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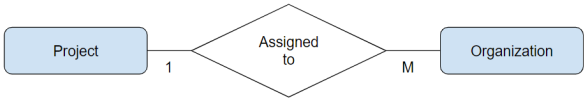
SOEN 363 - Database for Software Engineers
October 2nd, 2022

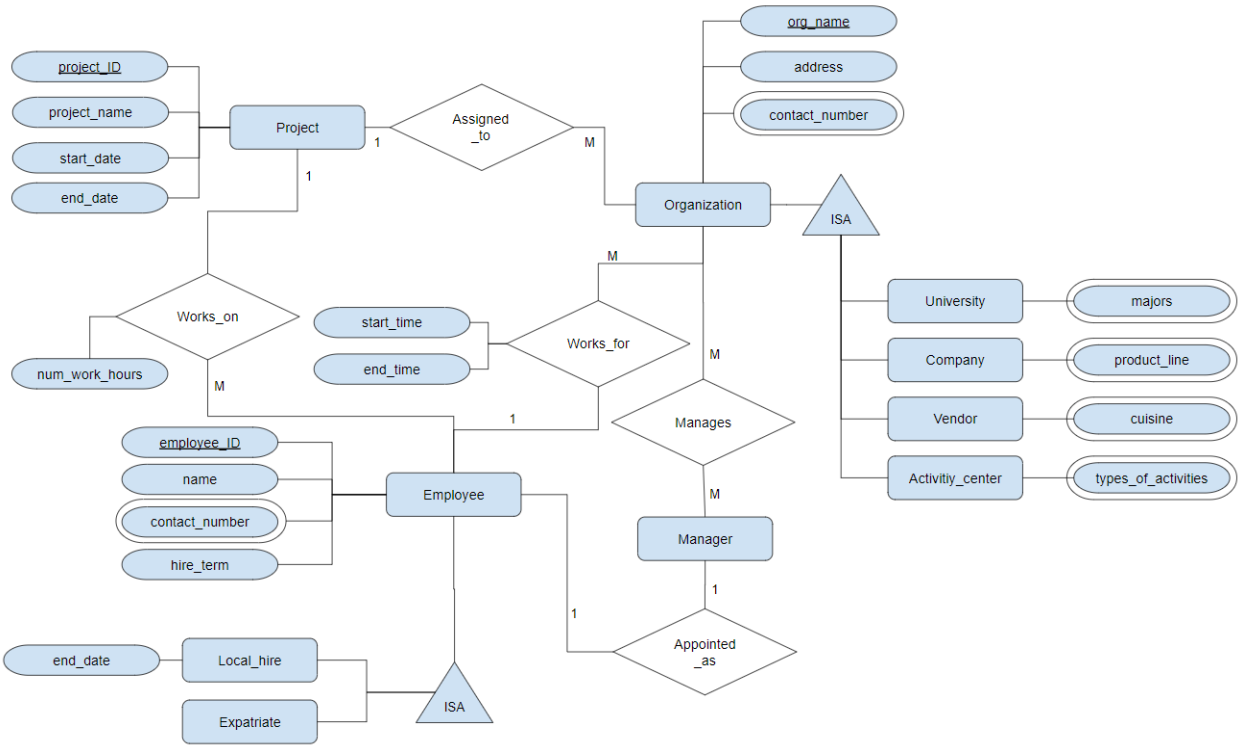
Problem Set 1

1. Building a Database for Concordia Foundation [40 Points]

(a)



(b)



(c)

Covering Constraints: Any organization can be either a university, a company, a vendor, or an activity center.

(d)

Overlap Constraints: An employee cannot be a local hire as well as an expatriate. A local hire employee cannot be an expatriate.

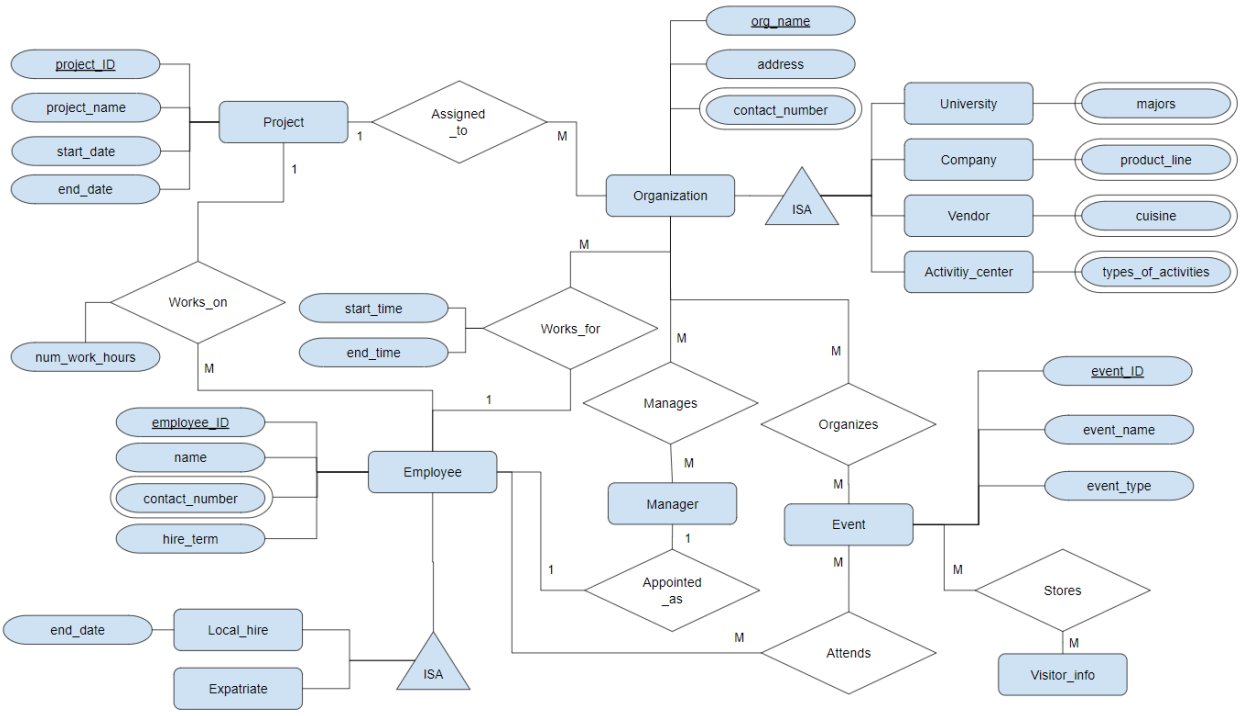
(e)

```
CREATE TABLE Organization (
        org_name CHAR(20) NOT NULL,
        address CHAR(20),
        contact_number CHAR(20),
        PRIMARY KEY (org_name)
);
CREATE TABLE University (
         majors CHAR(20),
         org_name CHAR(20) NOT NULL,
         FOREIGN KEY (org_name) REFERENCES Organization(org_name)
);
CREATE TABLE Company (
         product_line CHAR(20),
         org_name CHAR(20) NOT NULL,
         FOREIGN KEY (org_name) REFERENCES Organization(org_name)
);
CREATE TABLE Vendor(
         cuisine CHAR(20),
         org_name CHAR(20) NOT NULL,
         FOREIGN KEY (org_name) REFERENCES Organization(org_name)
);
CREATE TABLE Activity_center(
         types_of_activities CHAR(20),
         org_name CHAR(20) NOT NULL,
         FOREIGN KEY (org_name) REFERENCES Organization(org_name)
);
CREATE TABLE Project (
        project_ID CHAR(20) NOT NULL,
        project_name CHAR(20),
        start_date DATE,
        end_date DATE,
        PRIMARY KEY (project_ID)
);
CREATE TABLE Assigned_to (
        org_name CHAR(20) NOT_NULL,
        project_ID CHAR(20) NOT NULL,
        PRIMARY KEY (project_ID),
        FOREIGN KEY (org_name) REFERENCES Organization,
        FOREIGN KEY (project_ID) REFERENCES Project
```

```
);
CREATE TABLE Employee (
        employee_ID CHAR(20) NOT NULL,
        name CHAR(20),
        contact_number CHAR(20),
        hire_term CHAR(20),
        PRIMARY KEY (employee_ID)
);
CREATE TABLE Works_on (
        employee_ID CHAR(20) NOT_NULL,
        project_ID CHAR(20) NOT NULL,
        num_work_hours DOUBLE,
        PRIMARY KEY (project_ID),
        FOREIGN KEY (employee_ID) REFERENCES Employee,
        FOREIGN KEY (project_ID) REFERENCES Project
);
CREATE TABLE Works_for (
        org_name CHAR(20) NOT NULL,
        employee_ID CHAR(20) NOT NULL,
        start_time CHAR(20),
        end_time CHAR(20),
        PRIMARY KEY (org_name),
        FOREIGN KEY (employee_ID) REFERENCES Employee,
        FOREIGN KEY (org_name) REFERENCES Organization
);
CREATE TABLE Local_hire (
        employee_ID CHAR(20) NOT NULL,
        end_date DATE,
        FOREIGN KEY (employee_ID) REFERENCES Employee
);
CREATE TABLE Expatriate (
        employee_ID CHAR(20) NOT NULL,
        FOREIGN KEY (employee_ID) REFERENCES Employee
);
CREATE TABLE Manager (
        employee_ID CHAR(20) NOT NULL,
        FOREIGN KEY (employee_ID) REFERENCES Employee
);
```

2. Extending CF's Database [30 Points]

(a)

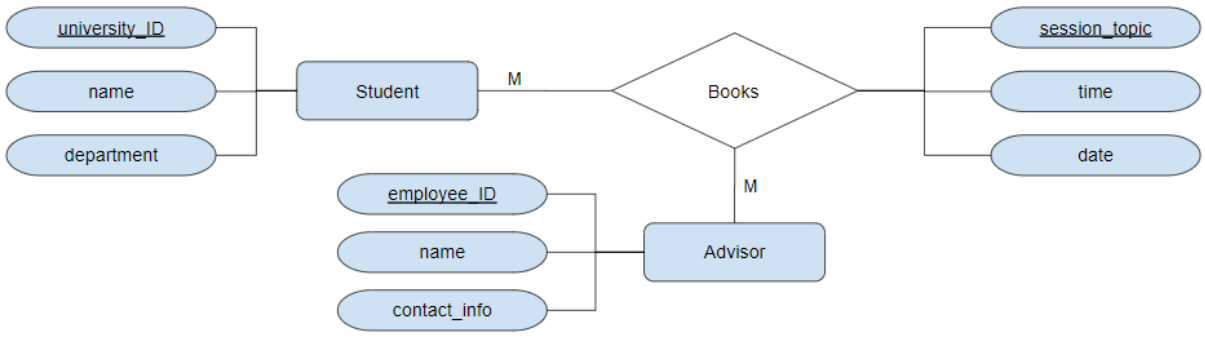


(b)

```
CREATE TABLE Event (
        org_name CHAR(20) NOT NULL,
        event_ID CHAR(20) NOT NULL,
        event_name CHAR(20),
        event_type CHAR(20),
        PRIMARY KEY (event_ID),
        FOREIGN KEY (org_name) REFERENCES Organization
);
CREATE TABLE Visitor_info (
        employee_ID CHAR(20) NOT NULL,
        contact_number CHAR(20),
        FOREIGN KEY (employee_ID) REFERENCES Employee,
        FOREIGN KEY (contact_number) REFERENCES Employee
);
```

3. Building a Database for Concordia Academic Advising System [30 Points]

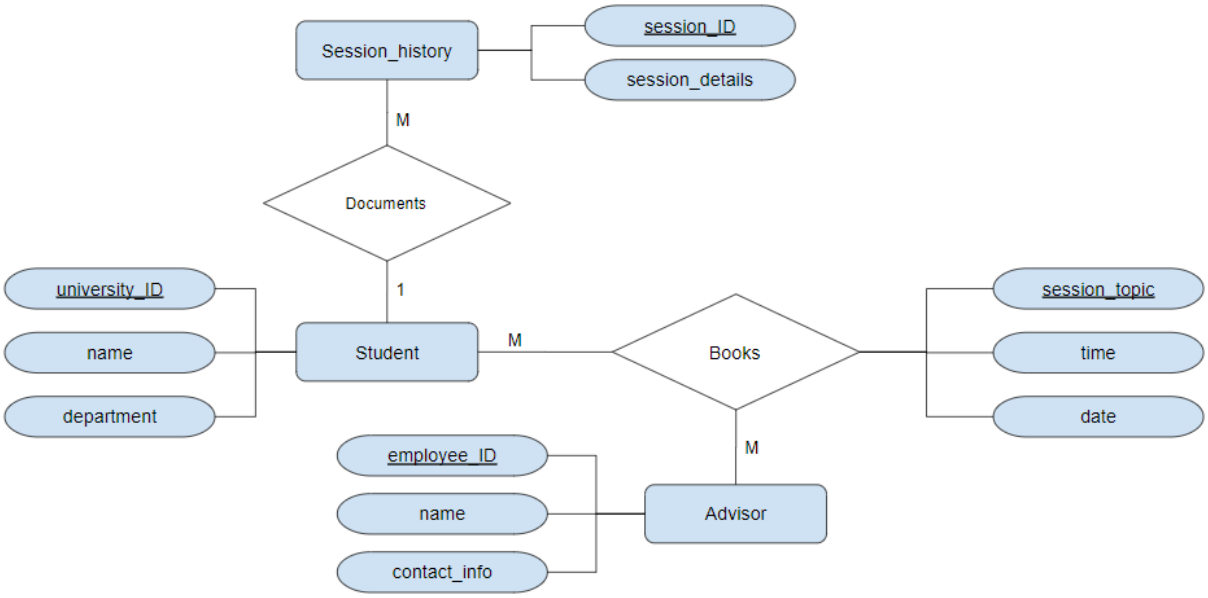
(a)



(b)

```
CREATE TABLE Student (
        university_ID CHAR(20) NOT NULL,
        name CHAR(20),
        department CHAR(20),
        PRIMARY KEY (university_ID)
);
CREATE TABLE Advisor (
        employee_ID CHAR(20) NOT NULL,
        name CHAR(20),
        contact_info CHAR(20)
        PRIMARY KEY (employee_ID)
);
CREATE TABLE Books (
        university_ID CHAR(20) NOT NULL,
        employee_ID CHAR(20) NOT NULL,
        session_topic CHAR(20) NOT NULL,
        time CHAR(20),
        date DATE,
        PRIMARY KEY (session_topic),
        FOREIGN KEY (university_ID) REFERENCES Student,
        FOREIGN KEY (employee_ID) REFERENCES Advisor
);
```

(c)




```
CREATE TABLE Session_history (
        university_ID CHAR(20) NOT NULL,
        session_ID CHAR(20) NOT NULL,
        session_details CHAR(100),
        PRIMARY KEY (session_ID),
        FOREIGN KEY (university_ID) REFERENCE Student
);
```