COMP 306: Database Management Systems

Spring 2023 - Homework #1

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Question 1.

Diagram

Description automatically generated

Question 2.

CREATE TABLE book (

isbn int(11) NOT NULL,

title varchar(255) NOT NULL,

price int(5) NOT NULL,

front\_cover\_type varchar(255) NOT NULL,

#\_of\_pages int(5) NOT NULL,

PRIMARY KEY (isbn),

customer\_id int(11),

FOREIGN KEY (customer\_id) REFERENCES customer(id),

payment\_method varchar(255) NOT NULL,

purchase\_date date NOT NULL,

registered\_customer\_id int(11),

FOREIGN KEY (registered\_customer\_id) REFERENCES registered\_customer(id),

borrow\_date date NOT NULL,

return\_date date NOT NULL

);

CREATE TABLE author (

id int(11) NOT NULL,

name varchar(255) NOT NULL,

PRIMARY KEY (id)

);

CREATE TABLE customer (

id int(11) NOT NULL,

name varchar(255) NOT NULL,

email\_address varchar(255) NOT NULL,

PRIMARY KEY (id)

);

CREATE TABLE visiting\_customer (

id int(11) NOT NULL,

address varchar(255) NOT NULL,

phone\_# int(11),

PRIMARY KEY (id),

FOREIGN KEY(id )REFERENCES customer(id)

);

CREATE TABLE registered\_customer (

id int(11) NOT NULL,

reg\_date date NOT NULL,

PRIMARY KEY (id),

FOREIGN KEY(id) REFERENCES customer(id)

);

CREATE TABLE written\_by (

book\_isbn int(11) NOT NULL,

author\_id int(11) NOT NULL,

FOREIGN KEY(book\_isbn) REFERENCES book(isbn),

FOREIGN KEY(author\_id) REFERENCES author(id),

PRIMARY KEY(book\_isbn,author\_id)

);

CREATE TABLE customer\_email\_address (

id int(11) NOT NULL,

email\_address varchar(255) NOT NULL,

PRIMARY KEY(id,email\_address),

FOREIGN KEY(id) REFERENCES customer(id)

);

Question 3.

(a) π Fname, Bdate, Address, Salary (σ Bdate >= '01/01/1990' ∧ Dname = 'Sales' (Employee ⨝ Works On ⨝ Project ⨝ Department))

(b) π Fname, Minit, Lname (σ Dnumber = 8 ∧ Hours > 20 ∧ Pname = 'DataPrivacy' (Employee ⨝ Works On ⨝ Project))

(c) π Lname, Salary ((Employee ⨝ Works On) / (π Pno (Project ⨝ σ Dnumber = 5 (Department))) ⨝ Project)

(d) π E.Lname, E.Salary, S.Lname ((Employee ⨝ Employee as S on E. Super Ssn = S.Ssn) - (Works On ⨝ π Pno, Essn (Works On) as P on P.Essn = E.Ssn)) ⨝ S on E.Super Ssn = S.Ssn

(e) π Dname ((Department ⨝ Dept Locations) ⨝ Project ⨝ σ Dlocation = 'Istanbul' Dept Locations)

(f) π Pno (σ ∃ E.Lname = 'Gursoy' (Employee ⨝ Works On ⨝ σ Dnum = (π Dnumber (Department ⨝ σ Lname = 'Gursoy' (Employee ⨝ Department))) (Project)))

(g) π M1.Lname, M1.Salary(Department ⨝ Manager as M1 ⨝ ∀M2((Manager as M2) ⨝ (M1.Start Date >= M2.Start Date)) (M1.Ssn = Department.Mgr ssn))

(h) π E.Fname, E.Lname (Employee as E ⨝ ∃S (E.Super Ssn = S.Ssn ∧ E.Bdate > S.Bdate))