SQL Exercise 2

# 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

SELECT SUM(population) FROM Population;

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

Top\_Sum 58.9241749607129

SELECT SUM (percentage)

FROM Population

WHERE rank <= 10;

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

Small\_Countries 68

SELECT COUNT(\*)

FROM Population

WHERE population < 1000000;

-- How many countries have airports?

SELECT COUNT(DISTINCT country)

FROM Airport;

Airport\_Count 247

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

select country, count(\*)

from airport

group by country

order by count(\*) desc

limit 10;

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)

select x.country, (y.gdp/x.population)

from population x, gdp y

where x.country = y.country

order by (y.gdp/x.population) desc

limit 10;

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

# 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?

Select x.fname, x.lname

From instructor x, teaches y

Where y.username = x.username and

y.dept = ‘CSE’ and x.number = 451;

fname lname

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Tom Anderson

John Zahorjan

Hank Levy

-- What courses does zahorjan teach?

SELECT x.dept, x.number

FROM Class x, Teaches y, Instructor z

WHERE x.dept = y.dept AND x.number = y.number

AND y.username = z.username

AND z.username = 'zahorjan';

dept number

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|  |  |
| --- | --- |
| CSE | 378 |
| CSE | 451 |
| CSE | 461 |

-- Which courses do both levy and zahorjan teach?

SELECT c.dept, c.number, c.title

FROM Class c, Teaches t1, Teaches t2, Instructor i1, Instructor i2

WHERE c.dept = t1.dept AND c.dept = t2.dept

AND c.number = t1.number

AND c.number = t2.number

AND t1.username = i1.username

AND i1.username = 'levy'

AND t2.username = i2.username

AND i2.username = 'zahorjan';

dept number title

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CSE 451 Introduction to Operating Systems

/\* Queries using aggregation functions \*/

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

COUNT(\*)

---------- 3

**select count(\*) from class;**

-- What are the highest and lowest class numbers?

MIN(number) MAX(number)

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378 461

**select min(number) as "Min(number)" , max(number) as "Max(number)" from class;**

/\* 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 |

**SELECT dept, number, COUNT(DISTINCT username) AS teacher\_count  
FROM Teaches  
GROUP BY dept, number;**

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

|  |  |
| --- | --- |
| username | Department\_Count |
| ---------- | ---------------- |
| djw | 1 |
| levy | 1 |
| tom | 1 |
| zahorjan | 1 |

**SELECT username, COUNT(DISTINCT dept) AS Department\_Count  
FROM Teaches  
GROUP BY username  
ORDER BY COUNT(DISTINCT dept) DESC;**