DISTRIBUTED AND PARALLEL DATABASE SYSTEMS

GROUP - 12

LIBRARY DATABASE MANAGEMENT SYSTEM

Library management system Design:

Library management system manages the catalog of a library as well as save the time of people. This system helps to keep the records of whole transactions of the books available in the library, gives the availability of a specific book along with it specifying its placement in the department. This system allows people to reserve cabin for a particular time. It also keeps track of the donations and funds received. This system stores details of the employees, specific details of books and users. This management system is available in many cities. So, the services provided are availed by libraries in all cities.

To build this project we use Oracle Enterprise 21c Edition Database. This can be used as a local database storage and in future can also be used to connect to distributed databases across the globe. This system can also be used for creating database links (public and private), that can be used to connect different libraries in the project and access data across them.

Here we have 7 entities. They are Employees, Books, Users, Cabins, Departments, funds and Donations, Library.

- **Libraries** are available in different places and each one has its own name. They have been identified by a unique id, Library_ID.
- **Employees** are specific to a single work location. They have a ID which is specific to a particular employee. Therefore, no two employees have the same EMP ID. This entity shares a many to one relationship with libraries.
- **Books** details are stored in this table. The primary key for this table is Book_ID. Libraries in various locations will have copies of a same book. So here it shares a many to many relationships with library.
- **Cabin** stores info about various bookings made and the availability status of the pods. Here a one-to-many relation is seen where one library will have many cabins in it.
- **Department** has its own Department_ID. Each department has more than one copy of a single book, hence showing a one-to-many relationship.
- **Funds and Donations** has info about the funds received from governments and any other sources.
- **Users** have details about each user. One user can borrow more than one book but are restricted to borrow more than five books at a time.

Library:

- Entity Library is a Strong Entity, and it has attributes, unique ID such as “l_id” which is the primary key, the name of the library as “name”, the address of the library as “address”.
- Library entity is in relationship with many other entities. Library has many Employees, Cabins/pods, books, and users. Hence Library entity is in one-to-many relationship with Employees.
- Library is in one-to-many relationship with weak entity “Cabin”.
- Library is in many-to-many relationship with “Users”.
- Library is in many-to-many relationship with “Books”.

Employees:

- Entity Employees is a strong entity which is in many-to-one relationship with Library.
- Employees has attributes such as “e_id” which is the primary key, employee name as “name”, employee salary as “salary” , contact email address as “contact”, employee designation as “role” , Employee date of joining as “doj”.
- All Employees should include in respective allocated library, so Employees Entity is in total participation with Library.

Cabin:

- Cabin is a weak entity, it is in many-to-one relationship with Library and cabin totally participates with Library.
- Cabin has attributes as Cabin_id, availability.
- As Cabin is a weak entity, Cabin_id is the partial key.

Books:

- Books is a strong entity, Books stores the information of every book present in the library. A book can be available in multiple libraries and libraries do have multiple books of same type, hence books is in many-to-many relationships with library.
- Books entity has following attributes, such as “b_id” which is primary key and unique, ISBN id as “ISBN”, Book Name as “name”, availability of the book as “status”, Author of the book as “Author”.
- Books entity is in total participation with library.
- Also books entity is in many-to-one relationship with Department.

Department:

- Department is the department for which a book belongs to.

- This is strong entity and has attributes, “dept_id” as primary key, Name of the department as “dept_name”, and location of the respective department as “instore_location”.

Users:

- Users are the people who uses the library. These people are not employees instead are customers.
- Users uses library and borrows books. Users also provides donation on interest.
- Users is a strong entity, having attributes as follows, each user has a specific id “U_id” which is a primary key, name as “U_name”, gender as “gender”, date of birth as “dob”, contact details as “contact”, address of user as “address.”
- From Date of birth age can be derived, so “age” is a derived attribute.
- Users could use multiple libraries; hence Users is n many-to-many relationship with library having relationship attributes as “checkin_id” and “checkin_date”.
- Users could borrow many books with limit upto five books. Hence, Users is in many-to-many relationship with Books with relationship attributes as “t_date”, “t_id”.
- Users can donate to the library for maintenance of library, Hence Users is in one-to-many relationship with donations since each user can donate multiple times.

Donations:

- Donations are the funds received from different sources.
- Donations is also a strong entity.
- Donations has attributes as follows, the transaction number for each donation received as “d_id”, which is the primary key, the date of dation received as “d_date”, the amount of fund received as “amount”.
- Donations is in many-to-one relationship with Users.

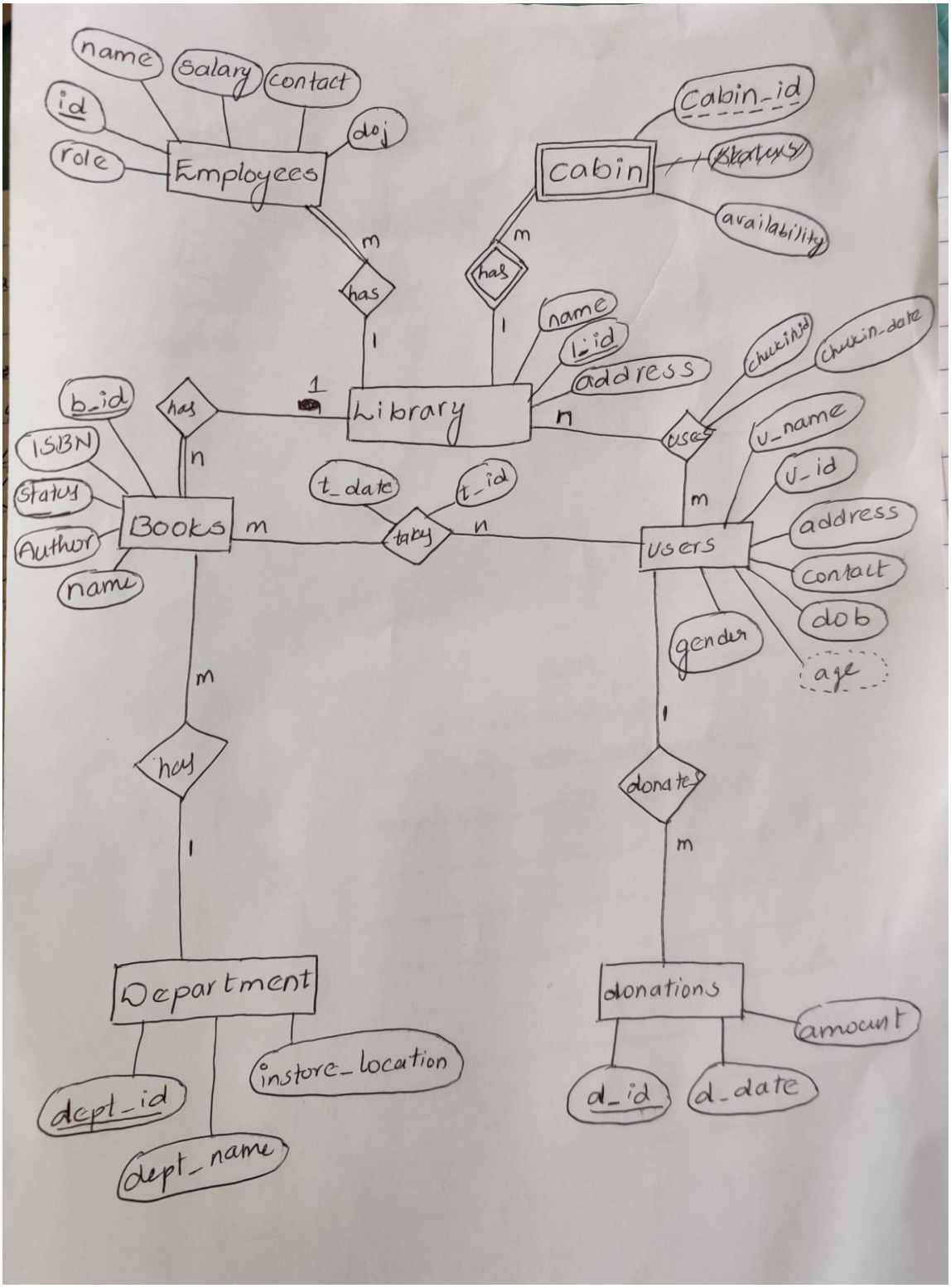
Book transactions:

- Has the record for all the transaction of a book. Book transaction is recorded when a user takes a book from the library or the user submits the book in library, “t_id” is the book transaction id that is auto generated. Along with the transaction id, transaction date (t_date) is stored in the table when a transaction occurs.

Library/Users check-in:

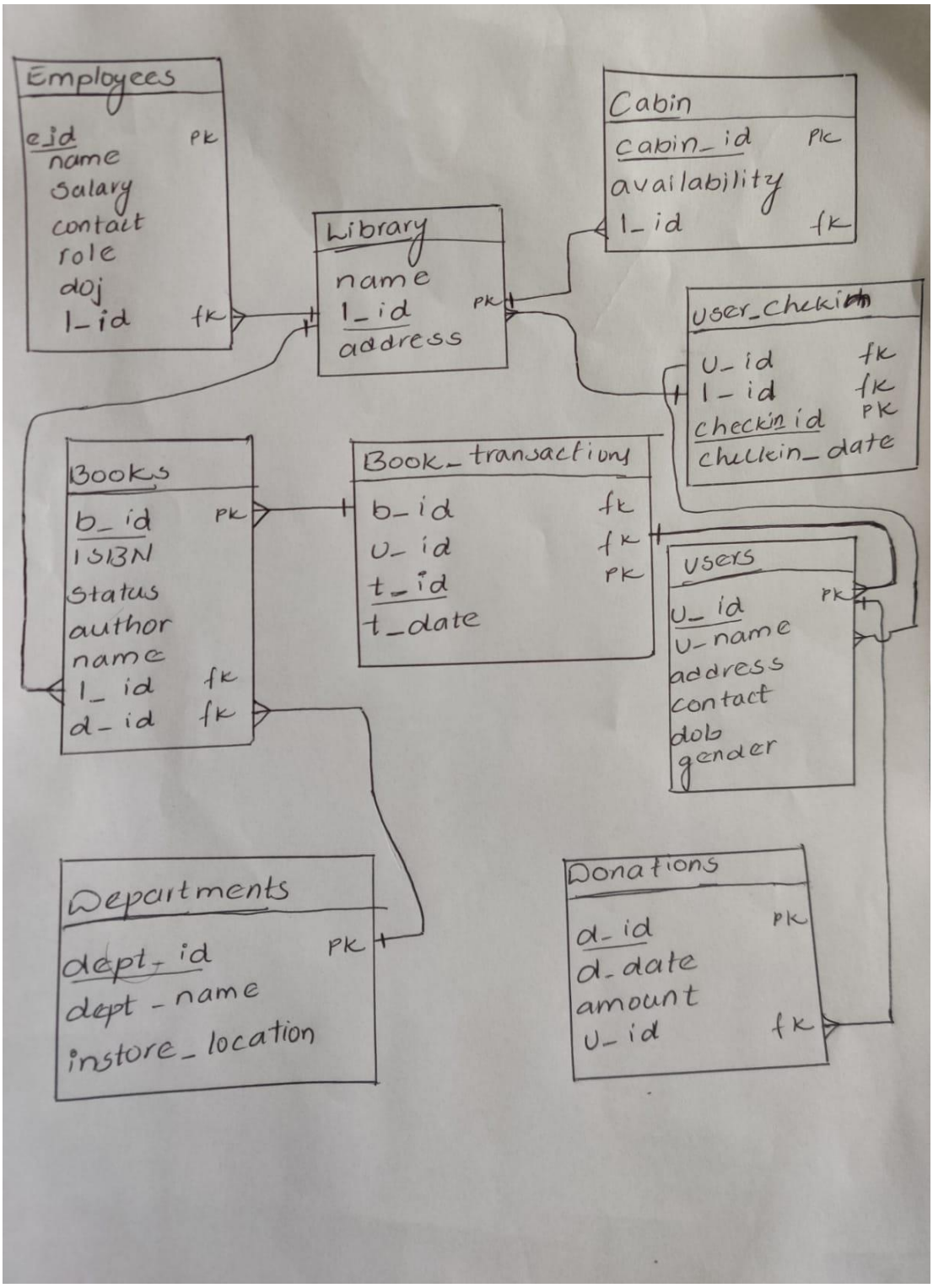
- Whenever a user enters or exits a library, his entry and exit timing are recorded in this table. “Checkin_id” is the unique id that is auto generated to record users’ activity and uniquely identify it. Along with the checkin id, checkin date (checkin_date) is stored in the table when a user accesses the library.

2) E-R Diagram of the library management system:



3) Transformation of E-R Diagram:

Relational ship diagram of above E-R Diagram:



Transformation of E-R diagram to Database Schema:

- Library (l_id, name address)
- Employees (e_id, name, salary, contact, role, doj,l_id)
- Cabin (cabin_id, availability,l_id)
- Books (b_id, ISBN, name, author, status,l_id, dept_id))
- Books_transactions (b_id, u_id, t_id, t_date)
- Departments(dept_id, dept_name, instore_location)
- Users (u_id, u_name, address, contact, dob, gender)
- Library_checkin (u_id, l_id, checkin_id, checkin_date)
- Donations (d_id, d_date, amount, u_id)

*Note: In above Database Schema, the primary keys are underlined, and foreign keys are shaded in blue color with ovel-shapes on it for better understanding.

Library

l_id	name	address

Employees

e_id	name	salary	contact	role	doj	l_id

Cabin

cabin_id	availability	l_id

Books

b_id	ISBN	name	author	status	l_id	dept_id

Books_transactions:

b_id	u_id	t_id	t_date

Departments:

dept_id	dept_name	instore_location

Users:

u_id	u_name	address	contact	dob	Gender

Library/Users_checkin:

u_id	l_id	checkin_id	checkin_date

Donations:

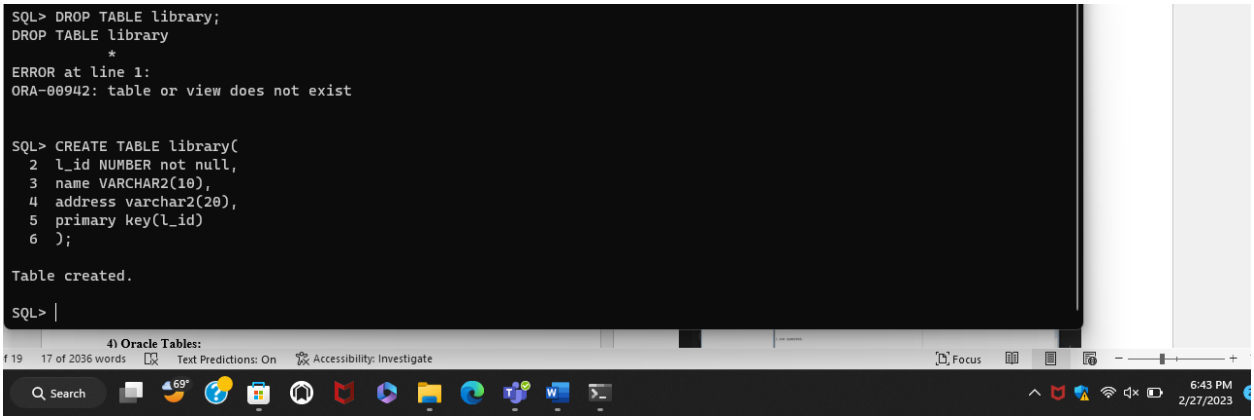
d_id	d_date	amount	u_id

4) Oracle Tables:

Library Table Creation:4

```
DROP TABLE library;

CREATE TABLE library(

l_id NUMBER not null,

name VARCHAR2(10),

address varchar2(20),

primary key(l_id)
```

);



INSERT INTO library VALUES(1,'willis','Denton-Texas');

INSERT INTO library VALUES(2,'Drakes','Frisco-Texas');

INSERT INTO library VALUES(3,'Sycamore','Irving-Texas');

INSERT INTO library VALUES(4,'Julies','Allen-Texas');

INSERT INTO library VALUES(5,'Sams','Austin-Texas');

INSERT INTO library VALUES(6,'Loki','Frisco-Texas');

INSERT INTO library VALUES(7,'Kerry','prosper-Texas');

INSERT INTO library VALUES(8,'Casey','Rohm-Texas');

INSERT INTO library VALUES(9,'Hulus','Decatur-Texas');

INSERT INTO library VALUES(10,'James','Lewisville-Texas');

```
SQL> INSERT INTO library VALUES(1,'willis','Denton-Texas');

1 row created.

SQL> INSERT INTO library VALUES(2,'Drakes','Frisco-Texas');

1 row created.

SQL> INSERT INTO library VALUES(3,'Sycamore','Irving-Texas');

1 row created.

SQL> INSERT INTO library VALUES(4,'Julies','Allen-Texas');

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1 row created.

SQL> INSERT INTO library VALUES(8,'Casey','Rohm-Texas');

1 row created.
```

```
SQL> INSERT INTO library VALUES(9,'Hulus','Decatur-Texas');

1 row created.

SQL> INSERT INTO library VALUES(10,'James','Lewisville-Texas');

1 row created.

SQL>
```

Employees Table Creation:

```
DROP table employees;

create TABLE employees(

e_id NUMBER not null,

name varchar(50) not null,

salary NUMBER not null,

contact varchar(20) not null,

role varchar(20) not null,

doj DATE not null,

l_id number not null,

PRIMARY KEY(e_id),

FOREIGN KEY(l_id) REFERENCES library(l_id),

CONSTRAINT sal_check CHECK(salary>5000),

CONSTRAINT role_check CHECK(role in('Manager', 'Librarian', 'Supervisor', 'Student Worker', 'Admin'))

);
```

```
SQL> create TABLE employees(
  2  e_id NUMBER not null,
  3  name varchar(50) not null,
  4  salary NUMBER not null,
  5  contact varchar(20) not null,
  6  role varchar(20) not null,
  7  doj DATE not null,
  8  l_id number not null,
  9  PRIMARY KEY(e_id),
 10  FOREIGN KEY(l_id) REFERENCES library(l_id),
 11  CONSTRAINT sal_check CHECK(salary>5000),
 12  CONSTRAINT role_check CHECK(role in('Manager', 'Librarian', 'Supervisor', 'Student Worker', 'Admin'))
 13  );

Table created.

SQL>
```

```
INSERT INTO employees VALUES
(1,'Harry',20000,'9457656765','Manager',TO_DATE('2019/07/07','yyyy/mm/dd'),3);

INSERT INTO employees VALUES
(2,'Larry',22000,'9457656365','Librarian',TO_DATE('2019/08/06','yyyy/mm/dd'),4);

INSERT INTO employees VALUES
(3,'Carry',12000,'9457666765','Librarian',TO_DATE('2019/06/05','yyyy/mm/dd'),5);

INSERT INTO employees VALUES
(4,'Gary',19000,'9457456765','Supervisor',TO_DATE('2019/03/07','yyyy/mm/dd'),6);
```

INSERT INTO employees VALUES
(5,'Mary',22340,'9457696765','Librarian',TO_DATE('2019/07/03','yyyy/mm/dd'),7);

INSERT INTO employees VALUES (6,'Ken',15000,'9457656767','Student
Worker',TO_DATE('2019/05/07','yyyy/mm/dd'),8);

INSERT INTO employees VALUES (7,'John',23440,'9457656565','Student
Worker',TO_DATE('2019/12/04','yyyy/mm/dd'),9);

INSERT INTO employees VALUES (8,'Dan',20004,'9457656985','Student
Worker',TO_DATE('2019/01/05','yyyy/mm/dd'),10);

INSERT INTO employees VALUES (9,'Zing',23000,'9457659965','Student
Worker',TO_DATE('2019/07/03','yyyy/mm/dd'),1);

INSERT INTO employees VALUES
(10,'Kim',21000,'9457656788','Supervisor',TO_DATE('2019/02/12','yyyy/mm/dd'),2);

```
SQL> INSERT INTO employees VALUES (1,'Harry',20000,'9457656765','Manager',TO_DATE('2019/07/07','yyyy/mm/dd'),3);

1 row created.

SQL> INSERT INTO employees VALUES (2,'Larry',22000,'9457656365','Librarian',TO_DATE('2019/08/06','yyyy/mm/dd'),4);

1 row created.

SQL> INSERT INTO employees VALUES (3,'Carry',12000,'9457666765','Librarian',TO_DATE('2019/06/05','yyyy/mm/dd'),5);

1 row created.

SQL> INSERT INTO employees VALUES (4,'Gary',19000,'9457456765','Supervisor',TO_DATE('2019/03/07','yyyy/mm/dd'),6);

1 row created.

SQL> INSERT INTO employees VALUES (5,'Mary',22340,'9457696765','Librarian',TO_DATE('2019/07/03','yyyy/mm/dd'),7);

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SQL> INSERT INTO employees VALUES (8,'Dan',20004,'9457656985','Student Worker',TO_DATE('2019/01/05','yyyy/mm/dd'),10);

1 row created.

SQL> INSERT INTO employees VALUES (9,'Zing',23000,'9457659965','Student Worker',TO_DATE('2019/07/03','yyyy/mm/dd'),1);

1 row created.

SQL> INSERT INTO employees VALUES (10,'Kim',21000,'9457656788','Supervisor',TO_DATE('2019/02/12','yyyy/mm/dd'),2);

1 row created.

SQL>
```

Cabin Table creation:

```
DROP table cabin;

create TABLE cabin(

cabin_id varchar2(5) not null,

availability varchar2(15) not null,

l_id number not null,

PRIMARY KEY(cabin_id),

FOREIGN KEY(l_id) REFERENCES library(l_id),

CONSTRAINT availability_check CHECK(availability in ('available', 'unavailable'))

);
```

```
SQL> DROP table cabin;
DROP table cabin
           *
ERROR at line 1:
ORA-00942: table or view does not exist


SQL> create TABLE cabin(
  2  cabin_id varchar2(5) not null,
  3  availability varchar2(15) not null,
  4  l_id number not null,
  5  PRIMARY KEY(cabin_id),
  6  FOREIGN KEY(l_id) REFERENCES library(l_id),
  7  CONSTRAINT availability_check CHECK(availability in ('available', 'unavailable'))
  8  );

Table created.

SQL>
```

```
INSERT INTO cabin VALUES ('c101', 'available', 1);

INSERT INTO cabin VALUES ('c102', 'available', 1);

INSERT INTO cabin VALUES ('c103', 'unavailable', 1);

INSERT INTO cabin VALUES ('c201', 'available', 2);

INSERT INTO cabin VALUES ('c202', 'available', 2);

INSERT INTO cabin VALUES ('c203', 'unavailable', 2);

INSERT INTO cabin VALUES ('c301', 'available', 3);

INSERT INTO cabin VALUES ('c302', 'available', 3);

INSERT INTO cabin VALUES ('c303', 'unavailable', 3);
```

INSERT INTO cabin VALUES ('c401', 'available', 4);

INSERT INTO cabin VALUES ('c402', 'available', 4);

INSERT INTO cabin VALUES ('c501', 'unavailable', 5);

INSERT INTO cabin VALUES ('c701', 'unavailable', 7);

```
SQL> INSERT INTO cabin VALUES ('c101', 'available', 1);

1 row created.

SQL> INSERT INTO cabin VALUES ('c102', 'available', 1);

1 row created.

SQL> INSERT INTO cabin VALUES ('c103', 'unavailable', 1);

1 row created.

SQL> INSERT INTO cabin VALUES ('c201', 'available', 2);

1 row created.

SQL> INSERT INTO cabin VALUES ('c202', 'available', 2);

1 row created.

SQL> INSERT INTO cabin VALUES ('c203', 'unavailable', 2);

1 row created.

SQL> INSERT INTO cabin VALUES ('c301', 'available', 3);

1 row created.

SQL> INSERT INTO cabin VALUES ('c302', 'available', 3);

1 row created.

SQL> INSERT INTO cabin VALUES ('c303', 'unavailable', 3);

1 row created.

SQL> INSERT INTO cabin VALUES ('c401', 'available', 4);

1 row created.
```

```
SQL> INSERT INTO cabin VALUES ('c402', 'available', 4);

1 row created.

SQL> INSERT INTO cabin VALUES ('c501', 'unavailable', 5);

1 row created.

SQL> INSERT INTO cabin VALUES ('c701', 'unavailable', 7);

1 row created.

SQL>
```

Departments table creation:

```
DROP TABLE departments;

CREATE TABLE departments(
  dept_id number not null,
  dept_name varchar(20) not null,
  instore_location varchar(20) not null,
  PRIMARY KEY(dept_id)
);
```

```
SQL> CREATE TABLE departments(
  2    dept_id number not null,
  3    dept_name varchar(20) not null,
  4    instore_location varchar(20) not null,
  5    PRIMARY KEY(dept_id)
  6  );

Table created.

SQL>
```

```
INSERT INTO departments VALUES(101,'History','I1');

INSERT INTO departments VALUES(102,'Physics','I3');

INSERT INTO departments VALUES(103,'Economics','I4');

INSERT INTO departments VALUES(104,'Civics','I5');

INSERT INTO departments VALUES(105,'Mathamatics','I6');
```

INSERT INTO departments VALUES(106,'Botony','I7');

INSERT INTO departments VALUES(107,'Arts','I8');

INSERT INTO departments VALUES(108,'Music','I9');

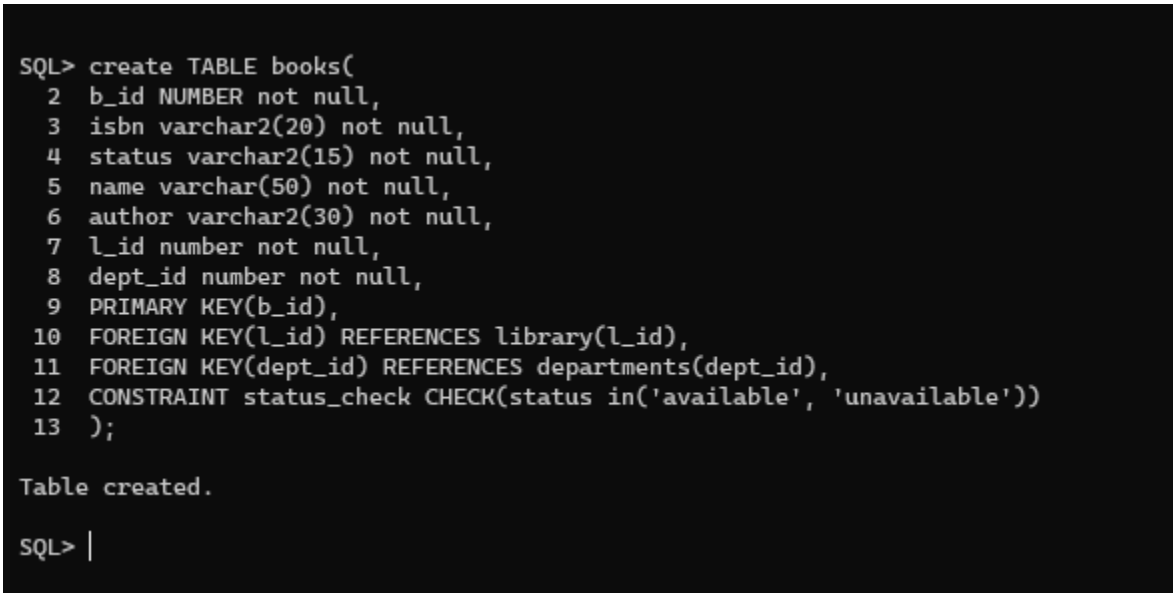
INSERT INTO departments VALUES(109,'Political Science','I10');

INSERT INTO departments VALUES(110,'Chemistry','I3');

```
SQL> INSERT INTO departments VALUES(101,'History','I1');

1 row created.

SQL> INSERT INTO departments VALUES(102,'Physics','I3');

1 row created.

SQL> INSERT INTO departments VALUES(103,'Economics','I4');

1 row created.

SQL> INSERT INTO departments VALUES(104,'Civics','I5');

1 row created.

SQL> INSERT INTO departments VALUES(105,'Mathamatics','I6');

1 row created.

SQL> INSERT INTO departments VALUES(106,'Botony','I7');

1 row created.

SQL> INSERT INTO departments VALUES(107,'Arts','I8');

1 row created.

SQL> INSERT INTO departments VALUES(108,'Music','I9');

1 row created.

SQL> INSERT INTO departments VALUES(109,'Political Science','I10');

1 row created.

SQL> INSERT INTO departments VALUES(110,'Chemistry','I3');

1 row created.
```

Books table creation:

```
DROP table books;
create TABLE books(
b_id NUMBER not null,
isbn varchar2(20) not null,
status varchar2(15) not null,
name varchar(50) not null,
author varchar2(30) not null,
l_id number not null,
dept_id number not null,
PRIMARY KEY(b_id),
FOREIGN KEY(l_id) REFERENCES library(l_id),
FOREIGN KEY(dept_id) REFERENCES departments(dept_id),
CONSTRAINT status_check CHECK(status in('available', 'unavailable'))
);
```




```
INSERT INTO books VALUES (601, 'a102', 'available', 'java', 'James Gosling', 1, 101);
INSERT INTO books VALUES (602, 'a103', 'unavailable', 'oracle', 'chad s', 2, 101);
INSERT INTO books VALUES (603, 'a104', 'available', 'mongo bd', 'nitesh', 1, 101);
INSERT INTO books VALUES (604, 'a105', 'available', 'finance', 'sreekar', 5, 104);
```

INSERT INTO books VALUES (605, 'a106', 'available', 'calclus', 'naveen', 1, 105);

INSERT INTO books VALUES (606, 'a107', 'available', 'circles', 'prasanth', 6, 105);

INSERT INTO books VALUES (607, 'a108', 'unavailable', 'anuglar monentum', 'sharanya', 1, 102);

INSERT INTO books VALUES (608, 'a111', 'available', 'organic chemistry', 'lavanya', 8, 110);

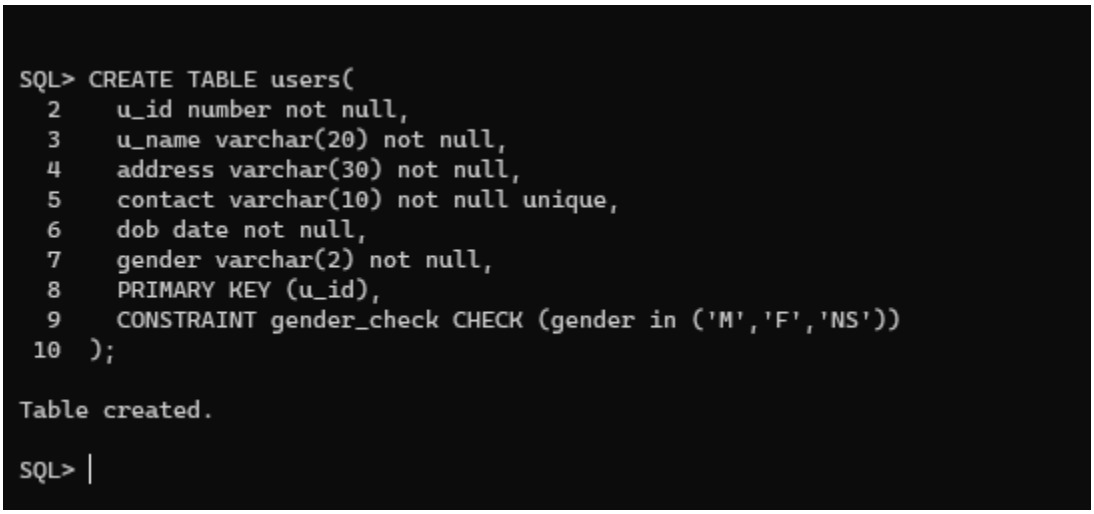
INSERT INTO books VALUES (609, 'a109', 'available', 'akbar history', 'manish', 3, 101);

INSERT INTO books VALUES (610, 'a115', 'available', 'pollination', 'vishnu', 4, 106);

```
SQL> INSERT INTO books VALUES (601, 'a102', 'available', 'java', 'James Gosling', 1, 101);

1 row created.

SQL> INSERT INTO books VALUES (602, 'a103', 'unavailable', 'oracle', 'chad s', 2, 101);

1 row created.

SQL> INSERT INTO books VALUES (603, 'a104', 'available', 'mongo bd', 'nitesh', 1, 101);

1 row created.

SQL> INSERT INTO books VALUES (604, 'a105', 'available', 'finance', 'sreekar', 5, 104);

1 row created.

SQL> INSERT INTO books VALUES (605, 'a106', 'available', 'calclus', 'naveen', 1, 105);

1 row created.

SQL> INSERT INTO books VALUES (606, 'a107', 'available', 'circles', 'prasanth', 6, 105);

1 row created.

SQL> INSERT INTO books VALUES (607, 'a108', 'unavailable', 'anuglar monentum', 'sharanya', 1, 102);

1 row created.

SQL> INSERT INTO books VALUES (608, 'a111', 'available', 'organic chemistry', 'lavanya', 8, 110);

1 row created.

SQL> INSERT INTO books VALUES (609, 'a109', 'available', 'akbar history', 'manish', 3, 101);

1 row created.

SQL> INSERT INTO books VALUES (610, 'a115', 'available', 'pollination', 'vishnu', 4, 106);

1 row created.

SQL>
```

Users Table Creation:

```
DROP TABLE users;

CREATE TABLE users(
  u_id number not null,
  u_name varchar(20) not null,
  address varchar(30) not null,
  contact varchar(10) not null unique,
  dob date not null,
  gender varchar(2) not null,
  PRIMARY KEY (u_id),
  CONSTRAINT gender_check CHECK (gender in ('M','F','NS'))
);
```




```
INSERT INTO users VALUES(110,'kin','Sacramento-
CA','5647765876',TO_DATE('1999/07/07','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(111,'kary','San Fransisco-
CA','5647675876',TO_DATE('1999/09/07','yyyy/mm/dd'),'F');

INSERT INTO users VALUES(112,'Lin','Longbeach-
CA','5647765899',TO_DATE('1998/07/07','yyyy/mm/dd'),'F');

INSERT INTO users VALUES(113,'Lilly','San Diego-
CA','5647765888',TO_DATE('1997/07/07','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(114,'Jacob','Fresno-
CA','5647765877',TO_DATE('1996/07/07','yyyy/mm/dd'),'M');
```

INSERT INTO users VALUES(115,'Jerry','Sacramento-CA','5647765866',TO_DATE('1999/04/07','yyyy/mm/dd'),'NS');

INSERT INTO users VALUES(116,'Manu','Fresno-CA','5647765855',TO_DATE('1999/07/03','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(117,'Fullery','Los Angeles-CA','5647765844',TO_DATE('1999/02/07','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(118,'Sam','Folsom-CA','5647765833',TO_DATE('1999/03/07','yyyy/mm/dd'),'F');

INSERT INTO users VALUES(119,'Drake','San Diego-CA','5647765822',TO_DATE('1999/07/01','yyyy/mm/dd'),'M');

```
SQL> INSERT INTO users VALUES(110,'kin','Sacramento-CA','5647765876',TO_DATE('1999/07/07','yyyy/mm/dd'),'M');

1 row created.

SQL> INSERT INTO users VALUES(111,'kary','San Fransisco-CA','5647675876',TO_DATE('1999/09/07','yyyy/mm/dd'),'F');

1 row created.

SQL> INSERT INTO users VALUES(112,'Lin','Longbeach-CA','5647765899',TO_DATE('1998/07/07','yyyy/mm/dd'),'F');

1 row created.

SQL> INSERT INTO users VALUES(113,'Lilly','San Diego-CA','5647765888',TO_DATE('1997/07/07','yyyy/mm/dd'),'M');

1 row created.

SQL> INSERT INTO users VALUES(114,'Jacob','Fresno-CA','5647765877',TO_DATE('1996/07/07','yyyy/mm/dd'),'M');

1 row created.

SQL> INSERT INTO users VALUES(115,'Jerry','Sacramento-CA','5647765866',TO_DATE('1999/04/07','yyyy/mm/dd'),'NS');

1 row created.

SQL> INSERT INTO users VALUES(116,'Manu','Fresno-CA','5647765855',TO_DATE('1999/07/03','yyyy/mm/dd'),'M');

1 row created.

SQL> INSERT INTO users VALUES(117,'Fullery','Los Angeles-CA','5647765844',TO_DATE('1999/02/07','yyyy/mm/dd'),'M');

1 row created.

SQL> INSERT INTO users VALUES(118,'Sam','Folsom-CA','5647765833',TO_DATE('1999/03/07','yyyy/mm/dd'),'F');

1 row created.

SQL> INSERT INTO users VALUES(119,'Drake','San Diego-CA','5647765822',TO_DATE('1999/07/01','yyyy/mm/dd'),'M');

1 row created.

SQL>
```

Donations table creation:

```
DROP table donations;
create TABLE donations(
   d_id number not null,
   d_date date not null,
   amount number not null,
   u_id number not null,
   primary key(d_id),
   CONSTRAINT amount_check CHECK(amount>5),
   FOREIGN KEY(u_id) REFERENCES users(u_id)
);
```

```
SQL> create TABLE donations(
  2      d_id number not null,
  3      d_date date not null,
  4      amount number not null,
  5      u_id number not null,
  6      primary key(d_id),
  7      CONSTRAINT amount_check CHECK(amount>5),
  8      FOREIGN KEY(u_id) REFERENCES users(u_id)
  9  );

Table created.

SQL>
```

```
INSERT INTO donations VALUES(201,TO_DATE('2019/07/12','yyyy/mm/dd'),70,111);
INSERT INTO donations VALUES(202,TO_DATE('2019/08/12','yyyy/mm/dd'),71,112);
INSERT INTO donations VALUES(203,TO_DATE('2019/08/07','yyyy/mm/dd'),72,113);
INSERT INTO donations VALUES(204,TO_DATE('2019/07/13','yyyy/mm/dd'),73,114);
INSERT INTO donations VALUES(205,TO_DATE('2019/09/07','yyyy/mm/dd'),74,115);
INSERT INTO donations VALUES(206,TO_DATE('2019/07/08','yyyy/mm/dd'),75,116);
INSERT INTO donations VALUES(207,TO_DATE('2019/12/23','yyyy/mm/dd'),76,117);
INSERT INTO donations VALUES(208,TO_DATE('2019/07/11','yyyy/mm/dd'),77,118);
INSERT INTO donations VALUES(209,TO_DATE('2019/07/07','yyyy/mm/dd'),78,119);
INSERT INTO donations VALUES(210,TO_DATE('2019/06/07','yyyy/mm/dd'),79,119);
```

```
SQL> INSERT INTO donations VALUES(201,TO_DATE('2019/07/12','yyyy/mm/dd'),70,111);

1 row created.

SQL> INSERT INTO donations VALUES(202,TO_DATE('2019/08/12','yyyy/mm/dd'),71,112);

1 row created.

SQL> INSERT INTO donations VALUES(203,TO_DATE('2019/08/07','yyyy/mm/dd'),72,113);

1 row created.

SQL> INSERT INTO donations VALUES(204,TO_DATE('2019/07/13','yyyy/mm/dd'),73,114);

1 row created.

SQL> INSERT INTO donations VALUES(205,TO_DATE('2019/09/07','yyyy/mm/dd'),74,115);

1 row created.

SQL> INSERT INTO donations VALUES(206,TO_DATE('2019/07/08','yyyy/mm/dd'),75,116);

1 row created.

SQL> INSERT INTO donations VALUES(207,TO_DATE('2019/12/23','yyyy/mm/dd'),76,117);

1 row created.

SQL> INSERT INTO donations VALUES(208,TO_DATE('2019/07/11','yyyy/mm/dd'),77,118);

1 row created.

SQL> INSERT INTO donations VALUES(209,TO_DATE('2019/07/07','yyyy/mm/dd'),78,119);

1 row created.

SQL> INSERT INTO donations VALUES(210,TO_DATE('2019/06/07','yyyy/mm/dd'),79,119);

1 row created.

SQL>
```

Book_Transaction table creation:

```
DROP table book_transactions;

create TABLE book_transactions(
    t_id number,
    t_date date,
    b_id number not null,
    u_id number not null,
```

```
   primary key(t_id),
   FOREIGN KEY(u_id) REFERENCES users(u_id),
   FOREIGN KEY(b_id) REFERENCES books(b_id)
);
```

```
SQL> create TABLE book_transactions(
  2      t_id number,
  3      t_date date,
  4      b_id number not null,
  5      u_id number not null,
  6      primary key(t_id),
  7      FOREIGN KEY(u_id) REFERENCES users(u_id),
  8      FOREIGN KEY(b_id) REFERENCES books(b_id)
  9  );

Table created.

SQL>
```

```
INSERT INTO book_transactions VALUES (4001, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 601, 116 );
INSERT INTO book_transactions VALUES (4002, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 602, 118 );
INSERT INTO book_transactions VALUES (4003, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 606, 117 );
INSERT INTO book_transactions VALUES (4004, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 603, 112 );
INSERT INTO book_transactions VALUES (4005, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 604, 116 );
INSERT INTO book_transactions VALUES (4006, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 605, 114 );
INSERT INTO book_transactions VALUES (4007, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 607, 116 );
INSERT INTO book_transactions VALUES (4008, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 609, 113 );
INSERT INTO book_transactions VALUES (4009, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 608, 110 );
INSERT INTO book_transactions VALUES (4010, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 610, 111 );
```

```
SQL> INSERT INTO book_transactions VALUES (4001, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 601, 116 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4002, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 602, 118 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4003, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 606, 117 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4004, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 603, 112 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4005, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 604, 116 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4006, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 605, 114 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4007, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 607, 116 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4008, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 609, 113 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4009, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 608, 110 );

1 row created.

SQL> INSERT INTO book_transactions VALUES (4010, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 610, 111 );

1 row created.

SQL>
```

library_checkin table creation:

```
DROP table library_checkin;
create TABLE library_checkin(
   checkin_id number,
   checkin_date date,
   l_id number not null,
   u_id number not null,
   primary key(checkin_id),
   FOREIGN KEY(l_id) REFERENCES library(l_id),
   FOREIGN KEY(u_id) REFERENCES users(u_id)
```

);

```
SQL> create TABLE library_checkin(
  2      checkin_id number,
  3      checkin_date date,
  4      l_id number not null,
  5      u_id number not null,
  6      primary key(checkin_id),
  7      FOREIGN KEY(l_id) REFERENCES library(l_id),
  8      FOREIGN KEY(u_id) REFERENCES users(u_id)
  9  );

Table created.

SQL>
```

INSERT INTO library_checkin VALUES (1201, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 1, 116);

INSERT INTO library_checkin VALUES (1202, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 2, 118);

INSERT INTO library_checkin VALUES (1203, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 6, 117);

INSERT INTO library_checkin VALUES (1204, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 3, 112);

INSERT INTO library_checkin VALUES (1205, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 4, 116);

INSERT INTO library_checkin VALUES (1206, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 5, 114);

INSERT INTO library_checkin VALUES (1207, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 7, 116);

INSERT INTO library_checkin VALUES (1208, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 9, 113);

INSERT INTO library_checkin VALUES (1209, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 8, 110);

INSERT INTO library_checkin VALUES (1210, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 10, 111);

```
SQL> INSERT INTO library_checkin VALUES (1201, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 1, 116 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1202, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 2, 118 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1203, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 6, 117 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1204, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 3, 112 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1205, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 4, 116 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1206, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 5, 114 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1207, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 7, 116 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1208, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 9, 113 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1209, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 8, 110 );

1 row created.

SQL> INSERT INTO library_checkin VALUES (1210, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 10, 111 );

1 row created.

SQL>
```

5) Contribution towards the Project:

My contribution towards the part-2 of the project is as follows:

- As a team member, I have involved with all my team-members to update the description and transform the E-R diagram from the description.
- With the description, I involved in transforming the E-R diagram to Relational diagram and database-schema.
- As I took the ownership in building up the Entity Users and data of Users, I worked with my team in building up the relationships between other entities and User Entity.
- I have created the Users table in SQL-Oracle using below commands,

```
CREATE TABLE users(
  u_id number not null,
  u_name varchar(20) not null,
  address varchar(30) not null,
  contact varchar(10) not null unique,
  dob date not null,
  gender varchar(2) not null,
  PRIMARY KEY (u_id),
  CONSTRAINT gender_check CHECK (gender in ('M','F','NS'))
);
```

- In the above script, “users” is the name of the table-users, As Users table has unique primary key, I represented it as “u_id” and this could not be empty, So constrain “not null” is used.
- Address of a user, contact of user and date of birth(dob) also cannot be empty, so I gave the condition/constrain as not null, not null unique and not null respectively.
- In gender, I have given the given that the gender should be only either of M / F / NS.
- After creating table, I have inserted data into it using below scripts;

```
INSERT INTO users VALUES(110,'kin','Sacramento-CA','5647765876',TO_DATE('1999/07/07','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(111,'kary','San Fransisco-CA','5647675876',TO_DATE('1999/09/07','yyyy/mm/dd'),'F');

INSERT INTO users VALUES(112,'Lin','Longbeach-CA','5647765899',TO_DATE('1998/07/07','yyyy/mm/dd'),'F');

INSERT INTO users VALUES(113,'Lilly','San Diego-CA','5647765888',TO_DATE('1997/07/07','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(114,'Jacob','Fresno-CA','5647765877',TO_DATE('1996/07/07','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(115,'Jerry','Sacramento-CA','5647765866',TO_DATE('1999/04/07','yyyy/mm/dd'),'NS');

INSERT INTO users VALUES(116,'Manu','Fresno-CA','5647765855',TO_DATE('1999/07/03','yyyy/mm/dd'),'M');
```

```
INSERT INTO users VALUES(117,'Fullery','Los Angeles-
CA','5647765844',TO_DATE('1999/02/07','yyyy/mm/dd'),'M');

INSERT INTO users VALUES(118,'Sam','Folsom-
CA','5647765833',TO_DATE('1999/03/07','yyyy/mm/dd'),'F');

INSERT INTO users VALUES(119,'Drake','San Diego-
CA','5647765822',TO_DATE('1999/07/01','yyyy/mm/dd'),'M');
```

- I have contributed myself in creating the many-to-many relationship table Library_checkin. As described before this has many-to-many relationship with Library Entity.
- Library_checkin has uniquely generated Id – checkin_id, I am using this as primary key to uniquely identify the tuple.
- There come 2 foreign keys each from either side i.e., from Library Entity and Users Entity. They are u_id from users and l_id from library.
- There is another attribute in library_checkin relationship table named checkin_date.
- Library_checkin (u_id, l_id, checkin_id, checkin_date) is the schema of Library_checkin.
- I have created the table Library_checkin and inserted data into it using below scripts:

```
DROP table library_checkin;

create TABLE library_checkin(
   checkin_id number,
   checkin_date date,
   l_id number not null,
   u_id number not null,
   primary key(checkin_id),
   FOREIGN KEY(l_id) REFERENCES library(l_id),
   FOREIGN KEY(u_id) REFERENCES users(u_id)
);


INSERT INTO library_checkin VALUES (1201, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 1, 116 );

INSERT INTO library_checkin VALUES (1202, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 2, 118 );

INSERT INTO library_checkin VALUES (1203, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 6, 117 );

INSERT INTO library_checkin VALUES (1204, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 3, 112 );

INSERT INTO library_checkin VALUES (1205, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 4, 116 );
```

```
INSERT INTO library_checkin VALUES (1206, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 5, 114 );
INSERT INTO library_checkin VALUES (1207, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 7, 116 );
INSERT INTO library_checkin VALUES (1208, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 9, 113 );
INSERT INTO library_checkin VALUES (1209, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 8, 110 );
INSERT INTO library_checkin VALUES (1210, TO_DATE('2019/07/12', 'yyyy/mm/dd'), 10, 111 );
```