

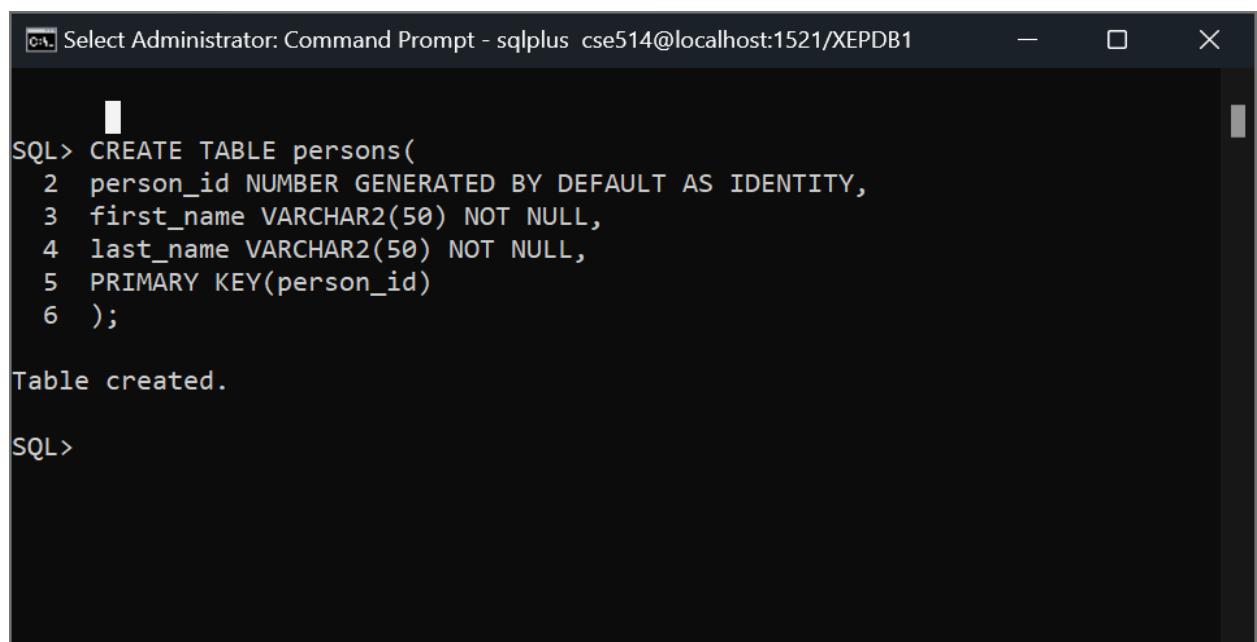
To create a new table in oracle Database, you use CREATE TABLE statement

#### Syntax:

```
CREATE TABLE schema_name.table_name (
    column_1 data_type column_constraint,
    column_2 data_type column_constraint,
    ...
    table_constraint
);
```

### 7. Now Oracle Create Table statement of one table example:

create table for persons



The screenshot shows a terminal window titled "Select Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1". The command entered is:

```
SQL> CREATE TABLE persons(
 2 person_id NUMBER GENERATED BY DEFAULT AS IDENTITY,
 3 first_name VARCHAR2(50) NOT NULL,
 4 last_name VARCHAR2(50) NOT NULL,
 5 PRIMARY KEY(person_id)
 6 );
```

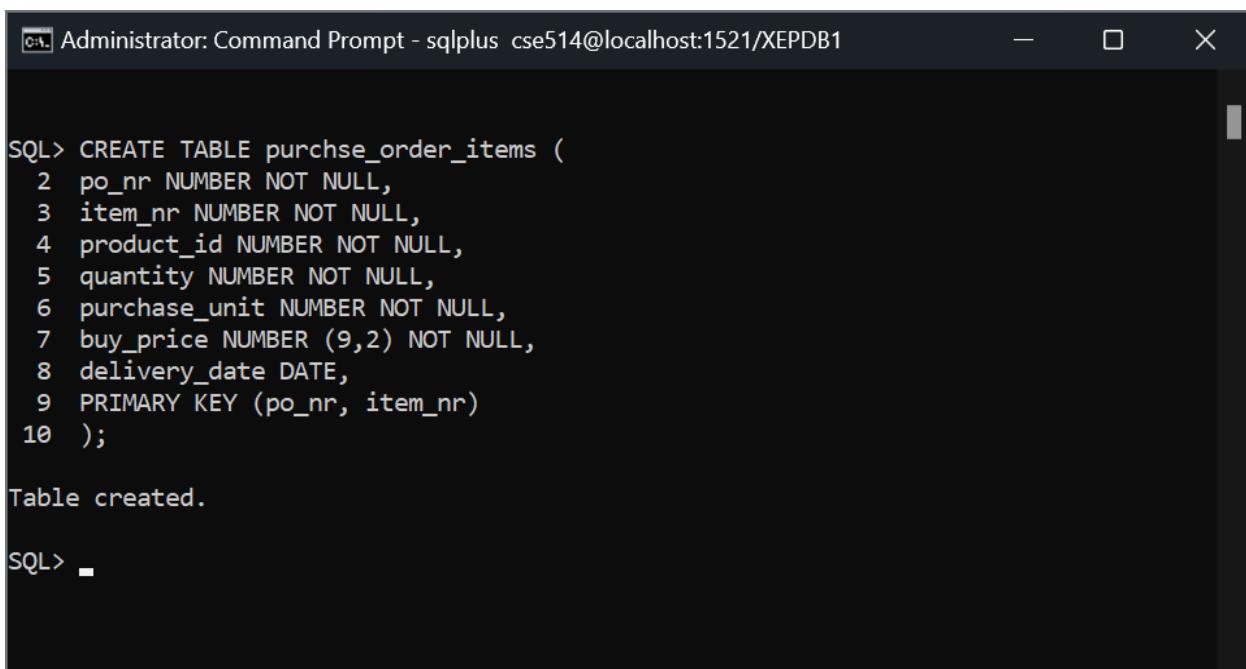
Followed by the output:

```
Table created.
```

```
SQL>
```

### 8. Oracle Create Table of multiple columns example

## Design of Databases using DDL Commands



The screenshot shows a terminal window titled "Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1". The window contains the following SQL code:

```
SQL> CREATE TABLE purchase_order_items (
  2   po_nr NUMBER NOT NULL,
  3   item_nr NUMBER NOT NULL,
  4   product_id NUMBER NOT NULL,
  5   quantity NUMBER NOT NULL,
  6   purchase_unit NUMBER NOT NULL,
  7   buy_price NUMBER (9,2) NOT NULL,
  8   delivery_date DATE,
  9   PRIMARY KEY (po_nr, item_nr)
10 );
```

Table created.

```
SQL> -
```

### ALTER TABLE:

To modify the structure of an existing table, you use the ALTER TABLE statement

#### Syntax :

```
ALTER TABLE table_name action;
```

#### 9. Oracle Alter Table ADD column

#### Syntax:

```
ALTER TABLE table_name
ADD column_name type constraint;
```

## Design of Databases using DDL Commands

```
SQL> ALTER TABLE persons
  2 ADD birthdate DATE NOT NULL;

Table altered.

SQL> DESC persons;
      Name          Null?    Type
-----+
PERSON_ID           NOT NULL NUMBER
FIRST_NAME          NOT NULL VARCHAR2(50)
LAST_NAME           NOT NULL VARCHAR2(50)
BIRTHDATE           NOT NULL DATE
```

**10. Oracle ALTER TABLE for multiple columns****Syntax:**

```
ALTER TABLE table_name
MODIFY ( column_1 type constraint,
          column_1 type constraint,
          ...);

SQL> ALTER TABLE persons
  2 ADD(
  3 phone VARCHAR(20),
  4 email VARCHAR(20)
  5 );

Table altered.

SQL> DESC persons;
      Name          Null?    Type
-----+
PERSON_ID           NOT NULL NUMBER
FIRST_NAME          NOT NULL VARCHAR2(50)
LAST_NAME           NOT NULL VARCHAR2(50)
BIRTHDATE           NOT NULL DATE
PHONE               VARCHAR2(20)
EMAIL               VARCHAR2(20)
```

**11. DROP TABLE**

To move a table to recycle bin or remove it entirely from database, you use DROP TABLE statement.

## Design of Databases using DDL Commands

```
SQL> DROP TABLE persons;
```

```
Table dropped.
```

### 12. TRUNCATE TABLE

Oracle introduced the TRUNCATE TABLE statement that allows you to delete all rows from big table.

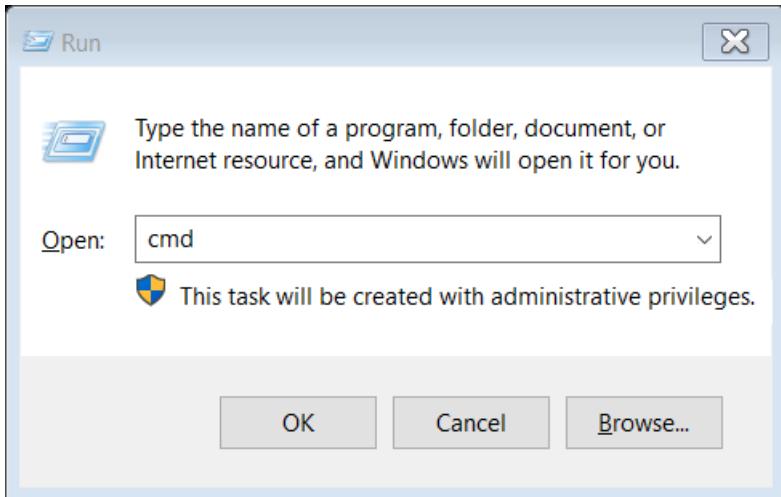
```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
```

```
SQL> TRUNCATE TABLE persons;
```

```
Table truncated.
```

### Manipulating and Querying of Database Using DML Commands

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the following text:

```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

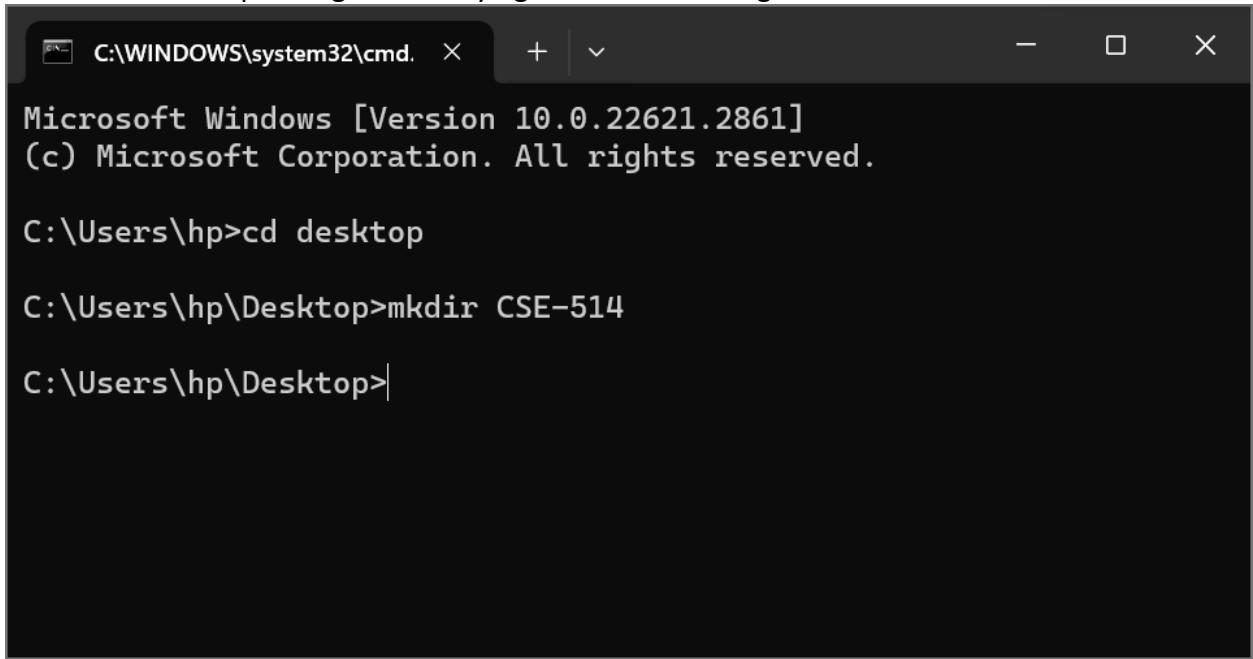
C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The command "cd desktop" is being typed at the prompt, and the output shows the current directory is now "C:\Users\hp\Desktop".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.

## Manipulating and Querying of Database Using DML Commands



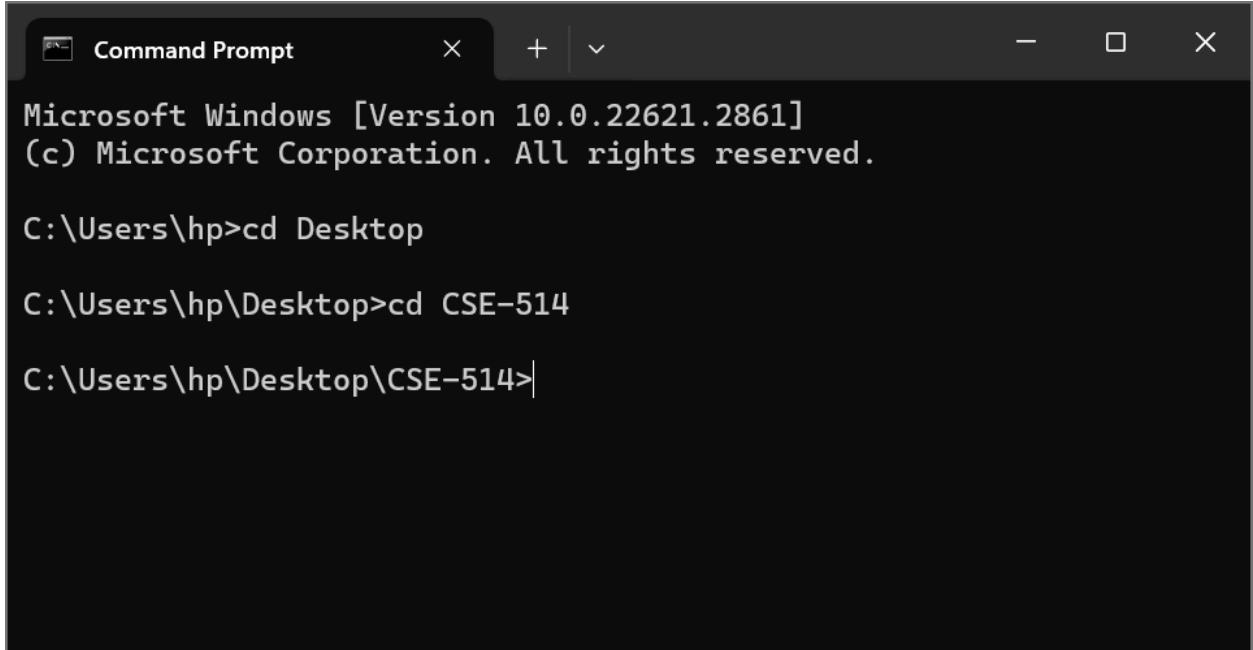
```
C:\WINDOWS\system32\cmd. × + ▾
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt × + ▾
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login, , Type sqlplus command enter username and password when system is prompted.

## Manipulating and Querying of Database Using DML Commands

6. DML Commands are used to manipulate and query databases using DML Commands like INSERT, SELECT, UPDATE, and delete.

### 7. Introduction to Oracle INSERT statement:

To insert a new row into a table, you use the Oracle INSERT statement as follows:

```
INSERT INTO table_name (column_list)
VALUES( value_list);
```

If the value list has the same order as the table columns, you can skip the column list although this is not considered as a good practice:

```
INSERT INTO table_name
VALUES (value_list);
```

EX:

```
SQL> CREATE TABLE parts (
 2 part_id NUMBER,
 3 part_name VARCHAR(50) NOT NULL,
 4 lead_time NUMBER(2, 0) NOT NULL,
 5 cost NUMBER(9,2) NOT NULL,
 6 status NUMBER(1,0) NOT NULL,
 7 PRIMARY KEY(part_id)
 8 );
```

```
Table created.
```

## Manipulating and Querying of Database Using DML Commands

```
SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(1,'sed dictum',5,134,0);

1 row created.

SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(2,'tristique neque',3,62,1);

1 row created.
```

```
SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(3,'dolor quam',16,82,1);

1 row created.

SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(4,'nec diam.',41,10,1);

1 row created.

SQL> INSERT INTO parts(part_id,part_name,lead_time,cost,status)
  2  VALUES(5,'vitae erat',22,116,0);

1 row created.
```

## 8. Oracle UPDATE – update multiple columns of a single row

```
UPDATE
    table_name
SET
    column1 = value1,
    column2 = value2,
    column3 = value3,
    ...
WHERE
    condition;
```

EX:

## Manipulating and Querying of Database Using DML Commands

```
SQL> UPDATE parts
  2  SET cost = 130
  3  WHERE part_id = 1;

1 row updated.
```

Oracle UPDATE – update multiple rows example

EX:

```
SQL> UPDATE parts
  2  SET cost = cost * 1.05;

5 rows updated.
```

## 9. SELECT COMMAND:

The SELECT command used to list the contents of a table.

```
INSERT INTO target_table (col1, col2, col3)
SELECT col1,
       col2,
       col3
FROM source_table
WHERE condition;
```

EX:

```
SQL> SELECT * FROM parts
  2  WHERE part_id = 1;

PART_ID PART_NAME                                     LEAD_TIME
----- -----
COST      STATUS
----- -----
1         sed dictum                                5
136.5     0
```

## Manipulating and Querying of Database Using DML Commands

```
SQL> SELECT * FROM parts;
```

PART_ID	PART_NAME	COST	STATUS	LEAD_TIME
1	sed dictum	136.5	0	5
2	tristique neque	65.1	1	3
3	dolor quam	86.1	1	16

PART_ID	PART_NAME	COST	STATUS	LEAD_TIME
4	nec, diam.	10.5	1	41
5	vitae erat	121.8	0	22

## 10.DELETE COMMAND

To delete all rows or specified rows in a table.

```
DELETE  
FROM  
    table_name  
WHERE  
    condition;
```

```
SQL> DELETE FROM parts;
```

```
5 rows deleted.
```

```
SQL> SELECT * FROM parts;
```

```
no rows selected
```

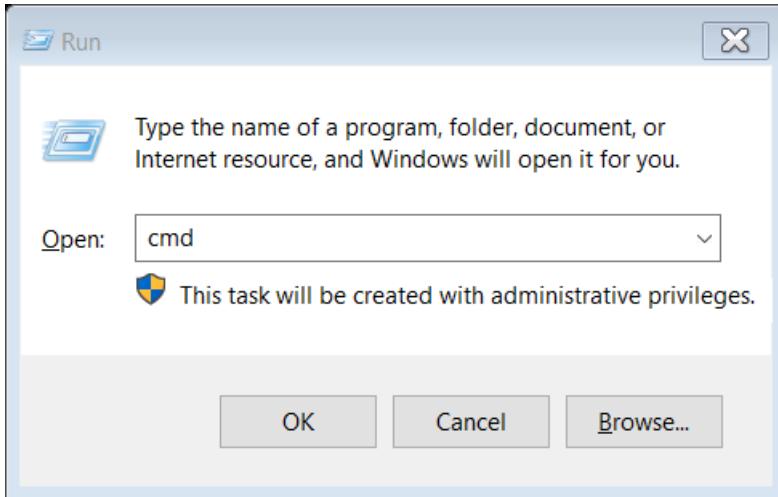
Name : S.M.Chaithra

Experiment - 2

Date: 19-10-2023

Manipulating and Querying of Database Using DML Commands

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Command Prompt window. The title bar says "Command Prompt". The window shows the following text:

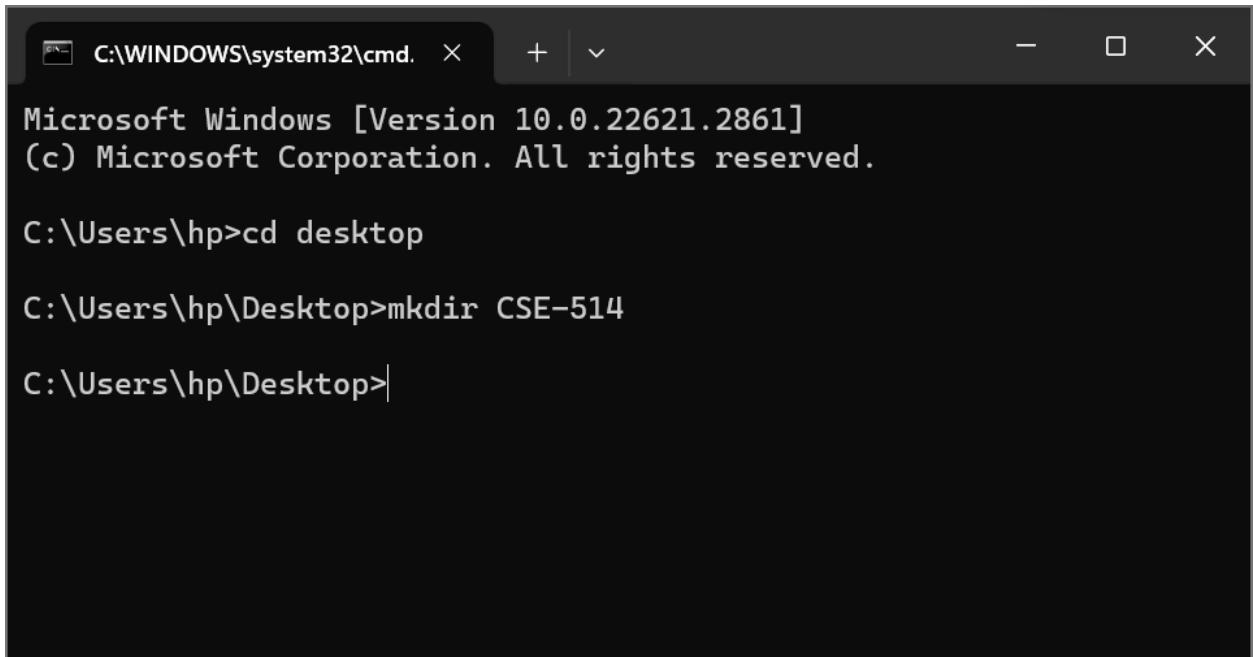
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The window has a dark theme with white text.

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



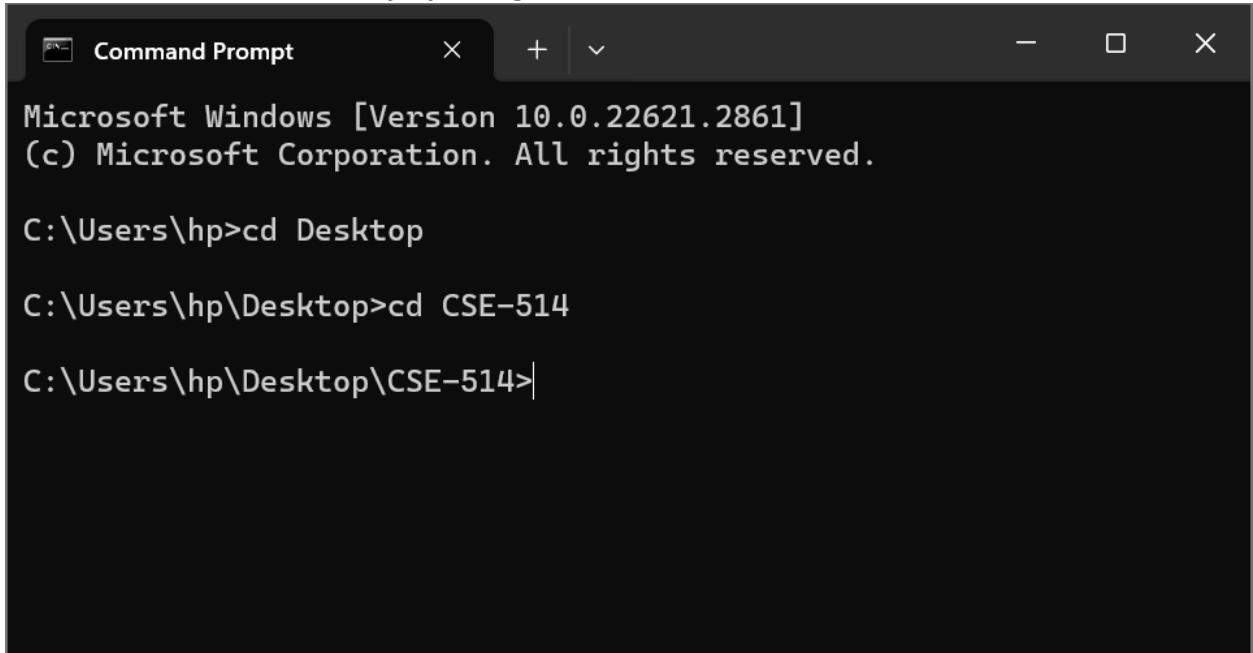
```
C:\WINDOWS\system32\cmd. × + ▾ Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt × + ▾ Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login,, Type sqlplus command enter username and password when system is prompted.

**To implement a view level design using CREATE VIEW,ALTER VIEW and DELETE VIEW DDL commands:****CREATE student1 TABLE**

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> CREATE TABLE student1(
  2  name VARCHAR(10),
  3  roll_no NUMBER,
  4  sec VARCHAR(10),
  5  id_no NUMBER,
  6  PRIMARY KEY(ID_NO)
  7  );
```

**INSERTING student1 VALUES**

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> INSERT INTO student1 VALUES('chaithra',514,'A','CSE',1);
1 row created.

SQL> INSERT INTO student1 VALUES('Devi',515,'A','CSE',2);
1 row created.

SQL> INSERT INTO student1 VALUES('Ganesh',516,'A','CSE',3);
1 row created.
```

**Creating view councellor1:**

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> CREATE VIEW councellor1 AS SELECT name,roll_no,id_no FROM student1;
View created.
```

**Inserting values into councellor1:****Selecting specific row:**

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> INSERT INTO councellor1 VALUES('Ravi',516,7);
1 row created.

SQL> INSERT INTO councellor1 VALUES('Rajesh',509,8);
1 row created.

SQL> INSERT INTO councellor1 VALUES('Rakul',520,9);
1 row created.
```

### Selecting specific row:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT * FROM councellor1 WHERE id_no = 7;
NAME      ROLL_NO      ID_NO
-----  -----
Ravi          516           7
```

### Update:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> UPDATE councellor1 SET name = 'Shruthi' WHERE id_no = 1;
1 row updated.

SQL> SELECT * FROM councellor1;
NAME      ROLL_NO      ID_NO
-----  -----
Shruthi     514           1
Devi        515           2
Ganesh      516           3
Ravi         516           7
Rajesh      509           8
Rakul       520           9
6 rows selected.
```

### truncate or drop view

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> DROP VIEW councellor1;
View dropped.
```

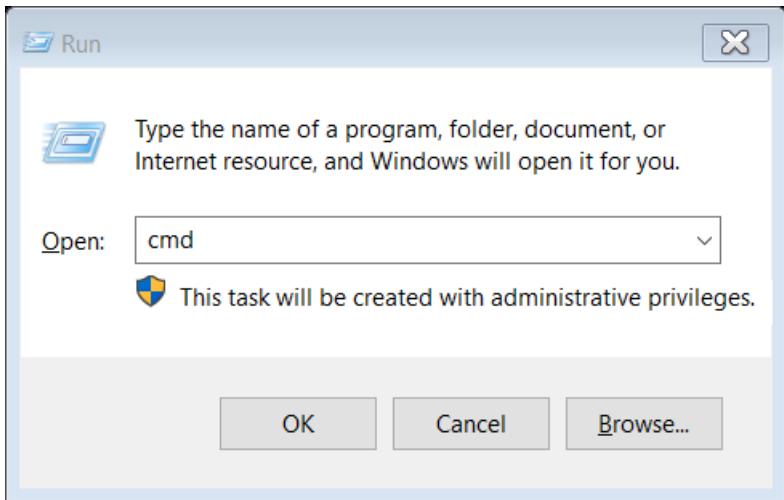
Name : S.M.Chaithra

Experiment - 3

Date:28-10-2023

SQL queries to implement VIEWS for various database

1. Open the command prompt Press WIN+R , type cmd



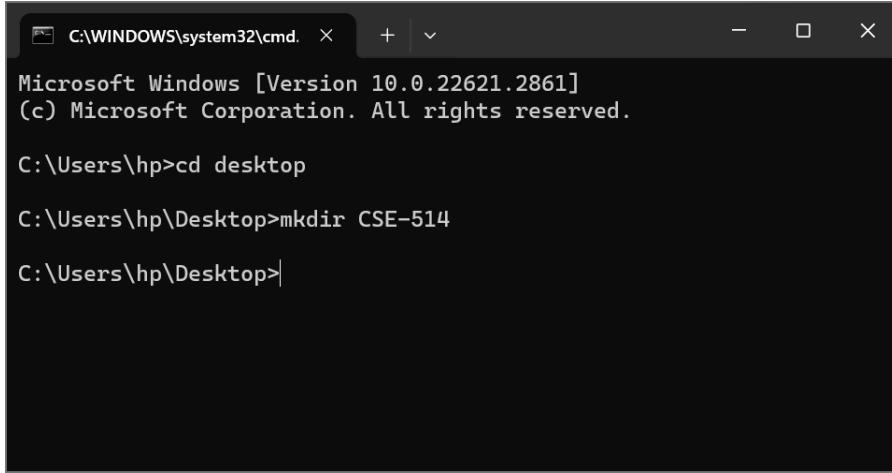
2. Once cmd prompt open go to DESKTOP using cd Desktop

```
Command Prompt
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop
C:\Users\hp\Desktop>
```

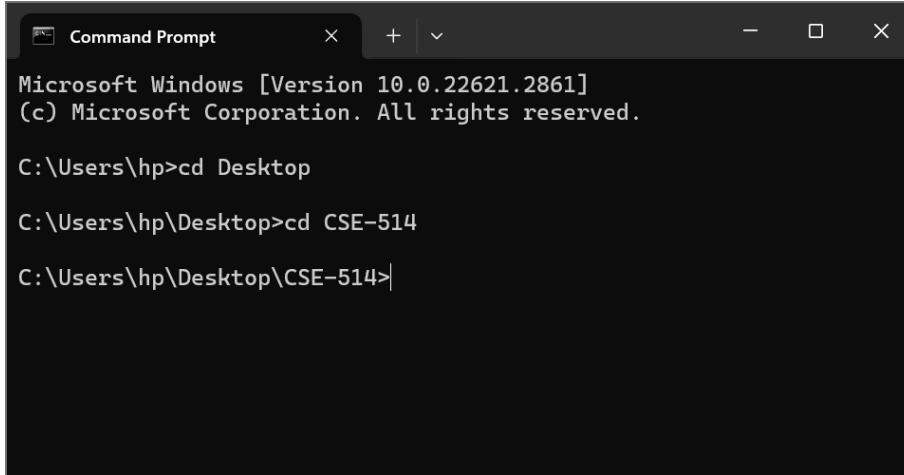
A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the standard Windows copyright message. In the command line, the user types "cd desktop" and presses Enter. The prompt then changes to "C:\Users\hp\Desktop>".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



A screenshot of a Windows Command Prompt window titled 'C:\WINDOWS\system32\cmd'. The window shows the following text:  
Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.  
C:\Users\hp>cd desktop  
C:\Users\hp\Desktop>mkdir CSE-514  
C:\Users\hp\Desktop>

4. Now, move into the directory by using cd command show below.



A screenshot of a Windows Command Prompt window titled 'Command Prompt'. The window shows the following text:  
Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.  
C:\Users\hp>cd Desktop  
C:\Users\hp\Desktop>cd CSE-514  
C:\Users\hp\Desktop\CSE-514>

5. To Login, , Type sqlplus command enter username and password when system is prompted.
6. To perform RELATIONAL SET OPERATIONS (i.e. UNION, UNION ALL, INTERSECT, MINUS, CROSS JOIN, NATURAL JOIN).

### **CREATING STUDENT Table**

```
SQL> CREATE TABLE student(
 2  roll_no int PRIMARY KEY,
 3  name VARCHAR2(20)
 4  );
```

Table created.

### Inserting values into student table

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> INSERT INTO student VALUES(501, 'Abhi');
1 row created.

SQL> INSERT INTO student VALUES(502, 'Akhila');
1 row created.

SQL> INSERT INTO student VALUES(503, 'Bhavana');
1 row created.

SQL> ■
```

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT * FROM student
 2  ;
-----  
 ROLL_NO NAME
-----  
 501 Abhi
 502 Akhila
 503 Bhavana
```

### CREATE EMPLOYEE TABLE

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

      502 Akhila
      503 Bhavana

SQL> CREATE TABLE employee(
 2  emp_no int PRIMARY KEY,
 3  name VARCHAR2(20)
 4  );
Table created.
```

### Inserting values into employee table

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> INSERT INTO employee VALUES(504, 'Ahishhek');

1 row created.

SQL> INSERT INTO employee VALUES(505, 'Arpita');

1 row created.
```

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT * FROM employee;

EMP_NO NAME
-----
504 Ahishhek
505 Arpita
```

## 7. UNION OPERATION

UNION is used to combine the results of two or more SELECT statements.

### Syntax:

```
SELECT * FROM table1
UNION
SELECT * FROM table2;
```

EX:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT * FROM student
2 UNION
3 SELECT * FROM employee;

ROLL_NO NAME
-----
501 Abhi
502 Akhila
503 Bhavana
504 Ahishhek
505 Arpita
```

## 8. UNION ALL OPERATION

This operation is similar to UNION, but it also shows the duplicate rows.

### Syntax:

```
SELECT * FROM table1
UNION ALL
SELECT * FROM table2;
```

EX:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> SELECT * FROM student
  2 UNION ALL
  3 SELECT * FROM employee;

    ROLL_NO NAME
    -----
      501 Abhi
      502 Akhila
      503 Bhavana
      504 Ahishek
      505 Arpita
      501 Abhi
```

## 9. INTERSECT OPERATIONS

Intersect operation is used to combine two SELECT statements but it only returns the records which are common from both SELECT statements.

### Syntax:

```
SELECT * FROM table1
INTERSECT
SELECT * FROM table2;
```

### EX:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> SELECT * FROM student
  2 INTERSECT
  3 SELECT * FROM employee;

    ROLL_NO NAME
    -----
      501 Abhi
```

## 10. MINUS OPERATION

The MINUS operation combines results of two SELECT statements and returns only those in final result which belongs to first set of the result.

### Syntax:

```
SELECT * FROM table1
MINUS
SELECT * FROM table2;
```

EX:

```
C:\ Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> SELECT * FROM student
  2 MINUS
  3 SELECT * FROM employee;

ROLL_NO NAME
-----
502 Akhila
503 Bhavana
```

**11.NATURAL JOIN OPERATION**

It joins two tables based on same attribute name and data type. The resulting table will contain common column. To perform this operation there must be common attribute between two tables.

**Syntax:**

```
SELECT * FROM table1
NATURAL JOIN
table;
```

```
C:\ Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> CREATE TABLE marks (
  2     roll_no INT,
  3     marks NUMBER(3),
  4     FOREIGN KEY (roll_no) REFERENCES students(roll_no)
  5 );

Table created.
```

EX:

```
C:\ Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> SELECT * FROM student
  2 NATURAL JOIN
  3 marks;

ROLL_NO NAME          MARKS
----- -----
60 Abhi              501
70 Akhila            502
```

**12.CROSS JOIN OPERATION**

It will produce cross or cartesian product of two tables if there is no conditions specifies. The resulting table will contain all the attributes of both the tables including duplicate or common columns also.

**Syntax:**

```
SELECT * FROM table1
CROSS JOIN table2;
```

EX:

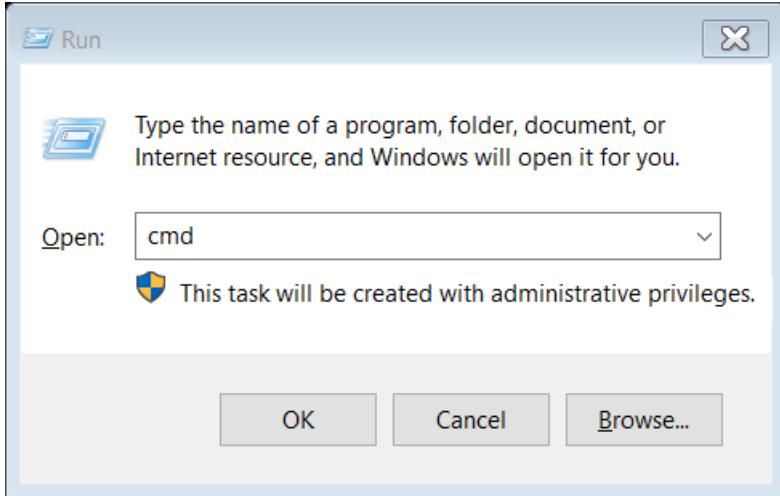
```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT * FROM student
  2  CROSS JOIN marks;

  ROLL_NO NAME          ROLL_NO      MARKS
-----  -----
    501 Abhi            60           501
    502 Akhila          60           501
    503 Bhavana         60           501
    501 Abhi            70           502
    502 Akhila          70           502
    503 Bhavana         70           502

6 rows selected.
```

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the command line output:

```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The command "cd desktop" is typed at the prompt, and the window shows the current directory as "C:\Users\hp\Desktop>".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.

C:\WINDOWS\system32\cmd. x + v Microsoft Windows [Version 10.0.22621.2861] (c) Microsoft Corporation. All rights reserved. C:\Users\hp>cd desktop C:\Users\hp\Desktop>mkdir CSE-514 C:\Users\hp\Desktop>

4. Now, move into the directory by using cd command show below.

Command Prompt x + v Microsoft Windows [Version 10.0.22621.2861] (c) Microsoft Corporation. All rights reserved. C:\Users\hp>cd Desktop C:\Users\hp\Desktop>cd CSE-514 C:\Users\hp\Desktop\CSE-514>

5. To Login,, Type sqlplus command enter username and password when system is prompted.

## 6. CREATE FACULTY TABLE

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> CREATE TABLE faculty(
  2  id int PRIMARY KEY,
  3  name VARCHAR2(20) NOT NULL,
  4  age int,
  5  Salary NUMBER(6)
  6  );

Table created.
```

## INSERTING VALUES TO FACULTY TABLE

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> INSERT INTO faculty VALUES(1,'Ravi',18,8000);
1 row created.

SQL> INSERT INTO faculty VALUES(2,'Raghu',19,3000);
1 row created.

SQL> INSERT INTO faculty VALUES(3,'Srujani',21,6000);
1 row created.

SQL> INSERT INTO faculty VALUES(4,'Dhoni',25,4500);
1 row created.

SQL> INSERT INTO faculty VALUES(5,'Sachin',28,7300);
1 row created.
```

```
SQL> SELECT * FROM faculty;

      ID NAME          AGE    SALARY
-----  --  -----
      1 Ravi           18     8000
      2 Raghu          19     3000
      3 Srujani        21     6000
      4 Dhoni          25     4500
      5 Sachin         28     7300
```

## 7. IS NULL

IS NULL operator is used to check the presence or absence of null values in a column.

### Syntax:

```
SELECT column_name
FROM table_name
WHERE column_name IS NULL;
```

EX:

```
SQL> SELECT *
  2  FROM faculty
  3  WHERE SALARY IS NULL;

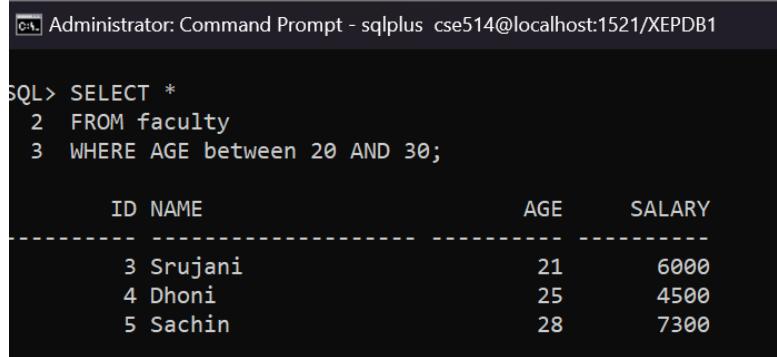
no rows selected
```

## 8. BETWEEN OPERATOR

BETWEEN operator returns information within given range of value.

### Syntax:

```
SELECT * FROM table_name
WHERE column_name BETWEEN VALUE1 AND VALUE2;
EX:
```



```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT *
  2  FROM faculty
  3  WHERE AGE between 20 AND 30;

      ID NAME          AGE    SALARY
----- 3 Srujan 21 6000
        4 Dhoni 25 4500
        5 Sachin 28 7300
```

## 9. LIKE OPERATOR

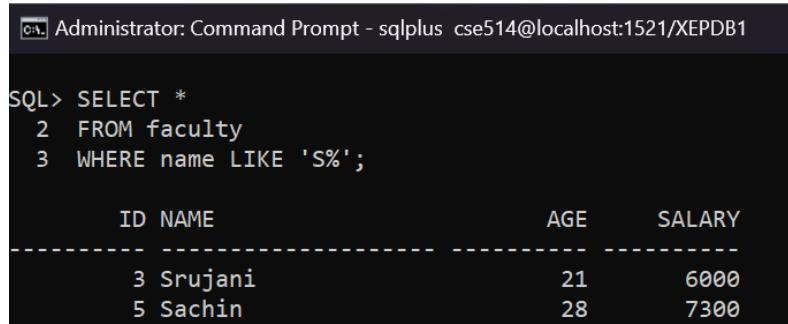
LIKE operator is used in a 'WHERE' clause to search for specified pattern in a column it is often used with your wild character.

- % represents zero or more character.
- - represents single character.

### Syntax

```
SELECT * FROM table_name
WHERE column_name LIKE pattern;
```

Ex:



```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT *
  2  FROM faculty
  3  WHERE name LIKE 'S%';

      ID NAME          AGE    SALARY
----- 3 Srujan 21 6000
        5 Sachin 28 7300
```

## 10.IN OPERATOR

The IN operator allows us to specify multiple values in a WHERE clause.

### Syntax:

```
SELECT *  
FROM table_name  
WHERE column_name IN(VALUE 1, VALUE 2....);
```

EX:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1  
  
SQL> SELECT *  
2  FROM faculty  
3  WHERE SALARY IN (4500, 3300, 6000);  
  
        ID NAME                AGE      SALARY  
-----  
        3 Srujani              21      6000  
        4 Dhoni               25      4500
```

## 11. EXIST OPERATOR

EXIST operator is used to test for existence of any record in sub query.

### Syntax:

```
SELECT * column_name(S)  
FROM table_name  
WHERE EXISTS (SELECT column_name(S) FROM table_name WHERE CONDITION);
```

## CREATING DEPARTMENT TABLE

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1  
  
SQL> CREATE TABLE department (  
2  dept_name VARCHAR2(20),  
3  id int,  
4  FOREIGN KEY(id) REFERENCES faculty(id)  
5  );  
  
Table created.
```

## INSERTING VALUES

```
c:\ Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
SQL> INSERT INTO department values('cse',1);
. row created.

SQL> INSERT INTO department values('csd',2);
. row created.

SQL> INSERT INTO department values('csm',3);
. row created.
```

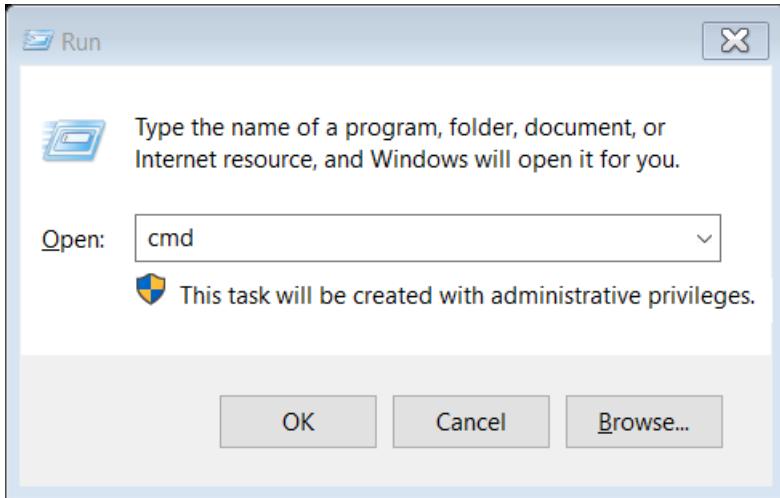
**EX:**

```
c:\ Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT *
  2  FROM faculty
  3 WHERE EXISTS (SELECT 1 FROM department WHERE faculty.id = department.id);

      ID NAME          AGE    SALARY
-----  --  --  --
        1 Ravi          18     8000
        2 Raghu         19     3000
        3 Srujan          21     6000
```

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the command line output:

```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The command "cd desktop" is being typed at the prompt, and the cursor is positioned after the command.

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.

```
C:\WINDOWS\system32\cmd. x + v
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.

```
Command Prompt x + v
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login,, Type sqlplus command enter username and password when system is prompted.

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>sqlplus cse514@localhost:1521/XEPDB1

SQL*Plus: Release 21.0.0.0.0 - Production on Fri Jan 12 20:01:41 2024
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Enter password:
Last Successful login time: Fri Jan 12 2024 20:00:02 +05:30

Connected to:
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production
Version 21.3.0.0.0

SQL>
```

6. To perform SQL queries JOIN OPERATIONS (i.e. CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN, FULL OUTER JOIN).

### CREATE TABLE SAIL

```
Administrator: Command Prompt - :
SQL> CREATE TABLE sail(
  2   sid NUMBER,
  3   sname VARCHAR2(5)
  4 );

Table created.
```

### INSERTING VALUES

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> INSERT INTO sail VALUES(1, 'aa');

1 row created.

SQL> INSERT INTO sail VALUES(2, 'ab');

1 row created.

SQL> INSERT INTO sail VALUES(3, 'ac');

1 row created.
```

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/xe

SQL> SELECT* FROM sail;

      SID  SNAME
----- 
      1    aa
      2    ab
      3    ac
```

### CREATE BOAT TABLE

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/xe

SQL> CREATE TABLE boat(
  2   sid NUMBER,
  3   bid VARCHAR2(2)
  4 );

Table created.
```

### INSERTING VALUES

```
SQL> INSERT INTO boat VALUES(3,'b1');

1 row created.

SQL> INSERT INTO boat VALUES(4,'b2');

1 row created.

SQL> INSERT INTO boat VALUES(5,'b3');

1 row created.
```

```
SQL> SELECT * FROM boat;

      SID  BI
----- 
      3    b1
      4    b2
      5    b3
```

## 7. LEFT OUTER JOIN

It is a method of joining.

### Syntax:

```
SELECT column_name FROM table_name  
LEFT OUTER JOIN table_name;
```

EX:

```
C:\ Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1  
  
SQL> SELECT * FROM sail NATURAL LEFT OUTER JOIN boat;  
  
 SID SNAME BI  
-----  
 2 ab     b1  
 3 ac     b2  
 1 aa
```

## 8. RIGHT OUTER JOIN

It is used to join tables.

### Syntax:

```
SELECT column_name FROM table_name  
RIGHT OUTER JOIN table_name;
```

EX:

```
C:\ Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1  
  
SQL> SELECT * FROM sail NATURAL RIGHT OUTER JOIN boat;  
  
 SID SNAME BI  
-----  
 2 ab     b1  
 3 ac     b2  
 4          b3
```

## 9. FULL OUTER JOIN

It is used to join or combine tables.

### Syntax

```
SELECT column_name FROM table_name  
FULL OUTER JOIN table_name;
```

EX:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT * FROM sail NATURAL FULL OUTER JOIN boat;

    SID SNAME BI
    -----
    2 ab     b1
    3 ac     b2
    4          b3
    1 aa      null
```

**10.CONDITIONAL JOIN**

It allows user to join tables when specified column values meet certain criteria.

**Syntax:**

```
SELECT column_name FROM table_name
WHERE (condition);
```

Ex:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT *
  2  FROM sail
  3  JOIN boat ON sail.sid > boat.sid;

    SID SNAME      SID BI
    -----
    3 ac           2 b1
```

**11.EQUI JOIN**

It joins the columns whose values are matching

**Syntax**

```
SELECT column_name FROM table_name
JOIN table_name USING (column_name)
```

EX:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

SQL> SELECT * FROM sail
  2  JOIN boat USING (sid);

    SID SNAME BI
    -----
    2 ab     b1
    3 ac     b2
```

**12.FULL OUTER JOIN**

A full outer join is a type of relational database join that combines the results of both left outer join and right outer join.

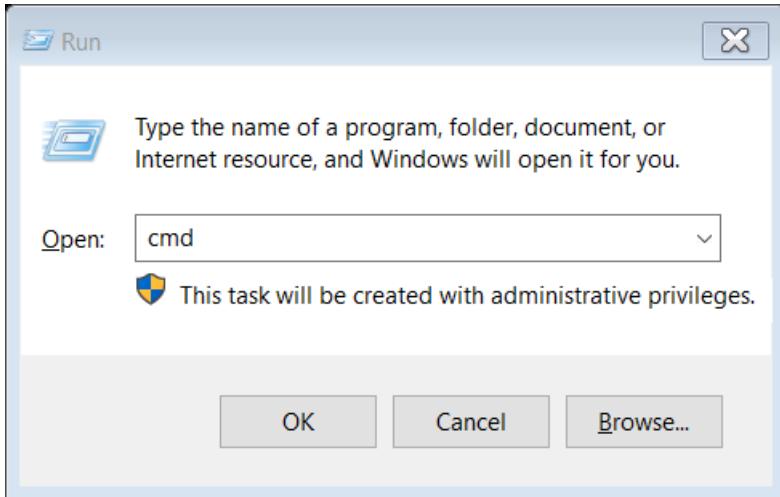
**Syntax**

```
SELECT *  
FROM table1  
FULL OUTER JOIN table2  
ON table1.column = table2.column;
```

EX:

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1  
SQL> SELECT * FROM sail  
  2  NATURAL FULL OUTER JOIN boat;  
  
    SID SNAME BI  
-----  
      2 ab     b1  
      3 ac     b2  
      4          b3  
      1 aa
```

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Command Prompt window. The title bar says "Command Prompt". The window shows the following text:

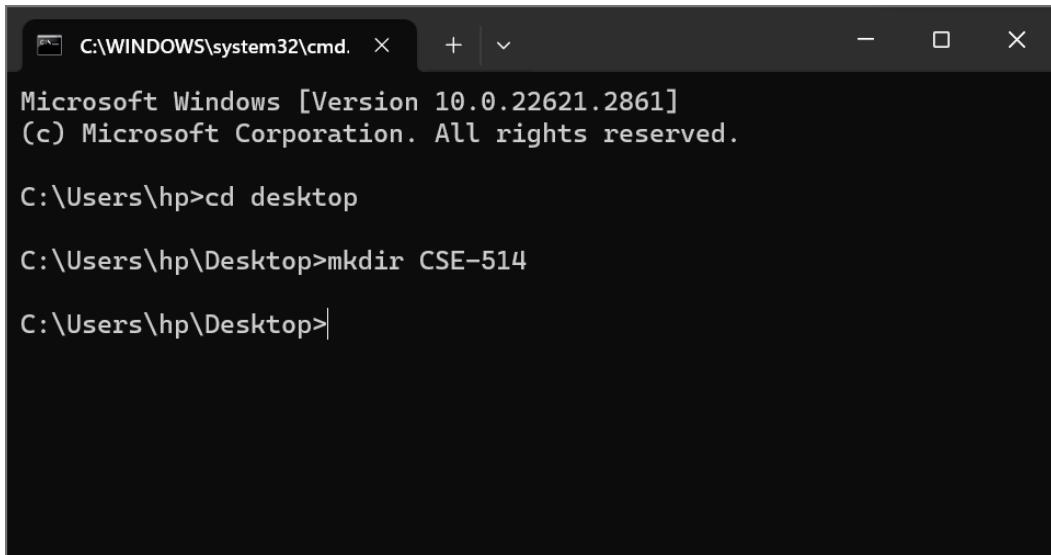
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The window has a dark theme with white text.

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



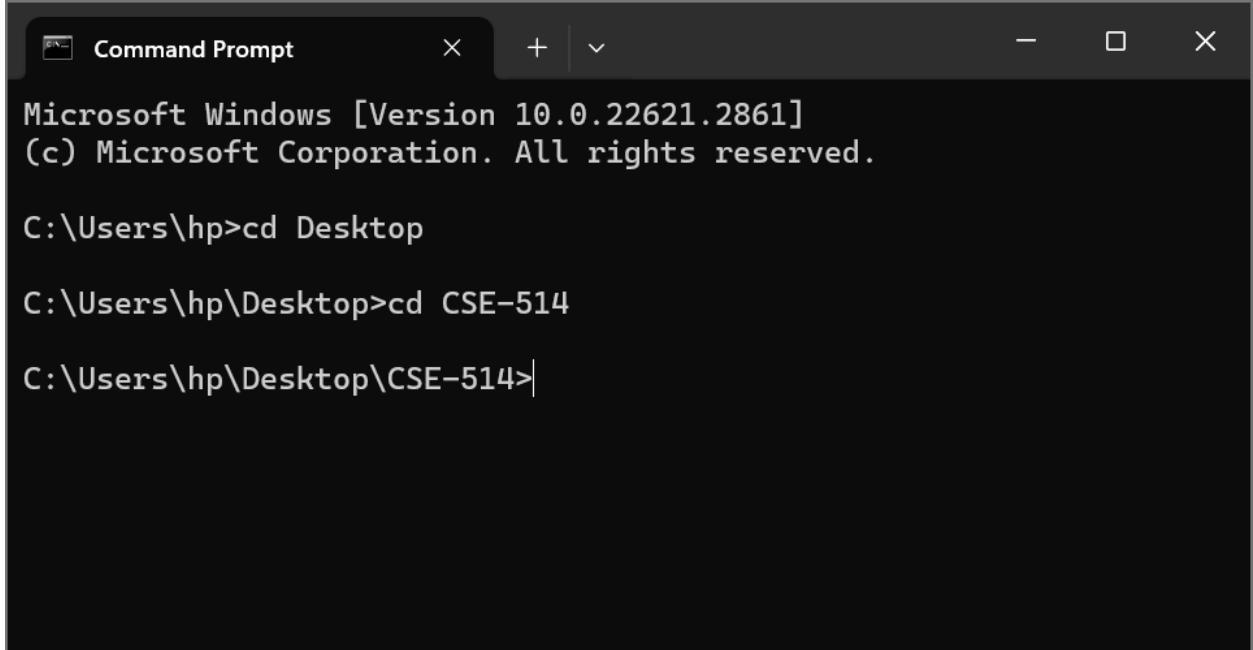
```
C:\WINDOWS\system32\cmd.  +  Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt  +  Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login, , Type sqlplus command enter username and password when system is prompted.

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>sqlplus cse514@localhost:1521/XEPDB1

SQL*Plus: Release 21.0.0.0.0 - Production on Fri Jan 12 20:01:41 2024
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Enter password:
Last Successful login time: Fri Jan 12 2024 20:00:02 +05:30

Connected to:
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production
Version 21.3.0.0.0

SQL>
```

TO implement SQL queries to perform AGGREGATE OPERATIONS (i.e. SUM, COUNT, AVG, MIN,MAX).

### **CREATE Department TABLE :**

```
SQL> CREATE TABLE DEPARTMENT
  2  (DEPT_NAME VARCHAR2(20),
  3  BUILDING VARCHAR2(15),
  4  BUDGET NUMERIC(12,2) CHECK (BUDGET > 0),
  5  PRIMARY KEY (DEPT_NAME)
  6  );

Table created.
```

```
SQL> INSERT INTO DEPARTMENT(DEPT_NAME,BUILDING,BUDGET)
  2  VALUES('CSE','Watson',29000);

1 row created.
```

### **CREATE Instructor TABLE :**

```
SQL> CREATE TABLE Instructor
  2  (
  3  ID VARCHAR2(20) NOT NULL,
  4  Name VARCHAR2(15),
  5  dept_name VARCHAR2(25),
  6  Salary NUMERIC(5,2) CHECK(Salary>29000),
  7  PRIMARY KEY(ID),
  8  FOREIGN KEY(dept_name) REFERENCES Department(dept_name) ON DELETE SET NULL
  9  );
```

Table created.

AVERAGE : The AVG() function returns the average value of a numeric column.

AVERAGE SYNTAX :

```
SELECT AVG(column_name)
FROM table_name
WHERE condition;
```

```
SQL> SELECT avg(budget)
  2  FROM Department
  3  WHERE Budget>0;

AVG(BUDGET)
-----
29000

SQL> |
```

SUM : The SUM() function returns the total sum of a numeric column.

SUM SYNTAX :

```
SELECT SUM(column_name)
FROM table_name
WHERE condition;
```

SUM EXAMPLE :

```
SQL> SELECT avg(budget)
  2  FROM Department
  3  WHERE Budget>0;

AVG(BUDGET)
-----
29000
```

MAXIMUM : The MAX() function returns the largest value of the selected column.

MAX SYNTAX :

```
SELECT MAX(column_name)
FROM table_name
WHERE condition;
```

MAX EXAMPLE :

```
SQL> SELECT MAX(budget)
  2  FROM Department
  3  WHERE Budget>0;
```

```
MAX(BUDGET)
-----
29000
```

MINIMUM : The MIN() function returns the smallest value of the selected column.

MIN SYNTAX :

```
SELECT MIN(column_name)
FROM table_name
WHERE condition;
```

MIN EXAMPLE:

```
SQL> SELECT MIN(budget)
  2  FROM Department
  3  WHERE Budget>0;
```

```
MIN(BUDGET)
-----
29000
```

COUNT : The COUNT() function returns the number of rows that matches a specified criterion.

COUNT SYNTAX :

```
SELECT COUNT(column_name)
FROM table_name
WHERE condition;
```

**COUNT EXAMPLE :**

```
SQL> SELECT count(budget)
  2  FROM Department
  3  WHERE Budget>0;
```

```
COUNT(BUDGET)
```

```
-----  
1
```

**GROUP BY :** The GROUP BY statement groups rows that have the same values into summary rows, like "find the number of customers in each country".

The GROUP BY statement is often used with aggregate functions (COUNT(), MAX(), MIN(), SUM(), AVG()) to group the result-set by one or more columns.

**GROUP BY SYNTAX :**

```
SELECT column_name(s)
FROM table_name
WHERE condition
GROUP BY column_name(s)
ORDER BY column_name(s);
```

**GROUP BY EXAMPLE :**

```
SQL> SELECT budget
  2  FROM Department
  3  WHERE budget>0
  4  GROUP BY budget;
```

```
BUDGET
```

```
-----  
29000
```

**HAVING :** The HAVING clause was added to SQL because the WHERE keyword cannot be used with aggregate functions.

**HAVING SYNTAX :**

```
SELECT column_name(s)
FROM table_name
```

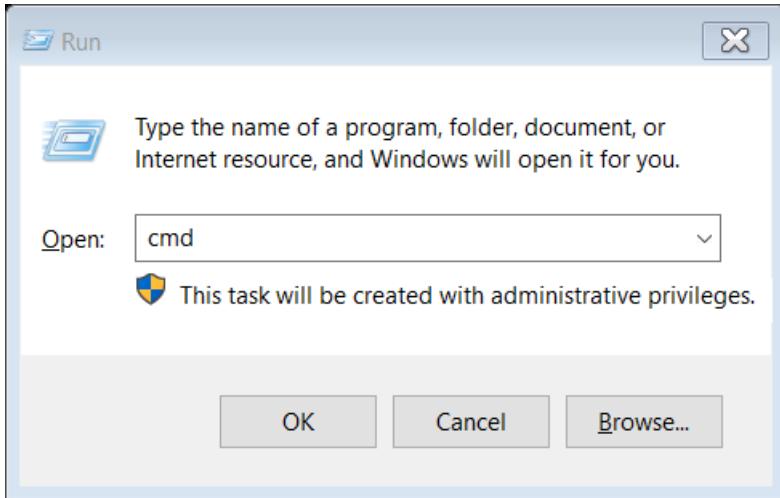
GROUP BY *column\_name(s)*  
HAVING *condition*;

*HAVING EXAMPLE :*

```
SQL> SELECT budget
  2  FROM Department
  3  GROUP BY budget
  4  HAVING budget>0;
```

BUDGET
-----
29000

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the following text:

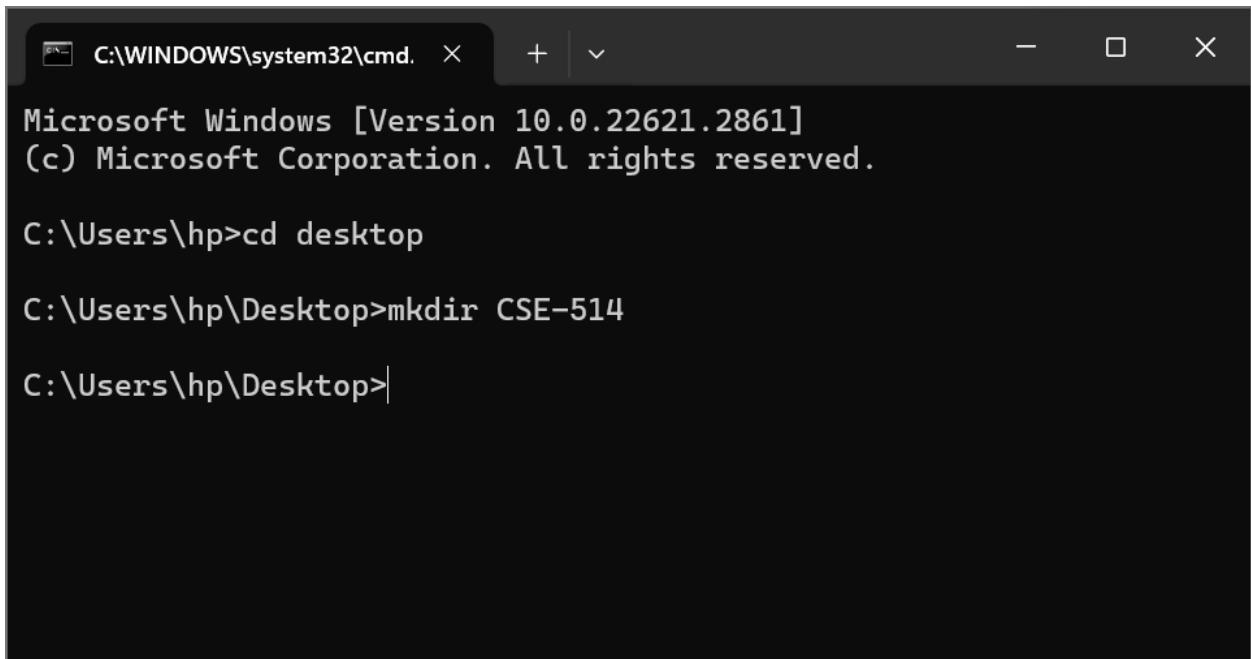
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The window has a dark theme.

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



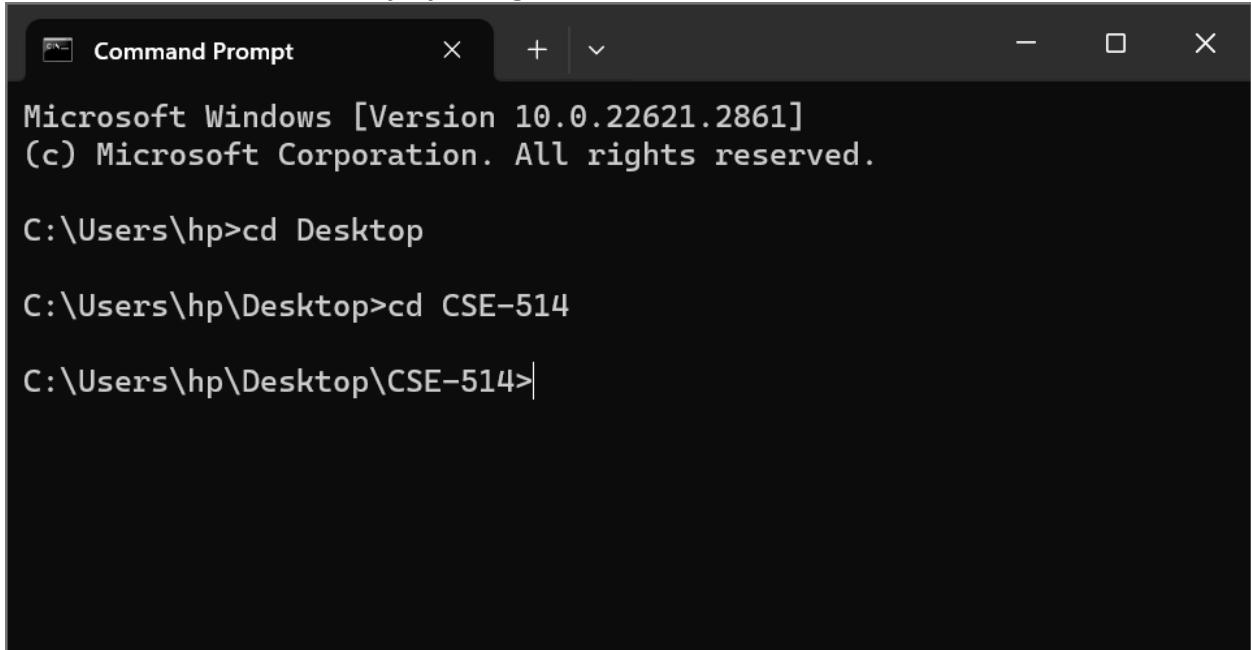
```
C:\WINDOWS\system32\cmd. x + v
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt x + v
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login,, Type sqlplus command enter username and password when system is prompted.

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>sqlplus cse514@localhost:1521/XEPDB1

SQL*Plus: Release 21.0.0.0.0 - Production on Fri Jan 12 20:01:41 2024
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Enter password:
Last Successful login time: Fri Jan 12 2024 20:00:02 +05:30

Connected to:
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production
Version 21.3.0.0.0

SQL>
```

6. To perform SQL queries to perform ORACLE BUILT-IN FUNCTIONS (DATE, TIME).

#### CREATE INSTRUCTOR TABLE

```
SQL> CREATE TABLE INSTRUCTOR (
  2      ID VARCHAR2(5),
  3      NAME VARCHAR2(50) NOT NULL,
  4      DEPT_NAME VARCHAR2(50),
  5      SALARY NUMBER(8,2) CHECK (SALARY > 29000),
  6      PRIMARY KEY (ID)
  7 );
```

```
Table created.
```

#### INSERTING VALUES

```
SQL> INSERT INTO INSTRUCTOR VALUES('501','Abhi','cse',65000);
1 row created.

SQL> INSERT INTO INSTRUCTOR VALUES('502','Bhavana','csd',72000);
1 row created.

SQL> INSERT INTO INSTRUCTOR VALUES('503','Chai','csm',30000);
1 row created.

SQL> INSERT INTO INSTRUCTOR VALUES('504','Dev','mec',80000);
1 row created.
```

```
SQL> SELECT * FROM INSTRUCTOR;

ID      NAME
-----
DEPT_NAME          SALARY
-----
501    Abhi           65000
cse
502    Bhavana        72000
csd
503    Chai            30000
csm
```

## UPPERCASE

### Syntax

```
SELECT UPPER(COL_name) FROM table_name;
```

EX:

```
SQL> SELECT UPPER(Name) from INSTRUCTOR;

UPPER(NAME)
-----
ABHI
BHAVANA
CHAI
DEV
```

## LOWER CASE

### Syntax

```
SELECT LOWER(COL name) FROM table_name;
```

EX:

```
SQL> SELECT LOWER(Name) from INSTRUCTOR;

LOWER(NAME)
-----
abhi
bhavana
chai
dev
```

**INIT CAP****Syntax**

```
SELECT Upper('String'), Lower('String'),  
INITCAP ('String') FROM table name;
```

EX:

```
SQL> SELECT Upper ('hi friends'), Lower('HI FRIENDS'),  
2 INITCAP ('hi friends') FROM dual;  
  
UPPER('HIF LOWER('HIF INITCAP('H  
-----  
HI FRIENDS hi friends Hi Friends
```

**LENGTH****Syntax:**

```
SELECT LENGTH('String') FROM table name;
```

EX:

```
SQL> SELECT LENGTH('HELLO WORLD') from dual;  
  
LENGTH('HELLOWORLD')  
-----  
11
```

**SUBSTR****Syntax**

```
SELECT SUBSTR('String', index 1, index2) from table name;
```

EX:

```
SQL> SELECT SUBSTR('Hello world',3,7) from dual;  
  
SUBSTR(  
-----  
llo wor
```

**REPLACE****Syntax**

```
SELECT REPLACE ('String1', 'Sub String', 'String 2') from table name;
```

EX:

```
SQL> SELECT REPLACE('Hello world','world','India') from dual;  
  
REPLACE('HE  
-----  
Hello India
```

**INSTR****LPAD****Syntax**

SELECT LPAD ('String', 20, '\*') from dual;

EX:

```
SQL> SELECT LPAD ('Hello world', 20, '*') from dual;  
  
LPAD('HELLOWORLD',20  
-----  
*****Hello world
```

**RPAD****Syntax**

SELECT RPAD ('String', 20, '\*') from dual;

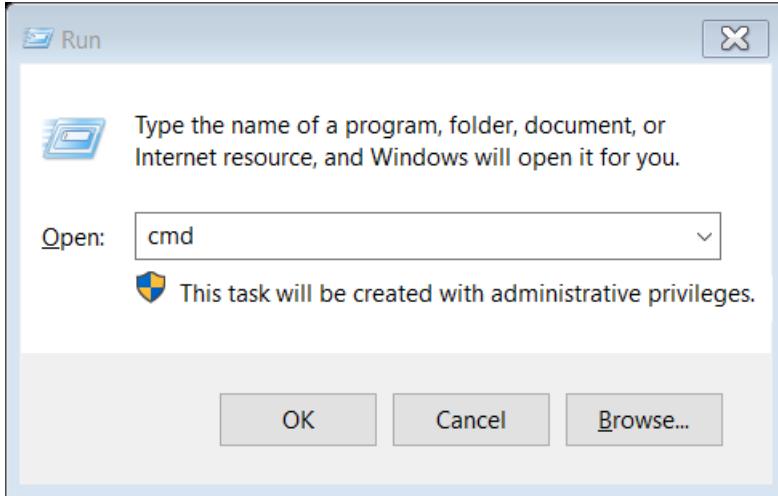
EX:

```
SQL> SELECT RPAD ('Hello world', 20, '*') from dual;  
  
RPAD('HELLOWORLD',20  
-----  
Hello world*****
```

**CONCAT****Syntax**

SELECT CONCAT(column 1, column2) from table name;

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

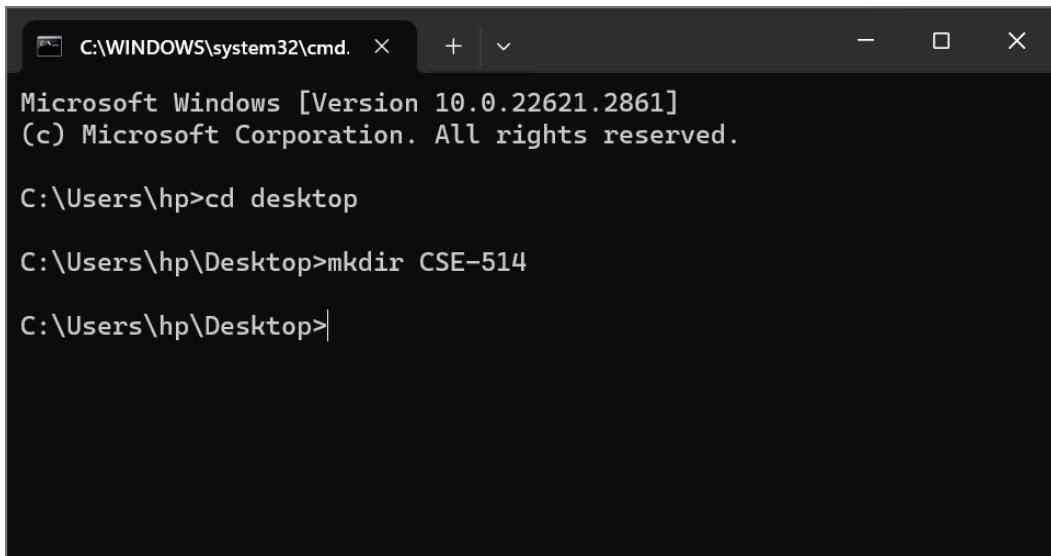
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

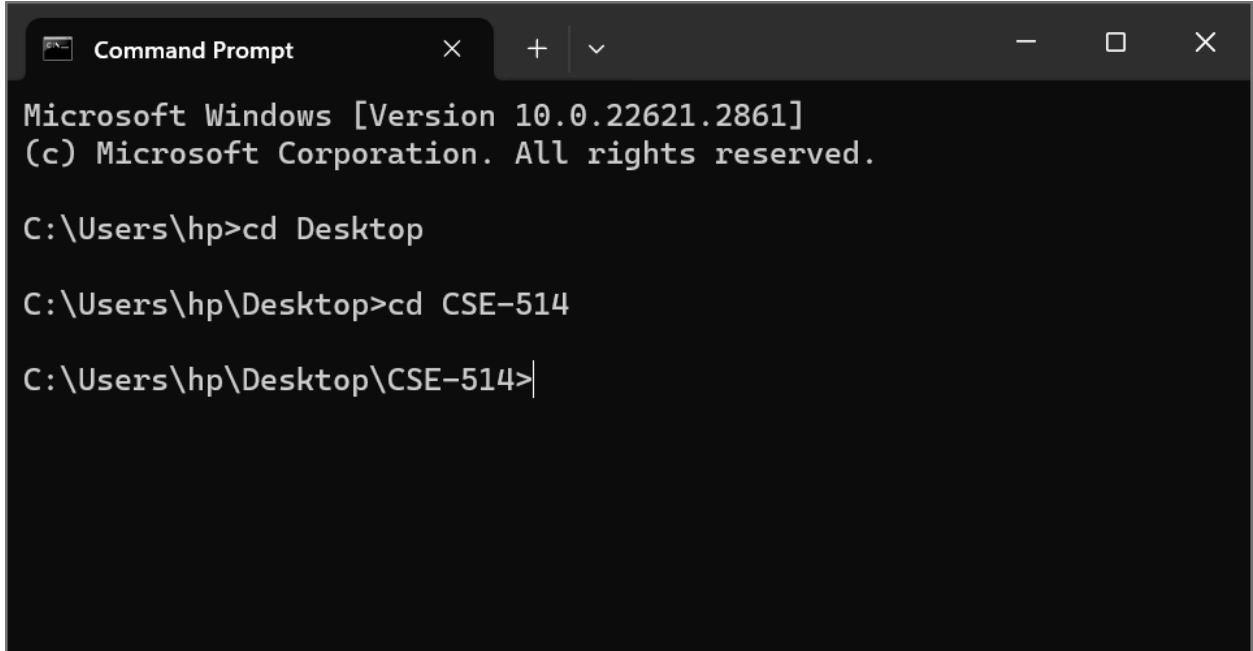
A screenshot of a Command Prompt window. The title bar says "Command Prompt". The window shows the command "cd desktop" being run, changing the current directory to "C:\Users\hp\Desktop". The prompt then changes to "C:\Users\hp\Desktop>".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



```
C:\WINDOWS\system32\cmd. + ▾ - □ ×  
Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\hp>cd desktop  
  
C:\Users\hp\Desktop>mkdir CSE-514  
  
C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt + ▾ - □ ×  
Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\hp>cd Desktop  
  
C:\Users\hp\Desktop>cd CSE-514  
  
C:\Users\hp\Desktop\CSE-514>
```

5. To Login, , Type sqlplus command enter username and password when system is prompted.

```
Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>sqlplus cse514@localhost:1521/XEPDB1

SQL*Plus: Release 21.0.0.0.0 - Production on Fri Jan 12 20:01:41 2024
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Enter password:
Last Successful login time: Fri Jan 12 2024 20:00:02 +05:30

Connected to:
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production
Version 21.3.0.0.0

SQL>
```

To Implement SQL queries to perform KEY CONSTRAINTS (i.e. PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT).

#### Types of SQL Constraints.

1. NOT NULL - Ensures that a column cannot have a NULL value
2. UNIQUE - Ensures that all values in a column are different
3. PRIMARY KEY - A combination of a NOT NULL and UNIQUE. Uniquely I Identifies each row in a table
4. FOREIGN KEY - Uniquely identifies a row/record in another table
5. CHECK - Ensures that all values in a column satisfies a specific condition
6. DEFAULT - Sets TO a default value for a column when no value is specified

**PRIMARY KEY:** A primary key is a field which can uniquely identify each row in table and this constraint is used to specify a field as primary key.

```
SQL> CREATE TABLE student5(
  2  ID NUMBER,
  3  NAME VARCHAR2(20),
  4  ADDRESS VARCHAR2(20)
  5  );

Table created.

SQL>
```

**FOREIGN KEY:** A foreign key is a field which can uniquely each row in another table.

```
SQL> CREATE TABLE orders5(
  2  o_id NUMBER NOT NULL,
  3  c_id NUMBER,
  4  PRIMARY KEY(o_id),
  5  FOREIGN KEY(c_id)REFERENCES customer(c_id)
  6  );
```

Table created.

```
SQL>
```

**UNIQUE:** This constraint when specified with a column, tells that the values in the column must be unique i.e., the values in any row of a column must not be repeated.

```
SQL> CREATE TABLE student3(
  2  id NUMBER UNIQUE,
  3  name VARCHAR2(20),
  4  address VARCHAR2(20)
  5  );
```

Table created.

```
SQL>
```

**NOT NULL:** This constraint tells that we cannot store a null value in a column.

```
SQL> CREATE TABLE student3(
  2  ID NUMBER,
  3  NAME VARCHAR2(20) NOT NULL,
  4  ADDRESS VARCHAR2(20)
  5  );
```

Table created.

```
SQL> |
```

**DEFAULT:** This constraint specifies a default value for the column when no value is specified by the user.

```
SQL> CREATE TABLE student6(
  2  ID NUMBER,
  3  NAME VARCHAR2(20) NOT NULL,
  4  AGE NUMBER DEFAULT 18
  5  );
```

Table created.

```
SQL>
```

**CHECK:** This constraint helps to validate the value for the column to meet a particular condition i.e. it helps to ensure that the value stored in a column meets a specific condition.

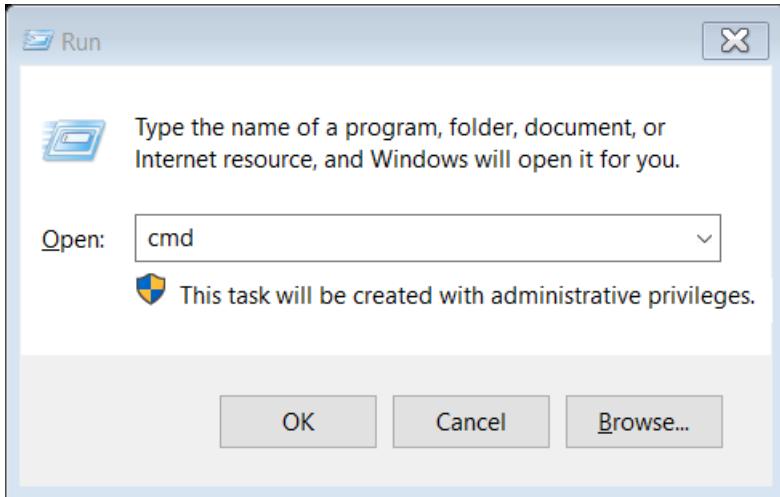
```
SQL> CREATE TABLE student8(
 2  id NUMBER NOT NULL,
 3  NAME VARCHAR2(20) NOT NULL,
 4  AGE NUMBER NOT NULL CHECK(AGE>=18)
 5 );
```

```
Table created.
```

```
SQL> |
```

**Conclusion:** In this lab, we have practiced KEY CONSTRAINTS PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, CHECK, DEFAULT on user created tables.

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the command line output:

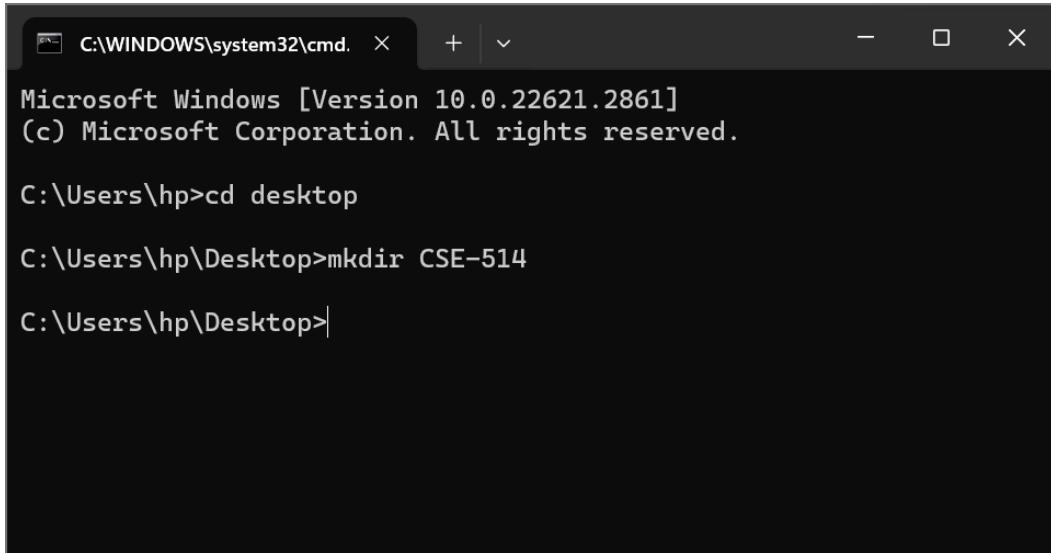
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The command "cd desktop" is typed at the prompt, and the window shows the current directory as "C:\Users\hp\Desktop>".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



C:\WINDOWS\system32\cmd. + X - □ ×

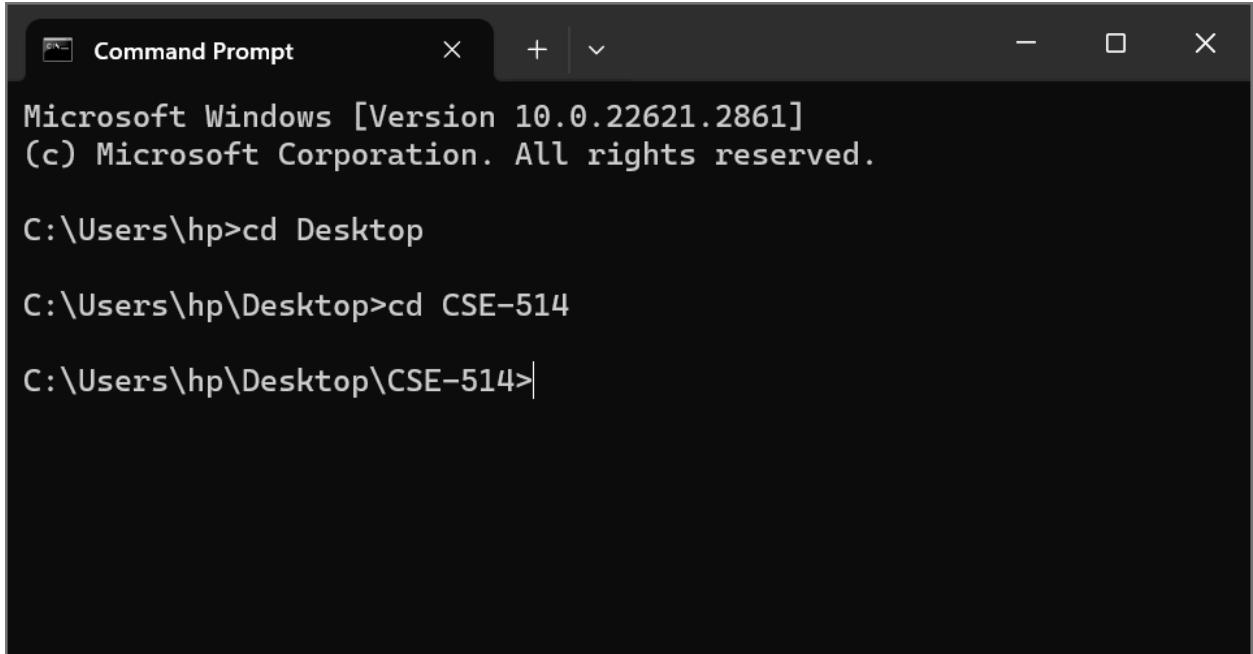
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

- Now, move into the directory by using cd command show below.



Command Prompt + X - □ ×

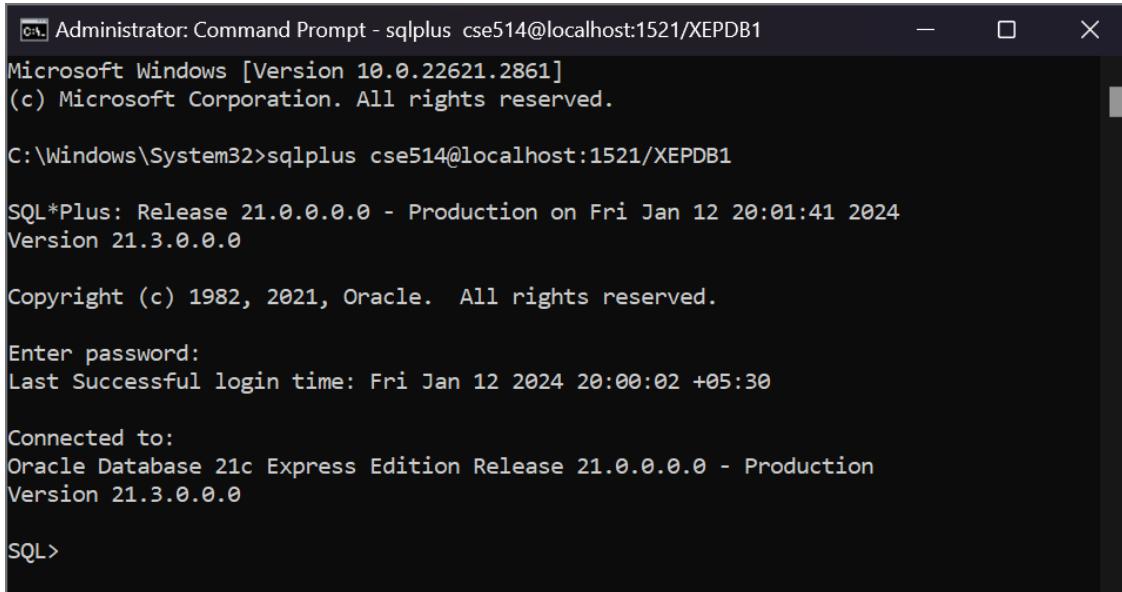
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

- To Login, , Type sqlplus command enter username and password when system is prompted.



Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>sqlplus cse514@localhost:1521/XEPDB1

SQL\*Plus: Release 21.0.0.0.0 - Production on Fri Jan 12 20:01:41 2024  
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Enter password:  
Last Successful login time: Fri Jan 12 2024 20:00:02 +05:30

Connected to:  
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production  
Version 21.3.0.0.0

SQL>

To write a PL/SQL program for calculating the factorial of a given number.

```
SQL> DECLARE
  2  FACT NUMBER:=1;
  3  N NUMBER;
  4  N1 NUMBER;
  5  BEGIN
  6  N:=&N;
  7  N1:=N;
  8  WHILE N>0 LOOP
  9  FACT:=N*FACT;
 10  N:=N-1;
 11  END LOOP;
 12  DBMS_OUTPUT.PUT_LINE('The Factorial of'||n1||' is'||FACT);
 13  END;
 14 /
Enter value for n: 5
old   6: N:=&N;
new   6: N:=5;
The Factorial of 5 is 120

PL/SQL procedure successfully completed.

SQL> SET VERIFY OFF
SQL> /
Enter value for n: 4
The Factorial of 4 is 24

PL/SQL procedure successfully completed.
```

Name : S.M.Chaithra

Experiment - 10

Date:30-11-2023

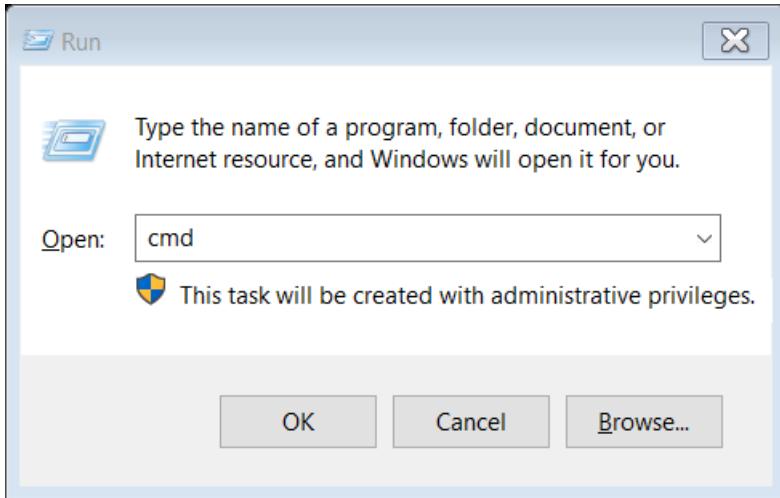
PL/SQL program to perform factorial numbers

- To run the program ‘/’ is used.
- To display the output, we use “SET SERVEROUT ON”.
- To eliminate debugging message “SET VERIFY OFF” should be used.

## PL/SQL programs to find given number is prime or not

## PL/SQL programs to find given number is prime or not

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window displays the following text:

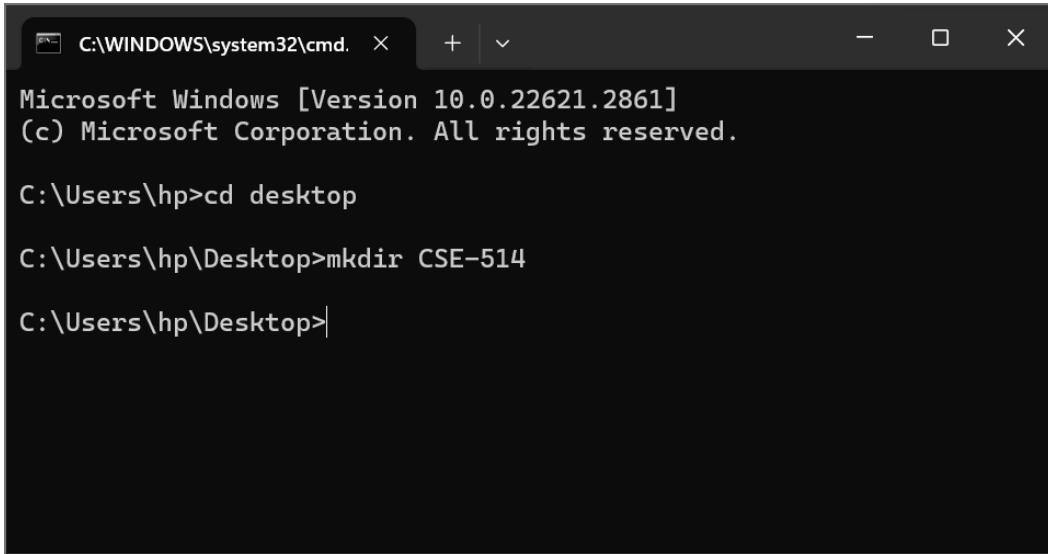
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The command "cd desktop" is entered and the prompt shows the current directory as "C:\Users\hp\Desktop>".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



A screenshot of a Windows Command Prompt window titled "C:\WINDOWS\system32\cmd.". The window shows the following text:

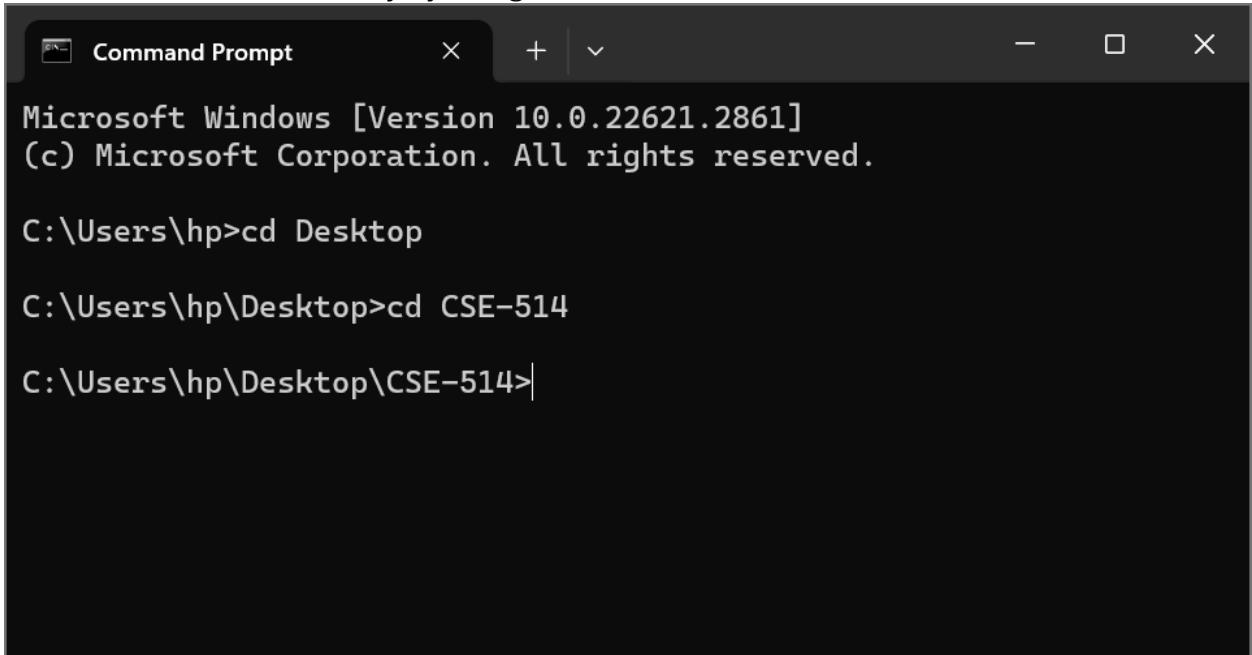
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



A screenshot of a Windows Command Prompt window titled "Command Prompt". The window shows the following text:

```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

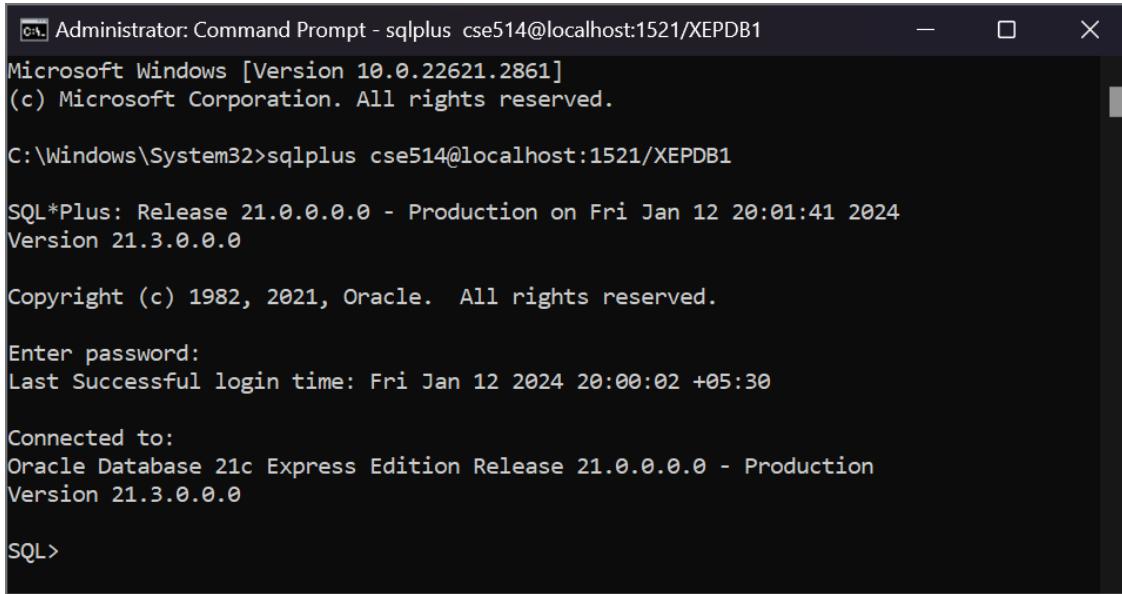
C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

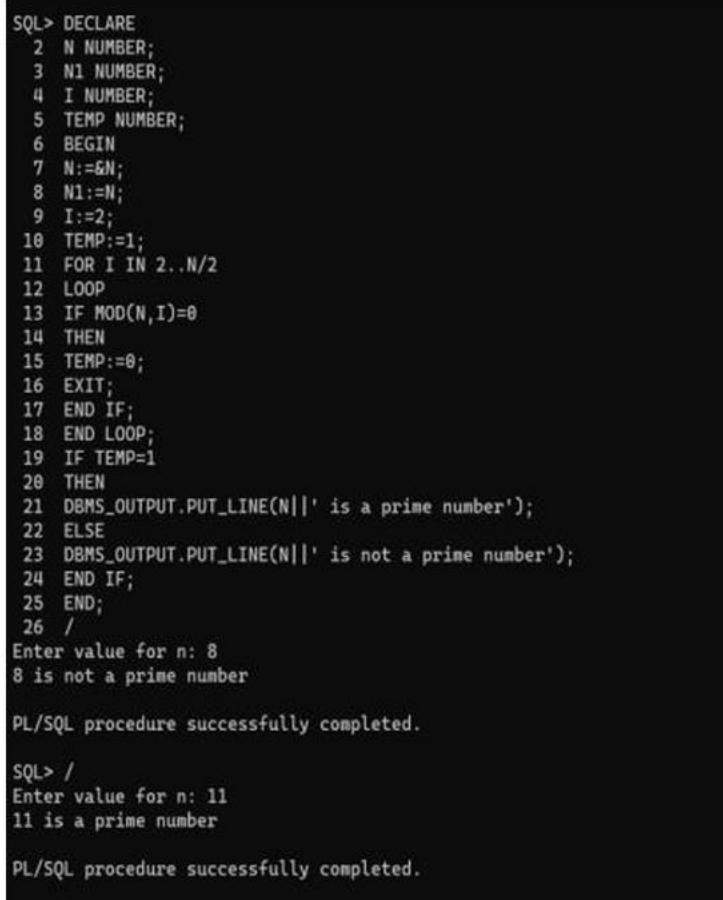
5. To Login,, Type sqlplus command enter username and password when system is prompted.

## PL/SQL programs to find given number is prime or not



Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1  
Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.  
C:\Windows\System32>sqlplus cse514@localhost:1521/XEPDB1  
SQL\*Plus: Release 21.0.0.0.0 - Production on Fri Jan 12 20:01:41 2024  
Version 21.3.0.0.0  
Copyright (c) 1982, 2021, Oracle. All rights reserved.  
Enter password:  
Last Successful login time: Fri Jan 12 2024 20:00:02 +05:30  
Connected to:  
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production  
Version 21.3.0.0.0  
SQL>

To write a PL/SQL program for calculating the factorial of a given number.

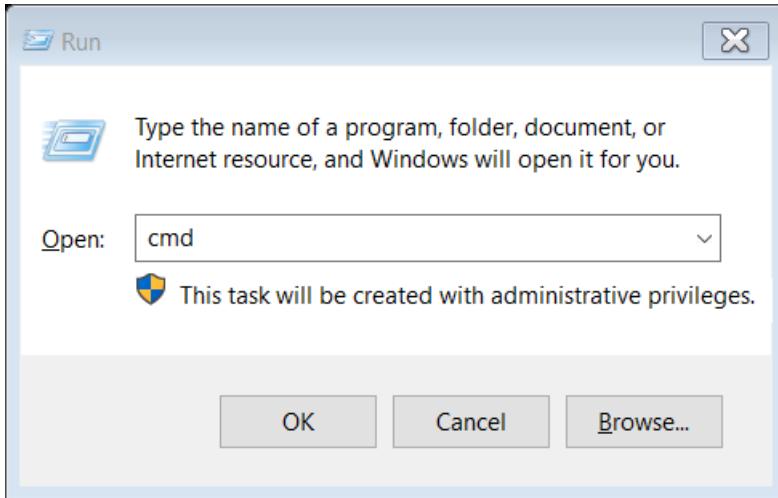


```
SQL> DECLARE
 2  N NUMBER;
 3  N1 NUMBER;
 4  I NUMBER;
 5  TEMP NUMBER;
 6  BEGIN
 7  N:=&N;
 8  N1:=N;
 9  I:=2;
10  TEMP:=1;
11  FOR I IN 2..N/2
12  LOOP
13  IF MOD(N,I)=0
14  THEN
15  TEMP:=0;
16  EXIT;
17  END IF;
18  END LOOP;
19  IF TEMP=1
20  THEN
21  DBMS_OUTPUT.PUT_LINE(N||' is a prime number');
22  ELSE
23  DBMS_OUTPUT.PUT_LINE(N||' is not a prime number');
24  END IF;
25  END;
26 /
Enter value for n: 8
8 is not a prime number
PL/SQL procedure successfully completed.

SQL> /
Enter value for n: 11
11 is a prime number
PL/SQL procedure successfully completed.
```

- To run the program ‘/’ is used.
- To display the output, we use “SET SERVEROUT ON”.
- To eliminate debugging message “SET VERIFY OFF” should be used.

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Command Prompt window. The title bar says "Command Prompt". The window shows the following text:

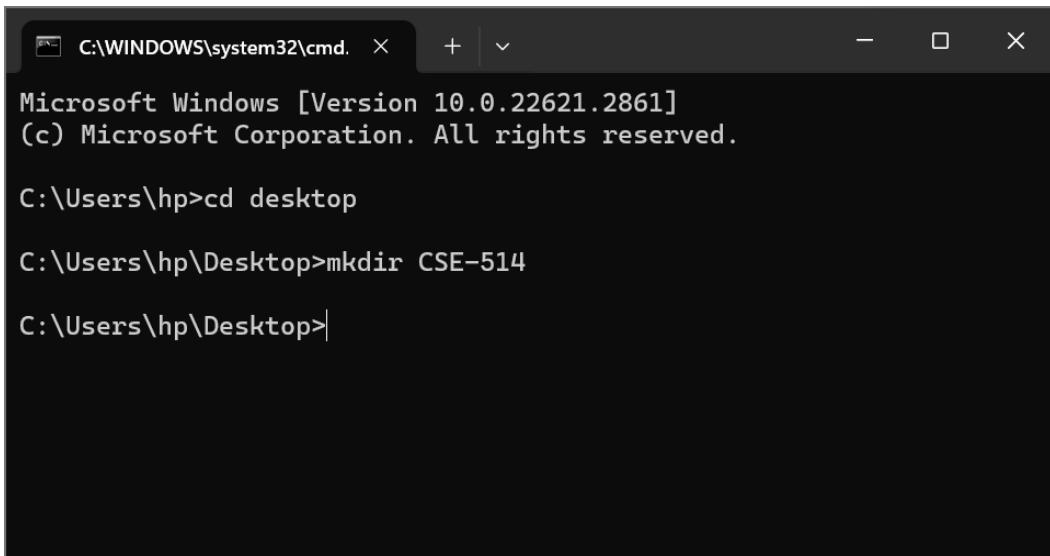
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The window has a dark theme with white text.

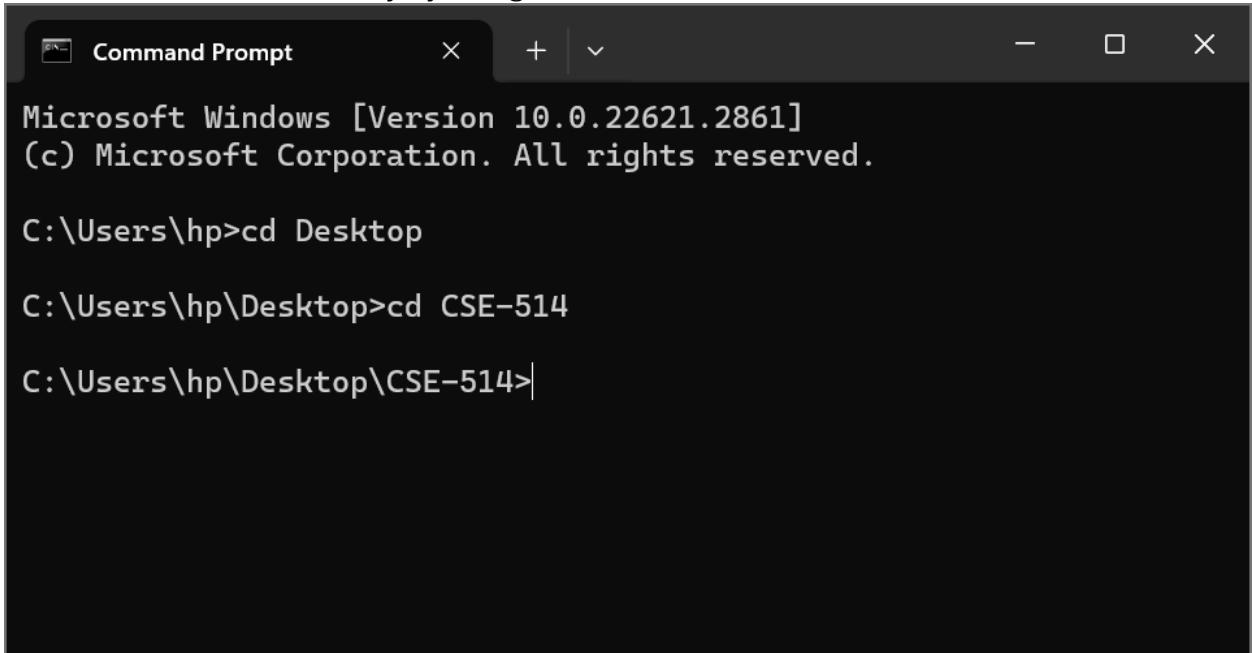
3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



A screenshot of a Windows Command Prompt window titled "C:\WINDOWS\system32\cmd.". The window shows the following command-line session:

```
C:\WINDOWS\system32\cmd. + ▾ - □ ×  
Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\hp>cd desktop  
C:\Users\hp\Desktop>mkdir CSE-514  
C:\Users\hp\Desktop>
```

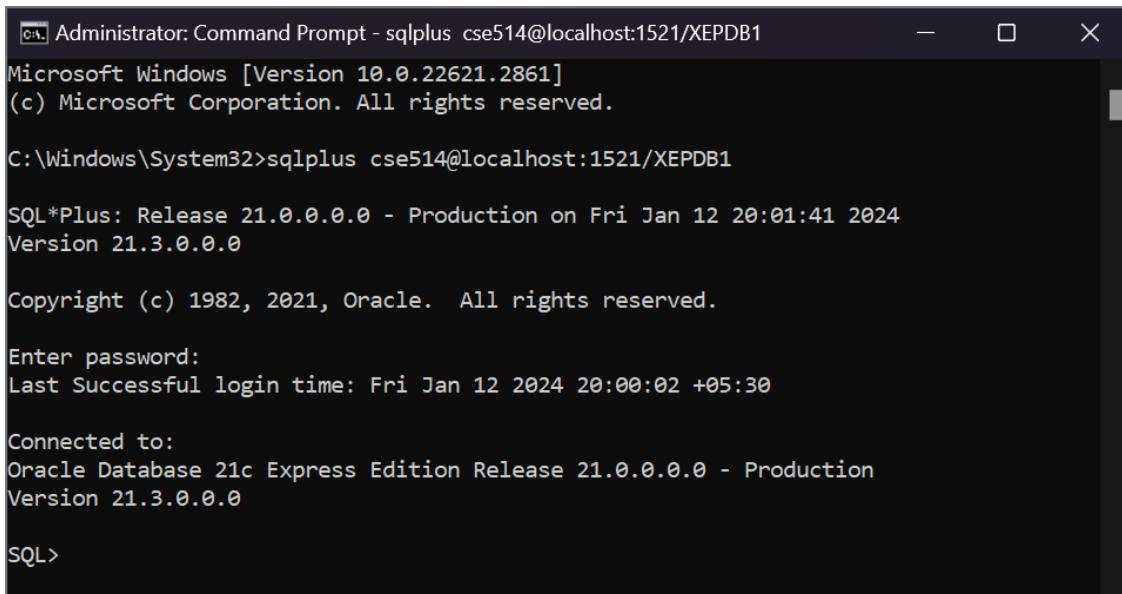
4. Now, move into the directory by using cd command show below.



A screenshot of a Windows Command Prompt window titled "Command Prompt". The window shows the following command-line session:

```
Command Prompt + ▾ - □ ×  
Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\hp>cd Desktop  
C:\Users\hp\Desktop>cd CSE-514  
C:\Users\hp\Desktop\CSE-514>
```

5. To Login,, Type sqlplus command enter username and password when system is prompted.



Administrator: Command Prompt - sqlplus cse514@localhost:1521/XEPDB1

Microsoft Windows [Version 10.0.22621.2861]  
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>sqlplus cse514@localhost:1521/XEPDB1

SQL\*Plus: Release 21.0.0.0.0 - Production on Fri Jan 12 20:01:41 2024  
Version 21.3.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Enter password:  
Last Successful login time: Fri Jan 12 2024 20:00:02 +05:30

Connected to:  
Oracle Database 21c Express Edition Release 21.0.0.0.0 - Production  
Version 21.3.0.0.0

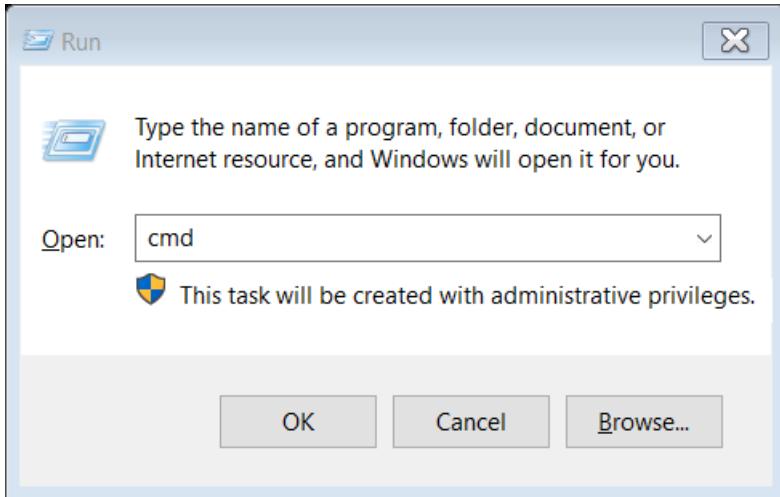
SQL>

To write a PL/SQL program for displaying the Fibonacci series up to an integer.

```
SQL> DECLARE
 2 FIRST NUMBER:=0;
 3 SECOND NUMBER:=1;
 4 TEMP NUMBER;
 5 N NUMBER;
 6 N1 NUMBER;
 7 I NUMBER;
 8 BEGIN
 9 N:=&N;
10 N1:=N;
11 DBMS_OUTPUT.PUT_LINE('SERIES:');
12 DBMS_OUTPUT.PUT_LINE(FIRST);
13 DBMS_OUTPUT.PUT_LINE(SECOND);
14 FOR I IN 2..N
15 LOOP
16 TEMP:=FIRST+SECOND;
17 FIRST:=SECOND;
18 SECOND:=TEMP;
19 DBMS_OUTPUT.PUT_LINE(TEMP);
20 END LOOP;
21 END;
22 /
Enter value for n: 6
SERIES:
0
1
1
2
3
5
8
PL/SQL procedure successfully completed.
```

- To run the program ‘/’ is used.
- To display the output, we use “SET SERVEROUT ON”.
- To eliminate debugging message “SET VERIFY OFF” should be used.

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the command line output:

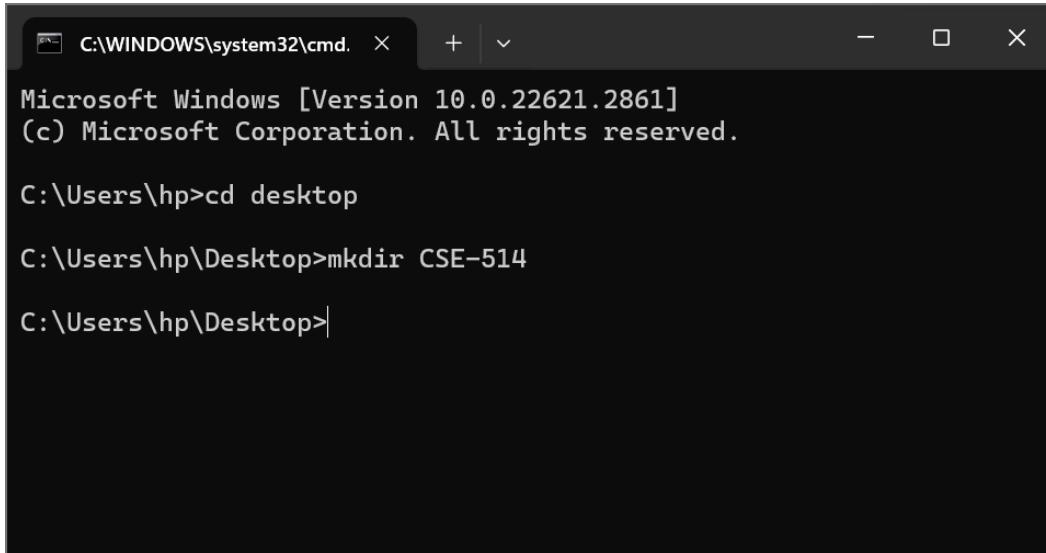
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The command "cd desktop" is typed and the cursor is at the end of the line.

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



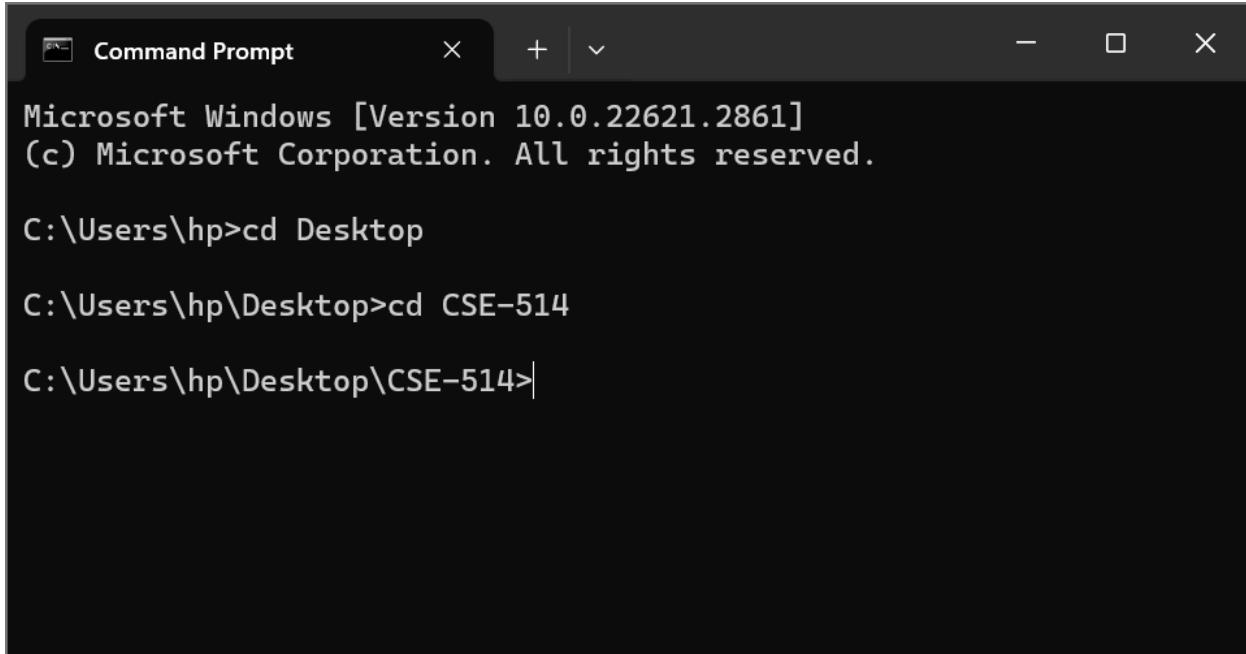
```
C:\WINDOWS\system32\cmd.  +  Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt  +  Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login, , Type sqlplus command enter username and password when system is prompted.

To write a PL/SQL program to implement Stored Procedure on table.

#### Example 1

```
SQL> CREATE TABLE SAILOR(ID NUMBER(10) PRIMARY KEY,NAME VARCHAR2(100));  
Table created.  
  
SQL> CREATE OR REPLACE PROCEDURE INSERTUSER  
2  (ID IN NUMBER,  
3  NAME IN VARCHAR2)  
4  IS  
5  BEGIN  
6  INSERT INTO SAILOR VALUES(ID,NAME);  
7  DBMS_OUTPUT.PUT_LINE('RECORD INSERTED SUCCESSFULLY');  
8  END;  
9 /  
  
Procedure created.
```

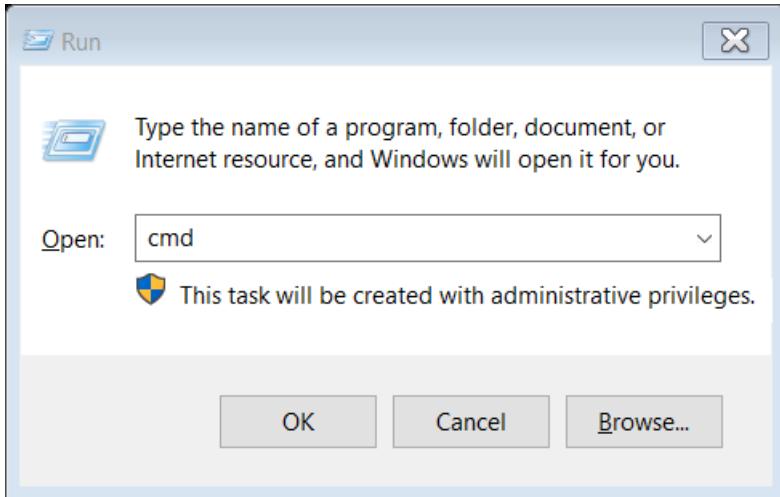
## EXECUTION PROCEDURE:

```
SQL> DECLARE  
2  CNT NUMBER;  
3  BEGIN  
4  INSERTUSER(202,'CHINNU');  
5  SELECT COUNT(*) INTO CNT FROM SAILOR;  
6  DBMS_OUTPUT.PUT_LINE(CNT||' RECORD IS INSERTED SUCCESSFULLY');  
7  END;  
8 /  
  
PL/SQL procedure successfully completed.
```

## DROP PROCEDURE:

```
SQL> DROP PROCEDURE insertuser;  
Procedure dropped.
```

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window shows the command line output:

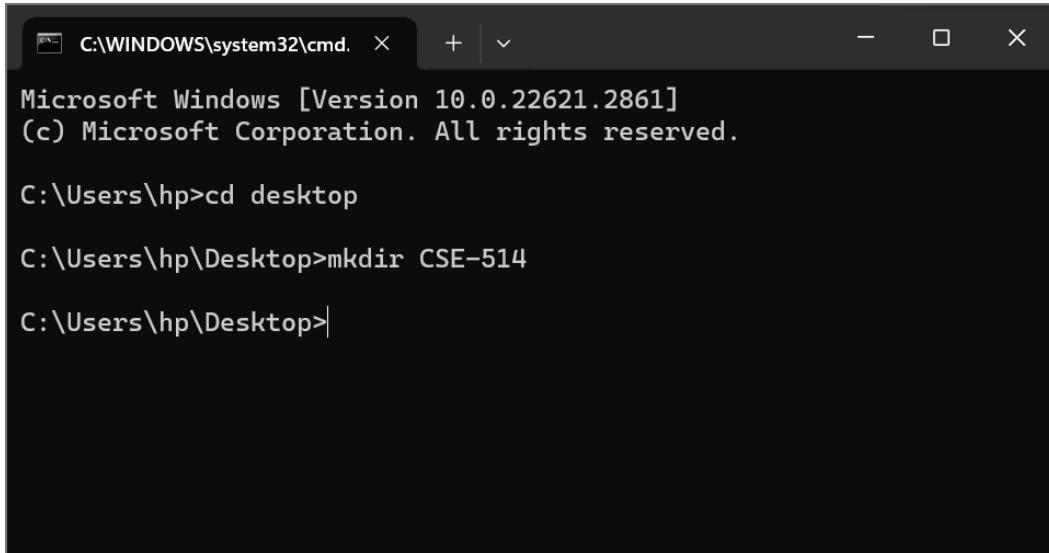
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The command "cd desktop" was run to change the current directory to "Desktop". The prompt now shows the full path "C:\Users\hp\Desktop>".

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



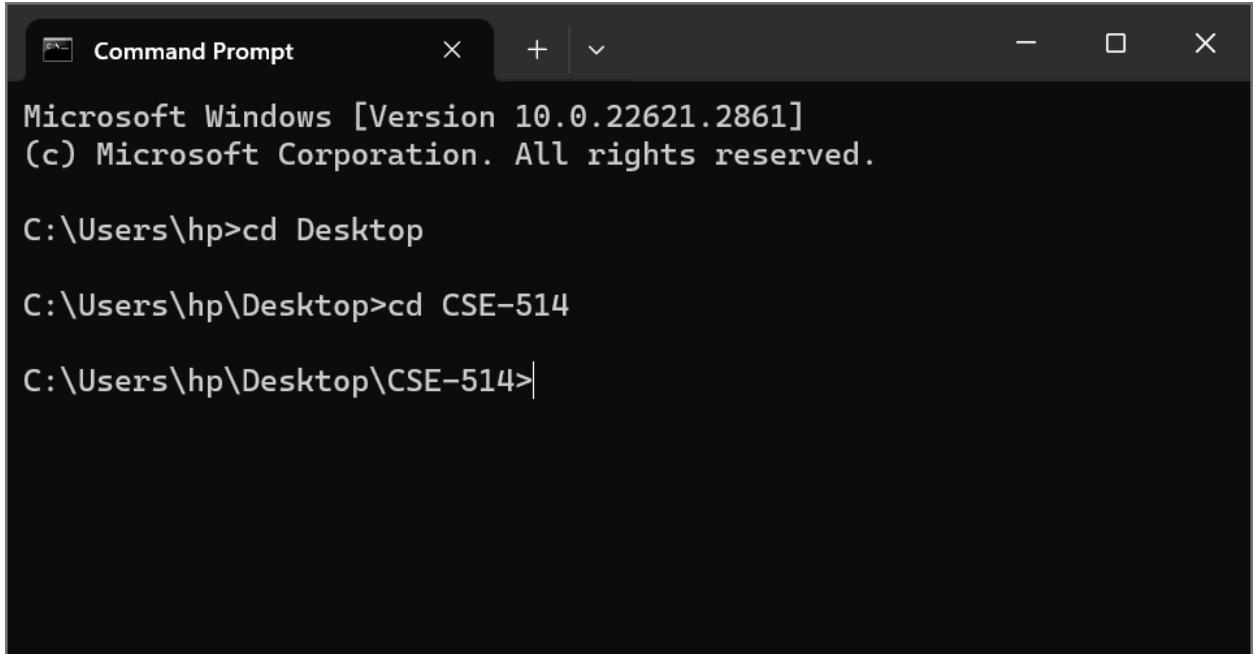
```
C:\WINDOWS\system32\cmd.  +  Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

- Now, move into the directory by using cd command show below.



```
Command Prompt  +  Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

- To Login, , Type sqlplus command enter username and password when system is prompted.

To write a PL/SQL program to implement Stored Function on table.  
EXAMPLE-1:

PL/SQL program to implement stored function on table

```
SQL> CREATE OR REPLACE FUNCTION ADDER(N1 IN NUMBER, N2 IN NUMBER)
  2  RETURN NUMBER
  3  IS
  4  N3 NUMBER(8);
  5  BEGIN
  6  N3:=N1+N2;
  7  RETURN N3;
  8  END;
  9 /

Function created.
```

## EXECUTION PROCEDURE:

```
SQL> DECLARE
  2  N3 NUMBER(2);
  3  BEGIN
  4  N3:=ADDER(22,44);
  5  DBMS_OUTPUT.PUT_LINE('ADDITION IS: '||N3);
  6  END;
  7 /

PL/SQL procedure successfully completed.

SQL> SET SERVEROUT ON
SQL> /
ADDITION IS: 66

PL/SQL procedure successfully completed.
```

```
SQL> DROP FUNCTION ADDER;

Function dropped.

SQL> |
```

## EXAMPLE-2

```
SQL> CREATE FUNCTION FACT(X NUMBER)
  2  RETURN NUMBER
  3  IS
  4  F NUMBER;
  5  BEGIN
  6  IF X=0 THEN
  7  F:=1;
  8  ELSE
  9  F:=X*FACT(X-1);
 10 END IF;
 11 RETURN F;
 12 END;
 13 /

Function created.
```

## EXECUTION PROCEDURE:

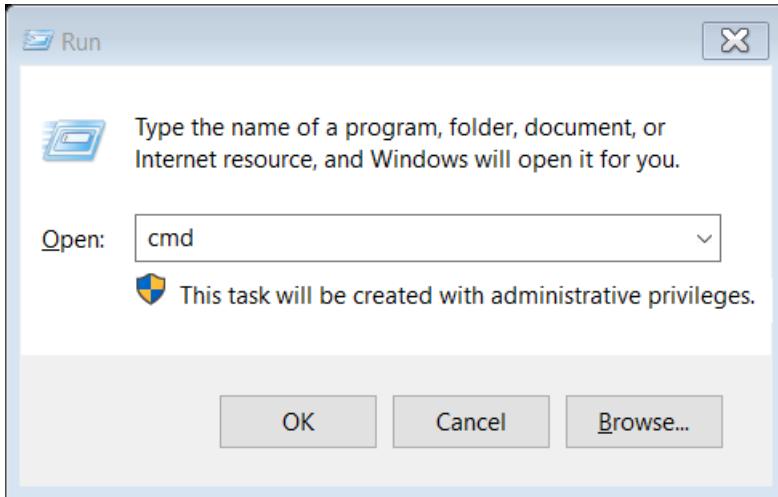
```
SQL> DECLARE
  2  NUM NUMBER;
  3  FACTORIAL NUMBER;
  4  BEGIN
  5  NUM:=4;
  6  FACTORIAL:=FACT(NUM);
  7  DBMS_OUTPUT.PUT_LINE(' FACTORIAL'||NUM||' IS '|| FACTORIAL);
  8  END;
  9 /
FACTORIAL 4 IS 24

PL/SQL procedure successfully completed.
```

```
SQL> DROP FUNCTION FACT;

Function dropped.
```

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Command Prompt window. The title bar says "Command Prompt". The window shows the following text:

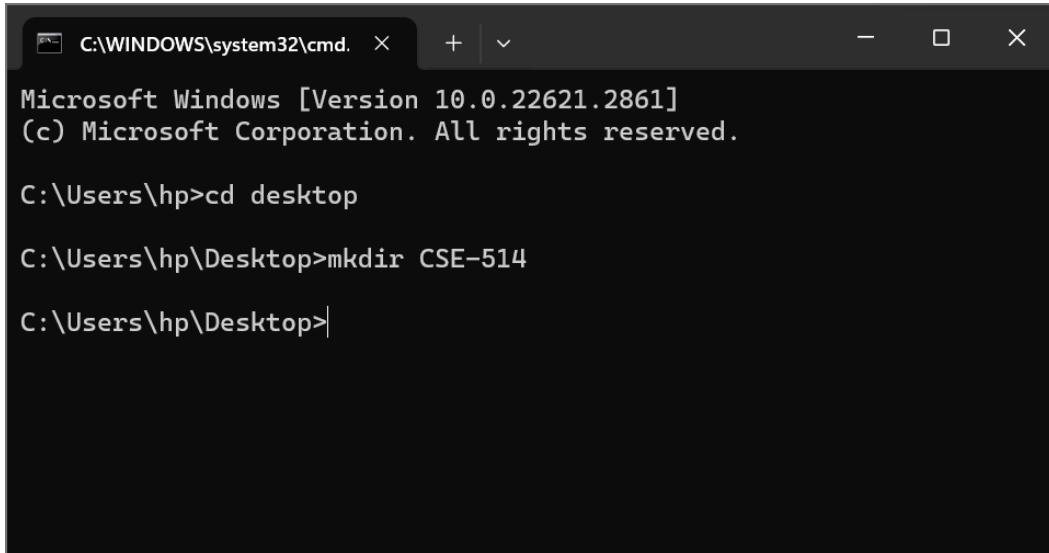
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

The window has a dark background and light-colored text.

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



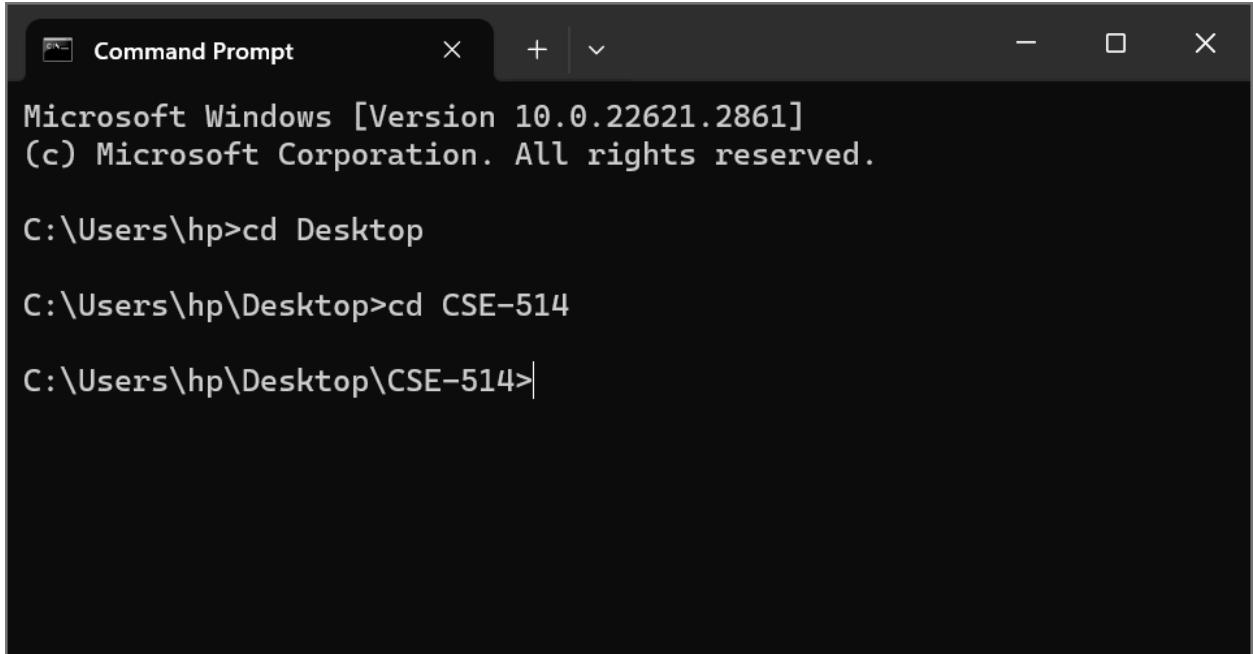
```
C:\WINDOWS\system32\cmd.  X  +  ▾ Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>mkdir CSE-514

C:\Users\hp\Desktop>
```

4. Now, move into the directory by using cd command show below.



```
Command Prompt  X  +  ▾ Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd Desktop

C:\Users\hp\Desktop>cd CSE-514

C:\Users\hp\Desktop\CSE-514>
```

5. To Login, , Type sqlplus command enter username and password when system is prompted.

To write PL/SQL program to implement Trigger on table.

#### CREATING TABLE

```
SQL> CREATE TABLE INSTRUCTOR(
  2  ID NUMBER PRIMARY KEY,
  3  NAME VARCHAR2(50) NOT NULL,
  4  DEPT_NAME VARCHAR2(20) NOT NULL,
  5  SALARY NUMBER(10,2) CHECK (SALARY>30000)
  6  );
```

Table created.

```
SQL> INSERT INTO INSTRUCTOR VALUES(30, 'AMMU', 'CSE', 50000);
1 row created.

SQL> INSERT INTO INSTRUCTOR VALUES(40, 'ANI', 'CSM', 57000);
1 row created.

SQL> INSERT INTO INSTRUCTOR VALUES(50, 'ARUSH', 'CSD', 40000);
1 row created.
```

```
SQL> SELECT * FROM INSTRUCTOR;
      ID NAME
----- -----
DEPT_NAME          SALARY
----- -----
          30 AMMU
CSE                  50000
          40 ANI
CSM                  57000
          50 ARUSH
CSD                  40000
```

AN EXAMPLE TO CREATE TRIGGER:

```
SQL> CREATE OR REPLACE TRIGGER display_changes
  2  BEFORE UPDATE ON instructor
  3  FOR EACH ROW
  4  WHEN (NEW.ID=OLD.ID)
  5  DECLARE
  6    sal_diff NUMBER;
  7  BEGIN
  8    sal_diff:=:NEW.SALARY- :OLD.SALARY;
  9    DBMS_OUTPUT.PUT_LINE('OLD SALARY: '|| :OLD.SALARY);
10    DBMS_OUTPUT.PUT_LINE('NEW SALARY: '|| :NEW.SALARY);
11    DBMS_OUTPUT.PUT_LINE('SALARY DIFFERENCE: '|| sal_diff);
12  END;
13 /
```

Trigger created.

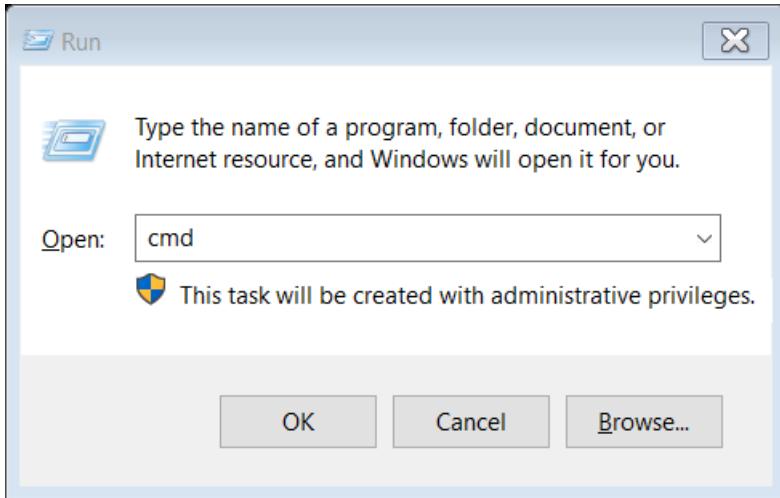
A PL/SQL Procedure to execute a trigger:

```
SQL> DECLARE
  2  tot_rows NUMBER;
  3  BEGIN
  4  UPDATE instructor
  5  SET SALARY=SALARY*1.5;
  6  IF sql%notfound THEN
  7    DBMS_OUTPUT.PUT_LINE(' NO INSTRUCTORS UPDATED');
  8  ELSIF sql%found THEN
  9    tot_rows:=sql%rowcount;
10  DBMS_OUTPUT.PUT_LINE(tot_rows||' INSTRUCTORS UPDATED');
11  END IF;
12  END;
13 /
```

OLD SALARY: 55000  
NEW SALARY: 82500  
SALARY DIFFERENCE: 27500  
OLD SALARY: 50000  
NEW SALARY: 75000  
SALARY DIFFERENCE: 25000  
OLD SALARY: 60000  
NEW SALARY: 90000  
SALARY DIFFERENCE: 30000  
3 INSTRUCTORS UPDATED

PL/SQL procedure successfully completed.

1. Open the command prompt Press WIN+R , type cmd



2. Once cmd prompt open go to DESKTOP using cd Desktop

A screenshot of a Windows Command Prompt window. The title bar says "Command Prompt". The window content shows:

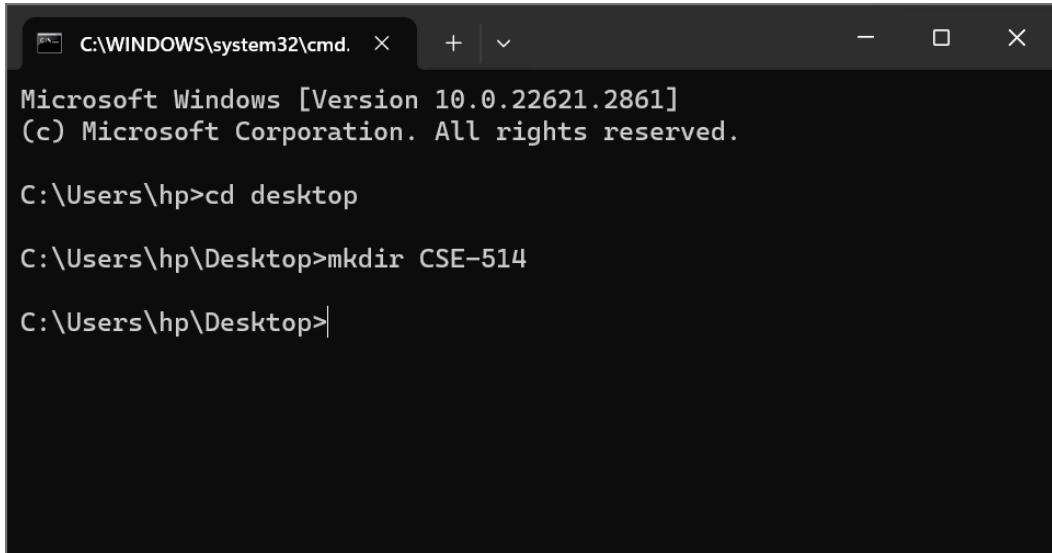
```
Microsoft Windows [Version 10.0.22621.2861]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hp>cd desktop

C:\Users\hp\Desktop>
```

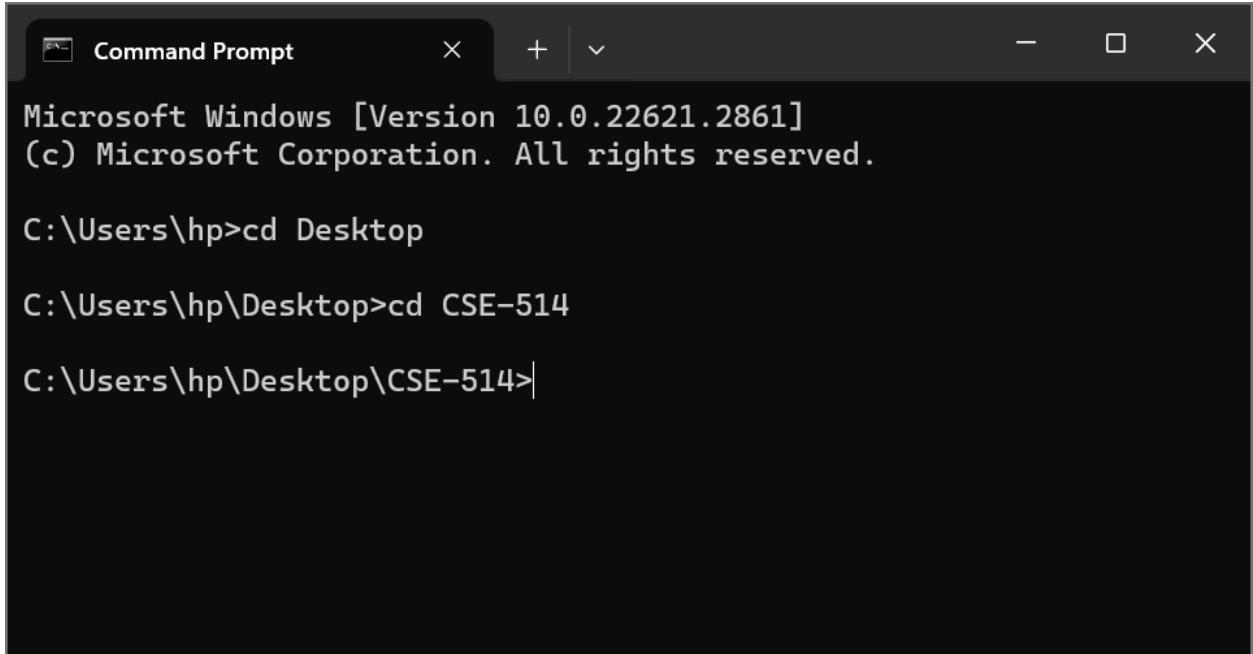
The text is white on a black background.

3. Now create a Directory using mkdir or md command using your branch abbreviation and last 3 digit hall ticket number like md CSE-514.



```
C:\WINDOWS\system32\cmd. + X Microsoft Windows [Version 10.0.22621.2861] (c) Microsoft Corporation. All rights reserved. C:\Users\hp>cd desktop C:\Users\hp\Desktop>mkdir CSE-514 C:\Users\hp\Desktop>
```

- Now, move into the directory by using cd command show below.



```
Command Prompt + X Microsoft Windows [Version 10.0.22621.2861] (c) Microsoft Corporation. All rights reserved. C:\Users\hp>cd Desktop C:\Users\hp\Desktop>cd CSE-514 C:\Users\hp\Desktop\CSE-514>
```

- To Login, , Type sqlplus command enter username and password when system is prompted.

To write a PL/SQL program to implement Cursor on table.

CREATING A TABLE:

```
SQL> CREATE TABLE customers(
  2  ID NUMBER PRIMARY KEY,
  3  NAME VARCHAR2(20) NOT NULL,
  4  AGE NUMBER,
  5  ADDRESS VARCHAR2(20),
  6  SALARY NUMERIC(20,2)
  7  );
```

Table created.

#### INSERTING VALUES INTO TABLE:

```
SQL> INSERT INTO customers VALUES(501, 'Siri','19','Delhi', '270000');

1 row created.

SQL> INSERT INTO customers VALUES(502, 'Smith','21','Agra', '290000');

1 row created.

SQL> INSERT INTO customers VALUES(503, 'Suresh','23','Noida', '320000');

1 row created.
```

```
SQL> SELECT * FROM customers;
```

ID	NAME	AGE	ADDRESS
SALARY			
501	Siri	19	Delhi
270000			
502	Smith	21	Agra
290000			
503	Suresh	23	Noida
320000			

PL/SQL Program using Explicit Cursors:

```
SQL> DECLARE
  2  c_id customers.id%type;
  3  c_name customers.name%type;
  4  c_addr customers.address%type;
  5  CURSOR c_customers IS
  6  SELECT id,name,address FROM customers;
  7  BEGIN
  8  OPEN c_customers;
  9  LOOP
 10  FETCH c_customers INTO c_id,c_name,c_addr;
 11  EXIT WHEN c_customers%notfound;
 12  DBMS_OUTPUT.PUT_LINE(c_id||' '||c_name||' '||c_addr);
 13  END LOOP;
 14  CLOSE c_customers;
 15  END;
 16 /
```

PL/SQL procedure successfully completed.

```
SQL> SET SERVEROUT ON
SQL> /
501 Siri Delhi
502 Smith Agra
503 Suresh Noida
```

PL/SQL procedure successfully completed.