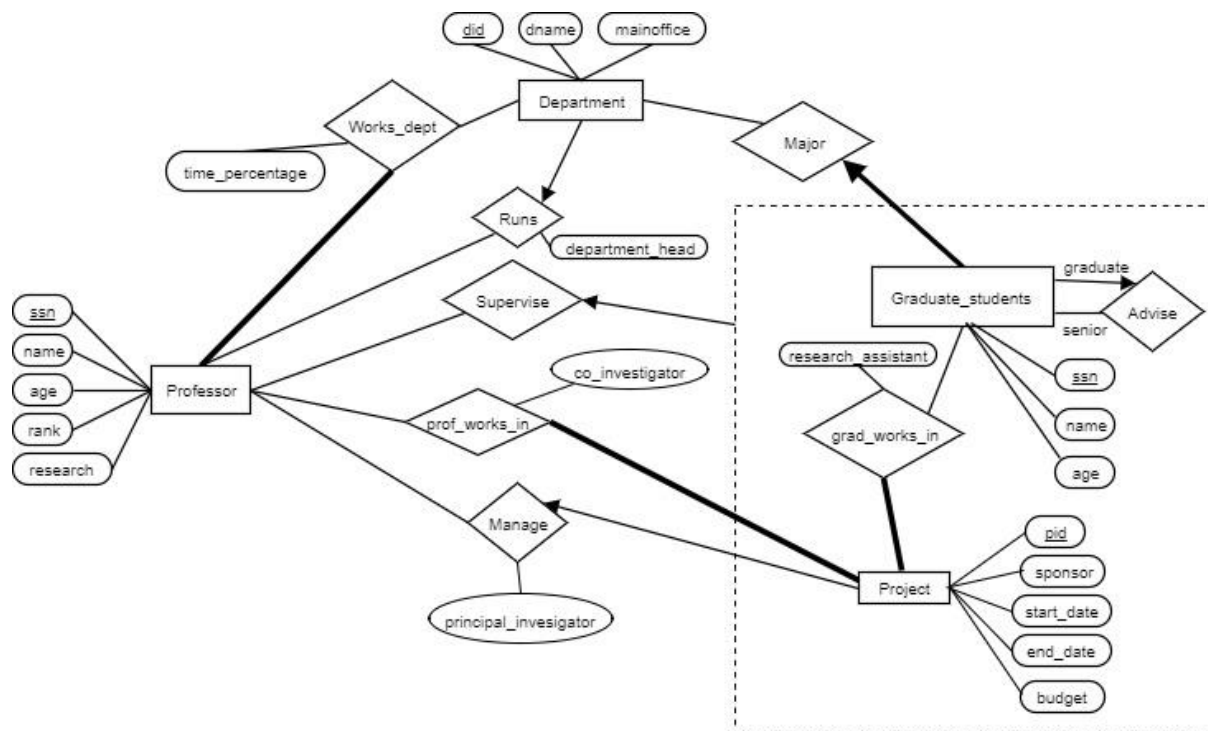


Databases: Homework 1

1 a)



1 b)

/* Professor, Department, Graduate students entities */

```

CREATE TABLE Professor (
    ssn CHAR(10),
    name CHAR(64),
    age INTEGER,
    rank CHAR(64),
    research VARCHAR(64),
    PRIMARY KEY (ssn)
);
    
```

```

CREATE TABLE Department (
    did CHAR(10),
    dname CHAR(64),
    mainoffice VARCHAR(64),
    PRIMARY KEY (did)
);
    
```

```

CREATE TABLE Graduate_students (
    ssn CHAR(10),
    name CHAR(64),
    age INTEGER,
    PRIMARY KEY (ssn)
);
    
```

```
CREATE TABLE Project (  
    pid CHAR(10),  
    sponsor CHAR(32),  
    start_date CHAR(32),  
    end_date CHAR(32),  
    budget FLOAT(10),  
    PRIMARY KEY (pid)  
);
```

```
/* Relationships */
```

```
/* A professor works in one or more department. There is no constraint that each professor can  
work in one or more department */
```

```
CREATE TABLE Works_dept (  
    ssn CHAR(10),  
    did CHAR(10),  
    time_percentage REAL,  
    PRIMARY KEY (ssn, did),  
    FOREIGN KEY (ssn) REFERENCES Professors(ssn),  
    FOREIGN KEY (did) REFERENCES Department(did)  
);
```

```
CREATE TABLE Runs (  
    did CHAR(10),  
    ssn CHAR(10) NOT NULL,  
    department_head CHAR(10),  
    PRIMARY KEY (did, ssn),  
    FOREIGN KEY (did) REFERENCES Department(did),  
    FOREIGN KEY (ssn) REFERENCES Professor(ssn)  
);
```

```
/* Each graduate student has a major department for their degree. There is no constraint that each  
graduate student must have a major */
```

```
CREATE TABLE Major (  
    did CHAR(10) NOT NULL,  
    ssn CHAR(10),  
    PRIMARY KEY (did, ssn),  
    FOREIGN KEY (did) REFERENCES Department(did),  
    FOREIGN KEY (ssn) REFERENCES Graduate_students(ssn)  
);
```

```
CREATE TABLE Supervise (  
    ssn CHAR(10) NOT NULL,  
    pid CHAR(10),  
    PRIMARY KEY (ssn, pid),  
    FOREIGN KEY (ssn) REFERENCES Professor(ssn),  
    FOREIGN KEY (pid) REFERENCES Project(pid)  
);
```

/* A professor can work on multiple projects. There is no constraint that each professor can work on at least one project */

```
CREATE TABLE prof_works_in (  
    ssn CHAR(10),  
    pid CHAR(10),  
    co_investigatior CHAR(10),  
    PRIMARY KEY (ssn, pid),  
    FOREIGN KEY (pid) REFERENCES Project(pid),  
    FOREIGN KEY (ssn) REFERENCES Professor(ssn)  
);
```

```
CREATE TABLE Manage (  
    ssn CHAR(10),  
    pid CHAR(10),  
    principal_investigator CHAR(10),  
    PRIMARY KEY (ssn, pid),  
    FOREIGN KEY (pid) REFERENCES Project(pid),  
    FOREIGN KEY (ssn) REFERENCES Professor(ssn)  
);
```

/* Graduate students can work on multiple projects. There is no constraint that each graduate student can work on at least one project*/

```
CREATE TABLE grad_works_in (  
    ssn CHAR(10),  
    pid CHAR(10),  
    research_assistant CHAR(10),  
    PRIMARY KEY (ssn, pid),  
    FOREIGN KEY (pid) REFERENCES Project(pid),  
    FOREIGN KEY (ssn) REFERENCES Graduate_students(ssn)  
);
```

```
CREATE TABLE Advise (  
    ssn CHAR(10) NOT NULL,  
    PRIMARY KEY (ssn),  
    FOREIGN KEY (ssn) REFERENCES Graduate_students(ssn)  
);
```

Q2a)

A	Q	R	B	C
10	a	5	b	6
10	a	5	b	5
25	a	6	C	3

Q2b)

A	Q	R	A	B	C
15	b	8	10	b	6
15	b	8	10	b	5

Q2c)

A	Q	R	B	C
10	a	5	b	6
10	a	5	b	5
25	a	6	c	3

Q2d)

A	Q	R	B	C
10	a	5	b	5