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Practical 3

AIM: XML Database

What is XML Database?

- XML Database is used to store huge amount of information in the XML format.
- As the use of XML is increasing in every field, it is required to have a secured place to store the XML documents.
- The data stored in the database can be queried using XQuery, serialized, and exported into a desired format.

XML Database Types:

There are two major types of XML databases:

- XML-enabled
- Native XML (NXD)

XML - Enabled Database:

- XML enabled database is nothing but the extension provided for the conversion of XML document.
- This is a relational database, where data is stored in tables consisting of rows and columns.
- The tables contain set of records, which in turn consist of fields.

Native XML Database:

- Native XML database is based on the container rather than table format.
- It can store large amount of XML document and data.
- Native XML database is queried by the XPath-expressions.
- Native XML database has an advantage over the XML-enabled database.
- It is highly capable to store, query and maintain the XML document than XML-enabled database.

PART A:

Aim: Create a table employee having dept_id as number datatype and employee_spec as XML datatype (XML_Type). The employee_spec is a schema with attributes emp_id, name, email, acc_no, managerEmail, dataOfJoning. Insert 10 tuples into employee table.

Fire the following queries on XML database.

Queries:

1. Retrieve the names of employee with single slash.
2. Retrieve the names of employee with double slash.
3. Retrieve the acc_no of employees.
4. Retrieve the names, acc_no, email of employees.
5. Update the 3rd from the table and display the name of an employee.
6. Delete 4th record from the table.

Step 1: Create Table:

SQL> create table xmlemp(deptid number(5), emp_spec XMLType);

```
SQL> spool 'D:\SADIQ\MSc\SEM 1\ADT\PRAC\3.txt'
SQL>
SQL> create table xmlemp(deptid number(5), emp_spec XMLType);

Table created.
```

Step 2: Insert Values:

SQL> insert into xmlemp values(001,XMLTYPE('<Emp Id="1">
  2 <Name> Sadiq </Name>
  3 <Email> sadiq@gmail.com </Email>
  4 <Acc_no>1234</Acc_no>
  5 <MngrEmail>Brim@gmail.com</MngrEmail>
  6 <DOJ>15-Dec-2021</DOJ>
  7 </Emp>'));

1 row created.

SQL> insert into xmlemp values (002,XMLTYPE('<Emp Id="2">
  2 <Name> Reyna </Name>
  3 <Email> reyna@gmail.com </Email>
  4 <Acc_no>5678</Acc_no>

```
  5  <MngrEmail>Brim@gmail.com</MngrEmail>
  6  <DOJ>15-Nov-2017</DOJ>
  7  </Emp>'));

1 row created.
SQL> insert into xmlemp values (003,XMLTYPE('<Emp Id="3">
  2  <Name> KillJoy </Name>
  3  <Email> kj@gmail.com </Email>
  4  <Acc_no>9123</Acc_no>
  5  <MngrEmail>Brim@gmail.com</MngrEmail>
  6  <DOJ>24-Jun-2019</DOJ>
  7  </Emp>'));

1 row created.
SQL> insert into xmlemp values (004,XMLTYPE('<Emp Id="4">
  2  <Name> Viper </Name>
  3  <Email> viper@gmail.com </Email>
  4  <Acc_no>4567</Acc_no>
  5  <MngrEmail>Brim@gmail.com</MngrEmail>
  6  <DOJ>14-Mar-2018</DOJ>
  7  </Emp>'));

1 row created.
SQL> insert into xmlemp values(005,XMLTYPE('<Emp Id="5">
  2  <Name> Cypher </Name>
  3  <Email> cypher@gmail.com </Email>
  4  <Acc_no>8912</Acc_no>
  5  <MngrEmail>Brim@gmail.com</MngrEmail>
  6  <DOJ>24-Aug-2020</DOJ>
  7  </Emp>'));
```

1 row created.

Step 3: Display Table:

SQL> select * from xmlemp;

```
SQL Plus
1 row created.

SQL> select * from xmlemp;

    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
         1
<Emp Id="1">
  <Name> Sadiq </Name>
  <Email> sadiq@gmail.com </Email>
  <Acc_no

         2
<Emp Id="2">
  <Name> Reyna </Name>

    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
  <Email> reyna@gmail.com </Email>
  <Acc_no

         3
<Emp Id="3">
  <Name> KillJoy </Name>
  <Email> kj@gmail.com </Email>
  <Acc_no>


    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
         4
<Emp Id="4">
  <Name> Viper </Name>
  <Email> viper@gmail.com </Email>
  <Acc_no

         5
<Emp Id="5">
  <Name> Cypher </Name>

    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
  <Email> cypher@gmail.com </Email>
  <Acc_
```

Step 4: Fire queries:

1. Retrieve the names of employee with single slash.

SQL> select e.emp_spec.extract('Emp/Name/text()') "Employee Name" from xmlemp e;

```
SQL Plus
SQL> select e.emp_spec.extract('Emp/Name/text()') "Employee Name" from xmlemp e;

Employee Name
--------------------------------------------------------------------------------
 Sadiq
 Reyna
 KillJoy
 Viper
 Cypher
```

2. Retrieve the names of employee with double slash.

SQL> select e.emp_spec.extract('//Name/text()') "Employee Name" from xmlemp e;

```
SQL> select e.emp_spec.extract('//Name/text()') "Employee Name" from xmlemp e;

Employee Name
--------------------------------------------------------------------------------
 Sadiq
 Reyna
 KillJoy
 Viper
 Cypher
```

3. Retrieve the acc_no of employees.

SQL> select e.emp_spec.extract('//Acc_no/text()') "Account Number" from xmlemp e;

```
SQL> select e.emp_spec.extract('//Acc_no/text()') "Account Number" from xmlemp e;

Account Number
--------------------------------------------------------------------------------
1234
5678
9123
4567
8912
```

4. Retrieve the names, acc_no, email of employees.

SQL> select e.emp_spec.extract('//Name/text()') "Employee Name",

  2 e.emp_spec.extract('Emp/Acc_no/text()') "Account Number",

  3 e.emp_spec.extract('Emp/Email/text()') "Email" from xmlemp e;

```
SQL Plus

SQL> select e.emp_spec.extract('//Name/text()') "Employee Name",
  2  e.emp_spec.extract('Emp/Acc_no/text()') "Account Number",
  3  e.emp_spec.extract('Emp/Email/text()') "Email" from xmlemp e;

Employee Name
--------------------------------------------------------------------------------
Account Number
--------------------------------------------------------------------------------
Email
--------------------------------------------------------------------------------
 Sadiq
1234
 sadiq@gmail.com

 Reyna
5678
 reyna@gmail.com

Employee Name
--------------------------------------------------------------------------------
Account Number
--------------------------------------------------------------------------------
Email
--------------------------------------------------------------------------------

 KillJoy
9123
 kj@gmail.com

 Viper
4567

Employee Name
--------------------------------------------------------------------------------
Account Number
--------------------------------------------------------------------------------
Email
--------------------------------------------------------------------------------
 viper@gmail.com

 Cypher
8912
 cypher@gmail.com
```

5. Update the 3rd from the table and display the name of an employee.

SQL> update xmlemp e set
  2 emp_spec=updatexml(emp_spec,'Emp/Name/text()','Sage') where
  3 e.emp_spec.extract('//Acc_no/text()').getstringval()='8912';

```
SQL Plus

SQL> update xmlemp e set
  2  emp_spec=updatexml(emp_spec,'Emp/Name/text()','Sage') where
  3  e.emp_spec.extract('//Acc_no/text()').getstringval()='8912';

1 row updated.
```

```
SQL Plus
  <Acc_no

         5
<Emp Id="5">
  <Name>Sage</Name>

    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
  <Email> cypher@gmail.com </Email>
  <Acc_no>8
```

Name have been updated to Sage where Account No. is 8912

6. Delete 4th record from the table.

SQL> delete from xmlemp e where
e.emp_spec.extract('//Acc_no/text()').getstringval()='9123';

```
SQL> delete from xmlemp e where e.emp_spec.extract('//Acc_no/text()').getstringval()='9123';

1 row deleted.

SQL> select * from xmlemp;

    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
         1
<Emp Id="1">
  <Name> Sadiq </Name>
  <Email> sadiq@gmail.com </Email>
  <Acc_no

         2
<Emp Id="2">
  <Name> Reyna </Name>

    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
  <Email> reyna@gmail.com </Email>
  <Acc_no

         4
<Emp Id="4">
  <Name> Viper </Name>
  <Email> viper@gmail.com </Email>
  <Acc_no


    DEPTID
----------
EMP_SPEC
--------------------------------------------------------------------------------
         5
<Emp Id="5">
  <Name>Sage</Name>
  <Email> cypher@gmail.com </Email>
  <Acc_no>8
```

Record have been deleted where Account No. was 9123

PART B:

Aim: Create a table candidate having cand_id as varchar2 datatype and biodata as XML datatype (XML type). The biodata is a schema with attributes:

Name, address, skill - compskill - 1) language 2) networking, expr - 1) prog 2) prjmgr, objectives.

Fire the following queries on XML database

Queries:

1. Display candidate name who is good in java and having experience more than 5 years
2. Display candidate having project manager level experience
3. Display name and skill of all candidates
4. Delete record for address = Worli
5. Update experience of a particular candidate

Step 1: Create Table:

SQL> create table candidate(cand_id number,biodata xmltype);

```
SQL> spool 'D:\SADIQ\MSc\SEM 1\ADT\PRAC\3b.txt'
SQL>
SQL> create table candidate(cand_id number,biodata xmltype);

Table created.
```

Step 2: Insert Values into Table:

SQL> Insert into candidate values (01,XMLTYPE('<EMP ID="1">

```
  2  <name>Sadiq</name>
  3  <address>Bandra</address>
  4  <skill>
  5  <compskill>
  6  <lang>java</lang>
  7  <os>Window</os>
  8  </compskill>
  9  </skill>
 10  <expr>
```

```
 11  <programer>2</programer>
 12  <projmngr>1</projmngr>
 13  </expr>
 14  <objective>become successfull in life</objective>
 15  </EMP>'));

1 row created.
SQL> Insert into candidate values(02,XMLTYPE('<EMP ID="2">
  2  <name>Sova</name>
  3  <address>Andheri</address>
  4  <skill>
  5  <compskill>
  6  <lang>java</lang>
  7  <os>Window</os>
  8  </compskill>
  9  </skill>
 10  <expr>
 11  <programer>6</programer>
 12  <projmngr>5</projmngr>
 13  </expr>
 14  <objective>become successfull in life</objective>
 15  </EMP>'));

1 row created.
SQL> Insert into candidate values (03,XMLTYPE('<EMP ID="3">
  2  <name>Reyna</name>
  3  <address>CST</address>
  4  <skill>
  5  <compskill>
  6  <lang>Python</lang>
  7  <os>Window</os>
```

```
  8  </compskill>
  9  </skill>
 10  <expr>
 11  <programer>3</programer>
 12  <projmngr>4</projmngr>
 13  </expr>
 14  <objective>become successfull in life</objective>
 15  </EMP>'));

1 row created.
SQL> Insert into candidate values(04,XMLTYPE('<EMP ID="4">
  2  <name>Viper</name>
  3  <address>Marine Lines</address>
  4  <skill>
  5  <compskill>
  6  <lang>c</lang>
  7  <os>Window</os>
  8  </compskill>
  9  </skill>
 10  <expr>
 11  <programer>2</programer>
 12  <projmngr>5</projmngr>
 13  </expr>
 14  <objective>become successfull in life</objective>
 15  </EMP>'));

1 row created.
SQL> Insert into candidate values(05,XMLTYPE('<EMP ID="5">
  2  <name>Cypher</name>
  3  <address>Worli</address>
  4  <skill>
```

```
 5  <compskill>
 6  <lang>.net</lang>
 7  <os>Window</os>
 8  </compskill>
 9  </skill>
10   <expr>
11   <programer>4</programer>
12   <projmngr>6</projmngr>
13   </expr>
14   <objective>become successfull in life</objective>
15   </EMP>'));
```

1 row created.

Step 3: Display values from the table:

SQL> select * from candidate;

```
SQL Plus
1 row created.

SQL> select * from candidate;

   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------
         1
<EMP ID="1">
  <name>Sadiq</name>
  <address>Bandra</address>
  <skill>
    <com

         2
<EMP ID="2">

   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------
  <name>Sova</name>
  <address>Andheri</address>
  <skill>
    <com

         3
<EMP ID="3">
  <name>Reyna</name>
  <address>CST</address>

   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------
  <skill>
    <compsk

         4
<EMP ID="4">
  <name>Viper</name>
  <address>Marine Lines</address>
  <skill>
```

```
   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------

         5
<EMP ID="5">
  <name>Cypher</name>
  <address>Worli</address>
  <skill>
    <com
```

Step 4: Fire the Queries:

1. **Display candidate name who is good in java and having experience more than 5 years**

SQL> select c.biodata.extract('EMP/name/text()')"employee name" from candidate c

2 where c.biodata.extract('EMP/skill/compskill/lang/text()').GetStringVal()='java'

3 and (c.biodata.extract('EMP/expr/programer/text()').GetStringVal()>'5'

4 or c.biodata.extract('EMP/expr/projmngr/text()').GetStringVal()>'5');

```
SQL Plus
SQL> select c.biodata.extract('EMP/name/text()')"employee name" from candidate c
  2  where c.biodata.extract('EMP/skill/compskill/lang/text()').GetStringVal()='java'
  3  and (c.biodata.extract('EMP/expr/programer/text()').GetStringVal()>'5'
  4  or c.biodata.extract('EMP/expr/projmngr/text()').GetStringVal()>'5');

employee name
--------------------------------------------------------------------------------
Sova
```

2. **Display candidate having project manager level experience**

SQL> select c.biodata.extract('EMP/name/text()')"employee name" from candidate c

2 where c.biodata.extract('EMP/expr/projmngr/text()').GetStringVal()>'5';

```
SQL> select c.biodata.extract('EMP/name/text()')"employee name" from candidate c
  2  where c.biodata.extract('EMP/expr/projmngr/text()').GetStringVal()>'5';

employee name
--------------------------------------------------------------------------------
Cypher
```

3. Display name and skill of all candidates

SQL> select c.biodata.extract('EMP/name/text()')"employee name",

2 c.biodata.extract('EMP/skill/compskill/lang/text()')"computer skill",c.biodata.extract('EMP/skill/compskill/os/text()')"Os" from candidate c;

```
SQL> select c.biodata.extract('EMP/name/text()')"employee name",
  2  c.biodata.extract('EMP/skill/compskill/lang/text()')"computer skill",c.biodata.extract('EMP/skill/compskill/os/text()')"Os"
  3  from candidate c;

employee name
--------------------------------------------------------------------------------
computer skill
--------------------------------------------------------------------------------
Os
--------------------------------------------------------------------------------
Sadiq
java
Window

Sova
java
Window

employee name
--------------------------------------------------------------------------------
computer skill
--------------------------------------------------------------------------------
Os
--------------------------------------------------------------------------------

Reyna
Python
Window

Viper
c

employee name
--------------------------------------------------------------------------------
computer skill
--------------------------------------------------------------------------------
Os
--------------------------------------------------------------------------------
Window

Cypher
.net
Window

Sova

employee name
--------------------------------------------------------------------------------
computer skill
--------------------------------------------------------------------------------
Os
--------------------------------------------------------------------------------
java
Window
```

4. Delete record for address = Worli

SQL> delete from candidate c where c.biodata.extract('EMP/address/text()').getStringVal()='Worli';

```
SQL Plus


SQL> delete from candidate c where c.biodata.extract('EMP/address/text()').getStringVal()='Worli';

1 row deleted.
```

The candidate with address ‘Worli’ have been deleted.

Enter ‘select * from candidate’ it won’t show the data of candidate with address Worli

```
SQL> select * from candidate;

   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------
         1
<EMP ID="1">
  <name>Sadiq</name>
  <address>Bandra</address>
  <skill>
    <com

         2
<EMP ID="2">

   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------
  <name>Sova</name>
  <address>Andheri</address>
  <skill>
    <com

         3
<EMP ID="3">
  <name>Reyna</name>
  <address>CST</address>

   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------
  <skill>
    <compsk

         4
<EMP ID="4">
  <name>Viper</name>
  <address>Marine Lines</address>
  <skill>


   CAND_ID
----------
BIODATA
--------------------------------------------------------------------------------
```

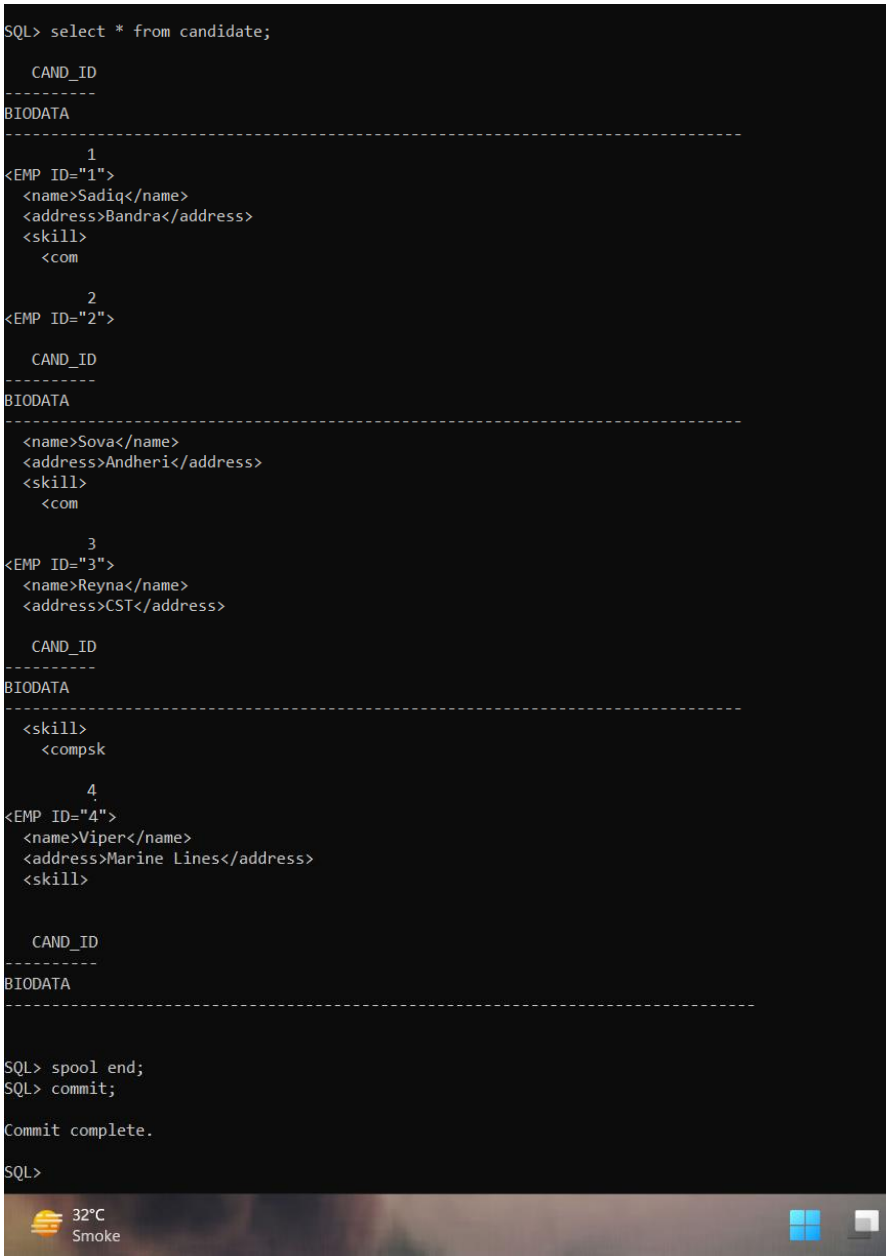
5. Update experience of a particular candidate

SQL> update candidate c set biodata =

2 UPDATEXML(biodata,'/Emp/ID/text()','4') where c.biodata.extract('Emp/expr/programer/text()').GetStringVal()='3';

```
SQL> update candidate c set biodata =
  2  UPDATEXML(biodata,'/Emp/ID/text()','4') where c.biodata.extract('Emp/expr/programer/text()').GetStringVal()='3';
```

The candidate experience have been updated.


SQL> select * from candidate;
CAND_ID
BIODATA
1
<EMP ID="1">
<name>Sadiq</name>
<address>Bandra</address>
<skill>
<com
2
<EMP ID="2">
CAND_ID
BIODATA
<name>Sova</name>
<address>Andheri</address>
<skill>
<com
3
<EMP ID="3">
<name>Reyna</name>
<address>CST</address>
CAND_ID
BIODATA
<skill>
<compsk
4
<EMP ID="4">
<name>Viper</name>
<address>Marine Lines</address>
<skill>
CAND_ID
BIODATA
SQL> spool end;
SQL> commit;
Commit complete.
SQL>
32°C
Smoke