SQL Queries

For the following queries: (a) formulate and write down the query in SQL, (b) execute them on your Mondial database, and (c) write down the number of rows returned. Make sure your queries are correct for all Mondial database instances. Result relations may not contain duplicates and the duplicates must be removed if necessary.

1. The codes of all countries in lexicographical order that are adjacent to the deepest sea(s).

   (a) State the query without using joins or Cartesian products in the FROM clauses.

   ```sql
   SELECT DISTINCT Country
   FROM geosea
   WHERE Sea IN
   (SELECT Name
    FROM sea
    WHERE Depth = (SELECT MAX(Depth)
                 FROM sea))
   ORDER BY Country;
   ```

   The query returns 43 rows when executed on the Mondial database.

   ```sql
   SELECT DISTINCT Country
   FROM geosea JOIN sea
   ON geosea.Sea = sea.Name
   AND Depth = (SELECT max(Depth)
                 FROM sea)
   ORDER BY Country;
   ```

   The query returns 43 rows when executed on the Mondial database.

2. The name, province and country code of all cities that are located next to a lake and a sea, but not to a river.

   ```sql
   ( SELECT City, Province, Country
     FROM located WHERE Lake IS NOT NULL
     INTERSECT
     SELECT City, Province, Country
     FROM located WHERE Sea IS NOT NULL
   ) EXCEPT ( SELECT City, Province, Country
              FROM located WHERE River IS NOT NULL
   );
   ```
The query returns 2 rows when executed on the Mondial database.

3. For each country determine its name and count the number of provinces where the number of mountains and islands are equal.

```sql
SELECT DISTINCT c1.Name, COALESCE(Cp, 0)
FROM country c1
LEFT OUTER JOIN
(SELECT Country, COUNT(Name) Cp FROM
 (SELECT p.Country, p.Name, COUNT(Island) AS c
  FROM province p LEFT OUTER JOIN geoIsland g
  GROUP BY p.Country, p.Name) t1
 NATURAL JOIN
 (SELECT p.Country, p.Name, COUNT(Mountain) AS c
  FROM province p LEFT OUTER JOIN geoMountain g
  GROUP BY p.Country, p.Name) t2
GROUP BY Country) c2
ON c1.Code = c2.Country;
```

Or:

```sql
WITH provinceNo(Country, CountProv) AS (
 SELECT Name, Cp
 FROM country c1
 LEFT OUTER JOIN
 (SELECT Country, COUNT(Name) Cp FROM
  (SELECT p.Country, p.Name, COUNT(Island) AS c
   FROM province p
   LEFT OUTER JOIN geoIsland g
   GROUP BY p.Country, p.Name) t1
  NATURAL JOIN
  (SELECT p.Country, p.Name, COUNT(Mountain) AS c
   FROM province p
   LEFT OUTER JOIN geoMountain g
   GROUP BY p.Country, p.Name) t2
  GROUP BY Country) c2
 ON c1.Code = c2.Country)
)
SELECT *
FROM provinceNo
WHERE CountProv IS NOT NULL
UNION
SELECT Country, 0
FROM provinceNo
WHERE CountProv IS NULL;
```

The query returns 238 rows when executed on the Mondial database.
4. The names of all countries in the continent 'America' for which the database records that at least one language is spoken and

(a) at least one Australian/Oceanic language is spoken. No GROUP BY is allowed.

```
SELECT c.Name
FROM country c, encompasses e, language l
WHERE c.Code = e.Country
AND l.Country = c.Code
AND e.Continent = 'America'
AND l.Name IN
   (SELECT Name
    FROM language l1, encompasses e1
    AND Continent = 'Australia/Oceania');
```

The query returns 15 rows when executed on the Mondial database.

(b) at least two Australian/Oceanic languages are spoken.

```
SELECT c.Name
FROM country c, encompasses e, language l
WHERE c.Code = e.Country
AND l.Country = c.Code
AND e.Continent = 'America'
AND l.Name IN
   (SELECT Name
    FROM language l1, encompasses e1
    AND Continent = 'Australia/Oceania')
GROUP BY c.Code, c.Name
HAVING COUNT(l.Name) >= 2;
```

The query returns 0 rows when executed on the Mondial database.

(c) all Australian/Oceanic languages are spoken.

```
SELECT c.Name
FROM country c, encompasses e, language l
WHERE c.Code = e.Country
AND l.Country = c.Code
AND e.Continent = 'America'
AND l.Name IN
   (SELECT Name
    FROM language l1, encompasses e1
    AND Continent = 'Australia/Oceania')
GROUP BY c.Code, c.Name
HAVING COUNT(l.Name) = (SELECT COUNT(DISTINCT Name)
                        FROM language l2, encompasses e2
                        WHERE l2.Country = e2.Country
                        AND Continent = 'Australia/Oceania');
```

Or:
The query returns 0 rows when executed on the Mondial database.

An Australian/Oceanic language is a language spoken in the continent 'Australia/Oceania'. You may use the constants 'America' and 'Australia/Oceania'.