

## TD1 – SQL avancé

### Exercice 1 : Requêtes avancées sur la base MONDIAL

Le schéma relationnel de la base MONDIAL est :

**Continent** (Name, Area)

**Country** (Name, Code, Capital, Province, Area, Population) // Province est la région de la capitale

**Province** (Name; Country, Population, Area, Capital, CapProv) // CapProv est la province de la capitale. Peut différer du nom de la province lorsque deux provinces «concentriques» ont la même capitale.

**City** (Name, Country, Province, Population, Longitude, Latitude)

**Encompasses** (Country, continent, percentage)

**Borders** (Country1, Country2, length) // cette relation est asymétrique. On a (F, I, ...) pour France-Italie et (E,F,...) pour Espagne-France. Country1 < Country2 selon l'ordre lexicographique.

**Organization** (Abbreviation, Name, City, Country, Province, Established) // Established est une date

**IsMember**(Country, Organization, type)

**Population** (Country, Population\_growth, infant\_mortality)

**Economy** (Country, GDP, Agriculture, Service, Industry, Inflation) // GDP=PIB

**Politics** (Country, Independence, Dependent, Government) // date d'indépendance, dependent = code du pays d'attache

**Language** (Country, Name, Percentage)

**EthnicGroup** (Country, Name, Percentage)

**Religion** (Country, Name, Percentage)

**Sea** (Name, Depth)

**Lake** (Name, Area, Depth, Altitude, Type, River, Coordinates)

**Island** (Name, Islands, Area, Height, Type, Coordinates)

**IslandIn** (Island, Sea, Lake, River)

**River** (Name, River, Lake, Sea, Length, Source, Moutains, SourceAltitude, Estuary)

//le fleuve name se jette dans un fleuve, un lac ou une mer.

**MergesWith** (sea1, Sea2) // cette relation est asymétrique.

**Desert** (Name, Area, Coordinates)

**Mountain** (Name, Mountains, Height, Type, Coordinates)

**MountainOnIsland** (Mountain, Island)

**Located** (City, Province, Country, River, Lake, Sea) // ville en bordure de lac, mer et/ou fleuve

**LocatedOn** (City, Province, Country, Island) // ville sur une ile

**Geo\_Desert** (Desert, Country, Province)

**Geo\_Estuary** (River, Country, Province)

**Geo\_River** (River, Country, Province)

**Geo\_Source** (River, Country, Province)

**Geo\_Sea** (Sea, Country, Province)

**Geo\_Island** (Island, Country, Province)

**Geo\_Lake** (Lake, Country, Province)

**Geo\_Mountain** (Mountain, Country, Province)

Ecrire en SQL les requêtes suivantes

1. Le nom des pays membres des nations unies trié par nom de pays
2. Idem avec la population, trié décroissant par population
3. Le nom des pays NON membre des nations unies
4. Les pays frontaliers de la France (solution avec union)
5. Les pays frontaliers de la France (solution avec OR)
6. La longueur de la frontière française
  
7. Pour chaque pays, le nombre de voisins
8. Pour chaque pays, la population totale de ses voisins
9. Pour chaque pays d'Europe, la population totale de ses voisins
10. Les organisations, avec le nombre de membres et pop totale.
11. Les organisations regroupant plus de 100 pays, avec le nombre de membre et pop totale
12. Les pays d'Amérique avec leur plus haute montagne
13. (\*) Les affluents directs du Nil : tous les fleuves qui se jettent dans le Nil.
14. (\*) Tous les affluents du Nil : ceux qui s'écoulent directement ou indirectement dans le Nil.
15. (\*) La longueur totale des cours d'eau alimentant le Nil, Nil inclus.
16. a) La plus grande organisation en termes de nombre pays membre  
b) (\*) Les 3 plus grandes organisations en termes de nombre pays membre
17. (\*) La densité de population (exprimée en nombre d'habitants par km<sup>2</sup>) de la zone formée de l'Algérie et la Lybie ainsi que de tous leurs voisins directs.
18. (\*) Idem mais en enlevant tous les déserts de la zone en question.
19. Le pourcentage de croyants de chaque religion dans la population mondiale
20. Les couples de pays européens ayant exactement accès aux mêmes mers

## **TME 1 : Requêtes avancées sur la base MONDIAL**

Lire les instructions sur le site web MLBDA, rubrique : *Les travaux dirigés et TME*

## The relational schema of the Mondial database

**Country:** the countries (and similar areas) of the world with some data.

name: The country name

code: The car code

capital: The name of the capital

province: The province where the capital belongs to

area: the total area

population: the population number

**Economy:** economical information about the countries.

country: the country code

GDP: gross domestic product (in million \$)

agriculture: percentage of agriculture of the GDP

service: percentage of services of the GDP

industry: percentage of industry of the GDP

inflation: inflation rate (per annum)

**Population:** information about the population of the countries.

country: the country code

population\_growth: population growth rate (per annum)

infant\_mortality: infant mortality (per thousand)

**Politics:** political information about the countries.

country: the country code

independence: date of independence (if independent)

dependent: the country code where the area belongs to

government: type of government

**Language:** information about the languages spoken in a country

country: the country code

name: name of the language

percentage: percentage of the language in this country

**Religion:** information about the religions in a country

country: the country code

name: name of the religion

percentage: percentage of the language in this country

**EthnicGroup:** information about the ethnic groups in a country

country: the country code

name: name of the religion

percentage: percentage of the language in this country

**borders:** informations about neighboring countries. Note that in this relation, for every pair of neighboring countries (A,B), only one tuple is given – thus, the relation is *not* symmetric.

country1: a country code

country2: a country code

length: length of the border between country1 and country2

**Continent:** Information about continents.

name: name of the continent

area: total area of the continent

**encompasses:** information to which continents a country belongs.

country: the country code

continent: the continent name

percentage: percentage, how much of the area of a country belongs to the continent

**City:** information about cities.

name: the name of the city  
country: the country code where it belongs to  
province: the name of the province where it belongs to  
population: population of the city  
longitude: geographic longitude  
latitude: geographic latitude

**Province:** information about administrative divisions.

name: the name of the administrative division  
country: the country code where it belongs to  
area: the total area of the province  
population: the population of the province  
capital: the name of the capital  
capprov: the name of the province where the capital belongs to  
note that *capprov* is not necessarily equal to *name*. E.g., the municipality of *Bogota (Columbia)* is a province of its own, and *Bogota* is the capital of the surrounding province *Cudinamarca*.

**Organization:** information about political and economical organizations.

name: the full name of the organization  
abbreviation: its abbreviation  
city: the city where the headquarter is located  
country: the country code where the headquarter is located  
province: the province where the headquarter is located  
established: date of establishment

**isMember:** memberships in political and economical organizations.

organization: the abbreviation of the organization  
country: the code of the member country  
type: the type of membership

**Lake:** information about lakes.

name: the name of the lake  
area: the total area of the lake  
depth: the depth of the lake  
altitude: the altitude of the lake  
river: the river that flows out of the lake (may be null)  
type: the type of the lake, e.g., salt, caldera, ...  
coordinates: its geographical coordinates as (longitude, latitude)

**River:** information about rivers.

name: the name of the river  
length: the length of the river  
river: the river where it flows to  
lake: the lake where it flows to  
sea: the sea where it flows to  
source: the coordinates of its source  
sourceAltitude: the altitude of its source  
mountains: the mountains where the its source is located  
source: the coordinates of its estuary

**Sea:** information about seas.

name: the name of the sea  
depth: the maximal depth of the sea

**Mountain:** information about mountains

name: the name of the mountain  
mountains: the mountains where it belongs to  
height: the height of the mountain  
type: the type of the mountain, e.g. volcanic, (active) volcano, ...  
coordinates: its geographical coordinates as (longitude, latitude)

**Island:** information about islands

name: the name of the island  
islands: the group of islands where it belongs to  
area: the area of the island  
height: the height of the highest point on the island  
type: the type of the island, e.g. volcanic, coral, atoll, ...  
coordinates: its geographical coordinates as (longitude, latitude)

**Desert:** information about deserts.

name: the name of the desert  
area: the total area of the desert  
coordinates: its geographical coordinates as (longitude, latitude)

**geo\_Mountain:** geographical information about mountains

mountain: the name of the mountain  
country: the country code where it is located  
province: the province of this country

Note that for a country there can be several provinces where the mountain is located in.  
analogous for *geo\_island*, *geo\_desert*, *geo\_river*, *geo\_lake*, *geo\_sea*.

**mergesWith:** information about neighboring seas. Note that in this relation, for every pair of neighboring seas (A,B), only one tuple is given – thus, the relation is *not* symmetric.

sea1: a sea  
sea2: a sea

**located:** information about cities located at rivers, lakes, and seas.

city: the name of the city  
country: the country code where the city belongs to  
province: the province where the city belongs to  
river: the river where it is located at  
lake: the lake where it is located at  
sea: the sea where it is located at

Note that for a given city, there can be several lakes/seas/rivers where it is located at.

**locatedOn:** information about cities located in islands.

city: the name of the city  
country: the country code where the city belongs to  
province: the province where the city belongs to  
island: the island it is (maybe only partially) located on

Note that for a given city, there can be several islands where it is located on.

**islandIn:** information the waters where the islands are located in.

island: the name of the island  
sea: the sea where the island is located in  
lake: the sea where the island is located in

river: the sea where the island is located in

Note that an island can have coasts to several seas.

**MountainOnIsland:** information which mountains are located in islands.

mountain: the name of the mountain

island: the name of the island

Incrementally extended version: Mondial-II, 2009