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**Prep 5 - Part 1 of 1**

### Null Values

When we studied relational algebra, we assumed every attribute in every tuple had a value. But in a real database, sometimes information is missing. First, read the section of our Readings called [Null Values in SQL](#). (All readings are available via the Lectures page on Queruc.) Then answer the questions below.

**Not high salary** ✓

Suppose this is the content of the Employee table:

eid	name	salary	dept
2	Mariissa Mayer	82	55
3	Sheryl Sandberg	17	55
4	Larry Ellison	55	33
5	Tim Cook	48	55
6	Mayer Zuckerberg	99	22
7	Jeff Weiner	28	33
8	Larry Page	145	33
25	Julia	55	
1	Bill Gates	100	55

(9 rows)

*Q 3: Double Manager*

6 employee X manages  
eid = manager

create Table T AS  
select \* From employee cross join manages  
where eid = manager.

select T1.eid from T T1 cross join T T2  
where T1.eid = T2.eid and  
T1.junior != T2.junior;

Q 4:

Rich Sales

```
sales[eid, day, amount]
employee[eid, name, salary, dept]
manages[manager, junior]
department[eid, name, division]
employee[dept] c department[eid]
manages[manager] c employee[eid]
manages[junior] c employee[eid]
sales[eid] c employee[eid]
```

Report the name and sales of everyone with a salary over 50, using the keywords NATURAL JOIN (plus a WHERE clause, of course):

```
SELECT * FROM Table1 NATURAL JOIN Table2
```

Your output table should have three columns: 'name', 'day', and 'amount', in that order.

```
1 | ... NATURAL JOIN ...
```

History

Select name, day, amount  
from employee Natural join sales  
where salary > 50;

Q5 :

### Department Salaries I

```
sales[eid, day, amount]
employee[eid, name, salary, dept]
manages[manager, junior]
department[did, name, division]
employee[dept] c department[did]
manages[manager] c employee[eid]
manages[junior] c employee[eid]
sales[eid] c employee[eid]
```

Report the salaries of everyone in every department, using the keywords INNER JOIN ... ON (equivalent to theta join):

```
SELECT * FROM Table1 INNER JOIN Table2 ON Condition
```

Your output table should have three columns: 'name' (name of employee), 'department' (name of employee's department) and 'salary' (salary of an employee in that department).

```
1 ... INNER JOIN ... ON ...
```

History

Select employee.name as name, department.name as department, salary from  
employee inner join department  
on dept = did ;

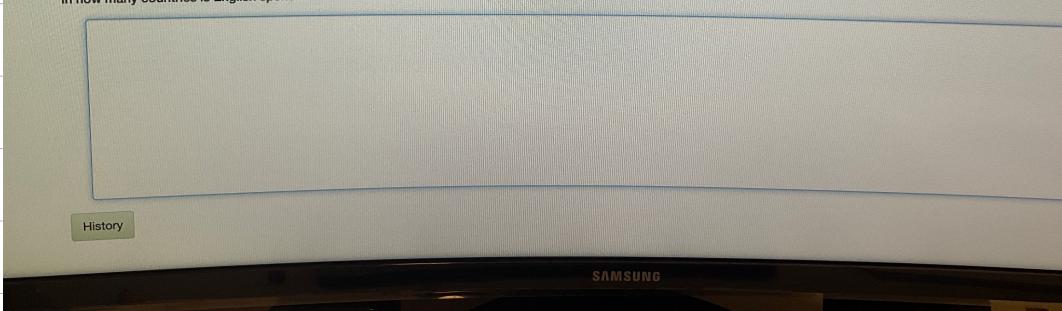
## Using PostgreSQL on the CS Teaching Lab Machines

Now it's time to begin using PostgreSQL to run your queries. Here's what to do:

1. Learn how to use PostgreSQL on the CS Teaching Labs by completing Parts 1 through 4 of the PostgreSQL tutorial on Quercus (see the page labelled PostgreSQL Instructions).
  - "d" to describe the tables that are available.
  - "d country" to describe the table called "country".
  - "\?" to get a look at some of the other commands available inside psql. You can use "q" to quit the list.
- You don't have to understand all of what you see here, but remember that these psql commands exist. They will be helpful later.
3. Run SQL queries on the CS Teaching labs to find out the answer to the final questions below. Give each answer (a number, not the query that generated it) below.

### English countries

In how many countries is English spoken?



```

CREATE SCHEMA world;
SET search_path TO World;
SELECT * FROM countrylanguage WHERE language = 'English';

```

Country/language

code	name	continent	population
AFG	Afghanistan	Asia	22720000
NLD	Netherlands	Europe	15844000
ANT	Netherlands Antilles	North America	300000
ALB	Albania	Europe	3461200
DZA	Algeria	Africa	3480000
ASM	American Samoa	Oceania	10000
AND	Andorra	Europe	70000
AGO	Angola	Africa	12870000
ATA	Anguilla	North America	8000
ATG	Antigua and Barbuda	North America	60000
ARE	United Arab Emirates	Asia	2441800
ARM	Armenia	South America	37032000
AWO	Aruba	North America	300000
BLW	Bolivia	Oceania	1830000
AZE	Azerbaijan	Europe	18860000
BHS	Bahamas	North America	7734000
BHR	Bahrain	Asia	700000
BGD	Bangladesh	Asia	6170000
BRB	Barbados	North America	12910000
BEL	Belgium	Europe	10239000
BZL	Belize	North America	241000
BEN	Benin	Africa	6092000
BMI	Bermuda	North America	0

countrycode	countrylanguage	isofficial	percentage
AFG	Pashto	t	52.4
NLD	Dutch	t	95.6
ANT	Papiamento	t	86.2
ALB	Albanian	t	97.9
DZA	Arabic	t	85
ASM	Samoan	t	98.6
AND	Spanish	f	44.6
AGO	Owambo	f	37.2
ATA	English	f	0
ATG	Creeole English	f	95.7
ARE	Arabic	t	42
ARG	Spanish	t	96.8
ARM	Armenian	t	93.4
ABW	Papiamento	t	76.7
AUS	English	t	81.2
AZE	Azerbaijani	t	89
BHR	Arabic	t	89.7
BGR	Bulgarian	t	67.7
BGD	Bengali	t	97.7
BRB	Bajan	t	95.1
BLW	Dutch	t	95.2
BZL	English	t	50.8
REN	Fon	t	89.8
SMU	English	t	100
BTN	Dzongkha	t	100
BOL	Spanish	t	87.7
BIH	Serbo-Croatian	t	99.2
TKM	Tsowata	t	75.6
GBR	English	t	97.5
VGB	English	t	97.3
BRN	Malay	t	45.5
			83.2

Select \* from  
country inner join countrylanguage  
on code = countrycode and countrylanguage = 'English';

**Using PostgreSQL on the CS Teaching labs**

Now it's time to begin using PostgreSQL to run your queries.

1. Learn how to use PostgreSQL on the CS Teaching labs
2. Re-acquaint yourself with the schema for our database
  - “id” to describe the tables that are available
  - “country” to describe the table called “countries”
  - “? ” to get a look at some of the other tables
3. Run SQL queries on the CS Teaching labs to answer the following questions.

**English countries**

In how many countries is English spoken?

60

History

✓ Your solution is complete.

ISO	Name	Continent	Population	ISO2	Language
LSO	Lesotho	Africa	2153000	LSO	English
MAC	Macao	Asia	473800	MAC	Portuguese
MAR	Maldives	Asia	286900	MAR	English
MYS	Malaysia	Asia	22244800	MYS	English
MLT	Malta	Europe	388280	MLT	English
MCO	Monaco	Europe	34800	MCO	French
MSR	Montserrat	North America	11000	MSR	English
MUS	Mosambique	Oceania	12000	MUS	English
NCL	Nicaragua	Oceania	20000	NCL	Spanish
NFK	Norfolk Island	Oceania	2000	NFK	English
NOR	Norway	Europe	4478500	NOR	English
PAK	Pakistan	Oceania	19000	PAK	Urdu
PLW	Palau	Oceania	78000	PLW	English
PRT	Puerto Rico	North America	3840000	PRT	Spanish
SCH	Saint Helena	Africa	6000	SCH	English
SLV	Saint Kitts and Nevis	North America	38800	SLV	Spanish
LCA	Saint Lucia	North America	100000	LCA	English
VCT	Saint Vincent and the Grenadines	North America	114000	VCT	English
WSM	Samoa	Oceania	180000	WSM	English
DEU	San Marino	Europe	77000	DEU	Italian
DNK	Denmark	Europe	5330000	DNK	English
TKL	Tokelau	Oceania	2300	TKL	English
TON	Tonga	Oceania	99000	TON	English
TTO	Turks and Caicos Islands	North America	1295000	TTO	English
TCI	Turks and Caicos Islands	North America	12000	TCI	English
TUV	Tuvalu	Oceania	12000	TUV	English
VUT	Vanuatu	Oceania	3862000	VUT	English
USA	United States	North America	278357880	USA	English
ZWE	Zimbabwe	North America	930000	ZWE	English
UMI	United States Minor Outlying Islands	Oceania	11659000	UMI	English

(68 rows)

[END]

**Mozambique languages**

How many languages are spoken in Mozambique?

History

✓ Your solution is complete.

Select \* from  
 country inner join countrylanguage  
 on code = countrycode  
 where name = 'Mozambique';

✓ Your solution is complete.

**Mozambique languages**

How many languages are spoken in Mozambique?

10

History

✓ Your solution is complete.

code	name	continent	population	countrycode	countrylanguage	isofficial	percentage
MOZ	Mozambique	Africa	19680000	MOZ	Makua	f	27.8
MOZ	Mozambique	Africa	19680000	MOZ	Tsonga	f	12.4
MOZ	Mozambique	Africa	19680000	MOZ	Senza	f	9.4
MOZ	Mozambique	Africa	19680000	MOZ	Lomwe	f	7.8
MOZ	Mozambique	Africa	19680000	MOZ	Shona	f	6.5
MOZ	Mozambique	Africa	19680000	MOZ	Tswa	f	6
MOZ	Mozambique	Africa	19680000	MOZ	Chichewa	f	5.7
MOZ	Mozambique	Africa	19680000	MOZ	Ronga	f	3.7
MOZ	Mozambique	Africa	19680000	MOZ	Marronde	f	3.5
MOZ	Mozambique	Africa	19680000	MOZ	Nyanja	f	3.3

(10 rows)

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