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Practical 2

AIM: Temporal DB

Temporal Database:

- Temporal databases, in the broadest sense, encompass all database applications that require some aspect of time when organizing their information.
- Hence, they provide a good example to illustrate the need for developing a set of unifying concepts for application developers to use.

Time Representation, Calendars and Time Dimensions:

- For temporal databases, time is considered to be an ordered sequence of points in some granularity that is determined by the application.
- The temporal data types include:
  - DATE (specifying Year, Month, and Day as YYYY-MM-DD)
  - TIME (specifying Hour, Minute, and Second as HH: MM: SS)
  - TIMESTAMP (specifying a Date/Time combination)
  - INTERVAL (a relative time duration, such as 10 days or 250 minutes)
  - PERIOD (an anchored time duration with a fixed starting point, such as the 10-day period from January 1, 2009, to January 10,2009, inclusive)

Valid Time and Transaction Time Dimensions:

- Given a particular event or fact that is associated with a particular time point or time period in the database, the association may be interpreted to mean different things.
- The most natural interpretation is that the associated time is the time that the event occurred, or the period during which the fact was considered to be true in the real world.
- If this interpretation is used, the associated time is often referred to as the valid time. A temporal database using this interpretation is called a **valid time database.**
- However, a different interpretation can be used, where the associated time refers to the time when the information was actually stored in the database; that is, it is the value of the system time clock when the information is valid in the system.
- In this case, the associated time is called the transaction time. A temporal database using this interpretation is called a **transaction time database.**

Types of Temporal Database:

- **Uni-Temporal:** A uni-temporal database has one axis of time, either the validity range or the system time range.
- **Bi-Temporal:** A bi-temporal database has two axes of time, valid time and transaction time.
- **Tri-Temporal:** A tri-temporal database has three axes of time valid time, transaction time and decision time.

Syntaxes, Functions and Data types:

1. **Create Table Query:**
   create table <table_name>(<column1> number(20), <column2> varchar2(20), <column3>date,<column4> date, <column5> date);
   create table <table_name >(< column1> varchar2(20) , <column2> number(5),<column3> number(8), <column4> timestamp);
   Date: The DATE type is used for values with a date part but no time part. MySQL retrieves and displays DATE values in 'YYYY-MM-DD' format.
   Timestamp: The TIMESTAMP data type is used for values that contain both date and time parts.
2. **Select Query:**
   select from <column_name> from <table_name> where to_char(<column_name_of_timestamp>,'HH:MI:SS:PM')='<HH:MI:SS:PM>;
   to_char():TO_CHAR() function converts a DATE or INTERVAL value to a string in a specified date format.
   The Oracle TO_CHAR() function is very useful for formatting the internal date data returned by a query in a specific date format.

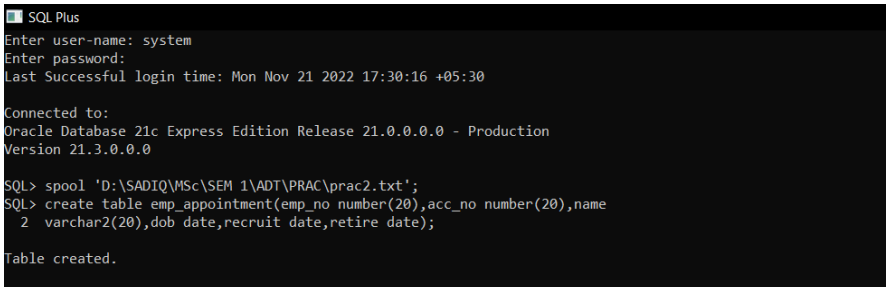
A. Aim: Create a table emp_appointment, which stores the account number, name, dob (Recruitment date and Retirement date). Insert 5-10 records. Also create the trigger to calculate retirement date.

Execute following queries:
Find all the employee who join the company on 24-oct-2000.
Find all the employee who join the company on 2-mar-2005.
Find all the employee who retire the company on 31-mar-2024.
Find all the employee who retire the company on 28-feb-2027.

CREATE TABLE:

```
create table emp_appointment(emp_no number(20),acc_no number(20),name
2  varchar2(20),dob date,recruit date,retire date);
```

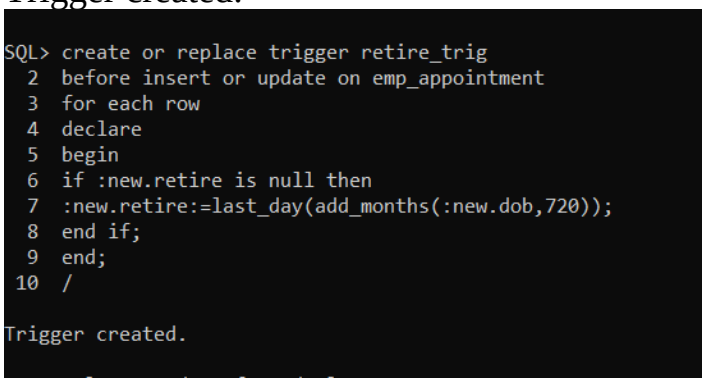
Table created.



CREATE TRIGGER:

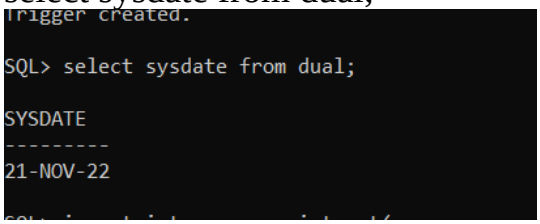
```
create or replace trigger retire_trig
2  before insert or update on emp_appointment
3  for each row
4  declare
5  begin
6  if :new.retire is null then
7  :new.retire:=last_day(add_months(:new.dob,720));
8  end if;
9  end;
0  /
```

Trigger created.



CHECK DATE FORMAT:

```
select sysdate from dual;
```



We check date format so we can insert our data in the same format.

INSERT VALUES:

```
insert into emp_appointment(emp_no,acc_no,name,dob,recruit)
values(1,123,'Sadiq','29-DEC-2000','22-JUL-2021');
1 row created.

insert into emp_appointment(emp_no,acc_no,name,dob,recruit)
values(2,456,'Sova','13-FEB-1967','17-SEP-1991');
1 row created.

insert into emp_appointment(emp_no,acc_no,name,dob,recruit)
values(3,789,'Reyna','27-AUG-1978','24-OCT-2000');
1 row created.

insert into emp_appointment(emp_no,acc_no,name,dob,recruit)
values(4,012,'Cypher','31-MAR-1964','30-MAY-1986');
1 row created.

insert into emp_appointment(emp_no,acc_no,name,dob,recruit)
values(5,345,'Viper','9-JAN-1983','2-MAR-2005');
1 row created.

insert into emp_appointment(emp_no,acc_no,name,dob,recruit)
values(6,678,'Sage','29-NOV-1967','31-JAN-1991');
1 row created.

insert into emp_appointment(emp_no,acc_no,name,dob,recruit)
values(7,901,'KJ','19-JUN-1996','11-AUG-2019');
1 row created.
```

DISPLAY THE TABLE:

```
Select * from emp_appointment;
```

```
SQL> select * from emp_appointment;

    EMP_NO     ACC_NO NAME                 DOB       RECRUIT   RETIRE
---------- ---------- -------------------- --------- --------- ---------
         1        123 Sadiq                29-DEC-00 22-JUL-21 31-DEC-60
         2        456 Sova                 13-FEB-67 17-SEP-91 28-FEB-27
         3        789 Reyna                27-AUG-78 24-OCT-00 31-AUG-38
         4         12 Cypher               31-MAR-64 30-MAY-86 31-MAR-24
         5        345 Viper                09-JAN-83 02-MAR-05 31-JAN-43
         6        678 Sage                 29-NOV-67 31-JAN-91 30-NOV-27
         7        901 KJ                   19-JUN-96 11-AUG-19 30-JUN-56

7 rows selected.
```

a) Find all the employee who join the company on 24-oct-2000.

select name,recruit from emp_appointment where recruit='24-OCT-2000';

```
7 rows selected.

SQL> select name,recruit from emp_appointment where recruit='24-OCT-2000';

NAME                 RECRUIT
-------------------- ---------
Reyna                24-OCT-00
```

b) Find all the employee who join the company on 2-mar-2005.

select name,recruit from emp_appointment where recruit='02-MAR-2005';

```
SQL> select name,recruit from emp_appointment where recruit='02-MAR-2005';

NAME                 RECRUIT
-------------------- ---------
Viper                02-MAR-05
```

c) Find all the employee who retire the company on 31-mar-2024.

select name,retire from emp_appointment where retire='31-mar-2024';

```
SQL> select name,retire from emp_appointment where retire='31-mar-2024';

NAME                  RETIRE
--------------------- ---------
Cypher                31-MAR-24
```

d) Find all the employee who retire the company on 28-feb-2027.

select name,retire from emp_appointment where retire='28-feb-2027';

```
SQL> select name,retire from emp_appointment where retire='28-feb-2027';

NAME                 RETIRE
-------------------- ---------
Sova                 28-FEB-27

SQL> select * from emp_appointment where dob='29-Nov-1967';

    EMP_NO     ACC_NO NAME                 DOB       RECRUIT   RETIRE
---------- ---------- -------------------- --------- --------- ---------
         6        678 Sage                 29-NOV-67 31-JAN-91 30-NOV-27

SQL> spool off;
SQL>
```

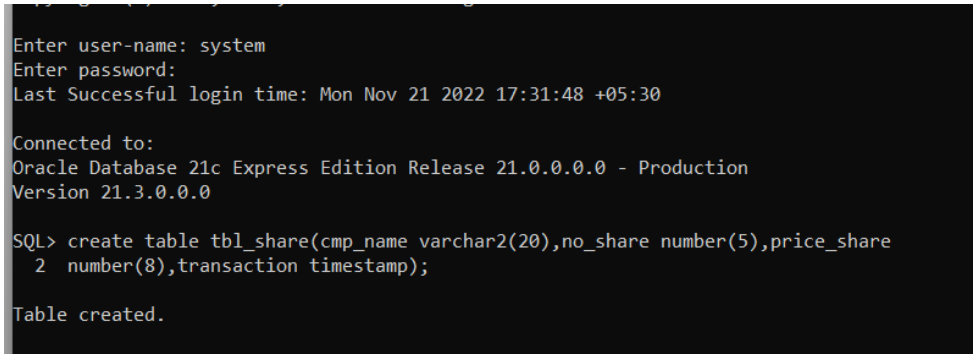
B. Aim: Create a table tbl_share, which stores the, name of company, number of shares, and price per share at transaction time. Insert 10 records.

Execute following queries:
Find all the names of company whose share is more than Rs.100 at 11:45:00 AM.
Find the name of the company which has the highest share price at 11:45:00 AM.
Find all the names of company whose share is more than Rs.200 at 03:00:00 PM.

CREATE TABLE:

```
create table tbl_share(cmp_name varchar2(20),no_share number(5),price_share
  2  number(8),transaction timestamp);

Table created.
```



INSERT VALUES:

```
insert into tbl_share values('NeoSOFT',150,99,'02-Mar-2005 11:45:00:AM');
1 row created.

insert into tbl_share values('LNT',1,134,'08-Jul-2022 03:00:00:PM');
1 row created.

insert into tbl_share values('Infosys Limited',2,4500,'06-Jun-2022
11:45:00:AM');
1 row created.

insert into tbl_share values('TCS',3,250,'06-Jun-2022 11:45:00:AM');
1 row created.

insert into tbl_share values('Web Werks',4,90,'23-Dec-2021 1:00:00:AM');
1 row created.
```

insert into tbl_share values('Wipro',5,290,'28-Feb-2013 3:00:00:PM');
1 row created.

insert into tbl_share values('SAP',3,50,'12-May-2018 11:45:00:AM');
1 row created.

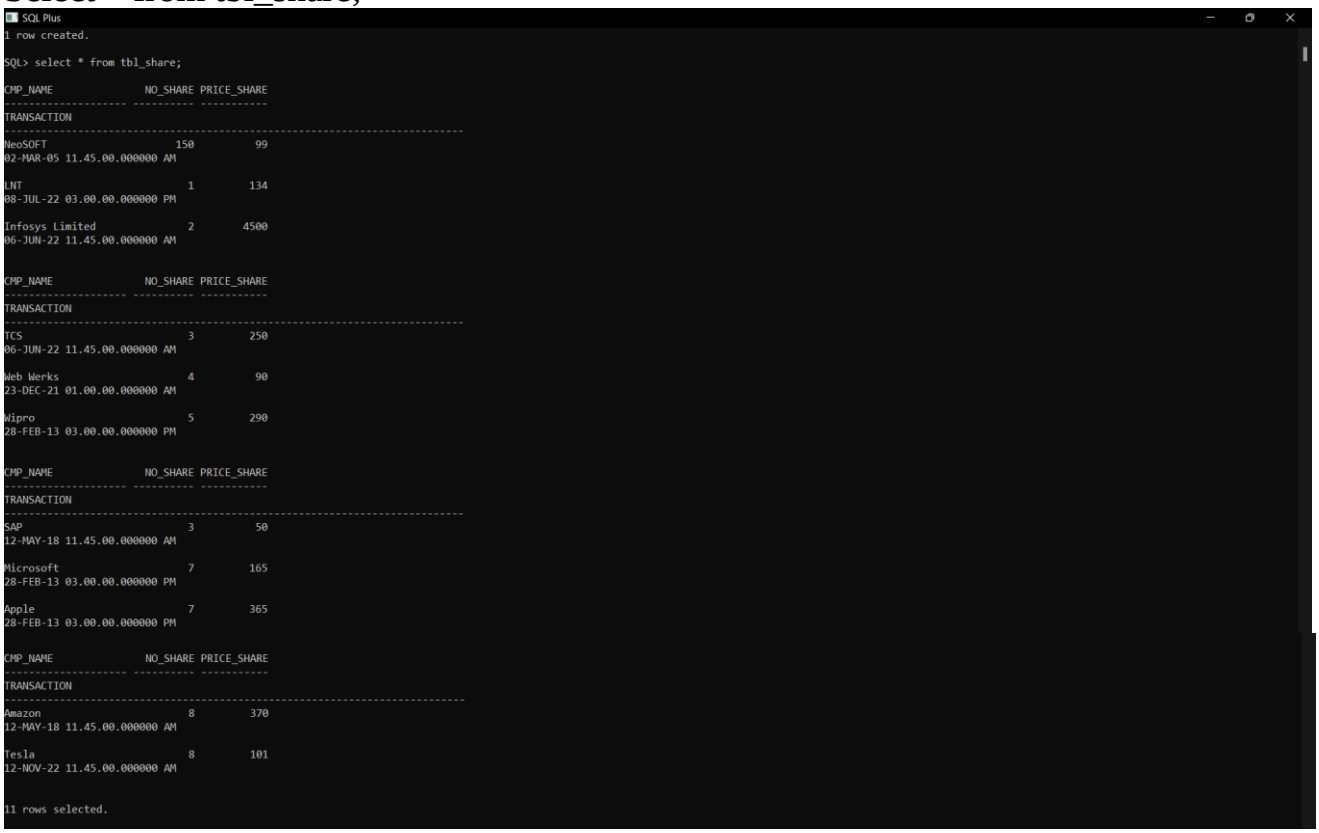
insert into tbl_share values('Microsoft',7,165,'28-Feb-2013 3:00:00:PM');
1 row created.

insert into tbl_share values('Apple',7,365,'28-Feb-2013 3:00:00:PM');
1 row created.

insert into tbl_share values('Amazon',8,370,'12-May-2018 11:45:00:AM');
1 row created.

insert into tbl_share values('Tesla',8,101,'12-Nov-2022 11:45:00:AM');
1 row created.

DISPLAY THE TABLE:
Select * from tbl_share;



a) Find all the names of company whose share is more than Rs.100 at 11:45:00 AM.

select cmp_name,price_share,transaction from tbl_share where price_share>100
2 and to_char(transaction,'HH:MI:SS:PM')='11:45:00:AM';

```
SQL> select cmp_name,price_share,transaction from tbl_share where price_share>100
  2  and to_char(transaction,'HH:MI:SS:PM')='11:45:00:AM';

CMP_NAME            PRICE_SHARE
------------------- -----------
TRANSACTION
---------------------------------------------------------------------------
Infosys Limited            4500
06-JUN-22 11.45.00.000000 AM

TCS                         250
06-JUN-22 11.45.00.000000 AM

Amazon                      370
12-MAY-18 11.45.00.000000 AM


CMP_NAME            PRICE_SHARE
------------------- -----------
TRANSACTION
---------------------------------------------------------------------------
Tesla                       101
12-NOV-22 11.45.00.000000 AM
```

b) Find the name of the company which has the highest share price at 11:45:00 AM.

select cmp_name, price_share from tbl_share where price_share=(select max(price_share) from tbl_share where to_char(transaction,'HH:MI:SS:PM')='11:45:00:AM');

```
SQL> select cmp_name, price_share from tbl_share where price_share=(select max(price_share) from tbl_share where to_char(transaction,'HH:MI:SS:PM')='11:45:00:AM');

CMP_NAME            PRICE_SHARE
------------------- -----------
Infosys Limited            4500
```

c) Find all the names of company whose share is more than Rs.200 at 03:00:00 PM.

select cmp_name,price_share,transaction from tbl_share where price_share>200
2 and to_char(transaction,'HH:MI:SS:PM')='03:00:00:PM';

```
SQL> select cmp_name,price_share,transaction from tbl_share where price_share>200
  2  and to_char(transaction,'HH:MI:SS:PM')='03:00:00:PM';

CMP_NAME            PRICE_SHARE
------------------- -----------
TRANSACTION
---------------------------------------------------------------------------
Wipro                       290
28-FEB-13 03.00.00.000000 PM

Apple                       365
28-FEB-13 03.00.00.000000 PM
```