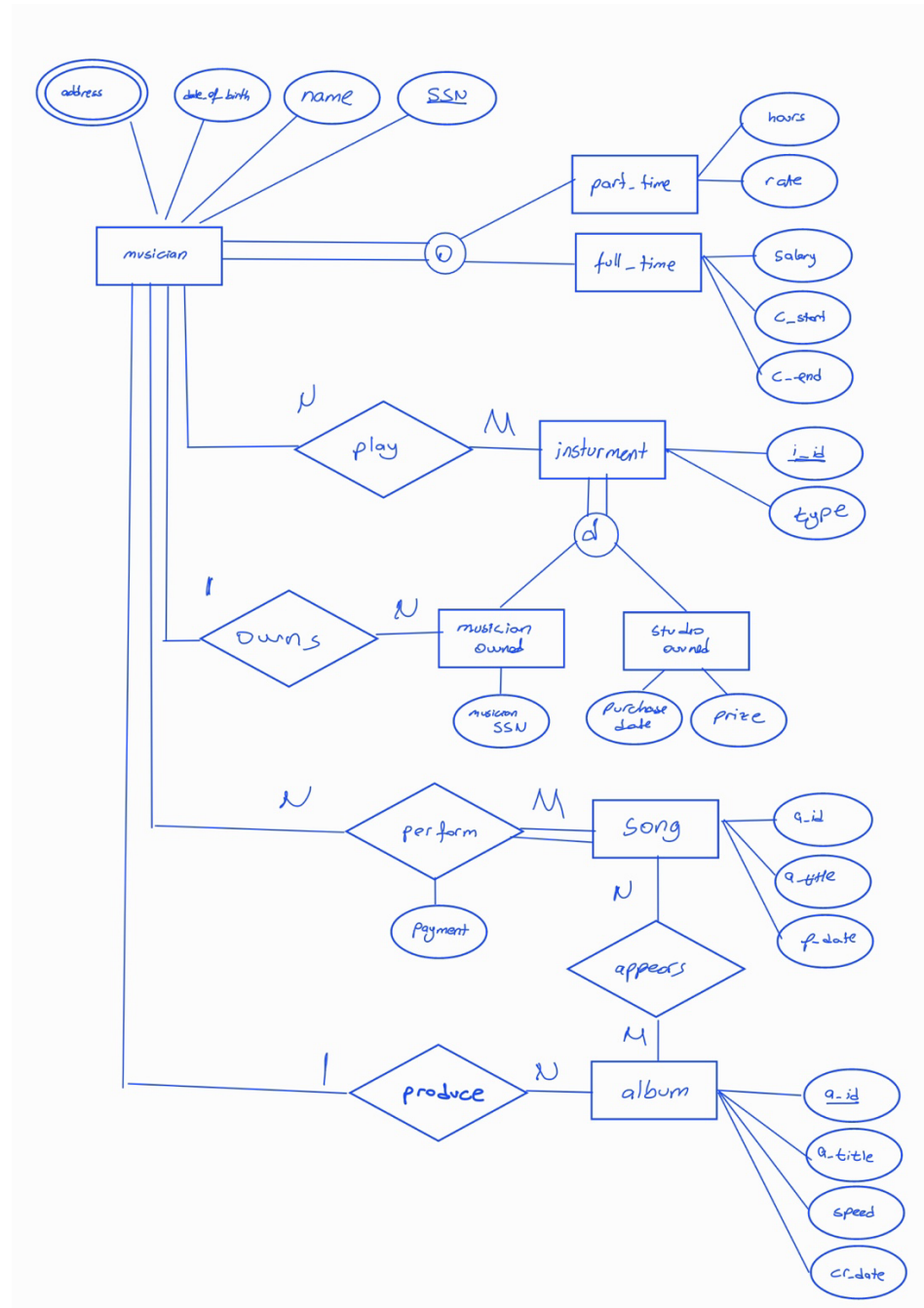


COMP 306: Database Management Systems

Spring 2023 - Homework #1

Yakup Enes GÜVEN - 64045

Question 1.



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 \geq '01/01/1990' \wedge Dname = 'Sales' (Employee \bowtie Works On \bowtie Project \bowtie Department))

(b) π Fname, Minit, Lname (σ Dnumber = 8 \wedge Hours $>$ 20 \wedge Pname = 'DataPrivacy' (Employee \bowtie Works On \bowtie Project))

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

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

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

(f) π Pno (σ \exists E.Lname = 'Gursoy' (Employee \bowtie Works On \bowtie σ Dnum = (π Dnumber (Department \bowtie σ Lname = 'Gursoy' (Employee \bowtie Department)))) (Project)))

(g) π M1.Lname, M1.Salary (Department \bowtie Manager as M1 \bowtie \forall M2((Manager as M2) \bowtie (M1.Start Date \geq M2.Start Date)) (M1.Ssn = Department.Mgr ssn))

(h) π E.Fname, E.Lname (Employee as E \bowtie \exists S (E.Super Ssn = S.Ssn \wedge E.Bdate $>$ S.Bdate))