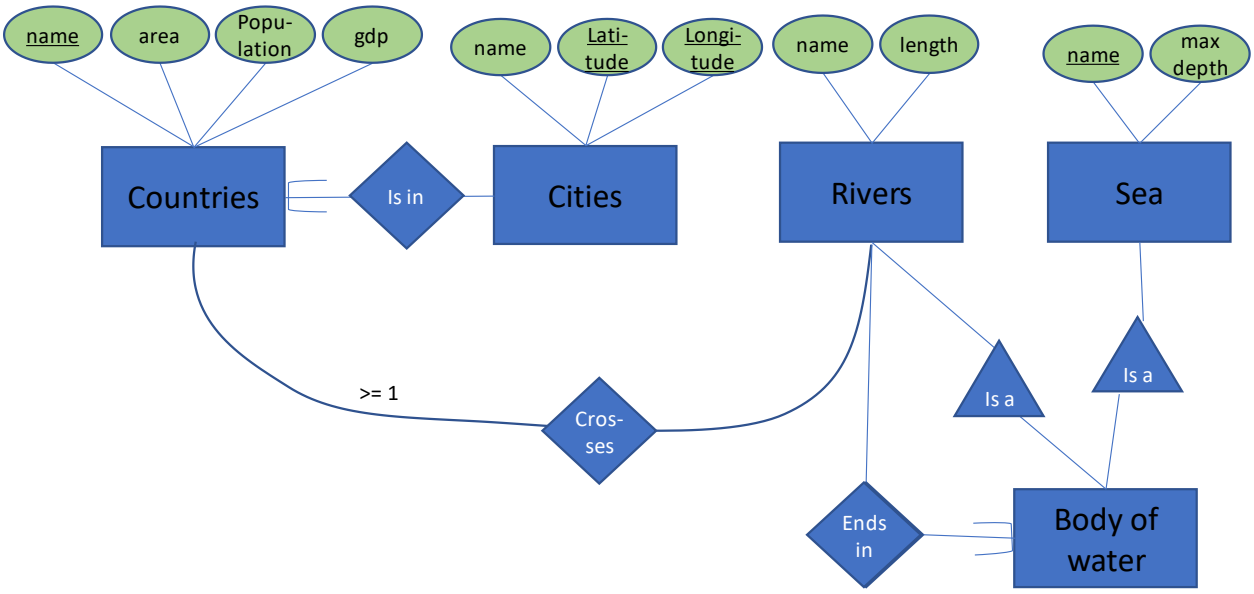
DATA 514: Homework 4:

Alyssa Goodrich

Question 1



Question 2.1

```
CREATE TABLE InsuranceCo (
                name varchar(30) primary key,
                phone char(10));

CREATE TABLE Vehicle (
                licensePlate char(12) primary key,
                maxLiability int,
                insuranceCo varchar(30),
                year int,
                FOREIGN KEY (InsuranceCo) REFERENCES InsuranceCo(name)
);
```

Each vehicle is only insured by one company and is owned by one person so they can go in the vehicle table.

-- what do you do when you reference something foreign that isn't a key

Consider drives table to link car and driver

```
CREATE TABLE Car (
                make varchar(30),
                Vehicle char(12))
CREATE TABLE NonProfessionalDriver
                driverID char(20) primary key,
                DriverSSN char(9),
```

```
                Vehicle char(12),
                FOREIGN KEY (Vehicle) References Vehicle(licensePlate)
                FOREIGN KEY (driverID) References Driver(driverID)
                FOREIGN KEY (DriverSSN) References Person(ssn)
                );

CREATE TABLE Truck (
                capacity int,
                Vehicle char(12) primary key,
                medicalHistory varchar(2000),
                Person char(9),
                Driver char(20),
                FOREIGN KEY (person) References Person(ssn),
                FOREIGN KEY (Vehicle) References Vehicle(licensePlate),
                FOREIGN KEY (Driver) References Driver(driverID)
                );

CREATE TABLE Person (
                ssn char(9) primary key,
                name varchar(35)
                );

CREATE TABLE Owns (
                Person char(9),
                Vehicle char(12),
                FOREIGN KEY (Vehicle) References Vehicle(licensePlate),
                FOREIGN KEY (Person) References Person(ssn)
);

CREATE TABLE Driver (
                driverID char(20),
                person char(9),
                FOREIGN KEY (Person) References Person(ssn)
);
```

Question 2.2

```
CREATE TABLE Vehicle (
                licensePlate char(12) primary key,
                maxLiability int,
                insuranceCo varchar(30),
                year int,
                FOREIGN KEY (InsuranceCo) REFERENCES InsuranceCo(name)
);
```

I chose this representation because each vehicle is insured by only one insurance company. As a result it is possible to place the max liability attribute directly in the vehicle relation. I also referenced the name of the insurance company from the insuranceCo relation because the insuranceCo relation is the master information on insurance company name and phone number. We must keep this master to prevent problems of inconsistency if we need to update information on the name or phone number of an insurance company.

Question 2.3

The representation of professional driver does not have its own relation. Rather it is contained in the truck relation, which can be merged with the driver relation. Because each truck is driven by only one driver we do not need an additional relation for professionalDriver. We placed the medical history attribute directly into the truck relation.

This is different than the non professionaldriver, which we represented in its own relation. Because there is a many to many relationship with nonprofessional drivers and cars, we needed to create a separate relation to maintain consistency if we must update data.

Question 4

a) If all sets of attributes are closed there are no functional dependencies

b) one set of functional dependencies that meets the stated criteria is A → B, B → C, C →D, D → A

c) One set of one set of functional dependencies that meets the stated criteria is A → B, B → A, C →D, D → C, CD → B