

1. (a) Display all the databases on your MySQL server.

```
show databases ;
```

- (b) Determine what database you are currently accessing.

```
select database( ) ;    or    \s
```

2. Create a table `student` which will hold information on students, namely, student number, name, email address, and phone number.

Allow the phone number to be null but the other columns should not allow nulls.

```
create table student
(
    number integer not null primary key,
    name character(80) not null,
    email character(64) not null,
    phone character(20) null
) ;
```

Use a system command to view the structure of your new table.

```
describe student ;
```

```
+-----+-----+-----+-----+-----+-----+
| Field | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| number | int(11)   | NO   | PRI |          |       |
| name   | char(80)  | NO   |     |          |       |
| email  | char(64)  | NO   |     |          |       |
| phone  | char(20)  | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.01 sec)
```

3.

- (a) Display today's date.

```
select current_date( ) ;
```

- (b) Use convert to display the date so that it is in the format:

yyyymmdd

```
select date_format( current_date( ), '%Y%m%d' ) ;
```

- (c) On what day of the week were you born?

For example, if your birth date is 2007-10-04 (a Thursday).

```
select date_format( '2007-10-04', '%W' ) ;
```

- (d) How many hours have elapsed since the beginning of the year?

```
select timestampdiff( HOUR, '2009-01-01 00:00:00', now( ) ) ;
```

4.

Use the alter command to add the column birthday to your table. This column will be used to record the student's date of birth.

```
alter table student add birthday date ;
```

Verify that the column has been added.

```
describe student ;
```

5.

(a) Insert new rows into your table: make sure that you insert several rows, leaving the phone number and/or birthday column null in a few. Try both forms of the INSERT statement.

```
mysql> insert into student
-> values ( 1234567, 'Joe Blough', 'jblough@skewl.edu', '555-5556', NULL );
Query OK, 1 row affected (0.03 sec)

mysql> insert into student ( number, name, email )
-> values ( 2324255, 'Jane Dough', 'jdoe@mail.com' );
Query OK, 1 row affected (0.00 sec)

mysql> insert into student ( number, name, email, birthday )
-> values ( 2324123, 'Peter Rabbett', 'pete_rab@hotmail.com', '1975-03-12' );
Query OK, 1 row affected (0.00 sec)
```

```
mysql> select * from student ;
```

number	name	email	phone	birthday
1234567	Joe Blough	jblough@skewl.edu	555-5556	NULL
2324255	Jane Dough	jdoe@mail.com	NULL	NULL
2324123	Peter Rabbett	pete_rab@hotmail.com	NULL	1975-03-12

```
3 rows in set (0.00 sec)
```

(b) Using UPDATE, change some of the rows in the table. Try to change the student numbers as well.

```
mysql> update student
-> set birthday = '1980-12-23'
-> where name = 'Jane Dough' ;
Query OK, 1 row affected (0.02 sec)
Rows matched: 1 Changed: 1 Warnings: 0
```

```
mysql> update student
-> set email = 'jdough@gmail.com'
-> where number = '2324255' ;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1 Changed: 1 Warnings: 0
```

```
mysql> update student
-> set number = number + 1 ;
Query OK, 3 rows affected (0.01 sec)
Rows matched: 3 Changed: 3 Warnings: 0
```

```
mysql> select * from student ;
```

number	name	email	phone	birthday
1234568	Joe Blough	jblough@skewl.edu	555-5556	NULL
2324256	Jane Dough	jdough@gmail.com	NULL	1980-12-23
2324124	Peter Rabbett	pete_rab@hotmail.com	NULL	1975-03-12

```
3 rows in set (0.01 sec)
```

(c) Delete from your table at least two rows that share a common criteria. Use LIKE and the % wildcard in the WHERE clause to do this.

```
mysql> delete from student
-> where name like '%ough' ;
Query OK, 2 rows affected (0.04 sec)
```

```
mysql> select * from student ;
```

number	name	email	phone	birthday
2324124	Peter Rabbett	pete_rab@hotmail.com	NULL	1975-03-12

```
1 row in set (0.00 sec)
```

6.

Copy and extract the world.sql.zip or world.sql.gz file from the /shared/ctec1731/lab2 directory.

Read world-setup.html or world-setup.pdf to learn how to install the database.

Install the database on your MySQL server.

```
~/lab2$ download world.sql.gz or world.sql.zip here
~/lab2$ either gzip -d world.sql.gz or unzip -a world.sql
~/lab2$ mysql -u root -p
. . .
mysql> create database world ;
. . .
mysql> use world ;
. . .
mysql> \. world.sql                (assuming that world.sql is in the c.w.d.
                                   you started mysql from)
. . .
mysql> grant all privileges on world.*
-> to 'yourusername'@'localhost' ;
```

What tables make up the world database?

```
mysql> show tables ;
+-----+
| Tables_in_world |
+-----+
| City             |
| Country         |
| CountryLanguage |
+-----+
3 rows in set (0.00 sec)
```

What are the columns for each table?

```
mysql> describe City ;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra      |
+-----+-----+-----+-----+-----+-----+
| ID         | int(11)   | NO   | PRI | NULL    | auto_increment |
| Name       | char(35)  | NO   |     |         |              |
| CountryCode | char(3)   | NO   |     |         |              |
| District   | char(20)  | NO   |     |         |              |
| Population | int(11)   | NO   |     | 0       |              |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.02 sec)
```

```
mysql> describe Country ;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra      |
+-----+-----+-----+-----+-----+-----+
| Code       | char(3)   | NO   | PRI |         |              |
| Name       | char(52)  | NO   |     |         |              |
| Continent  | *         | NO   |     |         | Asia       |
| Region     | char(26)  | NO   |     |         |              |
| SurfaceArea | float(10,2) | NO   |     | 0.00    |              |
| IndepYear  | smallint(6) | YES  |     | NULL    |              |
| Population | int(11)   | NO   |     | 0       |              |
| LifeExpectancy | float(3,1) | YES  |     | NULL    |              |
| GNP        | float(10,2) | YES  |     | NULL    |              |
| GNPOld     | float(10,2) | YES  |     | NULL    |              |
| LocalName  | char(45)  | NO   |     |         |              |
| GovernmentForm | char(45) | NO   |     |         |              |
| HeadOfState | char(60)  | YES  |     | NULL    |              |
| Capital    | int(11)   | YES  |     | NULL    |              |
| Code2      | char(2)   | NO   |     |         |              |
+-----+-----+-----+-----+-----+-----+
15 rows in set (0.02 sec)
```

* Continent column has type:

```
enum('Asia', 'Europe', 'North America', 'Africa', 'Oceania',
    'Antarctica', 'South America')
```

```
mysql> describe CountryLanguage ;
```

Field	Type	Null	Key	Default	Extra
CountryCode	char(3)	NO	PRI		
Language	char(30)	NO	PRI		
IsOfficial	enum('T','F')	NO		F	
Percentage	float(4,1)	NO		0.0	

```
4 rows in set (0.01 sec)
```

How many rows are there in each table?

```
mysql> select count(*) from City ;
```

```
+-----+
| count(*) |
+-----+
|      4079 |
+-----+
```

```
1 row in set (0.00 sec)
```

```
mysql> select count(*) from Country ;
```

```
+-----+
| count(*) |
+-----+
|       239 |
+-----+
```

```
1 row in set (0.00 sec)
```

```
mysql> select count(*) from CountryLanguage ;
```

```
+-----+
| count(*) |
+-----+
|       984 |
+-----+
```

```
1 row in set (0.00 sec)
```

7.

List all the cities from Canada.

```
mysql> select Name from City
-> where CountryCode = (
->   select Code from Country where Name = 'Canada'
-> ) ;
```

```
+-----+
| Name
+-----+
| Montréal
| Calgary
| Toronto
| North York
| Winnipeg
| Edmonton
| Mississauga
| Scarborough
| Vancouver
| Etobicoke
| London
| Hamilton
| Ottawa
| Laval
| Surrey
| Brampton
| Windsor
| Saskatoon
| Kitchener
| Markham
| Regina
| Burnaby
| Québec
| York
| Richmond
| Vaughan
| Burlington
| Oshawa
| Oakville
| Saint Catharines
| Longueuil
| Richmond Hill
| Thunder Bay
| Nepean
| Cape Breton
| East York
| Halifax
| Cambridge
| Gloucester
| Abbotsford
| Guelph
| Saint John's
```

```

| Coquitlam
| Saanich
| Gatineau
| Delta
| Sudbury
| Kelowna
| Barrie
+-----+

```

49 rows in set (0.00 sec)

List all the cities from Ontario and their populations, sorted by population, from the highest to the lowest.

```

mysql> select Name, Population
-> from City
-> where District = 'Ontario'
-> order by Population desc ;

```

```

+-----+-----+
| Name          | Population |
+-----+-----+
| Toronto       | 688275    |
| North York    | 622632    |
| Mississauga    | 608072    |
| Scarborough   | 594501    |
| Etobicoke     | 348845    |
| London        | 339917    |
| Hamilton      | 335614    |
| Ottawa        | 335277    |
| Brampton      | 296711    |
| Windsor       | 207588    |
| Kitchener     | 189959    |
| Markham       | 189098    |
| York          | 154980    |
| Vaughan       | 147889    |
| Burlington    | 145150    |
| Oshawa        | 140173    |
| Oakville      | 139192    |
| Saint Catharines | 136216    |
| Richmond Hill | 116428    |
| Thunder Bay   | 115913    |
| Nepean        | 115100    |
| East York     | 114034    |
| Cambridge     | 109186    |
| Gloucester    | 107314    |
| Guelph        | 103593    |
| Sudbury       | 92686     |
| Barrie        | 89269     |
+-----+-----+

```

27 rows in set (0.00 sec)

Insert a city row for Welland with population 50331.

```
mysql> insert into City ( Name, CountryCode, District, Population )
-> values ( 'Welland', 'CAN', 'Ontario', 50331 ) ;
Query OK, 1 row affected (0.00 sec)
```

```
mysql> select * from City where Name = 'Welland' ;
+-----+-----+-----+-----+-----+
| ID     | Name     | CountryCode | District | Population |
+-----+-----+-----+-----+-----+
| 4080   | Welland  | CAN         | Ontario  | 50331      |
+-----+-----+-----+-----+-----+
1 row in set (0.01 sec)
```

Select all possible information for Welland and include all the tables in the database.

```
mysql> select City.Name, City.District, City.Population,
-> Country.Name, Country.Continent, Country.Region,
-> CountryLanguage.Language
-> from City, Country, CountryLanguage
-> where City.CountryCode = Country.Code
-> and Country.Code = CountryLanguage.CountryCode
-> and City.Name = 'Welland' ;
+-----+-----+-----+-----+-----+-----+-----+
| Name   | District | Population | Name   | Continent | Region   | Language |
+-----+-----+-----+-----+-----+-----+-----+
| Welland | Ontario  | 50331      | Canada | North America | North America | Chinese |
| Welland | Ontario  | 50331      | Canada | North America | North America | Dutch   |
| Welland | Ontario  | 50331      | Canada | North America | North America | English |
| Welland | Ontario  | 50331      | Canada | North America | North America | Eskimo Languages |
| Welland | Ontario  | 50331      | Canada | North America | North America | French  |
| Welland | Ontario  | 50331      | Canada | North America | North America | German  |
| Welland | Ontario  | 50331      | Canada | North America | North America | Italian |
| Welland | Ontario  | 50331      | Canada | North America | North America | Polish  |
| Welland | Ontario  | 50331      | Canada | North America | North America | Portuguese |
| Welland | Ontario  | 50331      | Canada | North America | North America | Punjabi |
| Welland | Ontario  | 50331      | Canada | North America | North America | Spanish |
| Welland | Ontario  | 50331      | Canada | North America | North America | Ukrainian |
+-----+-----+-----+-----+-----+-----+-----+
12 rows in set (0.00 sec)
```

This query shows all possible languages that may or may not be spoken in Welland, because they are spoken in Canada as a whole. (The Welland-specific information is duplicated.)

A better way would be to split this up into two queries:

```
select City.Name, City.District, City.Population,
       Country.Name, Country.Continent, Country.Region
from City, Country
where City.CountryCode = Country.Code and City.Name = 'Welland' ;
```

```
select Language, IsOfficial, Percentage from CountryLanguage
where CountryCode = 'CAN' ;
```

Part D *continued ...*

Find out the head of state for Canada.

```
mysql> select HeadOfState from Country where Name = 'Canada' ;
+-----+
| HeadOfState |
+-----+
| Elisabeth II |
+-----+
1 row in set (0.00 sec)
```

Find out which other countries that person is head of state for (if any).

```
mysql> select Name from Country where HeadOfState = 'Elisabeth II' ;
+-----+
| Name |
+-----+
| Anguilla |
| Antigua and Barbuda |
| Australia |
| Bahamas |
| Barbados |
| Belize |
| Bermuda |
| United Kingdom |
| Virgin Islands, British |
| Cayman Islands |
| Cook Islands |
| Falkland Islands |
| Gibraltar |
| Grenada |
| Jamaica |
| Christmas Island |
| Canada |
| Cocos (Keeling) Islands |
| Montserrat |
| Niue |
| Norfolk Island |
| Papua New Guinea |
| Pitcairn |
| Saint Helena |
| Saint Kitts and Nevis |
| Saint Lucia |
| Saint Vincent and the Grenadines |
| Solomon Islands |
| Tokelau |
| Turks and Caicos Islands |
| Tuvalu |
| New Zealand |
| British Indian Ocean Territory |
| South Georgia and the South Sandwich Islands |
```

```
| Heard Island and McDonald Islands |
+-----+
35 rows in set (0.00 sec)
```

List the top ten countries in the world, by life expectancy.

```
mysql> select Name, LifeExpectancy
-> from Country
-> order by LifeExpectancy desc
-> limit 10 ;
```

```
+-----+-----+
| Name          | LifeExpectancy |
+-----+-----+
| Andorra       | 83.5           |
| Macao         | 81.6           |
| San Marino    | 81.1           |
| Japan         | 80.7           |
| Singapore     | 80.1           |
| Australia     | 79.8           |
| Sweden        | 79.6           |
| Switzerland   | 79.6           |
| Hong Kong     | 79.5           |
| Iceland       | 79.4           |
+-----+-----+
```

```
10 rows in set (0.00 sec)
```

List the top ten countries in the world, by gross domestic product.

```
mysql> select Name, GNP from Country order by GNP desc limit 10;
```

```
+-----+-----+
| Name          | GNP            |
+-----+-----+
| United States | 8510700.00     |
| Japan         | 3787042.00     |
| Germany       | 2133367.00     |
| France        | 1424285.00     |
| United Kingdom| 1378330.00     |
| Italy         | 1161755.00     |
| China         | 982268.00      |
| Brazil        | 776739.00      |
| Canada        | 598862.00      |
| Spain         | 553233.00      |
+-----+-----+
```

```
10 rows in set (0.00 sec)
```

Group the countries and the sum of their gross domestic products by region.

```
mysql> select Region, Sum( GNP ) as RegionalGNP
-> from Country
-> group by Region
-> order by RegionalGNP desc ;
```

Region	RegionalGNP
North America	9111890.00
Eastern Asia	5524885.00
Western Europe	4673272.00
Southern Europe	2012289.00
South America	1511874.00
British Islands	1454251.00
Southern and Central Asia	810604.00
Middle East	677260.00
Nordic Countries	676655.00
Eastern Europe	659980.00
Southeast Asia	642643.00
Central America	473151.00
Australia and New Zealand	405851.00
Northern Africa	243870.00
Southern Africa	126931.00
Western Africa	106711.00
Caribbean	103586.20
Eastern Africa	69925.00
Central Africa	32938.00
Baltic Countries	22418.00
Melanesia	10530.00
Micronesia	1848.70
Polynesia	1545.00
Antarctica	0.00
Micronesia/Caribbean	0.00

25 rows in set (0.00 sec)

Group the countries and the average of their gross domestic products by continent.

```
mysql> select Continent, AVG( GNP ) as ContinentalAverageGNP
-> from Country
-> group by Continent
-> order by ContinentalAverageGNP desc ;
```

Continent	ContinentalAverageGNP
North America	261854.789189
Europe	206497.065217
Asia	150105.725490
South America	107991.000000
Oceania	14991.953571
Africa	10006.465517
Antarctica	0.000000

7 rows in set (0.65 sec)

How many countries have English as one of their official languages? French? Spanish? German?

```
mysql> select Language, count( CountryCode ) as SpeakingCountries
-> from CountryLanguage
-> where Language in ( 'English', 'French', 'Spanish', 'German' )
-> and IsOfficial = 'T'
-> group by Language ;
```

Language	SpeakingCountries
English	44
French	18
German	6
Spanish	20

4 rows in set (0.08 sec)

How many countries do not have English as one of their official languages?

```
mysql> select count( distinct ( CountryCode ) ) as 'Non Official English Countries'
-> from CountryLanguage where CountryCode not in
-> (
->   select CountryCode from CountryLanguage
->   where Language = 'English' and IsOfficial = 'T'
-> );
```

Non Official English Countries
189

1 row in set (0.01 sec)

How many countries have English or an English like language as one of their official languages?

The way this question was worded makes it the same as the previous question. (44; no countries have an English-like language as an official language.)

```
mysql> select CountryCode, Language, IsOfficial
-> from CountryLanguage
-> where Language like '%English%'
-> order by CountryCode ;
```

CountryCode	Language	IsOfficial
ABW	English	F
AIA	English	T
ANT	English	F
ASM	English	T
ATG	Creole English	F
ATG	English	T
AUS	English	T
BHR	English	F
BHS	Creole English	F
BLZ	English	T
BMU	English	T
BRB	English	T
BRN	English	F
BRN	Malay-English	F
CAN	English	T
CCK	English	T
COK	English	F
COL	Creole English	F
CRI	Creole English	F
CXR	English	T
CYM	English	T
DMA	Creole English	F
DNK	English	F
FLK	English	T
GBR	English	T
GIB	English	T
GRD	Creole English	F
GUM	English	T
GUY	Creole English	F
HKG	English	T
HND	Creole English	F
IRL	English	T
ISL	English	F
JAM	Creole English	F
JPN	English	F
KNA	English	T
KNA	Creole English	F

KWT	English	F
LCA	English	T
LSO	English	T
MAC	English	F
MCO	English	F
MDV	English	F
MHL	English	T
MLT	English	T
MNP	English	T
MSR	English	T
MYS	English	F
NFK	English	T
NIC	Creole English	F
NIU	English	T
NOR	English	F
NRU	English	T
NZL	English	T
PAN	Creole English	F
PLW	English	T
PRI	English	F
SHN	English	T
SYC	English	T
TCA	English	T
TKL	English	T
TON	English	T
TTO	English	F
TTO	Creole English	F
TUN	Arabic-French-English	F
TUV	English	T
UMI	English	T
USA	English	T
VCT	English	T
VCT	Creole English	F
VGB	English	T
VIR	English	T
VUT	English	T
WSM	Samoan-English	F
WSM	English	T
ZAF	English	T
ZWE	English	T

-----+
77 rows in set (0.00 sec)

```
mysql> select count( distinct( CountryCode ) )
-> from CountryLanguage
-> where Language like '%English%'
```

```
-----+
| count( distinct( CountryCode ) ) |
-----+
|                                71 |
-----+
```

1 row in set (0.00 sec)

List the countries which are older than 500 years and their age in years, arranged from the oldest to the youngest.

```
mysql> select Name, IndepYear, 2009 - IndepYear as Age
-> from Country
-> where IndepYear is not null
-> and IndepYear <= ( 2009 - 500 )
-> order by Age desc ;
```

Name	IndepYear	Age
China	-1523	3532
Ethiopia	-1000	3009
Japan	-660	2669
Denmark	800	1209
Sweden	836	1173
France	843	1166
San Marino	885	1124
United Kingdom	1066	943
Portugal	1143	866
Andorra	1278	731
Thailand	1350	659
Spain	1492	517
Switzerland	1499	510

13 rows in set (0.02 sec)

Here, you can't use "Age" (a computed column) in the WHERE clause. Instead, I get the SQL server to do the math and figure out the minimum year where a country would be 500 years old.