Project: Deforestation Exploration

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1. GLOBAL SITUATION

Instructions:

- Answering these questions will help you add information into the template.
- Use these questions as guides to write SQL queries.
- Use the output from the query to answer these questions.

a. What was the total forest area (in sq km) of the world in 1990? Please keep in mind that you can use the country record denoted as “World" in the region table.

```
SELECT forest_area_sqkm
FROM forest_area
WHERE country_name = 'World' and year = '1990';
```

b. What was the total forest area (in sq km) of the world in 2016? Please keep in mind that you can use the country record in the table denoted as “World.”

```
SELECT forest_area_sqkm
FROM forest_area
WHERE country_name = 'World' and year = '2016';
```

c. What was the change (in sq km) in the forest area of the world from 1990 to 2016?

```
SELECT country_code,
       year,
```

```
       forest_area_sqkm,
       LEAD(forest_area_sqkm) OVER (ORDER BY forest_area_sqkm) - forest_area_sqkm AS area_change
FROM forest_area
WHERE country_name = 'World' AND year IN ('1990', '2016')
```

d. What was the percent change in forest area of the world between 1990 and 2016?

```
SELECT ((LEAD(forest_area_sqkm) OVER (ORDER BY forest_area_sqkm) - forest_area_sqkm)/
       (
        SELECT forest_area_sqkm
        FROM forest_area
        WHERE country_name = 'World' AND year = '1990'
        ))*100 AS area_percentage_change
FROM forest_area
WHERE country_name = 'World' AND year IN ('1990', '2016')
```

e. If you compare the amount of forest area lost between 1990 and 2016, to which country's total area in 2016 is it closest to?

```
WITH t1 AS (
        SELECT country_name,
               total_area_sq_mi*2.59 as total_area_sqkm
        FROM land_area
        WHERE year = '2016'
        )
SELECT country_name,
       total_area_sqkm
FROM t1
WHERE total_area_sqkm <= (
        SELECT LEAD(forest_area_sqkm) OVER (ORDER BY forest_area_sqkm) - forest_area_sqkm AS area_change
        FROM forest_area
        WHERE country_name = 'World' AND year IN ('1990', '2016')
        LIMIT 1
        )
ORDER BY 2 DESC
LIMIT 1
```

2. REGIONAL OUTLOOK

Instructions:

- Answering these questions will help you add information into the template.
- Use these questions as guides to write SQL queries.
- Use the output from the query to answer these questions.
- Create a table that shows the Regions and their percent forest area (sum of forest area divided by sum of land area) in 1990 and 2016. (Note that 1 sq mi = 2.59 sq km). Based on the table you created, ...

```
CREATE VIEW regional_outlook
AS
SELECT  r.region,
        f.year,
        (SUM(f.forest_area_sqkm)/SUM(l.total_area_sq_mi*2.59))*100 AS percent_forest_area
FROM forest_area f
JOIN land_area l
ON l.country_code = f.country_code
JOIN regions r
ON r.country_code = l.country_code
WHERE f.year IN ('1990','2016')
GROUP BY 1, 2
ORDER BY 2, 1
```

a. What was the percent forest of the entire world in 2016? Which region had the HIGHEST percent forest in 2016, and which had the LOWEST, to 2 decimal places?

```
/* Percent forest of the entire world in 2016 */
SELECT  region,
        ROUND((percent_forest_area) :: numeric, 2) AS round_pfa_2016
FROM regional_outlook
WHERE region = 'World' AND year = '2016'

/* HIGHEST percent forest in 2016 */
SELECT region,
       ROUND((percent_forest_area) :: numeric, 2) AS round_pfa_2016
FROM regional_outlook
WHERE percent_forest_area = (SELECT MAX(percent_forest_area)
                             FROM regional_outlook
                             WHERE year = '2016')

/* LOWEST percent forest in 2016 */
SELECT region,
       ROUND((percent_forest_area) :: numeric, 2) AS round_pfa_2016
FROM regional_outlook
WHERE year = '2016' AND percent_forest_area = (SELECT MIN(percent_forest_area)
                             FROM regional_outlook
                             WHERE year = '2016')
```

b. What was the percent forest of the entire world in 1990? Which region had the HIGHEST percent forest in 1990, and which had the LOWEST, to 2 decimal places?

```
/* Percent forest of the entire world in 1990*/
SELECT region,
       ROUND((percent_forest_area) :: numeric, 2) AS round_pfa_1990
FROM regional_outlook
WHERE region = 'World' AND year = '1990'

/* HIGHEST percent forest in 1990 */
SELECT region,
       ROUND((percent_forest_area) :: numeric, 2) AS round_pfa_1990
FROM regional_outlook
WHERE percent_forest_area = (SELECT MAX(percent_forest_area)
                             FROM regional_outlook
                             WHERE year = '1990')

/* LOWEST percent forest in 1990 */
SELECT region,
       ROUND((percent_forest_area) :: numeric, 2) AS round_pfa_1990
FROM regional_outlook
WHERE year = '1990' AND percent_forest_area = (SELECT MIN(percent_forest_area)
                             FROM regional_outlook
                             WHERE year = '1990')
```

c. Based on the table you created, which regions of the world DECREASED in forest area from 1990 to 2016?

```
WITH T1 AS (
            SELECT *
            FROM regional_outlook
            WHERE year = '1990'),
     T2 AS (
            SELECT *
            FROM regional_outlook
            WHERE year = '2016')

SELECT t2.region,
       ROUND(t1.percent_forest_area :: numeric,2) AS percent_forest_area_1990,
       ROUND(t2.percent_forest_area :: numeric,2) AS percent_forest_area_2016,
       ROUND((t1.percent_forest_area - t2.percent_forest_area) :: numeric,2) AS area_diff
FROM T1
JOIN T2
/* If we remove the AND condition we can see the percent forest area by every region in 1990 and 2016 */
ON T2.region = T1.region AND t2.percent_forest_area < t1.percent_forest_area
ORDER BY 1
```

3. COUNTRY-LEVEL DETAIL

Instructions:

- Answering these questions will help you add information to the template.
- Use these questions as guides to write SQL queries.
- Use the output from the query to answer these questions.

```
/* Forest area change from 1990 to 2016 */
CREATE VIEW country_level
AS
SELECT f.country_name,
       f.year,
       r.region,
       f.forest_area_sqkm,
       f.forest_area_sqkm - lag(f.forest_area_sqkm) OVER (PARTITION BY f.country_name ORDER BY year) AS forest_area_diff
FROM forest_area f
JOIN regions r
ON r.country_code = f.country_code
WHERE year IN (1990,2016)

/* Forest area percent relative to land area */
CREATE VIEW forest_percent_land
AS
SELECT  r.country_name,
        r.region,
        (SUM(f.forest_area_sqkm)/SUM(l.total_area_sq_mi*2.59))*100 AS percent_forest_area
FROM forest_area f
JOIN land_area l
ON l.country_code = f.country_code
JOIN regions r
ON r.country_code = l.country_code
WHERE f.year IN ('2016') AND f.forest_area_sqkm IS NOT NULL
GROUP BY 1, 2
ORDER BY 3
```

a. Which 5 countries saw the largest amount decrease in forest area from 1990 to 2016? What was the difference in forest area for each?

```
SELECT country_name,
       region,
       ROUND(forest_area_diff :: numeric, 2) AS forest_area_change
FROM country_level
WHERE forest_area_diff IS NOT NULL AND country_name != 'World' AND year = '2016'
ORDER BY forest_area_diff
LIMIT 5
```

b. Which 5 countries saw the largest percent decrease in forest area from 1990 to 2016? What was the percent change to 2 decimal places for each?

```
SELECT  country_name,
        region,
        ROUND((forest_area_diff/(forest_area_sqkm - forest_area_diff)*100) :: numeric,2) AS percentage_change
FROM country_level
WHERE forest_area_diff IS NOT NULL AND country_name != 'World' AND year = '2016'
ORDER BY percentage_change
LIMIT 5
```

c. If countries were grouped by percent forestation in quartiles, which group had the most countries in it in 2016?

```
SELECT DISTINCT(quartiles), COUNT(country_name)
FROM (
      SELECT country_name,
             CASE WHEN percent_forest_area <= 25 THEN '0-25%'
                  WHEN percent_forest_area > 25 AND percent_forest_area <= 50 THEN '25-50%'
                  WHEN percent_forest_area > 50 and percent_forest_area <= 75 THEN '50-75%'
                  ELSE '75%+'
```

```
                  END AS quartiles
                  FROM forest_percent_land
                  WHERE percent_forest_area IS NOT NULL AND country_name != 'World'
                  GROUP BY 1, 2) sub
GROUP BY 1
ORDER BY 1
```

d. List all of the countries that were in the 4th quartile (percent forest > 75%) in 2016.

```
SELECT country_name,
       region,
       ROUND(percent_forest_area :: numeric,2) AS pct_desig_forest
FROM forest_percent_land
WHERE percent_forest_area > 75
ORDER BY 3
```

e. How many countries had a percent forestation higher than the United States in 2016?

```
SELECT COUNT(*)
FROM forest_percent_land
WHERE percent_forest_area > (
                             SELECT percent_forest_area
                             FROM forest_percent_land
                             WHERE country_name = 'United States'
                            )
```