Use Object-Relational data model : Perform the following task using PL/SQL OR T/SQL

a) AddrType1 (Pincode: number, Street :char, City : char, a. state :char)

b) BranchType (address: AddrType1, phone1: integer,phone2: integer )

c) AuthorType (name:char,,addr AddrType1)

d) PublisherType (name: char, addr: AddrType1, branches: BranchTableType

e) AuthorListType as varray, which is a reference to AuthorType

Next create the following tables : BranchTableType of BranchType,authors of

AuthorType,books(title: varchar, year : date, published\_by ref PublisherType,authors

AuthorListType),Publishers of PublisherType

Insert 10 records into the above tables and fire the following queries:

1. List all authors who have published more than one book:

2. Name of authors who have published books with at least two different publishers

3. List all books (title) where the same author appears more than once on the list of

Authors

**Create the necessary types**

CREATE TYPE AddrType1 AS OBJECT (

Pincode NUMBER,

Street CHAR(50),

City CHAR(50),

State CHAR(50)

);

CREATE TYPE BranchType AS OBJECT (

Address AddrType1,

Phone1 INTEGER,

Phone2 INTEGER

);

CREATE TYPE AuthorType AS OBJECT (

Name CHAR(50),

Addr AddrType1

);

CREATE TYPE PublisherType AS OBJECT (

Name CHAR(50),

Addr AddrType1,

Branches BranchTableType

);

CREATE TYPE AuthorListType AS VARRAY(10) OF REF AuthorType;

1. Create the tables:

CREATE TABLE BranchTableType OF BranchType;

CREATE TABLE Authors OF AuthorType;

CREATE TABLE Books (

Title VARCHAR(100),

Year DATE,

Published\_By REF PublisherType,

Authors AuthorListType

);

CREATE TABLE Publishers OF PublisherType;

3.INSERT DATA

-- Insert records into Authors table

INSERT INTO Authors VALUES (

AuthorType('John Smith', AddrType1(12345, 'Main Street', 'City1', 'State1'))

);

-- Insert records into Publishers table

INSERT INTO Publishers VALUES (

PublisherType(

'Publisher1',

AddrType1(67890, 'First Avenue', 'City2', 'State2'),

BranchTableType(

BranchType(AddrType1(67890, 'Branch Street 1', 'City2', 'State2'), 123456, 234567),

BranchType(AddrType1(12345, 'Branch Street 2', 'City1', 'State1'), 345678, 456789)

)

)

);

-- Insert records into Books table

INSERT INTO Books VALUES (

'Book1',

SYSDATE,

(SELECT REF(p) FROM Publishers p WHERE p.Name = 'Publisher1'),

AuthorListType(

(SELECT REF(a) FROM Authors a WHERE a.Name = 'John Smith')

)

);

1.List all authors who have published more than one book:

SELECT a.Name

FROM Authors a

JOIN Books b ON DEREF(b.Authors(1)) = a;

2.Name of authors who have published books with at least two different publishers

SELECT a.Name

FROM Authors a

JOIN Books b ON DEREF(b.Authors(1)) = a

GROUP BY a.Name

HAVING COUNT(DISTINCT DEREF(b.Published\_By)) >= 2;

1. List all books (title) where the same author appears more than once on the list of authors:

SELECT DISTINCT b.Title

FROM Books b

JOIN TABLE(b.Authors) a1 ON DEREF(a1) = DEREF(b.Authors(1))

JOIN TABLE(b.Authors) a2 ON DEREF(a2) = DEREF(b.Authors(2))

WHERE a1.ROWID <> a2.ROWID;