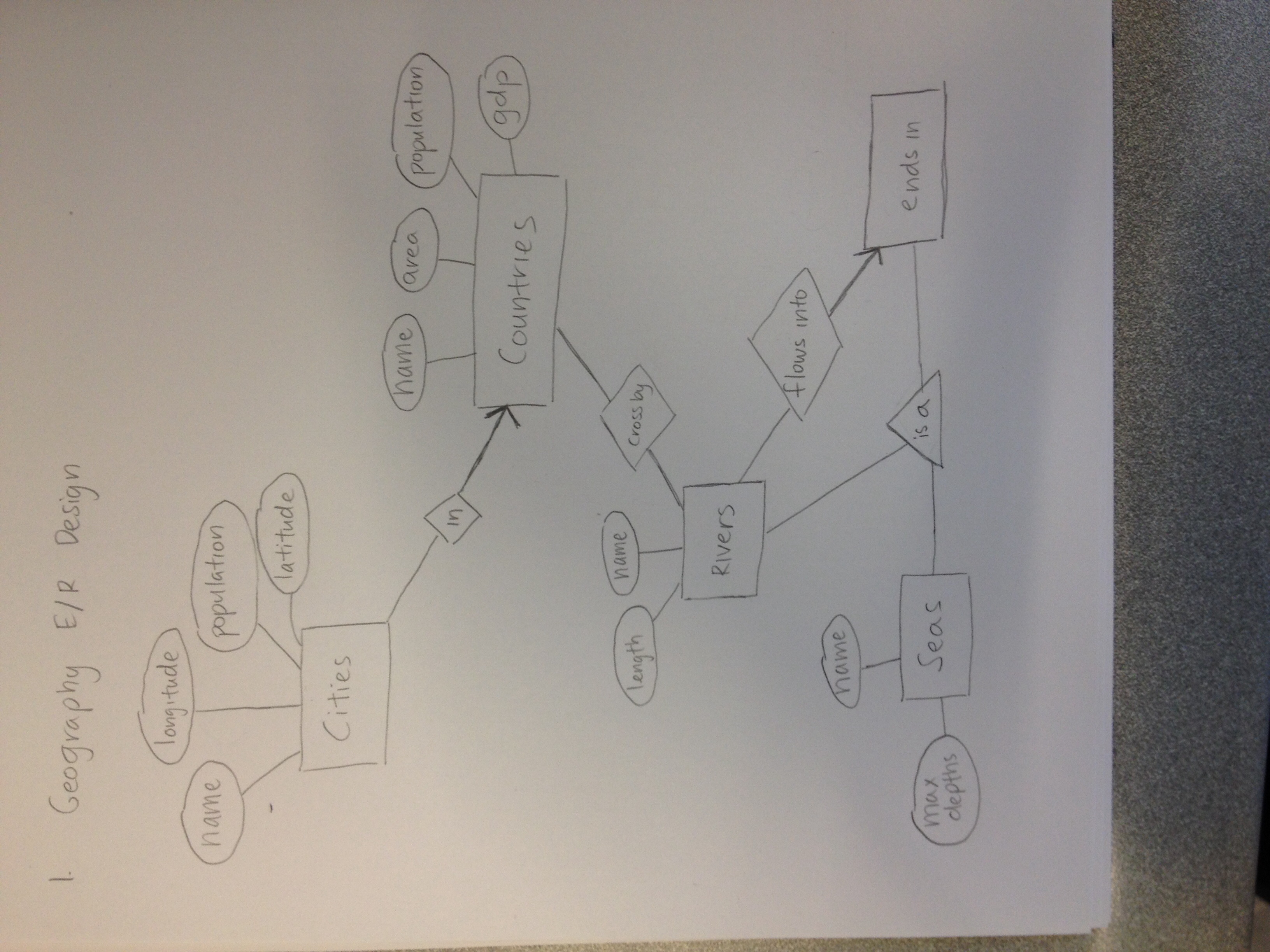
William Thing

CSE 414

Homework 6

1. E/R Diagram below and attached in file (if hard to read).



2.

a) CREATE TABLE **InsuranceCo**(name VARCHAR(30) PRIMARY KEY, phone VARCHAR(10));

CREATE TABLE **Person**(name VARCHAR(30), ssn VARCHAR(9) PRIMARY KEY);

CREATE TABLE **Driver**(licenceNo VARCHAR(12) PRIMARY KEY, ssn VARCHAR(9) REFERENCES Person);

CREATE TABLE **NonProfessionalDriver**(licenceNo VARCHAR(12) PRIMARY KEY, FOREIGN KEY (licenceNo) REFERENCES Driver);

CREATE TABLE **ProfessionalDriver**(licenceNo VARCHAR(12) PRIMARY KEY, medicalHistory VARCHAR(200), FOREIGN KEY (licenceNo) REFERENCES Driver);

CREATE TABLE **Vehicle**(licencePlate VARCHAR(10) PRIMARY KEY, year INT, maxLiability INT, maxLossDamage INT, name VARCHAR(20) REFERENCES InsuranceCo, ssn VARCHAR(9) REFERENCES Person);

CREATE TABLE **Car**(licencePlate VARCHAR(10) PRIMARY KEY, make VARCHAR(20), FOREIGN KEY (licencePlate) REFERENCES Vehicle);

CREATE TABLE **Truck**(licencePlate VARCHAR(10) PRIMARY KEY, capacity INT, licenceNo VARCHAR(12) REFERENCES ProfessionalDriver, FOREIGN KEY (licencePlate) REFERENCES Vehicle);

CREATE TABLE **drives**(licenceNo VARCHAR(12) REFERENCES NonProfessionalDriver, licencePlate VARCHAR(10) REFERENCES Vehicle, PRIMARY KEY (licenceNo, licencePlate));

b) In my relational schema, Vehicles represents “insures” because we do not need to make a separate relation for “insures” in the E/R diagram. Which is why I j included it in my Vehicles relation.

c) The operates represents a ‘many-to-one relationship’ when drives represents a ‘many-to-many relationship’.

3. i.

R(A,B,C,D,E), D → B, CE → A

Step 1: R: D+ = {D,B}

Dependency violations: D+ ≠ {D} or {A,B,C,D,E}

Decompose into: R1(D,B), R2(D,A,C,E)

Step 2: R2: (CE)+ = {C,E,A}

Dependency violations: (CE)+ ≠ {C,E} or {D,A,C,E}

Decompose into: R21(C,E,A), R22(C,E,D)

Final BCNF: R1(D,B), R21(C,E,A), R22(C,E,D)

ii.

S(A,B,C,D,E), A → E, BC → A, DE → B

Step 1: S: A+ = {A,E}

Dependency violations: A+ ≠ {A} or {A,B,C,D,E}

Decompose into: S1(A,E), S2(A,B,C,D)

Step 2 2: S2: (BC)+ = {B,C,A}

Dependency violations: (BC)+ ≠ {B,C} or {B,C,A,D}

Decompose into: S21(B,C,A), S22(B,C,D)

Step 3: No dependency violations

Final BCNF: S1(A,E), S21(B,C,A), S22(B,C,D)

4.

a. Functional dependencies: A → A, B → B, C → C, D → D

b. Functional dependencies: A → B, B → C, C → D, D → A

c. Functional dependencies: A → B, B → A, C → ABD, D → ABC

5.