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**Roll No:** 22P-9216

**Section:** BSCS-6A

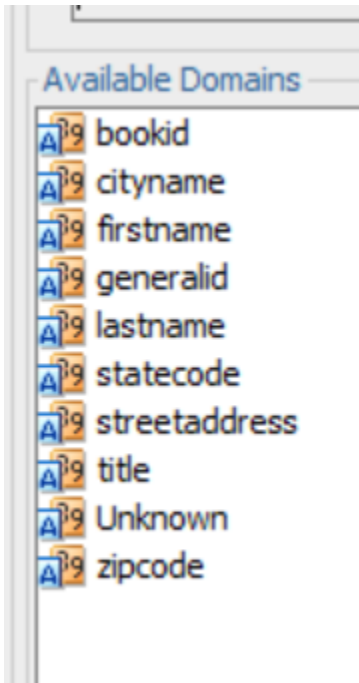
## Database Systems Labtask 8

### Task 1:









Perform the lab manual example as first task.

### Answer:

First we add domains:



Now we will create the Books entity with the following attributes:


Details Overview UDP		
Attributes:		
Name		
       		
	Name	Data type
1	book_id	bookid
2	title	title
3	author_last_name	lastname
4	author_first_name	firstname
5	rating	NUMERIC (2)









This is how it looks like:



Now we will create the Patrons entity with the following attributes:

Attributes:

 Name









       

	Name	Data type
1	patron_id	generalid
2	last_name	lastname
3	first_name	firstname
4	street_address	streetaddress
5	city	cityname
6	state	statecode
7	zip	zipcode
8	location	SDO_GEOMETRY

This is how it looks like:



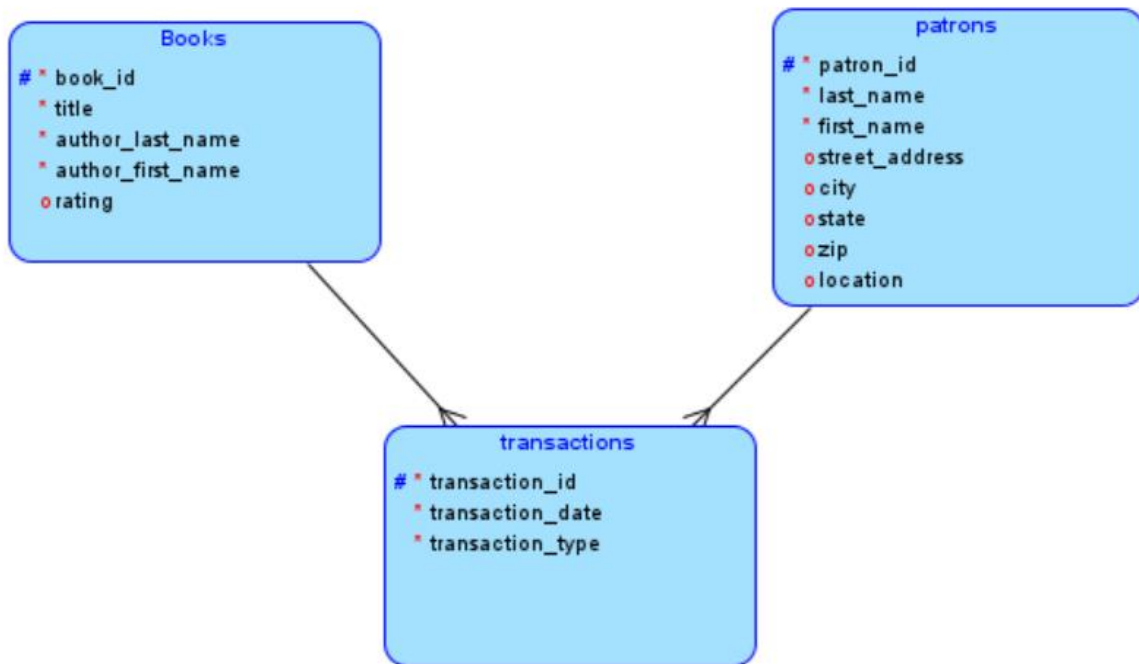
Similarly, we will create the Transactions entity with the following attributes:

Details Overview UDP		
Attributes:		
Name		
       		
	Name	Data type
1	transaction_id	generalid
2	transaction_date	Datetime
3	transaction_type	generalid

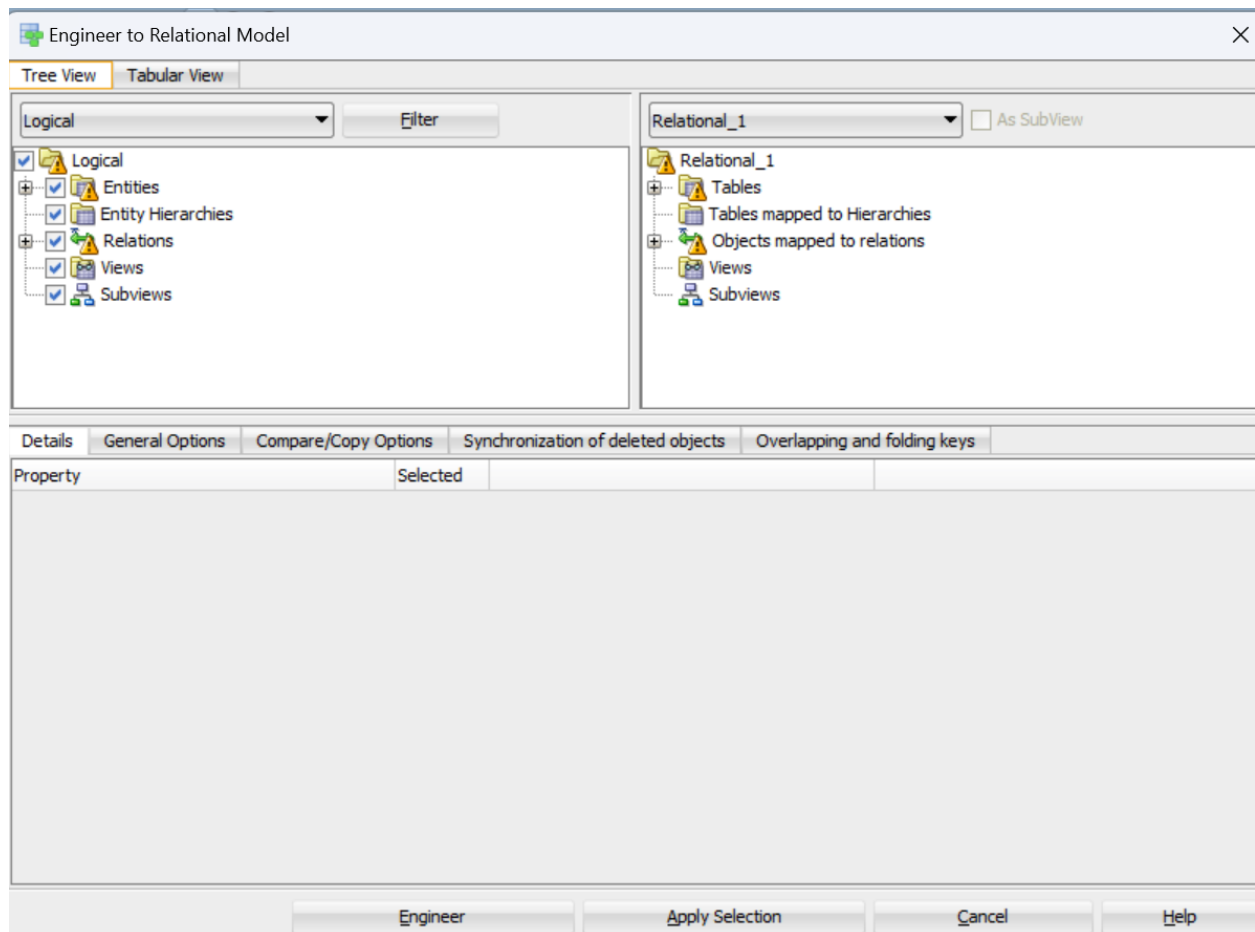
This is how it looks like:



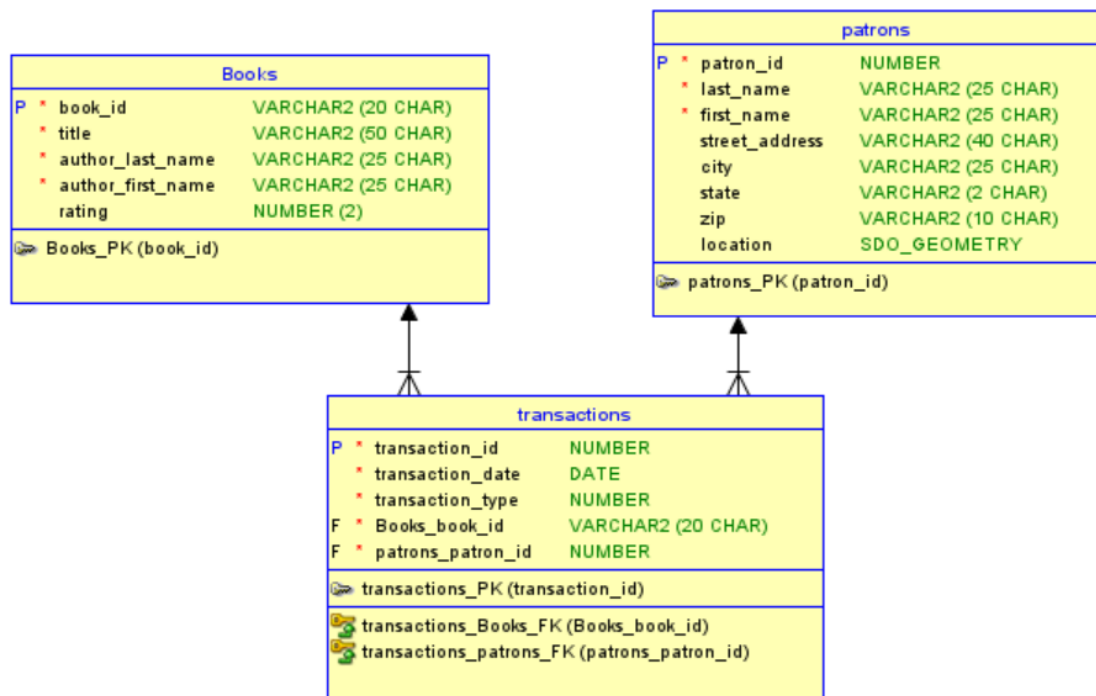
Now we create two one-to-many relationship between Books and Transactions entities and Patrons and Transactions.



Now we develop the relational model by engineering it.



Hence forming the following relationship model:



Now we have to generate the DDL which is:

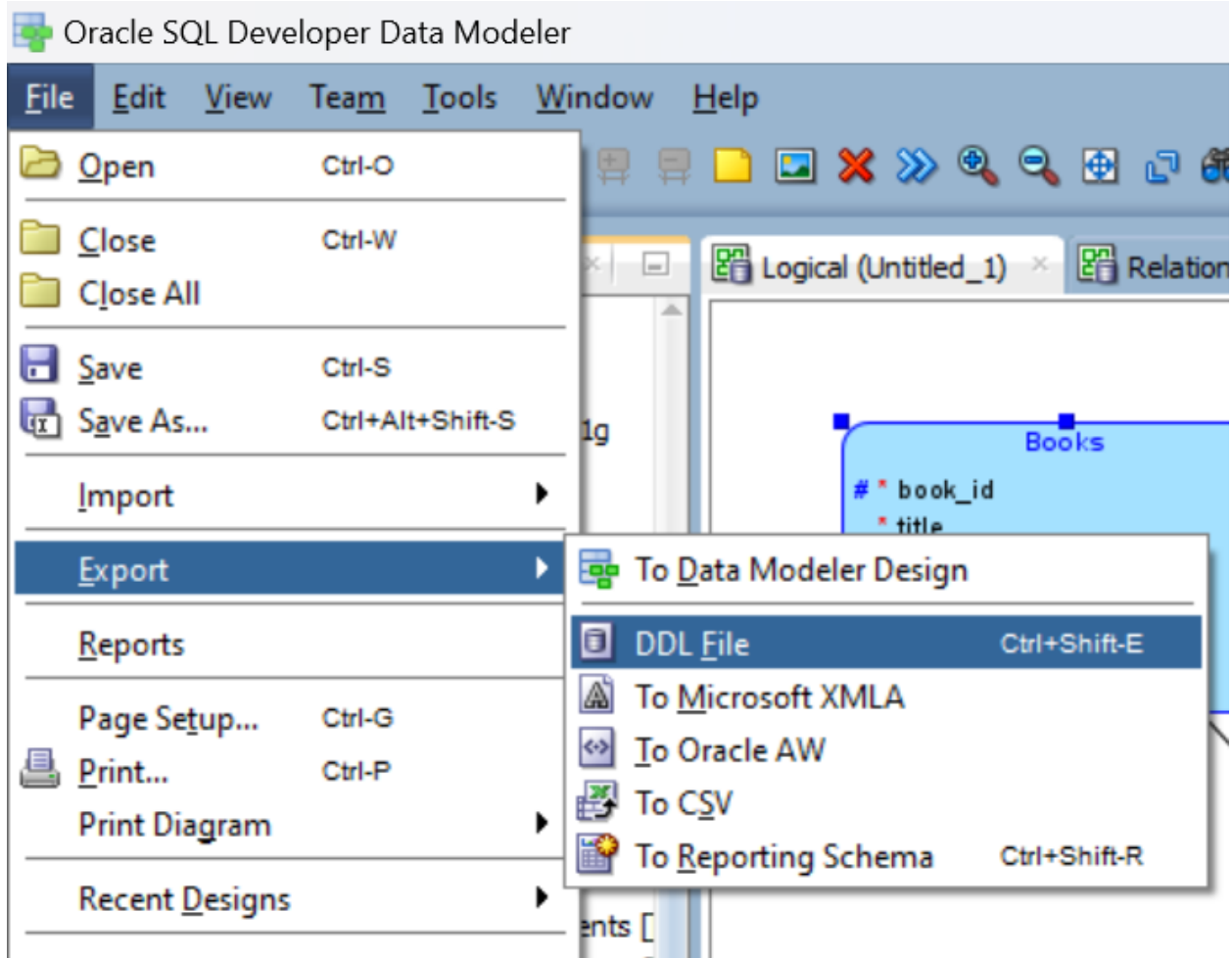
DDL File Editor - Oracle Database 11g

Oracle Database 11g   Relational\_1   Generate   Clear

```
1  -- Generated by Oracle SQL Developer Data Modeler 24.3.1.351.0831
2  -- at:      2025-03-26 10:06:03 PKT
3  -- site:    Oracle Database 11g
4  -- type:    Oracle Database 11g
5
6
7
8  -- predefined type, no DDL - MDSYS.SDO_GEOMETRY
9
10 -- predefined type, no DDL - XMLTYPE
11
12 CREATE TABLE Books
13 (
14     book_id          VARCHAR2 (20 CHAR) NOT NULL ,
15     title            VARCHAR2 (50 CHAR) NOT NULL ,
16     author_last_name VARCHAR2 (25 CHAR) NOT NULL ,
17     author_first_name VARCHAR2 (25 CHAR) NOT NULL ,
18     rating           NUMBER (2)
19 )
20 LOGGING
21 ;
22
23 ALTER TABLE Books
24     ADD CONSTRAINT Books_PK PRIMARY KEY ( book_id ) ;
25
26 CREATE TABLE patrons
27 (
28     patron_id        NUMBER NOT NULL ,
29     last_name         VARCHAR2 (25 CHAR) NOT NULL ,
30     first_name        VARCHAR2 (25 CHAR) NOT NULL ,
31     street_address    VARCHAR2 (40 CHAR) ,
32     city              VARCHAR2 (25 CHAR) ,
33     state             VARCHAR2 (2 CHAR) ,
34     zip               VARCHAR2 (10 CHAR) ,
```

And we export the DDL and save the whole program:



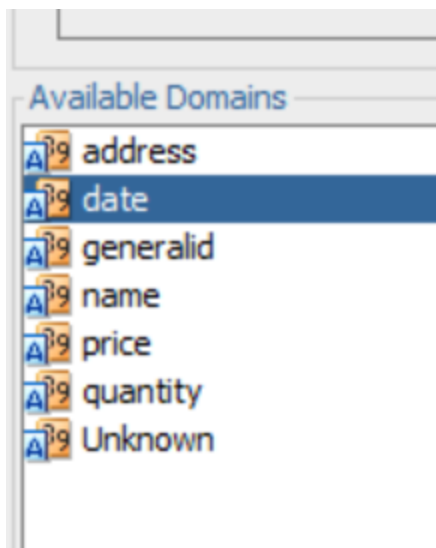


## Task 2:

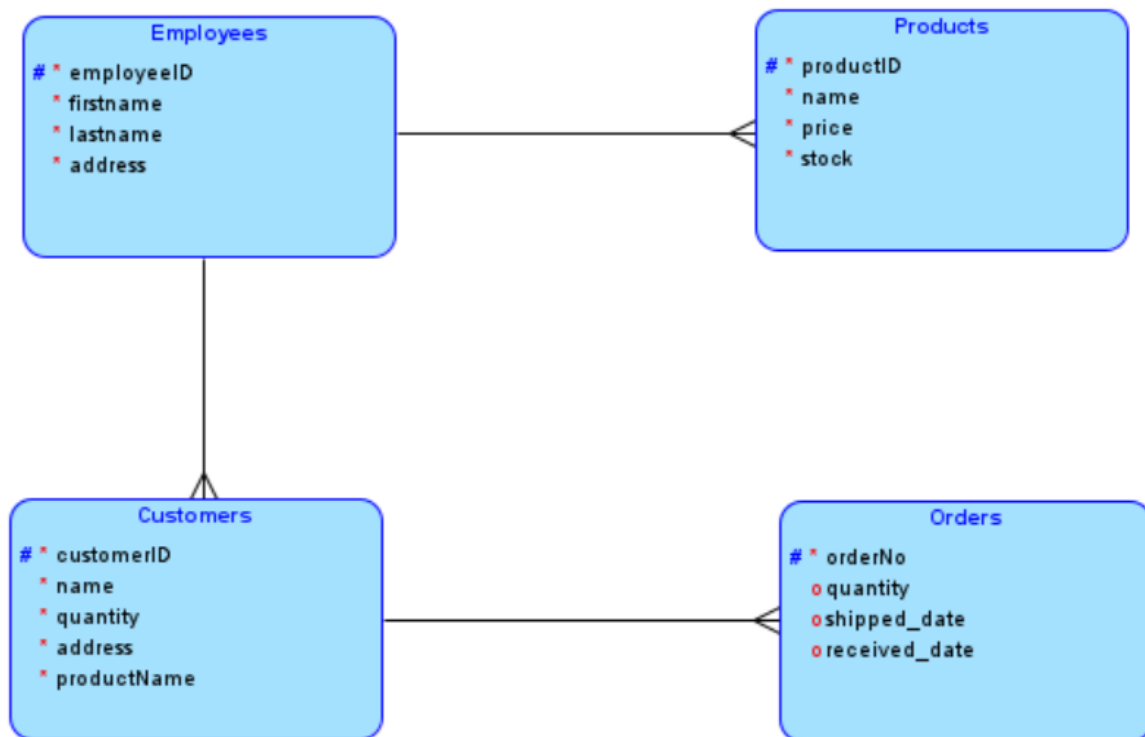
Create a physical design (DDL) from the above logically designed database. Keeping in mind the logical design, create foreign keys in each table where required. Populate each table up to maximum three records.

## Answer:

First we add domains:



Now we will make the entities and their relationships:



Now generate its DDL:

DDL File Editor - Oracle Database 11g

Oracle Database 11g Relational\_1 Generate Clear

```
1 -- Generated by Oracle SQL Developer Data Modeler 24.3.1.351.0831
2 -- at:      2025-03-26 14:31:36 PKT
3 -- site:    Oracle Database 11g
4 -- type:    Oracle Database 11g
5
6
7
8 -- predefined type, no DDL - MDSYS.SDO_GEOMETRY
9
10 -- predefined type, no DDL - XMLTYPE
11
12 CREATE TABLE Customers
13 (
14     customerID      NUMBER NOT NULL ,
15     name             VARCHAR2 (100 CHAR) NOT NULL ,
16     quantity         INTEGER NOT NULL ,
17     address          VARCHAR2 (40 CHAR) NOT NULL ,
18     productName      VARCHAR2 (100 CHAR) NOT NULL ,
19     Employees_employeeID NUMBER NOT NULL
20 )
21 LOGGING
22 ;
23
24 ALTER TABLE Customers
25     ADD CONSTRAINT Customers_PK PRIMARY KEY ( customerID ) ;
26
27 CREATE TABLE Employees
28 (
29     employeeID NUMBER NOT NULL ,
30     firstname  VARCHAR2 (100 CHAR) NOT NULL ,
31     lastname   VARCHAR2 (100 CHAR) NOT NULL ,
32     address    VARCHAR2 (40 CHAR) NOT NULL
33 )
34 LOGGING
```

After saving this, we will execute the DDL in oracle:

Worksheet Query Builder

```
CREATE TABLE Customers
(
    customerID          NUMBER NOT NULL ,
    name                VARCHAR2 (100 CHAR) NOT NULL ,
    quantity            INTEGER NOT NULL ,
    address             VARCHAR2 (40 CHAR) NOT NULL ,
    productName         VARCHAR2 (100 CHAR) NOT NULL ,
    Employees_employeeID NUMBER NOT NULL
)
LOGGING
;

ALTER TABLE Customers
    ADD CONSTRAINT Customers_PK PRIMARY KEY ( customerID ) ;

CREATE TABLE Employees
(
    employeeID NUMBER NOT NULL ,
    firstname  VARCHAR2 (100 CHAR) NOT NULL ,
    lastname   VARCHAR2 (100 CHAR) NOT NULL ,
    address    VARCHAR2 (40 CHAR) NOT NULL
)
LOGGING
;

ALTER TABLE Employees
    ADD CONSTRAINT Employees_PK PRIMARY KEY ( employeeID ) ;

CREATE TABLE Orders
(
    orderNo          NUMBER NOT NULL ,
    quantity         INTEGER ,
    shipped_date      DATE ,
    received_date     DATE ,
    Customers_customerID NUMBER NOT NULL
```

Script Output x

Task completed in 0.1 seconds

Table CUSTOMERS altered.

Table ORDERS altered.

Table PRODUCTS altered.

Now we will populate each table with 3 records. This is for the employees table:

Worksheet	Query Builder
	<pre>INSERT INTO Employees (EMPLOYEEID, FIRSTNAME, LASTNAME, ADDRESS) VALUES (1, 'Ali', 'Khan', 'Peshawar');  INSERT INTO Employees (EMPLOYEEID, FIRSTNAME, LASTNAME, ADDRESS) VALUES (2, 'Sara', 'Ahmed', 'Lahore');  INSERT INTO Employees (EMPLOYEEID, FIRSTNAME, LASTNAME, ADDRESS) VALUES (3, 'Usman', 'Zahid', 'Karachi');</pre>

1 row inserted.
1 row inserted.
1 row inserted.

This is for products table:

Worksheet	Query Builder
	<pre>INSERT INTO Products (PRODUCTID, NAME, PRICE, STOCK, EMPLOYEES_EMPLOYEEID) VALUES (1, 'Monitor', 15000.00, 10, 1);  INSERT INTO Products (PRODUCTID, NAME, PRICE, STOCK, EMPLOYEES_EMPLOYEEID) VALUES (2, 'Keyboard', 3000.50, 25, 2);  INSERT INTO Products (PRODUCTID, NAME, PRICE, STOCK, EMPLOYEES_EMPLOYEEID) VALUES (3, 'Mouse', 1500.75, 50, 3);</pre>

1 row inserted.

1 row inserted.

1 row inserted.

This is for the customers table:

sheet	Query Builder
	<pre>INSERT INTO Customers (CUSTOMERID, NAME, QUANTITY, ADDRESS, PRODUCTNAME, EMPLOYEES_EMPLOYEEID) VALUES (1, 'Urooba', 2, 'Islamabad', 'Laptop', 1);  INSERT INTO Customers (CUSTOMERID, NAME, QUANTITY, ADDRESS, PRODUCTNAME, EMPLOYEES_EMPLOYEEID) VALUES (2, 'Aimal', 1, 'Peshawar', 'Phone', 2);  INSERT INTO Customers (CUSTOMERID, NAME, QUANTITY, ADDRESS, PRODUCTNAME, EMPLOYEES_EMPLOYEEID) VALUES (3, 'Junaid', 5, 'Lahore', 'Keyboard', 3);</pre>

1 row inserted.

1 row inserted.

1 row inserted.

This is for the orders table:

rksheet	Query Builder
	<pre>INSERT INTO Orders (ORDERNO, QUANTITY, SHIPPED_DATE, RECEIVED_DATE, CUSTOMERS_CUSTOMERID) VALUES (101, 2, TO_DATE('2025-03-20', 'YYYY-MM-DD'), TO_DATE('2025-03-25', 'YYYY-MM-DD'), 1);  INSERT INTO Orders (ORDERNO, QUANTITY, SHIPPED_DATE, RECEIVED_DATE, CUSTOMERS_CUSTOMERID) VALUES (102, 1, TO_DATE('2025-03-21', 'YYYY-MM-DD'), TO_DATE('2025-03-26', 'YYYY-MM-DD'), 2);  INSERT INTO Orders (ORDERNO, QUANTITY, SHIPPED_DATE, RECEIVED_DATE, CUSTOMERS_CUSTOMERID) VALUES (103, 3, TO_DATE('2025-03-22', 'YYYY-MM-DD'), TO_DATE('2025-03-27', 'YYYY-MM-DD'), 3);</pre>

```
1 row inserted.
```

```
1 row inserted.
```

```
1 row inserted.
```

---

### Task 3:

This system is designed to streamline various hospital functions, including patient management, appointment scheduling, and electronic health record (EHR) management. Develop the Logical Model Diagram for the EHR database and build the design using a data modeling tool data modeler. Develop the Relational Model Diagram for the EHR database and build the design using a data modeling tool data modeler (create foreign keys in each table where required.) Generate DDL.

### Answer:

First we add domains:

Choose domain

Domains File

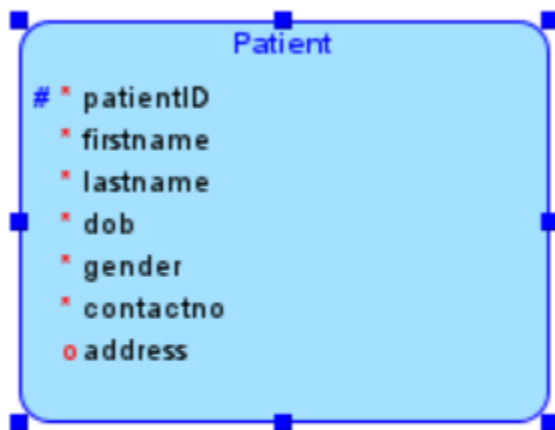
Available Domains

- amount
- contact
- date
- email
- generalid
- name
- status
- Unknown









Now we make Patient entity with the following attributes:



Details	Overview	UDP
Attributes:		
Name		
	Name	Data type
1	patientID	generalid
2	firstname	name
3	lastname	name
4	dob	date
5	gender	status
6	contactno	contact
7	address	VARCHAR (255)











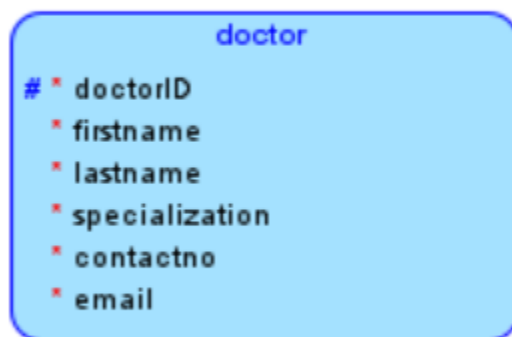
We make Medical Record entity with the following attributes:

Details	Overview	UDP
Attributes:		
Name		
       		
	Name	Data type
1	recordID	generalid
2	date	date
3	diagnosis	VARCHAR (255)
4	treatment	VARCHAR (255)
5	medications	VARCHAR (255)



We make Doctor entity with the following attributes:

Details Overview UDP		
Attributes:		
Name		
       		
	Name	Data type
1	doctorID	generalid
2	firstname	name
3	lastname	name
4	specialization	VARCHAR (100)
5	contactno	contact
6	email	email



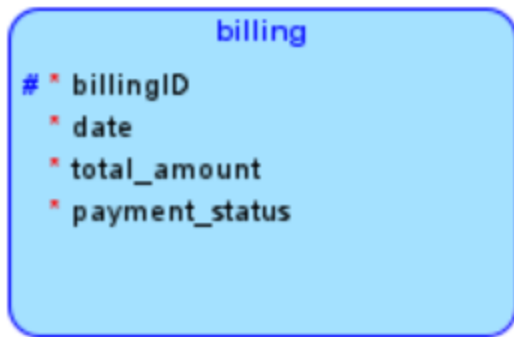
We make Appointment entity with the following attributes:

Details Overview UDP		
Attributes:		
Name		
	Name	Data type
1	appointmentID	generalid
2	appointment_dat...	Datetime
3	status	status

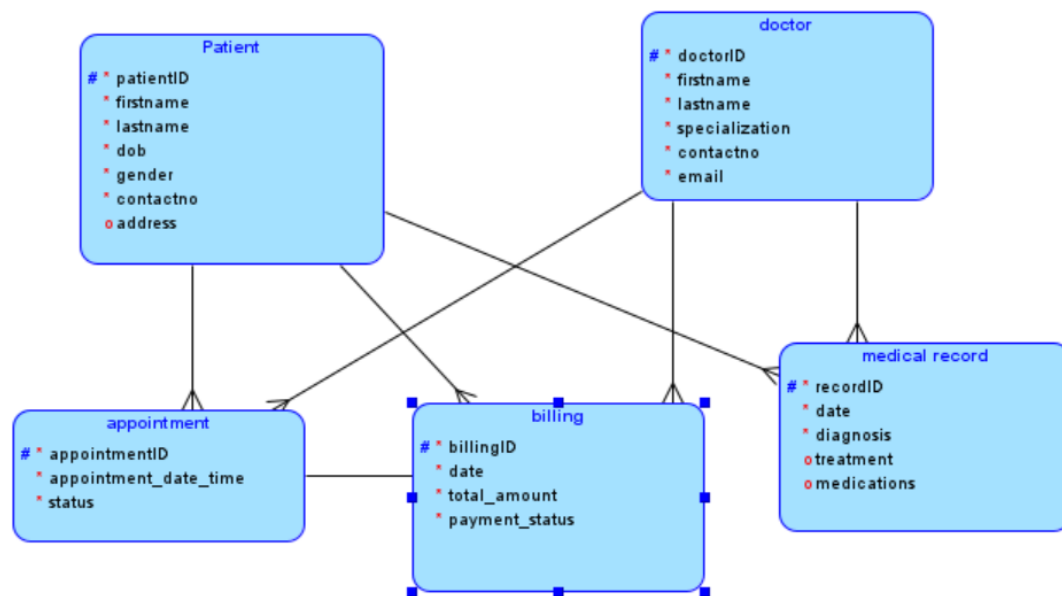


We make Billing entity with the following attributes:

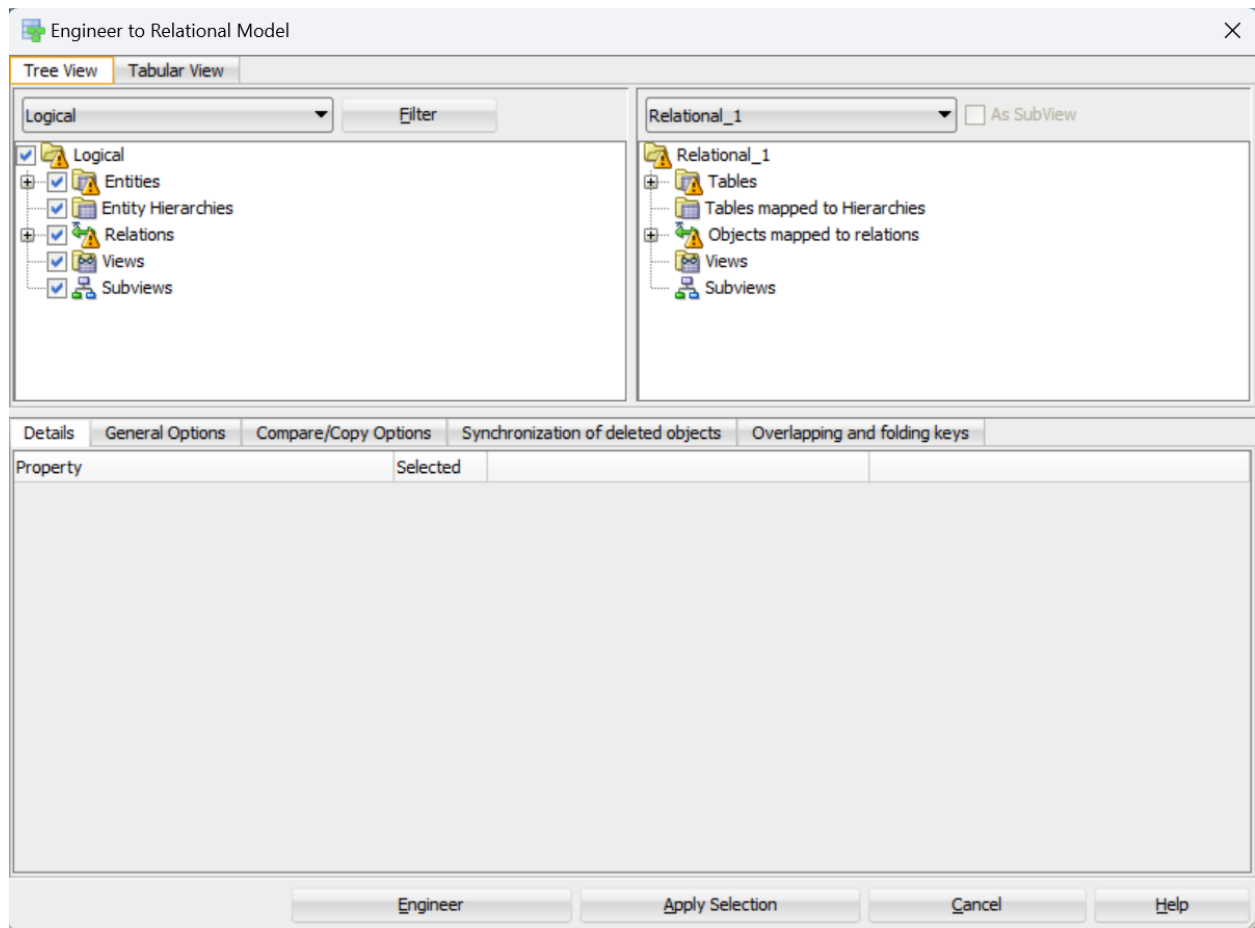
Name		
	Name	Data type
1	billingID	generalid
2	date	date
3	total_amount	amount
4	payment_status	status



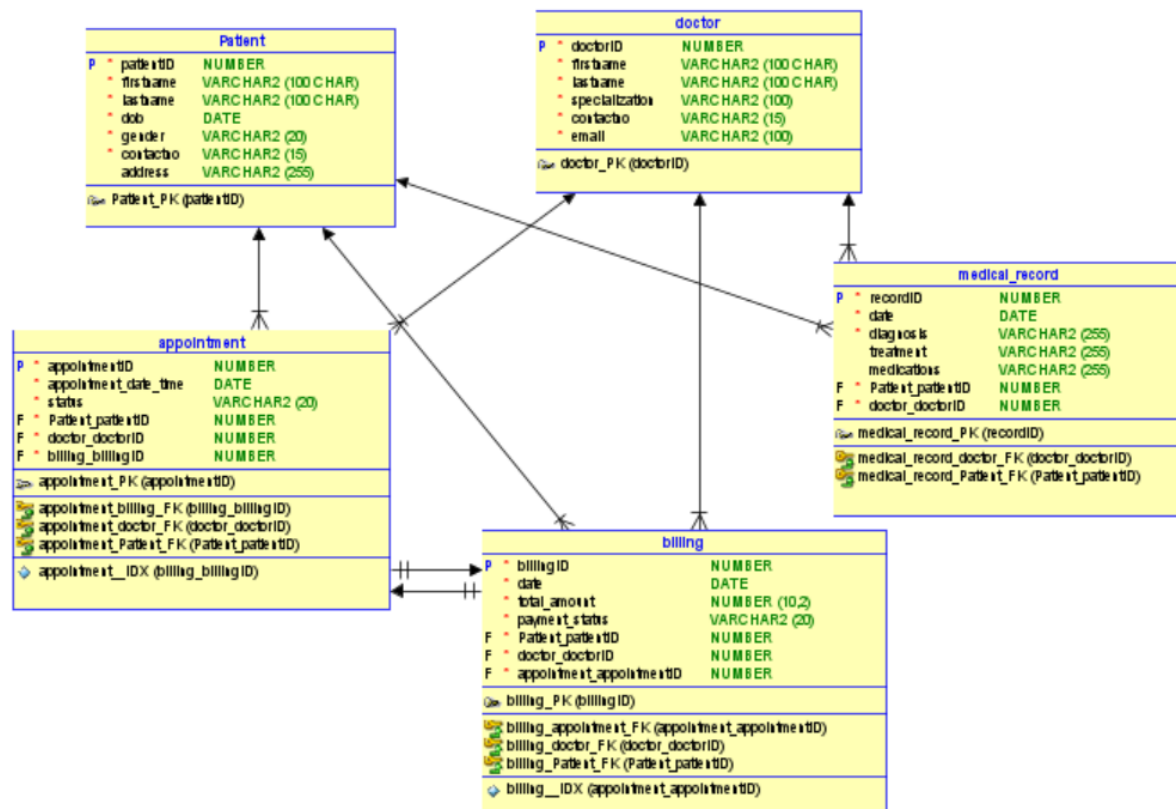
Now we add the relationships for all entities which looks like this:



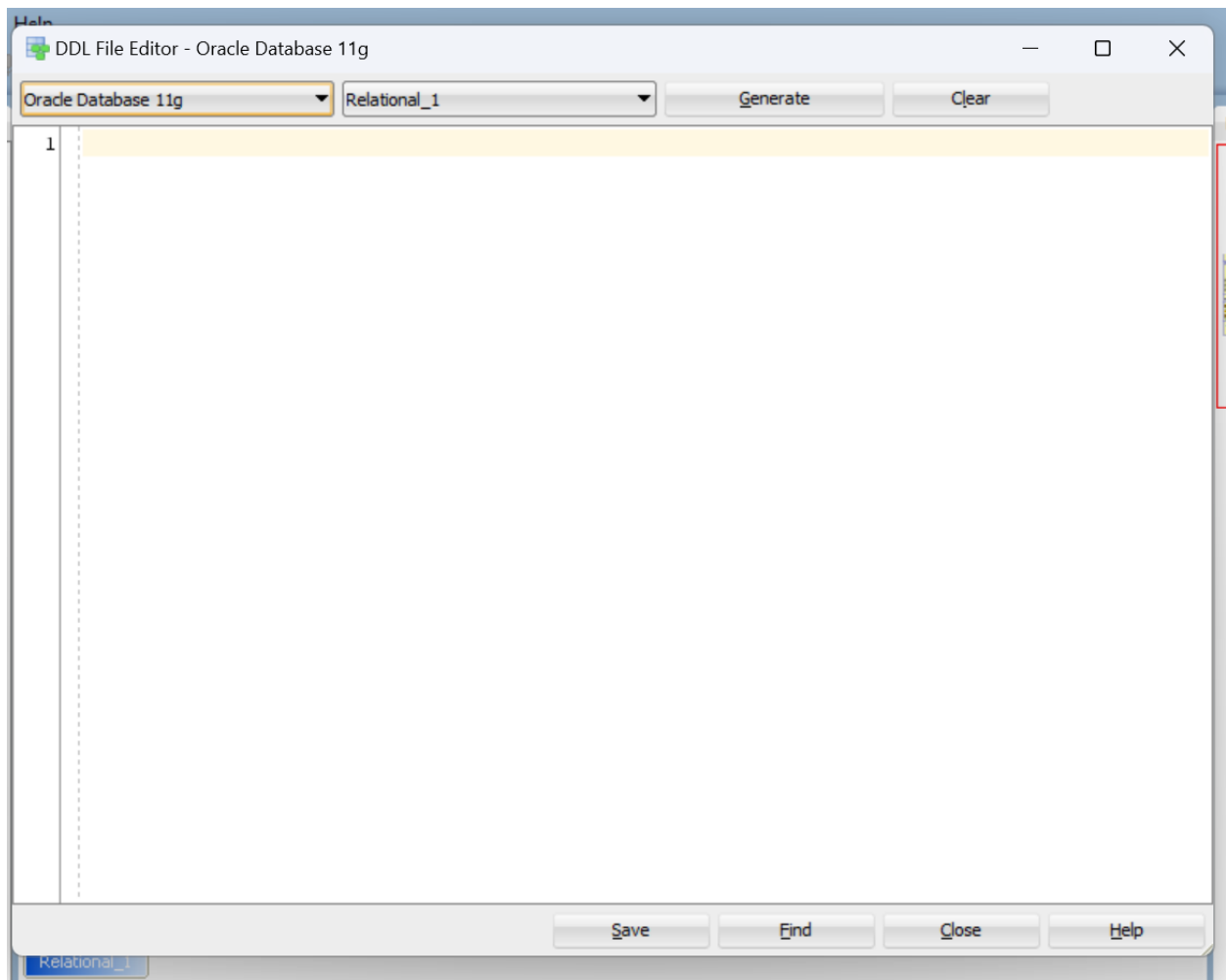
Now we engineer it to convert it into relational model:



This is the relational model:



Now we generate the DDL:



This is the DDL:



```
1 -- Generated by Oracle SQL Developer Data Modeler 24.3.1.351.0831
2 -- at:      2025-03-26 17:15:30 PKT
3 -- site:    Oracle Database 11g
4 -- type:    Oracle Database 11g
5
6
7
8 -- predefined type, no DDL - MDSYS.SDO_GEOMETRY
9
10 -- predefined type, no DDL - XMLTYPE
11
12 CREATE TABLE appointment
13 (
14     appointmentID      NUMBER NOT NULL ,
15     appointment_date_time DATE NOT NULL ,
16     status              VARCHAR2 (20) NOT NULL ,
17     Patient_patientID   NUMBER NOT NULL ,
18     doctor_doctorID     NUMBER NOT NULL ,
19     billing_billingID   NUMBER NOT NULL
20 )
21 ;
22 CREATE UNIQUE INDEX appointment__IDX ON appointment
23 (
24     billing_billingID ASC
25 )
26 ;
27
28 ALTER TABLE appointment
29     ADD CONSTRAINT appointment PK PRIMARY KEY ( appointmentID ) ;
```

## Task 4:

Design a database to manage employees, departments, projects, attendance, and payroll.  
Logical Model: Create a Logical Model Diagram. Relational Model: Design a Relational Model with foreign keys. DDL Script: Generate SQL DDL to define the schema. Constraints: Ensure Email is Unique & Not Null, enforce data integrity.

## Answer:

First we add domains:

Choose domain

Domains File









Select

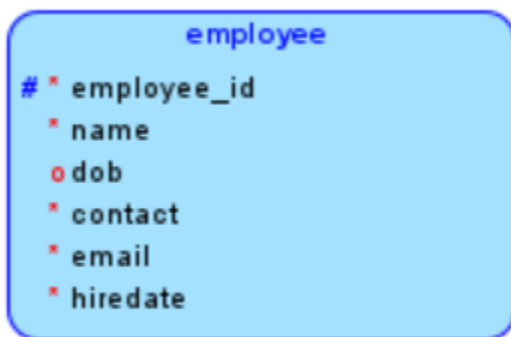
Available Domains

- bonus
- contact
- date
- dob
- email
- generalid
- location
- name
- role
- salary
- status
- Unknown

Add Remove Modify










Now we make employees entity with the following attributes:

Details Overview UDP		
Attributes:		
Name		
       		
	Name	Data type
1	employee_id	generalid
2	name	name
3	dob	date
4	contact	contact
5	email	email
6	hiredate	date

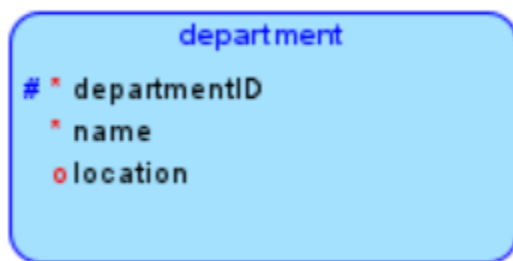


We make department entity with the following attributes:










Attributes:

 Name
   
 |     |   

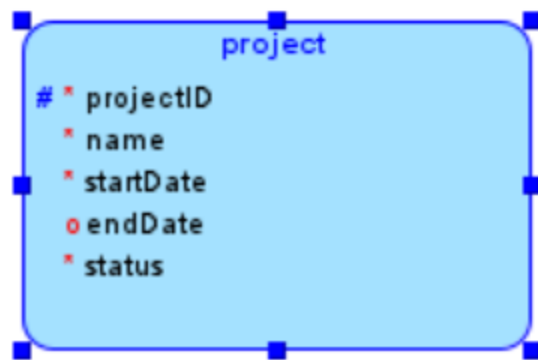
	Name	Data type
1	departmentID	generalid
2	name	name
3	location	location



Now make project entity with the following attributes:

 Name
   
 |     |   

	Name	Data type
1	projectID	generalid
2	name	location
3	startdate	date
4	enddate	date
5	status	status

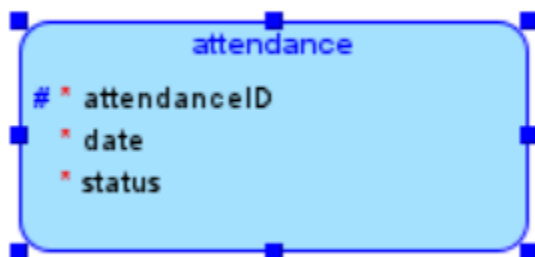


Now we make attendance entity with the following attributes:

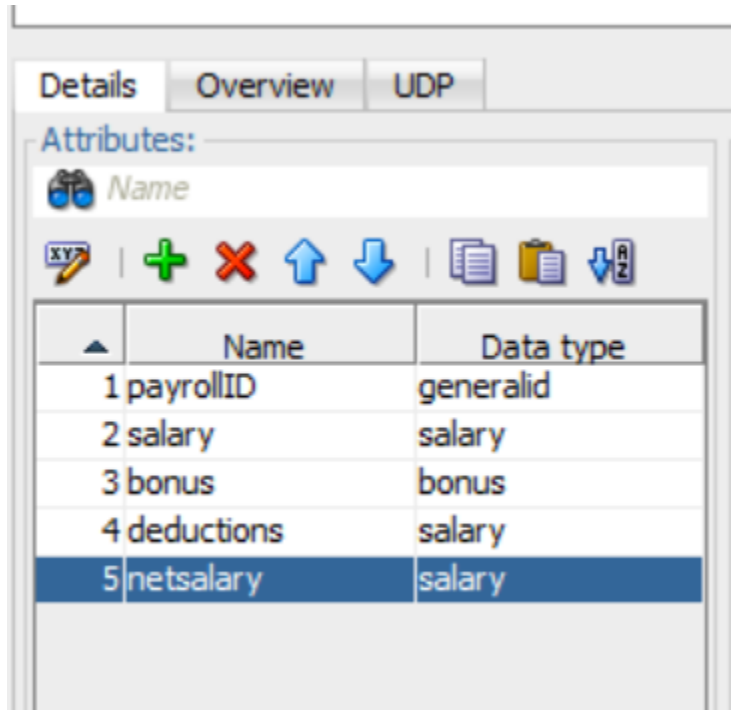
Attributes:

Name

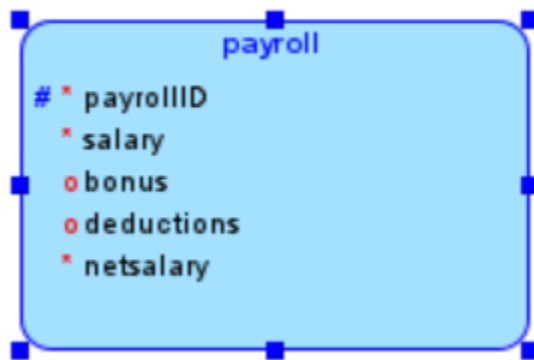
	Name	Data type
1	attendanceID	generalid
2	date	date
3	status	status











Now we make payroll entity with the following attributes:

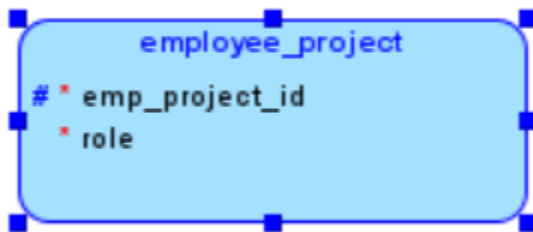


	Name	Data type
1	payrollID	generalid
2	salary	salary
3	bonus	bonus
4	deductions	salary
5	netsalary	salary

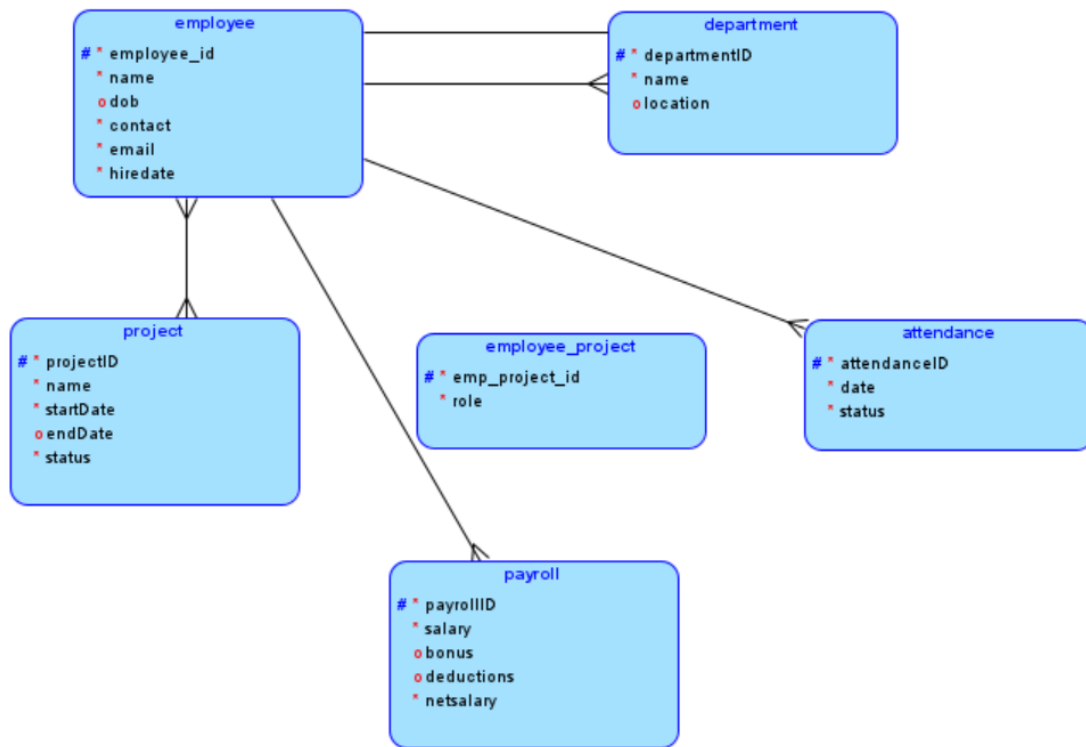


Finally we make employee\_project entity with the following attributes:

Details   Overview   UDP		
Attributes:		
Name		
       		
	Name	Data type
1	emp_project_id	generalid
2	role	role



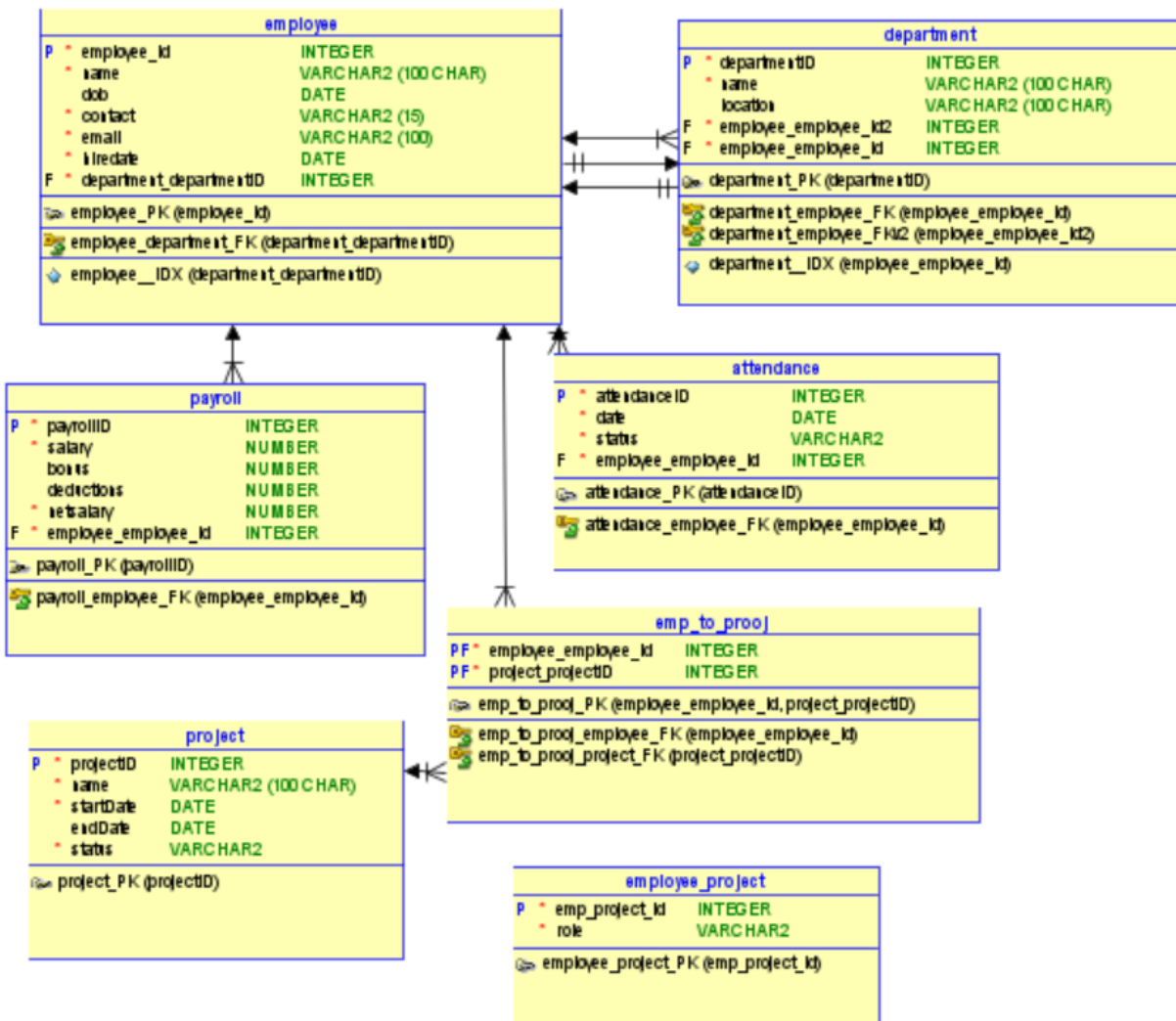
Now we connect the entities according to their relationships:



---

Now we engineer the model:





Now we generate the DDL script:

DDL File Editor - Oracle Database 11g

Oracle Database 11g Relational\_1 Generate Clear

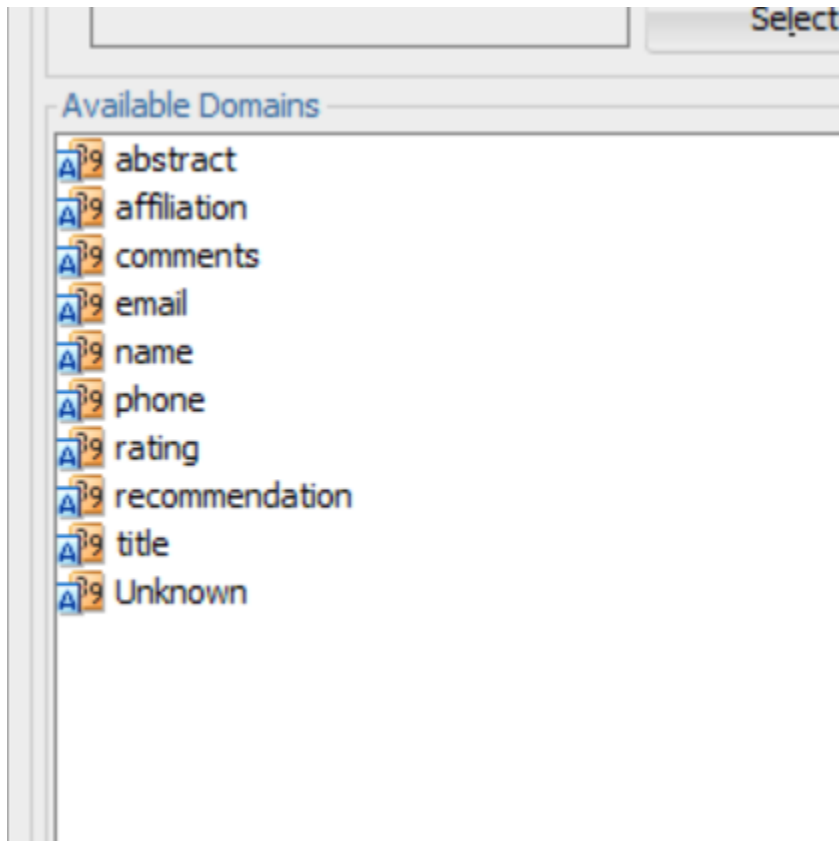
```
1 -- Generated by Oracle SQL Developer Data Modeler 24.3.1.351.0831
2 -- at:      2025-03-29 02:59:05 PKT
3 -- site:    Oracle Database 11g
4 -- type:    Oracle Database 11g
5
6
7
8 -- predefined type, no DDL - MDSYS.SDO_GEOMETRY
9
10 -- predefined type, no DDL - XMLTYPE
11
12 CREATE TABLE attendance
13 (
14     attendanceID      INTEGER NOT NULL ,
15     "date"            DATE NOT NULL ,
16     status            VARCHAR2 (199) NOT NULL ,
17     employee_employee_id INTEGER NOT NULL
18 )
19 ;
20
21 ALTER TABLE attendance
22     ADD CONSTRAINT attendance_PK PRIMARY KEY ( attendanceID ) ;
23
24 CREATE TABLE department
25 (
26     departmentID      INTEGER NOT NULL ,
27     name              VARCHAR2 (100 CHAR) NOT NULL ,
28     location          VARCHAR2 (100 CHAR) ,
29     employee_employee_id2 INTEGER NOT NULL ,
30     employee_employee_id INTEGER NOT NULL
31 )
32 ;
33 CREATE UNIQUE INDEX department__IDX ON department
34 (
```

## Task 5:









Develop the Logical Model Diagram for the CONFERENCE\_REVIEW database and build the design using a data modeling tool data modeler. Develop the Relational Model Diagram for the CONFERENCE\_REVIEW database and build the design using a data modeling tool data modeler. Generate DDL.

## Answer:

First we add domains:












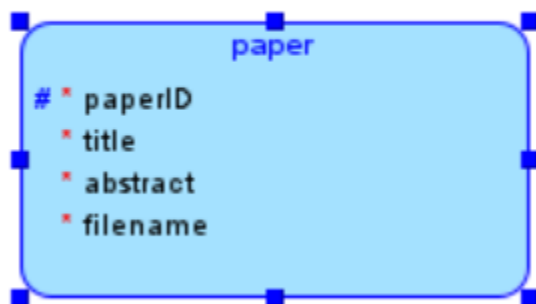
Now we create author entity with the following attributes:

Details	Overview	UDP
Attributes:		
Name		
       		
	Name	Data type
1	authorID	Integer
2	email	email
3	firstname	name
4	lastname	name











Now we will make paper entity with the following attributes:

Details	Overview	UDP
Attributes:		
 Name		
       		
	Name	Data type
1	paperID	Integer
2	title	title
3	abstract	abstract
4	filename	name











Now we will make review entity with the following attributes:

Details Overview UDP		
Attributes:		
Name		
       		
	Name	Data type
1	reviewID	Integer
2	technicalmerit	rating
3	readability	rating
4	originality	rating
5	relevance	rating
6	recommendation	recommendation
7	comments_to_co...	comments
8	comments_to_au...	comments

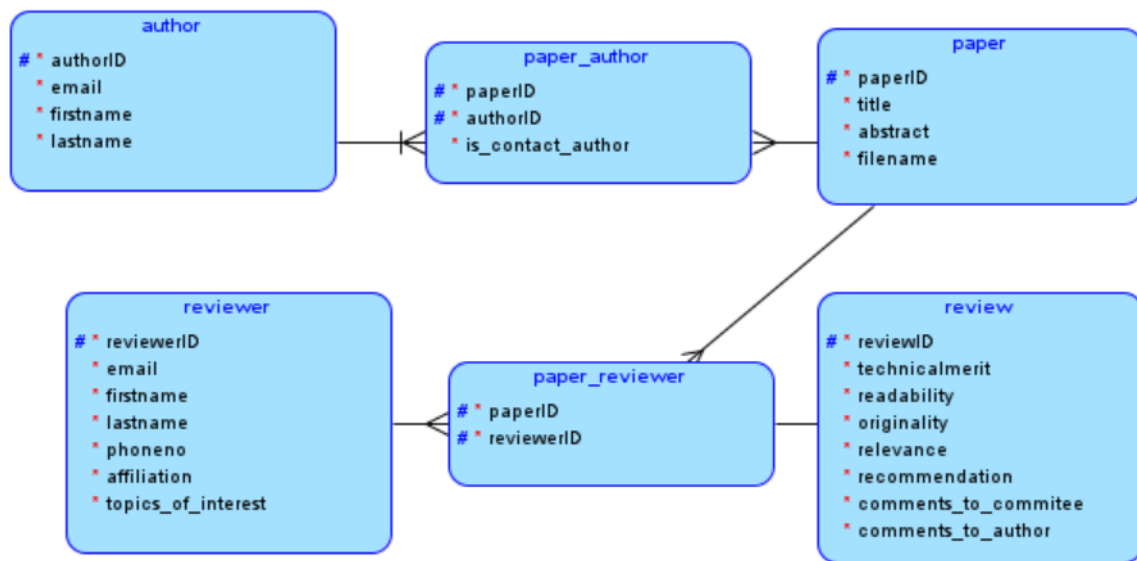


Now make reviewer entity with the following attributes:

Details Overview UDP		
Attributes:		
Name		
       		
	Name	Data type
1	reviewerID	Integer
2	email	email
3	firstname	name
4	lastname	name
5	phoneno	phone
6	affiliation	affiliation
7	topics_of_interest	TEXT

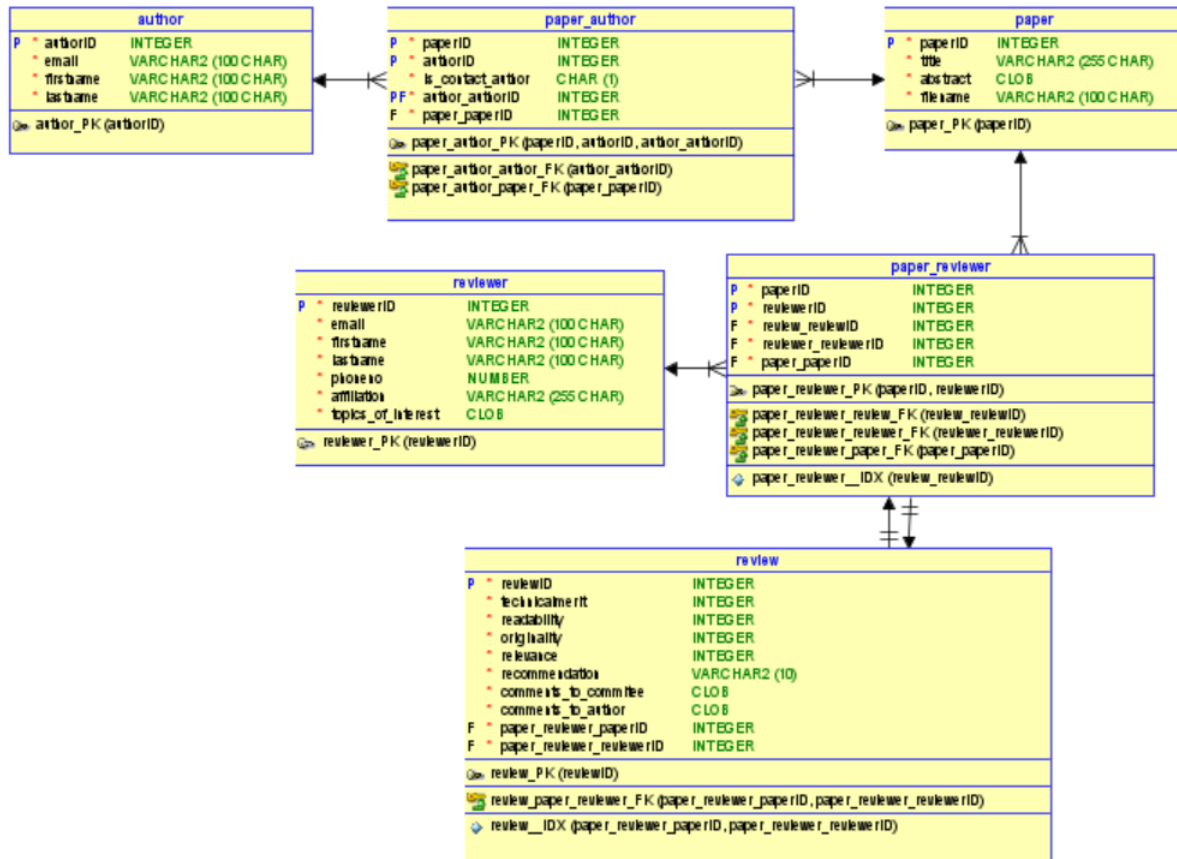


Now we connect relationships between the entities:



Now we engineer it to relational model:





Now we generate the DDL script for it:

Oracle Database 11g

Relational\_1

Generate

Clear

```
1 -- Generated by Oracle SQL Developer Data Modeler 24.3.1.351.0831
```

```
2 -- at:      2025-03-29 05:37:45 PKT
```

```
3 -- site:    Oracle Database 11g
```

```
4 -- type:    Oracle Database 11g
```

```
8 -- predefined type, no DDL - MDSYS.SDO_GEOMETRY
```

```
10 -- predefined type, no DDL - XMLTYPE
```

```
12 CREATE TABLE author
```

```
13 (
14     authorID  INTEGER NOT NULL ,
15     email     VARCHAR2 (100 CHAR) NOT NULL ,
16     firstname VARCHAR2 (100 CHAR) NOT NULL ,
17     lastname  VARCHAR2 (100 CHAR) NOT NULL
18 )
```

```
19 ;
```

```
21 ALTER TABLE author
```

```
22     ADD CONSTRAINT author_PK PRIMARY KEY ( authorID ) ;
```

```
24 CREATE TABLE paper
```

```
25 (
26     paperID  INTEGER NOT NULL ,
27     title    VARCHAR2 (255 CHAR) NOT NULL ,
28     abstract CLOB  NOT NULL ,
29     filename VARCHAR2 (100 CHAR) NOT NULL
```

Save

Find

Close

Help