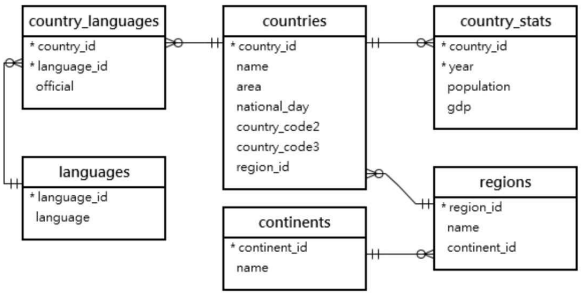
Database Midterm

2022.11.7.

You are given "nation.sql". To use in your MariaDB, install as follows:

mysql -uroot -pYOURPASSWORD < nations.sql



In this sample database (named "nation"), you have 6 primary tables (countries, regions, continents, country_languages, languages, country_stats) and 1 extra table (region_area). You may ignore "vips" and "guests" tables.

Continents contain 7 continent information. These continents are specialized in 25 regions (in "regions"). This db indexes 239 countries with their size(area), national_day, country_code2, country_code3, and their belonging regions. Their specific statistics are stored in country_stats. The table shows population and gdp per year for most of the countries. Some countries may not have such information available. This database also contains languages used in each country and whether they are "officially" accepted languages or not. In table "country_languages", 1 of "official" attribute means "officially accepted". Otherwise, it would mean that the given language (language_id) is not officially accepted.

a total of 85 points

[5 points per problem]

(1) find countries that locates in "Southern and Central Asia" and have areas greater than 2,000,000 km2.

```
MariaDB [nation]> select countries.name, regions.name from countries, regions where countries.region_id = regions.region_id and reg
ions.name='Southern and Central Asia' and area > 2000000;
+-----------+---------------------------+
| name      | name                      |
+-----------+---------------------------+
| India     | Southern and Central Asia |
| Kazakstan | Southern and Central Asia |
+-----------+---------------------------+
2 rows in set (0.011 sec)
```

(2) find countries whose country code are in the US, FR and JP country codes.

```
MariaDB [nation]> select countries.name from countries where countries.country_code2 in ('US', 'FR', 'JP');
+---------------+
| name          |
+---------------+
| France        |
| Japan         |
| United States |
+---------------+
3 rows in set (0.000 sec)
```

(3) find the countries and their GDPs. It also shows the countries who have no GDP information.

For your convenience, query was grouped by country_id.

```
MariaDB [nation]> select c.name, max(s.gdp) 'gdp 최고' from countries c left outer join country_stats s on c.country_id=s.country_i
d group by c.country_id;
+-------------------------------------------+----------------+
| name                                      | gdp 최고       |
+-------------------------------------------+----------------+
| Aruba                                     |     2745251397 |
| Afghanistan                               |    20561054090 |
| Angola                                    |   145712000000 |
| Anguilla                                  |           NULL |
| Albania                                   |    15058879129 |
| Andorra                                   |     4016972351 |
| Netherlands Antilles                      |           NULL |
| United Arab Emirates                      |   414179000000 |
| Vietnam                                   |   244848000000 |
| Vanuatu                                   |      887817896 |
| Wallis and Futuna                         |           NULL |
| Samoa                                     |      861494700 |
| Yemen                                     |    43228585321 |
| Yugoslavia                                |           NULL |
| South Africa                              |   416417000000 |
| Zambia                                    |    28045460442 |
| Zimbabwe                                  |    31000519447 |
+-------------------------------------------+----------------+
239 rows in set (0.002 sec)
```

(4) find the countries who have no GDP information available.

```
MariaDB [nation]> select c.name from countries c left join country_stats s on c.country_id=s.country_id group by c.country_id having sum
(s.gdp) is null;
+-------------------------------------------+
| name                                      |
+-------------------------------------------+
| Anguilla                                  |
| Netherlands Antilles                      |
| Antarctica                                |
| French Southern territories               |
| Bouvet Island                             |
| Cocos (Keeling) Islands                   |
| Cook Islands                              |
| Christmas Island                          |
| Western Sahara                            |
| Falkland Islands                          |
| Gibraltar                                 |
| Guadeloupe                                |
| French Guiana                             |
| Heard Island and McDonald Islands         |
| British Indian Ocean Territory            |
| Montserrat                                |
| Martinique                                |
| Mayotte                                   |
| Norfolk Island                            |
| Niue                                      |
| Pitcairn                                  |
| North Korea                               |
| R?union                                   |
| Romania                                   |
| South Georgia and the South Sandwich Islands |
| Saint Helena                              |
| Svalbard and Jan Mayen                    |
| Saint Pierre and Miquelon                 |
| Tokelau                                   |
| East Timor                                |
| Taiwan                                    |
| United States Minor Outlying Islands      |
| Holy See (Vatican City State)             |
| Virgin Islands, British                   |
| Wallis and Futuna                         |
| Yugoslavia                                |
+-------------------------------------------+
36 rows in set (0.002 sec)
```

(5) find the number of countries in each region. It also shows the region name not region id.

```
MariaDB [nation]> select r.name, count(*) from countries c, regions r where c.region_id = r.region_id group by r.region_id;
+--------------------------+----------+
| name                     | count(*) |
+--------------------------+----------+
| Caribbean                |       24 |
| Southern and Central Asia |       14 |
| Central Africa           |        9 |
| Southern Europe          |       15 |
| Middle East              |       18 |
| South America            |       14 |
| Polynesia                |       10 |
| Antarctica               |        5 |
| Australia and New Zealand |        5 |
| Western Europe           |        9 |
| Eastern Africa           |       20 |
| Western Africa           |       17 |
| Eastern Europe           |       10 |
| Central America          |        8 |
| North America            |        5 |
| Southeast Asia           |       11 |
| Southern Africa          |        5 |
| Eastern Asia             |        8 |
| Nordic Countries         |        7 |
| Northern Africa          |        7 |
| Baltic Countries         |        3 |
| Melanesia                |        5 |
| Micronesia               |        7 |
| British Islands          |        2 |
| Micronesia/Caribbean     |        1 |
+--------------------------+----------+
25 rows in set (0.000 sec)
```

(6) calculate the average area of countries in each region.

```
MariaDB [nation]> select r.name, avg(c.area) from countries c, regions r where c.region_id = r.region_id group by r.region_id;
+--------------------------+---------------+
| name                     | avg(c.area)   |
+--------------------------+---------------+
| Caribbean                |    9767.625000 |
| Southern and Central Asia |  770795.000000 |
| Central Africa           |  734740.777778 |
| Southern Europe          |   87759.493333 |
| Middle East              |  267810.666667 |
| South America            | 1276066.142857 |
| Polynesia                |     846.300000 |
| Antarctica               | 2626420.200000 |
| Australia and New Zealand | 1602387.800000 |
| Western Europe           |  123161.833333 |
| Eastern Africa           |  314994.550000 |
| Western Africa           |  361078.705882 |
| Eastern Europe           | 1881409.400000 |
| Central America          |  309941.500000 |
| North America            | 4300103.000000 |
| Southeast Asia           |  408618.272727 |
| Southern Africa          |  534955.600000 |
| Eastern Asia             | 1471810.250000 |
| Nordic Countries         |  188843.000000 |
| Northern Africa          | 1217814.714286 |
| Baltic Countries         |   58372.333333 |
| Melanesia                |  108154.800000 |
| Micronesia               |     443.142857 |
| British Islands          |  156586.500000 |
| Micronesia/Caribbean     |      16.000000 |
+--------------------------+---------------+
25 rows in set (0.000 sec)
```

(7) find regions that have more than 10 countries and total areas greater than 1,000,000 km2.

```
MariaDB [nation]> select r.name, count(c.country_id), sum(c.area) from countries c, regions r where c.region_id = r.region_id group by r
.region_id having count(c.country_id) >= 10 and sum(c.area) > 1000000;
+--------------------------+--------------------+-------------+
| name                     | count(c.country_id) | sum(c.area) |
+--------------------------+--------------------+-------------+
| Southern and Central Asia |                 14 | 10791130.00 |
| Southern Europe          |                 15 |  1316392.40 |
| Middle East              |                 18 |  4820592.00 |
| South America            |                 14 | 17864926.00 |
| Eastern Africa           |                 20 |  6299891.00 |
| Western Africa           |                 17 |  6138338.00 |
| Eastern Europe           |                 10 | 18814094.00 |
| Southeast Asia           |                 11 |  4494801.00 |
+--------------------------+--------------------+-------------+
8 rows in set (0.000 sec)
```

[10 points per problem]

(8) find the countries whose population and GDP are greater than the average population and average GDP of all countries in 2018.

```
MariaDB [nation]> select c1.name, s1.population, s1.gdp/1000000000 'gdb (billions)' from countries c1, country_stats s1 where c1.country
_id = s1.country_id and s1.year = 2018 and s1. population > (select avg(s.population) from countries c, country_stats s where c.country_
id=s.country_id and s.year=2018) and s1.gdp > (select avg(s.gdp) from countries c, country_stats s where c.country_id=s.country_id and s
.year=2018);
+--------------------+------------+---------------+
| name               | population | gdb (billions) |
+--------------------+------------+---------------+
| Argentina          |   44494502 |       518.4750 |
| Brazil             |  209469333 |      1868.6300 |
| China              | 1392730000 |     13608.2000 |
| Germany            |   82927922 |      3996.7600 |
| Spain              |   46723749 |      1426.1900 |
| France             |   66987244 |      2777.5400 |
| United Kingdom     |   66488991 |      2825.2100 |
| Indonesia          |  267663435 |      1042.1700 |
| India              | 1352617328 |      2726.3200 |
| Italy              |   60431283 |      2073.9000 |
| Japan              |  126529100 |      4970.9200 |
| South Korea        |   51635256 |      1619.4200 |
| Mexico             |  126190788 |      1223.8100 |
| Russian Federation |  144478050 |      1657.5500 |
| Thailand           |   69428524 |       504.9930 |
| Turkey             |   82319724 |       766.5090 |
| United States      |  327167434 |     20494.1000 |
+--------------------+------------+---------------+
17 rows in set (0.001 sec)
```

(9) for each language, find the total area of the countries where the official language is spoken.

```
ariaDB [nation]> select l.language, sum(c.area) from languages l, country_languages cl, countries c where l.language_id = cl.language_i
 and cl.country_id =c.country_id and cl.official=1 group by l.language_id;
+-------------------+-------------+
| language          | sum(c.area) |
+-------------------+-------------+
| Dutch             |    73037.00 |
| English           | 29359869.00 |
| Papiamento        |      800.00 |
| Spanish           | 11968191.00 |
| Pilipino          |   300000.00 |
| Palau             |      459.00 |
| Swazi             |    17364.00 |
| Kaby?             |    56785.00 |
| Bislama           |    12189.00 |
| Xhosa             |  1221037.00 |
+-------------------+-------------+
102 rows in set (0.001 sec)
```

(10) find all countries (name) whose economy growth (use gdp) is more than 500% throughout the whole reporting period.

```
MariaDB [nation]> select c.name, max(gdp)/min(gdp) 'economic growth' from countries c, country_stats s where c.country_id = s.country_id
 group by s.country_id having max(gdp) >= min(gdp)*500;
+-------------------+----------------+
| name              | economic growth |
+-------------------+----------------+
| Botswana          |       612.1212 |
| Equatorial Guinea |      2454.2626 |
| South Korea       |       669.8355 |
| Oman              |      1281.0840 |
| Qatar             |       683.3365 |
| Singapore         |       516.7134 |
+-------------------+----------------+
6 rows in set (0.003 sec)
```

(11) find all countries that have experienced a decrease in GDP at most twice compared to the previous year.

```
MariaDB [nation]> select c.name, count(*) from countries c, country_stats prev, country_stats next where c.country_id=prev.country_id an
d c.country_id=next.country_id and prev.year= next.year-1 and prev.gdp > next.gdp group by c.country_id having count(*) <= 2;
+-----------------------+----------+
| name                  | count(*) |
+-----------------------+----------+
| Lebanon               |        2 |
| Liberia               |        2 |
| Maldives              |        2 |
| Nauru                 |        1 |
| Panama                |        1 |
| Sao Tome and Principe |        2 |
| United States         |        1 |
| Vietnam               |        2 |
+-----------------------+----------+
8 rows in set (0.010 sec)
```

(12) find all continents that have experienced significant economic depression during IMF period (1997~1998). how much did they experience the decrease in growth rate (use gdp).

```
MariaDB [nation]> select continents.name, (sum(s1998.gdp)-sum(s1997.gdp))/sum(s1997.gdp)*100 'growth rate (%)' from continents, regions
r, countries c, country_stats s1997, country_stats s1998 where continents.continent_id=r.continent_id and r.region_id=c.region_id and c.
country_id=s1997.country_id and s1997.year=1997 and c.country_id=s1998.country_id and s1998.year=1998 group by continents.continent_id;
+---------------+-----------------+
| name          | growth rate (%) |
+---------------+-----------------+
| North America |          5.1002 |
| Asia          |         -7.9560 |
| Africa        |         -1.0962 |
| Europe        |          1.7121 |
| South America |         -1.3188 |
| Oceania       |         -9.1318 |
+---------------+-----------------+
6 rows in set (0.001 sec)
```