

Section 3

1. Aggregation & Join

Schema:

```
CREATE TABLE Population (
```

```
    rank INTEGER,
```

```
    country VARCHAR(30) PRIMARY KEY,
```

```
    population DOUBLE,
```

```
    percentage FLOAT
```

```
);
```

```
CREATE TABLE GDP (
```

```
    rank INTEGER,
```

```
    country VARCHAR(30) PRIMARY KEY,
```

```
    gdp DOUBLE
```

```
);
```

```
CREATE TABLE Airport (
```

```
    code VARCHAR(30) PRIMARY KEY,
```

```
    name VARCHAR(30),
```

```
    country VARCHAR(30)
```

```
);
```

Problems:

-- What is the total population of earth?

Total_Population

6778067375

-- What is the percentage of the population from the top 10 populated countries?

Top_Sum

58.9241749607129

-- How many countries do have less than 1,000,000 population?

Small_Countries

68

-- How many countries have airports?

Airport_Count

247

-- Top 10 countries with most airports, in descending order

country Count

United States 2238

Australia 617

Canada 533

Papua New Gui 380

Brazil 288

Indonesia 205

China 187

Colombia 167

United Kingdo 151

France 144

-- Order the top 10 countries by total GDP per capita (gdp / population)

country GDP_per_capita

Seychelles 0.282666666666667

"Saint Kitts and Nevis" 0.256076923076923

"Antigua and Barbuda" 0.196681818181818

Luxembourg 0.158883485309017

Dominica 0.152507462686567

Brunei 0.119825

Iceland 0.118570005575638

Grenada 0.102855769230769

"Saint Vincent and the Grenadines" 0.0929082568807339

Barbados 0.087

2. Join & Aggregation

Schema:

```
CREATE TABLE Class (  
    dept VARCHAR(6),  
    number INTEGER,  
    title VARCHAR(75),  
    PRIMARY KEY (dept, number)  
);
```

```
CREATE TABLE Instructor (  
    username VARCHAR(8),  
    fname VARCHAR(50),  
    lname VARCHAR(50),  
    started_on CHAR(10),  
    PRIMARY KEY (username)  
);
```

```
CREATE TABLE Teaches (  
    username VARCHAR(8),  
    dept VARCHAR(6),  
    number INTEGER,  
    PRIMARY KEY (username, dept, number),  
    FOREIGN KEY (username) REFERENCES Instructor(username),  
    FOREIGN KEY (dept, number) REFERENCES Class(dept, number)  
);
```

Problems:

/* Review of joins */

-- Who teaches CSE 451?

fname	lname
-----	-----
Tom	Anderson
John	Zahorjan
Hank	Levy

-- What courses does zahorjan teach?

dept	number
-----	-----
CSE	378
CSE	451
CSE	461

-- Which courses do both levy and zahorjan teach?

dept	number	title
-----	-----	-----
CSE	451	Introduction to Operating Systems

/* Queries using aggregation functions */

-- How many classes are there in the course catalog?

COUNT(*)

3

-- What are the highest and lowest class numbers?

MIN(number) MAX(number)

----- -----

378 461

/* Queries with both grouping and aggregation */

-- How many instructors teach each class?

dept number teacher_count

----- ----- -----

CSE 378 1

CSE 451 3

CSE 461 3

-- Order the instructors by who teaches in the most departments

username Department_Count

djw 1

levy 1

tom 1

zahorjan 1