

Practical 1

AIM: Object Oriented Database Management System

Part A:

Create the following types using OODBMS:

PersonType (Per_id, Per_name, DOB)

DOB is the date of birth of a person. Include a method to find the age of a person.

BankType (account_no, per_id, balance)

Create the appropriate tables. Insert 5 tuples and fire the following queries:

- (i) Find name and age of a person
- ii) Find all names with account number.
- iii) Find the names with balance more than 12,000

CREATE TYPE:

create or replace type persontype as object(personid number(3),person_name varchar2(20),dob date,member function age return number);

2 /

Type created.

```
Enter user-name: system
Enter password:
Last Successful login time: Mon Nov 21 2022 22:31:27 +05:30

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

SQL> spool 'D:\SADIQ\MSc\SEM 1\ADT\PRAC\prac1.txt';
SQL> create or replace type persontype as object(personid number(3),person_name varchar2(20),dob date,member function age return number);
2 /

Type created.
```

CREATE TRIGGER:

create or replace type body persontype as member function age return number

2 as

3 begin

4 return (round ((sysdate-dob)/365));

5 end age;

6 end;

7 /

Type body created.

```
SQL> create or replace type body persontype as member function age return number
  2  as
  3  begin
  4  return (round ((sysdate-dob)/365));
  5  end age;
  6  end;
  7  /

Type body created.
```

CREATE TYPE:

create or replace type banktype as object (account_no number(20),person ref persontype,balance number(20,2));

2 /

Type created.

```
SQL> create or replace type banktype as object (account_no number(20),person ref persontype,balance number(20,2));
  2  /

Type created.
```

CREATE TABLE:

create table person of persontype;

Table created.

```
SQL> create table person of persontype;

Table created.
```

INSERT VALUES:

insert into person values(persontype(1,'sadiq','29-DEC-2000'));

1 row created.

insert into person values(persontype(2,'reyna','8-FEB-1996'));

1 row created.

insert into person values(persontype(3,'viper','17-APR-2000'));

1 row created.

insert into person values(persontype(4,'sage','21-JUL-1998'));

1 row created.

```
insert into person values(persontype(5,'killjoy','2-OCT-1997'));
```

1 row created.

DISPLAY TABLE:

```
select * from person;
```

```
SQL> select * from person;
```

PERSONID	PERSON_NAME	DOB
1	sadiq	29-DEC-00
2	reyna	08-FEB-96
3	viper	17-APR-00
4	sage	21-JUL-98
5	killjoy	02-OCT-97

(i) Find name and age of a person:

```
select p.*,p.age() "Age" from person p;
```

```
select p.person_name,p.age() "Age" from person p;
```

```
SQL> select p.*,p.age() "Age" from person p;
```

PERSONID	PERSON_NAME	DOB	Age
1	sadiq	29-DEC-00	22
2	reyna	08-FEB-96	27
3	viper	17-APR-00	23
4	sage	21-JUL-98	24
5	killjoy	02-OCT-97	25

```
SQL> select p.person_name,p.age() "Age" from person p;
```

PERSON_NAME	Age
sadiq	22
reyna	27
viper	23
sage	24
killjoy	25

CREATE TABLE:

create table banktable of banktype;
Table created.

```
SQL> create table banktable of banktype;  
Table created.
```

INSERT VALUES:

insert into banktable select 101,ref(p),24000 from person p where
p.person_name='sadiq';
1 row created.

insert into banktable select 102,ref(p),40000 from person p where
p.person_name='reyna';
1 row created.

insert into banktable select 103,ref(p),11000 from person p where
p.person_name='viper';
1 row created.

insert into banktable select 104,ref(p),13000 from person p where
p.person_name='sage';
1 row created.

insert into banktable select 105,ref(p),11500 from person p where
p.person_name='killjoy';
1 row created.

DISPLAY VALUES:

select deref(person) from banktable;

```
SQL> select deref(person) from banktable;  
  
DEREF(PERSON)(PERSONID, PERSON_NAME, DOB)  
-----  
PERSONTYPE(1, 'sadiq', '29-DEC-00')  
PERSONTYPE(2, 'reyna', '08-FEB-96')  
PERSONTYPE(3, 'viper', '17-APR-00')  
PERSONTYPE(4, 'sage', '21-JUL-98')  
PERSONTYPE(5, 'killjoy', '02-OCT-97')
```

select account_no,deref(person), balance from banktable;

```
SQL Plus

SQL> select account_no,deref(person), balance from banktable;

ACCOUNT_NO
-----
DEREF(PERSON)(PERSONID, PERSON_NAME, DOB)
-----
BALANCE
-----
101
PERSONTYPE(1, 'sadiq', '29-DEC-00')
24000

102
PERSONTYPE(2, 'reyna', '08-FEB-96')
40000

ACCOUNT_NO
-----
DEREF(PERSON)(PERSONID, PERSON_NAME, DOB)
-----
BALANCE
-----
103
PERSONTYPE(3, 'viper', '17-APR-00')
11000

104
PERSONTYPE(4, 'sage', '21-JUL-98')

ACCOUNT_NO
-----
DEREF(PERSON)(PERSONID, PERSON_NAME, DOB)
-----
BALANCE
-----
13000

105
PERSONTYPE(5, 'killjoy', '02-OCT-97')
11500
```

ii) Find all names with account number.

select p.person_name,b.account_no from banktable b, person p where
2 p.personid=b.person.personid;

```
SQL> select p.person_name,b.account_no from banktable b, person p where
2 p.personid=b.person.personid;

PERSON_NAME      ACCOUNT_NO
-----
sadiq             101
reyna             102
viper             103
sage              104
killjoy           105
```

iii) Find the names with balance more than 12,000

select p.person_name, b.balance from banktable b , person p where
p.personid=b.person.personid and b.balance>12000;

```
SQL> select p.person_name, b.balance from banktable b , person p where p.personid=b.person.personid and b.balance>12000;

PERSON_NAME      BALANCE
-----
sadiq             24000
reyna             40000
sage              13000

SQL> _
```

Part B:

Using object oriented databases, create the following types

Staff(staff id,name, dept, sal, other detail, dob,GetAge)

Depttype(dept id,name, location, emp)

Next create the following tables:

Stafftable of Staff

Depttable of Depttype nested with emp and store it in reldept

Fire following queries:

- 1.List all the staff name from the stafftable.
- 2.List the age of the all-staff name.
- 3.List the staff name, id, dept, sal, age from the stafftable.
- 4.List the staff id, dept name from the depttype table.
- 5.Count the no. of name for given dept name='manager'.
- 6.List the all record of given staff name='jigi'.
- 7.Count the dept name from table depttype

CREATE TYPE:

```
create type stafftype as object(staff_id varchar2(20),name varchar2(20),dept
varchar2(20),sal number(20),other_details varchar2(20),dob date, member
function getage return number);
```

2 /

Type created.

```
Enter user-name: system
Enter password:
Last Successful login time: Tue Nov 22 2022 12:07:40 +05:30

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

SQL> spool 'D:\SADIQ\SEM 1\ADT\PRAC\prac1.txt';
SQL> create type stafftype as object(staff_id varchar2(20),name varchar2(20),dept varchar2(20),sal number(20),other_details varchar2(20),dob date, member function getage return number);
2 /
Type created.
```

create or replace type body stafftype as member function getage return number

2 as

3 begin

4 return(round((sysdate-dob)/365));

5 end getage;

6 end;

7 /

Type body created.

```
SQL> create or replace type body stafftype as member function getage return number
2  as
3  begin
4  return(round((sysdate-dob)/365));
5  end getage;
6  end;
7  /

Type body created.
```

create type stafftabletype as table of stafftype;

2 /

Type created.

```
SQL> create type stafftabletype as table of stafftype;
2  /

Type created.
```

create type depttype as object(dept_id varchar2(20),designation

2 varchar2(20),location varchar2(20),emp stafftabletype);

3 /

Type created.

```
SQL> create type depttype as object(dept_id varchar2(20),designation
2  varchar2(20),location varchar2(20),emp stafftabletype);
3  /

Type created.
```

CREATE TABLE:

create table depttable of depttype nested table emp store as reldept;

Table created.

```
SQL> create table depttable of depttype nested table emp store as reldept;

Table created.
```

create table stafftable of stafftype;

Table created.

```
SQL> create table stafftable of stafftype;

Table created.
```

INSERT VALUES:

```
insert into stafftable values(stafftype('s01','sadiq','SDE',26000,'abc','29-DEC-2000'));
```

1 row created.

```
insert into stafftable values(stafftype('s02','jigi','Salea',22000,'def','4-FEB-1999'));
```

1 row created.

```
insert into stafftable values(stafftype('s03','sage','Manager',32000,'pqr','13-MAY-1994'));
```

1 row created.

```
insert into stafftable values(stafftype('s04','viper','Manager',34000,'xyz','22-AUG-1995'));
```

1 row created.

```
insert into stafftable values(stafftype('s05','reyna','Marketing',25000,'mno','2-OCT-1998'));
```

1 row created.

DISPLAY TABLE:

```
select * from stafftable;
```

1 row created.

```
SQL> select * from stafftable;
```

STAFF_ID	NAME	DEPT	SAL
OTHER_DETAILS		DOB	
s01 abc	sadiq 29-DEC-00	SDE	26000
s02 def	jigi 04-FEB-99	Salea	22000
s03 pqr	sage 13-MAY-94	Manager	32000
OTHER_DETAILS		DOB	
s04 xyz	viper 22-AUG-95	Manager	34000
s05 mno	reyna 02-OCT-98	Marketing	25000

INSERT VALUES:

```
insert into depttable values ('D01','developer', 'bandra',stafftabletype  
(stafftype('s01', 'sadiq', 'SDE', 26000,'abc ', '29-DEC-2000')));
```

1 row created.

```
insert into depttable values ('D02','manager', 'andheri',stafftabletype (stafftype  
('s02','jigi', 'Salea',22000,'def','4-FEB-1999')));
```

1 row created.

```
insert into depttable values ('D03','manager', 'mahim',stafftabletype  
(stafftype('s03','sage', 'Manager',32000,'pqr','13-MAY-1994')));
```

1 row created.

```
insert into depttable values ('D04','HR', 'churchgate',stafftabletype  
(stafftype('s04','viper', 'Manager',34000,'xyz','22-AUG-1995')));
```

1 row created.

```
insert into depttable values ('D05','Security', 'Santa  
Cruz',stafftabletype(stafftype('s05','reyna', 'Marketing',25000,'mno','2-OCT-  
1998')));
```

1 row created.

DISPLAY TABLE:

```
select * from depttable;
```

```
SQL> select * from depttable;

DEPT_ID      DESIGNATION      LOCATION
-----
EMP(STAFF_ID, NAME, DEPT, SAL, OTHER_DETAILS, DOB)
-----
D01          developer        bandra
STAFFTABLETYPE(STAFFTYPE('s01', 'sadiq', 'SDE', 26000, 'abc ', '29-DEC-00'))

D02          manager         andheri
STAFFTABLETYPE(STAFFTYPE('s02', 'jigi', 'Salea', 22000, 'def', '04-FEB-99'))

D03          manager         mahim
STAFFTABLETYPE(STAFFTYPE('s03', 'sage', 'Manager', 32000, 'pqr', '13-MAY-94'))

DEPT_ID      DESIGNATION      LOCATION
-----
EMP(STAFF_ID, NAME, DEPT, SAL, OTHER_DETAILS, DOB)
-----
D04          HR              churchgate
STAFFTABLETYPE(STAFFTYPE('s04', 'viper', 'Manager', 34000, 'xyz', '22-AUG-95'))

D05          Security        Santa Cruz
STAFFTABLETYPE(STAFFTYPE('s05', 'reyna', 'Marketing', 25000, 'mno', '02-OCT-98')
)
```

1.List all the staff name from the stafftable.

```
select name from stafftable;
```

```
SQL> select name from stafftable;

NAME
-----
sadiq
jigi
sage
viper
reyna
```

2.List the age of the all-staff name.

```
select s.getage() "Age" from stafftable s;
```

```
SQL> select s.getage() "Age" from stafftable s;

      Age
-----
      22
      24
      29
      27
      24
```

3.List the staff name, id, dept, sal, age from the stafftable.

```
select s.name,s.staff_id,s.dept,s.getage() "Age" from stafftable s;
```

```
SQL> select s.name,s.staff_id,s.dept,s.getage() "Age" from stafftable s;

NAME           STAFF_ID      DEPT           Age
-----
sadiq          s01           SDE            22
jigi           s02           Salea          24
sage           s03           Manager        29
viper          s04           Manager        27
reyna          s05           Marketing      24
```

4.List the staff id, dept name from the depttype table.

```
select e.staff_id,d.designation from depttable d,table(d.emp) e;
```

```
SQL> select e.staff_id,d.designation from depttable d,table(d.emp) e;

STAFF_ID      DESIGNATION
-----
s01           developer
s02           manager
s03           manager
s04           HR
s05           Security
```

5.Count the no. of name for given dept name='manager'.

```
select count(designation) from depttable where designation='manager';
```

```
SQL> select count(designation) from depttable where designation='manager';

COUNT(DESIGNATION)
-----
2
```

6.List the all record of given staff name='jigi'.

```
select * from depttable,table(emp) e where e.name='jigi';
```

```
SQL> select * from depttable,table(emp) e where e.name='jigi';

DEPT_ID          DESIGNATION      LOCATION
-----
EMP(STAFF_ID, NAME, DEPT, SAL, OTHER_DETAILS, DOB)
-----
STAFF_ID         NAME             DEPT              SAL
-----
OTHER_DETAILS    DOB
-----
D02              manager          andheri
STAFFTABLETYPE(STAFFTYPE('s02', 'jigi', 'Salea', 22000, 'def', '04-FEB-99'))
s02              jigi             Salea              22000
def              04-FEB-99
```

7.Count the dept name from table depttype.

```
select count(designation) from depttable;
```

```
SQL> select count(designation) from depttable;

COUNT(DESIGNATION)
-----
5

SQL> spool off;
SQL> select * from depttable;
```

Part C:

Using object oriented databases, create the following types:

addrtype(pincode, street, city, state)

branchtype(address, phone1, phone2)

authortype(name, addr)

publishertype(name, addr, branches)

authorlisttype as varray, which is reference to authortype

Next create the following tables:

branchtabletype of branchtype

authors of authortype

books(title, year, publisher by ref publishertype, authors)

publishers of publisher type

Fire following queries:

List all of the authors that have the same pin code as their publisher.

List all books that have 2 or more authors.

List all authors who have published more than one book.

Name the title of the book that has the most authors.

CREATE TYPE:

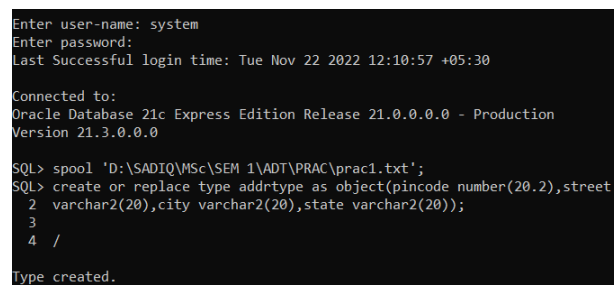
create or replace type addrtype as object(pincode number(20,2),street

2 varchar2(20),city varchar2(20),state varchar2(20));

3

4 /

Type created.



```
Enter user-name: system
Enter password:
Last Successful login time: Tue Nov 22 2022 12:10:57 +05:30

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

SQL> spool 'D:\SADIQ\MSc\SEM 1\ADT\PRAC\prac1.txt';
SQL> create or replace type addrtype as object(pincode number(20,2),street
2  varchar2(20),city varchar2(20),state varchar2(20));
3
4  /

Type created.
```

create or replace type branchtype as object(address addrtype,ph1

2 number(20),ph2 number(20));

3 /

Type created.

```
SQL> create or replace type branchtype as object(address addrtype,ph1
  2  number(20),ph2 number(20));
  3  /

Type created.
```

```
create or replace type authortype as object(name varchar2(20),address
2  addrtype);
3  /

Type created.
```

```
SQL> create or replace type authortype as object(name varchar2(20),address
  2  addrtype);
  3  /

Type created.
```

```
create or replace type branchtabletype as table of branchtype;
2  /

Type created.
```

```
SQL> create or replace type branchtabletype as table of branchtype;
  2  /

Type created.
```

```
create or replace type publishertype as object(name varchar2(20),address
2  addrtype, branches branchtabletype);
3  /

Type created.
```

```
SQL> create or replace type publishertype as object(name varchar2(20),address
  2  addrtype, branches branchtabletype);
  3  /

Type created.
```

```
create or replace type authorlisttype as array(10) of ref authortype;
2  /

Type created.
```

```
SQL> create or replace type authorlisttype as array(10) of ref authortype;
  2  /

Type created.
```

CREATE TABLES:

create table authors1 of authortype;

Table created.

```
SQL> create table authors1 of authortype;  
Table created.
```

create table books(title varchar2(20),year date,published_by ref

2 publishertype,authors authorlisttype);

Table created.

```
SQL> create table books(title varchar2(20),year date,published_by ref  
2 publishertype,authors authorlisttype);  
Table created.
```

create table publisher of publishertype nested table branches store as

2 branchtable1;

Table created.

```
SQL> create table publisher of publishertype nested table branches store as  
2 branchtable1;  
Table created.
```

INSERT VALUES:

insert into authors1 values('Sadiq',addrtype(400078,'Navpada','bandra','Mh'));

1 row created.

SQL> insert into authors1

values('GRRM',addrtype(400070,'Government','Mahim','Mh'));

1 row created.

SQL> insert into authors1 values('J.K.

Rowling',addrtype(400070,'Marol','Andheri','Mh'));

1 row created.

SQL> insert into authors1

values('Ronnie',addrtype(400088,'Bandstand','Bandra','Mh'));

1 row created.

```
SQL> insert into authors1 values('Robin',addrtype(400060,'Linking  
Road','Khar','Mh'));
```

1 row created.

```
SQL> insert into authors1 values('Paulo',addrtype(400050,'SV Road','Santa  
Cruz','Mh'));
```

1 row created.

```
SQL> insert into authors1 values('Gillian',addrtype(400020,'Carters  
Road','Matunga','Mh'));
```

1 row created.

```
SQL> insert into authors1  
values('Harper',addrtype(400020,'Lokhandwala','Andheri','Mh'));
```

1 row created.

```
SQL> insert into authors1 values('Ben',addrtype(400010,'Hill  
Road','Dadar','Mh'));
```

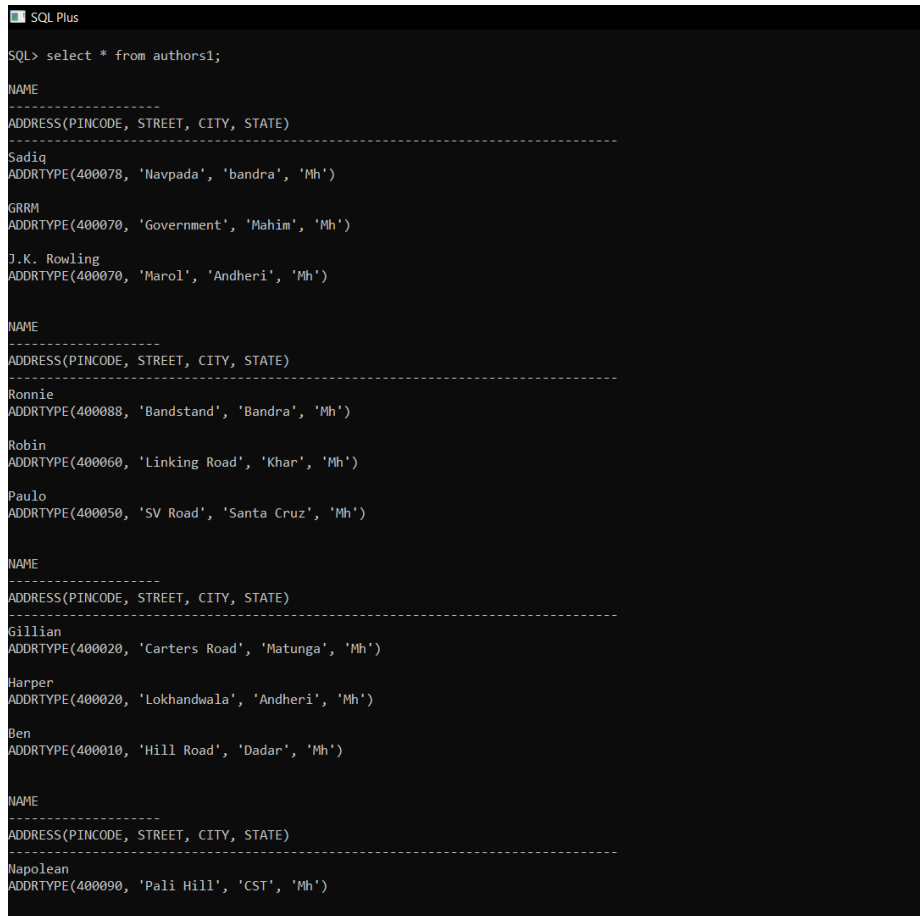
1 row created.

```
SQL> insert into authors1 values('Napolean',addrtype(400090,'Pali  
Hill','CST','Mh'));
```

1 row created.

DISPLAY TABLE:

select * from authors1;



```
SQL> select * from authors1;

NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
Sadiq
ADDRTYPE(400078, 'Navpada', 'bandra', 'Mh')

GRRM
ADDRTYPE(400070, 'Government', 'Mahim', 'Mh')

J.K. Rowling
ADDRTYPE(400070, 'Marol', 'Andheri', 'Mh')

NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
Ronnie
ADDRTYPE(400088, 'Bandstand', 'Bandra', 'Mh')

Robin
ADDRTYPE(400060, 'Linking Road', 'Khar', 'Mh')

Paulo
ADDRTYPE(400050, 'SV Road', 'Santa Cruz', 'Mh')

NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
Gillian
ADDRTYPE(400020, 'Carters Road', 'Matunga', 'Mh')

Harper
ADDRTYPE(400020, 'Lokhandwala', 'Andheri', 'Mh')

Ben
ADDRTYPE(400010, 'Hill Road', 'Dadar', 'Mh')

NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
Napoleon
ADDRTYPE(400090, 'Pali Hill', 'CST', 'Mh')
```

INSERT VALUES:

SQL> insert into publisher values ('Tata',addrtype(400078,'lbs marg','bhandup','Mh'),branchtabletype (branchtype (addrtype(400070,'lbs marg','sion','Mh'),11111111,22222222))));

1 row created.

SQL> insert into publisher values ('Tata',addrtype(400078,'lbs marg','bhandup','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs marg1','sion1','Mh'),11111111,22222222))));

1 row created.

SQL> insert into publisher values ('Vipul',addrtype(400078,'lbs marg','kurla','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs marg1','kurla1','Mh'),11111111,22222222))));

1 row created.


```
SQL> insert into publisher values ('Tata mac',addrtype(400075,'lbs  
marg','mulund','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs  
marg1','mulund1','Mh'),11111111,22222222))));
```

1 row created.

```
SQL> insert into publisher values ('wiely',addrtype(400075,'lbs  
marg','cst','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs  
marg1','cst1','Mh'),11111111,22222222))));
```

1 row created.

```
SQL> insert into publisher values ('wiely',addrtype(400075,'lbs  
marg','dadar','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs  
marg1','dadar1','Mh'),11111111,22222222))));
```

1 row created.

```
SQL> insert into publisher values ('navnit',addrtype(400075,'lbs  
marg','wadala','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs  
marg1','wadala1','Mh'),11111111,22222222))));
```

1 row created.

```
SQL> insert into publisher values ('navneet',addrtype(400075,'lbs  
marg','parel','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs  
marg1','parel1','Mh'),11111111,22222222))));
```

1 row created.

```
SQL> insert into publisher values ('Tata mac',addrtype(400075,'lbs  
marg','parel','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs  
marg1','parel1','Mh'),11111111,22222222))));
```

1 row created.

```
SQL> insert into publisher values ('Tata ',addrtype(400075,'lbs  
marg','parel','Mh'),branchtabletype(branchtype (addrtype(400070,'lbs  
marg1','parel1','Mh'),11111111,22222222))));
```

1 row created.

DISPLAY TABLE:

```
select * from publisher;
```

```

SQL Plus

SQL> select * from publisher;

NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
Tata
ADDRTYPE(400078, 'lbs marg', 'bhandup', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg', 'sion', 'Mh'), 11111111,
22222222))
Tata
ADDRTYPE(400078, 'lbs marg', 'bhandup', 'Mh')
NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'sion1', 'Mh'), 111111
1, 22222222))
Vipul
ADDRTYPE(400078, 'lbs marg', 'kur1a', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'kur1a1', 'Mh'), 111111
11, 22222222))
NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
Tata mac
ADDRTYPE(400075, 'lbs marg', 'mulund', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'mulund1', 'Mh'), 11111
111, 22222222))
wiely
NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
ADDRTYPE(400075, 'lbs marg', 'cst', 'Mh')

SQL Plus

BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
ADDRTYPE(400075, 'lbs marg', 'cst', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'cst1', 'Mh'), 11111111
, 22222222))
wiely
ADDRTYPE(400075, 'lbs marg', 'dadar', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'dadar1', 'Mh'), 111111
NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
11, 22222222))
navnit
ADDRTYPE(400075, 'lbs marg', 'wadala', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'wadala1', 'Mh'), 11111
111, 22222222))
NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
navneet
ADDRTYPE(400075, 'lbs marg', 'pare1', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'pare11', 'Mh'), 111111
11, 22222222))
Tata mac
ADDRTYPE(400075, 'lbs marg', 'pare1', 'Mh')
NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'pare11', 'Mh'), 111111
11, 22222222))
Tata
ADDRTYPE(400075, 'lbs marg', 'pare1', 'Mh')
BRANCHTABLETYPE(BRANCHTYPE(ADDRTYPE(400070, 'lbs marg1', 'pare11', 'Mh'), 111111
11, 22222222))

NAME
-----
ADDRESS(PINCODE, STREET, CITY, STATE)
-----
BRANCHES(ADDRESS(PINCODE, STREET, CITY, STATE), PH1, PH2)
-----

10 rows selected.

```

INSERT VALUES:

SQL> insert into books select 'Gone Girl','2-jan-2022',ref (p) ,
authorlisttype(ref(a)) from publisher p , authors1 a where p.name='navneet' and
a.name='Gillian';

1 row created.

SQL> insert into books select 'The Alchemist','2-jan-1989',ref (p) ,
authorlisttype(ref(a)) from publisher p , authors1 a where p.name='Tata' and
a.name='Paulo';

2 rows created.

SQL> insert into books select 'The winds of winter','22-nov-2022',ref (p) ,
authorlisttype(ref(a)) from publisher p , authors1 a where p.name='Tata mac'
and a.name='Sadiq';

2 rows created.

DISPLAY TABLE:

```

SQL Plus

SQL> select * from books;

TITLE                                YEAR
-----
PUBLISHED_BY
-----
AUTHORS
-----
Gone Girl                            02-JAN-22
00002202080A9AE84B6A7AE47E4BB4C9CED05AB1F8EDC2346BE79EA43849D212F474575DDEF
AUTHORLISTTYPE(0000280209EE1EF96AA0FA47C3B82E47221D0E009519AB2531572E41648141416
63870B8630042A0010006)

The Alchemist                        02-JAN-89
00002202080C2F577EF46984E5C8533A81FE6807260DC2346BE79EA43849D212F474575DDEF

TITLE                                YEAR
-----
PUBLISHED_BY
-----
AUTHORS
-----
AUTHORLISTTYPE(0000280209C8B458A9C24142EFB377EFBCFF3DDB2119AB2531572E41648141416
63870B8630042A0010005)

The Alchemist                        02-JAN-89
000022020803306524084F24FAA9C7CC8AF87D9E28ADC2346BE79EA43849D212F474575DDEF
AUTHORLISTTYPE(0000280209C8B458A9C24142EFB377EFBCFF3DDB2119AB2531572E41648141416
63870B8630042A0010005)

TITLE                                YEAR
-----
PUBLISHED_BY
-----
AUTHORS
-----

The winds of winter  22-NOV-22
00002202080EFA4853EBB0340219090DB7C49760CC8DC2346BE79EA43849D212F474575DDEF
AUTHORLISTTYPE(00002802097EF9D64969644392AF7E48C8B5461FEB19AB2531572E41648141416
63870B8630042A0010000)

The winds of winter  22-NOV-22

TITLE                                YEAR
-----
PUBLISHED_BY
-----
AUTHORS
-----
00002202080A2A105C9DFFF4E35AB8184D9D3346C80DC2346BE79EA43849D212F474575DDEF
AUTHORLISTTYPE(00002802097EF9D64969644392AF7E48C8B5461FEB19AB2531572E41648141416
63870B8630042A0010000)

```

a) List all of the authors that have the same pin code as their publisher.

select a.name from authors1 a, publisher p where a.address.pincode =
p.address.pincode;

```
SQL> select a.name from authors1 a, publisher p where a.address.pincode=p.address.pincode;

NAME
-----
Sadiq
Sadiq
Sadiq
```

b) List all books that have 2 or more authors.

select b.title from authors1 a,books b , table(b.authors)v where
v.column_value=REF(a) group by b.title having count(*)>1;

```
SQL> select b.title from authors1 a,books b , table(b.authors)v where v.column_value=REF(a) group by b.title having count(*)>1;

TITLE
-----
The Alchemist
The winds of winter
```

c) List the name of the publisher that has the most branches.

select p.name from publisher p , table(p.branches) group by p.name having
count(*)>=all (select count(*) from publisher p , table(p.branches) group by
name);

```
SQL> select p.name from publisher p , table(p.branches) group by p.name having count(*)>=all (select count(*) from publisher p , table(p.branches) group by name);

NAME
-----
Tata
Tata mac
wily
```

d) Name the title of the book that has the most authors.

select b.title from books b , table(b.authors) group by b.title having
count(*)>=(select max(count(*)) from books b , table(b.authors) group by title
);

```
SQL> select b.title from books b , table(b.authors) group by b.title having count(*)>=(select max(count(*)) from books b , table(b.authors) group by title );

TITLE
-----
The Alchemist
The winds of winter
```

e) List all authors who have published more than one book.

select a.name from authors1 a,books b , table(b.authors)v where
v.column_value=REF(a) group by a.name having count(*)>1;

```
SQL> select a.name from authors1 a,books b , table(b.authors)v where v.column_value=REF(a) group by a.name having count(*)>1;

NAME
-----
Paulo
Sadiq

SQL> spool off;
SQL>
```