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COURSE CODE: CSE 4308

SUBJECT: DATABASE MANAGEMENT SYSTEMS LAB

Introduction

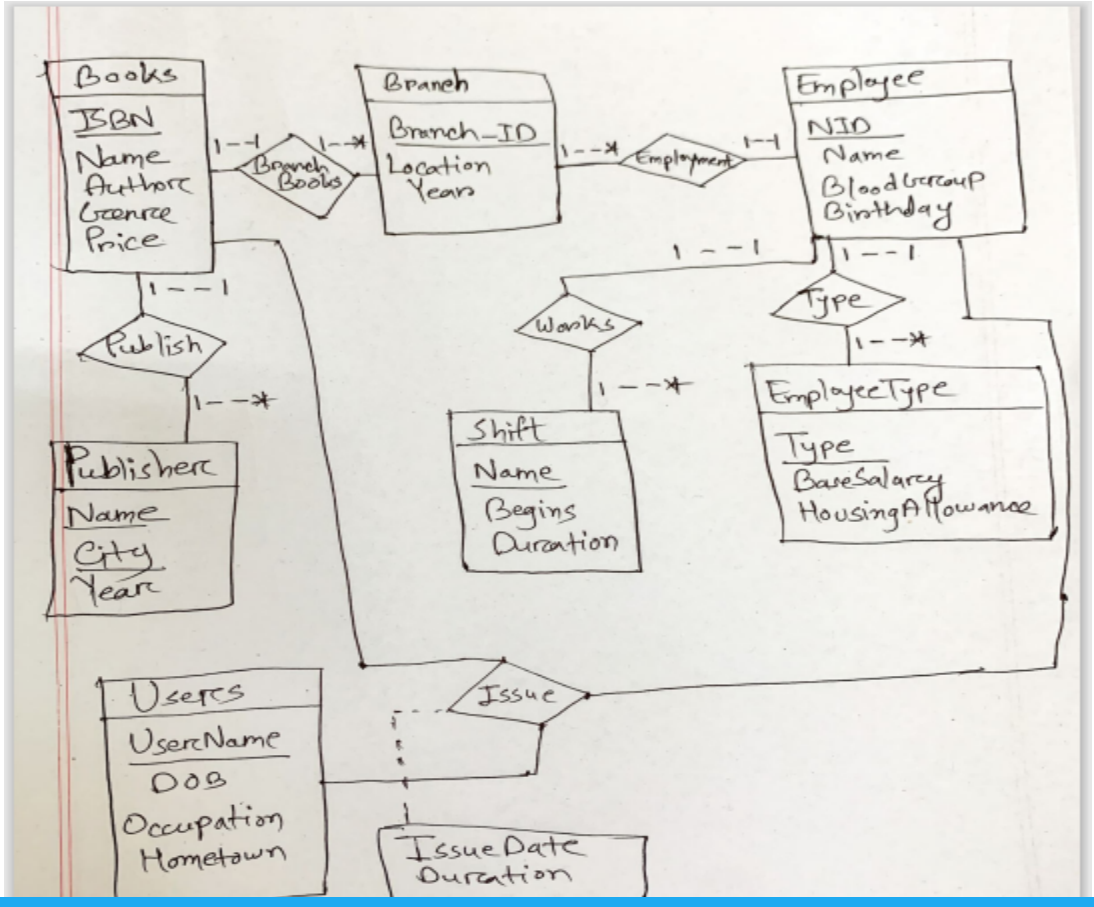
Our task in this lab was to draw an ER Diagram for the given scenario and convert the ER Diagram into DDL.

ER Diagram stands for Entity Relationship Diagram. ERD displays the relationship of entity sets stored in a database. ER Diagram consists of three basic components- entities, attributes of the entities and relation among the entities. ER Diagram provides visual representation of the database and makes the process of designing schema of the database easier.

Task1

Our first task was to create the ERD. I drew the ERD with pen and paper.Here I am providing the image of the ERD.

Solution:



Link of the ERD; Lab6.pdf

Explanation:

In the diagram, I have created 8 entities along with their necessary attributes.

Books entity has 5 attributes- ISBN, Name,Author,Genre and Price. Here ISBN is the primary key.

Branch entity has 3 attributes- Branch_ID,Location and Year. Here Brabch_ID is the primary key.

Employee entity has 4 attributes- NID,Name ,BloodGroup and DateofBirth.Here NID is the primary key.

Publisher entity has 3 attributes- Name ,City and Year.Here Name and City are the primary key.

Shift has 3 attributes - Name, Begins and Duration. Here Name is the primary key.

EmployeeType has 3 attributes- Type,BaseSalary and HousingAllowance. Type is the primary key.

Users has 4 attributes- UserName , DateOfBirth ,Occupation and Hometown.UserName is the primary key.

There are 6 relations in the diagram. Books and Branch have many to one relation. A book of a particular ISBN can be in only one Branch. Each branch can have many books. Relation between Books and Branch is BranchBooks. A book is generally published by one publisher. But a publisher can publish many books. So Book and Publisher have many to one relation. Relation between Books and Publisher is Publish.

An employee can work in only one branch.He/She can be of a particular type and can work only in a specific shift. So Employee has many to one relation with Shift and EmployeeType.Relation between Employee and Shift is Works. Relation between Employee and Shift is Type

Now a user can borrow any number of books and an employee can assign books to many users. So Books,Employee and Users have many to many relation. For this relation a junction table is created named Issue which will have the primary keys of the associated entities and two additional attributes- IssueDate and Duration.

All the relations in the ERD are binary except the Issue relation. Issue is a ternary relation.

Task2

Our second task was to convert the ER Diagram into DDL using SQL.

Solution:

```
CREATE TABLE BRANCH(
   BRANCH_ID NUMBER ,
   LOCATION VARCHAR(20),
   YEAR VARCHAR(20),
   CONSTRAINT PK_BRANCH PRIMARY KEY(BRANCH_ID)
);


 CREATE TABLE BOOKS(
    ISBN NUMBER,
    NAME VARCHAR(20),
    AUTHOR VARCHAR(20),
    GENRE VARCHAR(20),
    PRICE NUMBER,
    BRANCH_ID NUMBER ,
  CONSTRAINT PK_BOOKS PRIMARY KEY(ISBN),
  CONSTRAINT FK_BOOK FOREIGN KEY(BRANCH_ID) REFERENCES BRANCH(BRANCH_ID)
 );
 CREATE TABLE EMPLOYEE(
    NID NUMBER,
    NAME VARCHAR(20),
    BLOODGROUP VARCHAR(20),
    DATEOFBIRTH DATE,
   BRANCH_ID NUMBER ,
   SHIFTNAME VARCHAR(20),
```

```
   TYPE VARCHAR(20),
  CONSTRAINT PK_EMPLOYEE PRIMARY KEY(NID),
  CONSTRAINT FK_EMPLOYEE1 FOREIGN KEY(BRANCH_ID) REFERENCES
BRANCH(BRANCH_ID),
  CONSTRAINT FK_EMPLOYEE2 FOREIGN KEY(SHIFTNAME) REFERENCES SHIFT(NAME),
  CONSTRAINT FK_EMPLOYEE3 FOREIGN KEY(TYPE) REFERENCES
EMPLOYEETYPE(TYPE)
);
CREATE TABLE PUBLISHER(
    NAME VARCHAR(20),
    CITY VARCHAR(20),
    YEAR INTEGER,
   ISBN NUMBER ,
  CONSTRAINT PK_PUBLISHER PRIMARY KEY(NAME),
    CONSTRAINT PK_PUBLISHER2 PRIMARY KEY(CITY),
  CONSTRAINT FK_PUBLISHER FOREIGN KEY(ISBN) REFERENCES BOOKS(ISBN)
);
CREATE TABLE SHIFT(
    NAME VARCHAR(20),
   BEGIN NUMBER,
   DURATION NUMBER,
  CONSTRAINT PK_SHIFT PRIMARY KEY(NAME)
);

  CREATE TABLE EMPLOYEETYPE(
    TYPE VARCHAR(20),
   BASE_SALARY NUMBER ,
   HOUSING_AllOWANCE NUMBER,
  CONSTRAINT PK_EMPLOYEETYPE PRIMARY KEY(TYPE)
  );
  CREATE TABLE USER(
    USER_NAME VARCHAR(20),
   DOB VARCHAR(20),
    OCCUPATION VARCHAR(20),
    HOMETOWN VARCHAR(20),
  CONSTRAINT PK_USER PRIMARY KEY(USER_NAME)
  );
  CREATE TABLE ISSUE(
       ISBN NUMBER,
    USER_NAME VARCHAR(20),
    NID NUMBER,
    ISSUEDATE DATE,
    DURATION NUMBER,
```

```
  CONSTRAINT PRIMARYDURATION DURATION DEFAULT 15,
CONSTRAINT PK_ISSUE1 PRIMARY KEY(ISBN),
  CONSTRAINT PK_ISSUE2 PRIMARY KEY(USER_NAME),
  CONSTRAINT PK_ISSUE3 PRIMARY KEY(NID),
CONSTRAINT FK_ISSUE1 FOREIGN KEY(ISBN) REFERENCES BOOKS(ISBN),
  CONSTRAINT FK_ISSUE2 FOREIGN KEY(USER_NAME) REFERENCES USER(USER_NAME),
   CONSTRAINT FK_ISSUE3 FOREIGN KEY(NID) REFERENCES EMPLOYEE(NID)
);
```

Explanation:

To convert the ERD into a table we need to use the 'CREATE TABLE' command.

To implement many to one relation a foriegn key is introduced at the many part referencing the other entity. I used constraints such as primary key and foreign key to impose the constraints.

Books have a forign key named BRANCH_ID referencing Branch.Employee have three forign keys named BRANCH_ID,SHIFTNAME,TYPE referencing Branch,Shift and EmployeeType respectively. Issue has a composite primary key which consists of three keys and they are foreign keys also as it is a junction table.Another constraint that I have used is DEFAULT in the Issue table to set the default duration as 15 days.

Thus I solved the task. I did not face any significant problem during the task. It took a bit of time to develop the ERD. Following the ERD it was easy to impose constraints and create the tables.