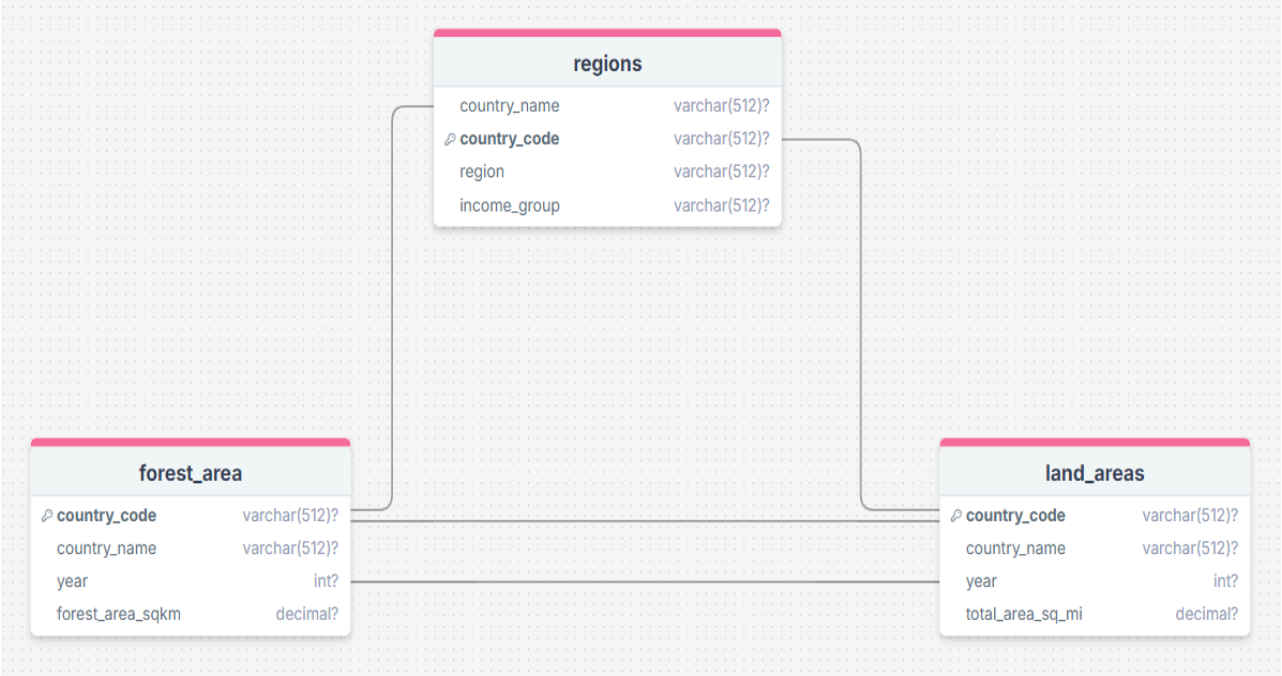
SQL Project



- We created the database and named it " deforestation " and it contains three tables: forest area , regions and land areas .
- And this is the schema that shows the relations between the tables .
- The forest_area and land_area tables join on both country_code AND year.
- The regions table joins these based on only country_code.

- First We Create a view called "forestation" by joining all three tables : forest_area, land_areas, and regions
- And also add a new column that provides the percent of the land area that is designated as forest , and called it " forest_percentage "

```sql
CREATE VIEW forestation AS
SELECT f.country_code,
       r.country_name,
       r.region,
       f.year,
       r.income_group,
       f.forest_area_sqkm,
       l.total_area_sq_mi,
       (f.forest_area_sqkm / (l.total_area_sq_mi * 2.59)) * 100 AS
forest_percent
FROM forest_area f
JOIN land_areas l
ON f.country_code = l.country_code
AND f.year = l.year
JOIN regions r
ON f.country_code = r.country_code;
```

country_code	country_name	region	year	income_group	forest_area_sqkm	total_area_sq_mi	forest_percentage
ABW	Aruba	Latin Americ…	2016	High income	4.199999869	69.5	2.3332684475431238020
AFG	Afghanistan	South Asia	2016	Low income	13500	252069.5	2.0678246326331477450
AGO	Angola	Sub-Saharan …	2016	Lower middle income	577311.9922	481351.35	46.307210541489722383
ALB	Albania	Europe & Cen…	2016	Upper middle income	7705.39978	10579.15	28.121898546819263512
AND	Andorra	Europe & Cen…	2016	High income	160	181.47	34.042024453662740983
ARE	United Arab Emirates	Middle East …	2016	High income	3236.600037	27420.85	4.5573077564635083820
ARG	Argentina	Latin Americ…	2016	High income	268151.9922	1056637.07	9.7984057782496427090
ARM	Armenia	Europe & Cen…	2016	Upper middle income	3322.000122	10992.28	11.668421198602380304
ASM	American Samoa	East Asia & …	2016	Upper middle income	175	77.22	87.500087500087500088
ATG	Antigua and Barbuda	Latin Americ…	2016	High income	98.00000191	169.88	22.273274414462900453
AUS	Australia	East Asia & …	2016	High income	1250590	2969891.89	16.258278069956339498
AUT	Austria	Europe & Cen…	2016	High income	38708.00049	31862.16	46.905714911867037147
AZE	Azerbaijan	Europe & Cen…	2016	Upper middle income	11656.19995	31918.92	14.099672862234377474
BDI	Burundi	Sub-Saharan …	2016	Low income	2806.000061	9915.06	10.926789217108186434
BEL	Belgium	Europe & Cen…	2016	High income	6838.400269	11691.12	22.583884043358413650
BEN	Benin	Sub-Saharan …	2016	Low income	42610	43536.68	37.788222371888374900
BFA	Burkina Faso	Sub-Saharan …	2016	Low income	52902.00195	105637.07	19.335526229928923983
BGD	Bangladesh	South Asia	2016	Lower middle income	14264.00024	50258.69	10.957977615413374284
BGR	Bulgaria	Europe & Cen…	2016	Upper middle income	38401.99951	41915.06	35.373984524507033600
BHR	Bahrain	Middle East …	2016	High income	6.100000143	300.39	0.784051536477482747
BHS	Bahamas The	Latin Americ…	2016	High income	5150	3864.86	51.448616209047376024
BIH	Bosnia and Herzegov…	Europe & Cen…	2016	Upper middle income	21850	19768.34	42.675780749893194337
BLR	Belarus	Europe & Cen…	2016	Upper middle income	86534.00391	78373.75	42.630105514235723649

Answers for ‘’ Part 1 - Global Situation ‘’ :

1- Total Forest area in 1990 using ‘World record “ :

```sql
SELECT SUM(f.forest_area_sqkm) AS total_forset_area_sq_km,
       f.year,
       r.region
FROM forest_area f
INNER JOIN regions r
ON r.country_code = f.country_code
WHERE year = 1990
     AND  r.region = 'World'
GROUP BY r.region , f.year
```

#	total_forset_area_sq_km	year	region
1	41282694.9	1990	World

2- Total Forest area in 2016 using ‘ World record ‘ :

```sql
SELECT SUM(forest_area_sqkm) AS total_forset_area_sq_km,
       year,
       country_name
FROM forest_area
WHERE year = 2016
     AND  country_name = 'World'
GROUP BY country_name, year
```

#	total_forset_area_sq_km	year	country_name
1	39958245.9	2016	World

3- Change in forest area from 1990 to 2016 :

```sql
WITH forest_area_1990 AS (
```

```sql
SELECT SUM(forest_area_sqkm) AS total_forest_area_1990
FROM forestation
WHERE year = 1990
AND country_name = 'World'
),
forest_area_2016 AS (
SELECT SUM(forest_area_sqkm) AS total_forest_area_2016
FROM forestation
WHERE year = 2016
AND country_name = 'World'
)
SELECT
(total_forest_area_2016 - total_forest_area_1990) AS
forest_area_change_sqkm
FROM
forest_area_1990,
forest_area_2016;
```

#	forest_area_change_sqkm
1	-1324449.0

4- Percent change in forest area from 1990 to 2016 :

```
 WITH forest_area_1990 AS (
   SELECT SUM(forest_area_sqkm) AS total_forest_area,
      SUM(forest_area_sqkm) AS total_forest_area_1990
      FROM forest_area
      WHERE year = 1990
      AND country_name = 'World'
),
     forest_area_2016 AS (
      SELECT SUM(forest_area_sqkm) AS total_forest_area_2016
      FROM forest_area
      WHERE year = 2016
      AND country_name = 'World'
)
SELECT
  ((total_forest_area_2016 - total_forest_area_1990) /
SUM(total_forest_area) ) *100 AS forest_area_percent
FROM
  forest_area_1990,
  forest_area_2016
GROUP BY total_forest_area_2016,total_forest_area_1990
```

#	forest_area_percent
1	-3.20824258980244044100

5- Country total area which close to the difference of forest area between 1990 to 2016 :

```
SELECT country_name,
       SUM(total_area_sq_mi*2.59) AS total_area_of_land
FROM forestation
WHERE YEAR = 2016
AND (total_area_sq_mi*2.59) <= 1324449
GROUP BY country_name
ORDER BY total_area_of_land DESC
LIMIT 1;
```

#	country_name	total_area_of_land
1	Peru	1279999.9891

Answers for ‘’ Part 2 - Regional Outlook ‘’ :

- First we create a table to show ‘ the Regions and their percent forest area ‘ and called it “Regional_outlook” :

```
CREATE TABLE Regional_Outlook AS
SELECT r.region,
       ROUND(SUM(CASE WHEN f.year = 1990 THEN f.forest_area_sqkm / 2.59
ELSE 0 END) /
          SUM(CASE WHEN l.year = 1990 THEN l.total_area_sq_mi ELSE 0 END) *
100, 2) AS percent_forest_1990,
       ROUND(SUM(CASE WHEN f.year = 2016 THEN f.forest_area_sqkm / 2.59
ELSE 0 END) /
          SUM(CASE WHEN l.year = 2016 THEN l.total_area_sq_mi ELSE 0 END) *
100, 2) AS percent_forest_2016
FROM forest_area f
JOIN  land_areas l
ON f.country_code = l.country_code
AND f.year = l.year
JOIN  regions r
ON f.country_code = r.country_code
GROUP BY r.region;
```

region	percent_forest_1990	percent_forest_2016
East Asia & …	25.78	26.36
World	32.42	31.38
Middle East …	1.78	2.07
Europe & Cen…	37.28	38.04
Latin Americ…	51.03	46.16
North Americ…	35.65	36.04
Sub-Saharan …	30.67	28.79
South Asia	16.51	17.51

- Based on the table we created:

a-

- First : The percent forest of the entire world in 2016:

```sql
SELECT ROUND(percent_forest_2016,2) AS world_forest_2016
FROM Regional_Outlook
WHERE region = 'World';
```

#	world_forest_2016
1	31.38

- Second : Region with HIGHEST percent forest in 2016

```sql
SELECT region, percent_forest_2016 AS highest_forest_2016
FROM Regional_Outlook
ORDER BY percent_forest_2016 DESC
LIMIT 1;
```

#	region	highest_forest_2016
1	Latin America & Caribbean	46.16

- Third Region with LOWEST percent forest in 2016:

```sql
SELECT region, percent_forest_2016 AS lowest_forest_2016
FROM Regional_Outlook
ORDER BY percent_forest_2016 ASC
LIMIT 1;
```

#	region	lowest_forest_2016
1	Middle East & North Africa	2.07

b-

- First : The percent forest of the entire world in 1990

```sql
SELECT percent_forest_1990 AS world_forest_1990
FROM Regional_Outlook
WHERE region = 'World'
```

#	world_forest_1990
1	32.42

- Second : Region with HIGHEST percent forest in 1990

```sql
SELECT region, percent_forest_1990 AS highest_forest_1990
FROM Regional_Outlook
ORDER BY percent_forest_1990 DESC
LIMIT 1;
```

#	region	highest_forest_1990
1	Latin America & Caribbean	51.03

- Third Region with LOWEST percent forest in1990:

```sql
SELECT region, percent_forest_1990 AS lowest_forest_1990
FROM Regional_Outlook
ORDER BY percent_forest_1990 ASC
LIMIT 1;
```

#	region	lowest_forest_1990
1	Middle East & North Africa	1.78

C- Regions of the world that decreased in forest area from 1990 to 2016

```sql
SELECT region,
      percent_forest_1990,
      percent_forest_2016
FROM Regional_Outlook
WHERE percent_forest_1990 > percent_forest_2016
AND region != 'World'
LIMIT 2;
```

#	region	percent_forest_1990	percent_forest_2016
1	Latin America & Caribbean	51.03	46.16
2	Sub-Saharan Africa	30.67	28.79

‘’ Part 3 - Country-Level Detail ‘’ :

a- Which 5 countries saw the largest amount decrease in forest area from 1990 to 206? What was the difference in forest area for each?

```
WITH forest_diff AS (
  SELECT
    f1.country_name,
    f1.forest_area_sqkm AS forest_1990,
    f2.forest_area_sqkm AS forest_2016,
    f2.forest_area_sqkm - f1.forest_area_sqkm AS forest_area_diff
  FROM forest_area f1
  JOIN  forest_area f2
  ON f1.country_code = f2.country_code
  WHERE f1.year = 1990 AND f2.year = 2016
)
SELECT
  country_name,
  forest_1990,
  forest_2016,
  ROUND(forest_area_diff, 2) AS forest_area_change
FROM forest_diff
WHERE country_name != 'World'
ORDER BY forest_area_diff ASC
LIMIT 5;
```

#	country_name	forest_1990	forest_2016	forest_area_change
1	Brazil	5467050	4925540	-541510.00
2	Indonesia	1185450	903256.0156	-282193.98
3	Myanmar	392180	284945.9961	-107234.00
4	Nigeria	172340	65833.99902	-106506.00
5	Tanzania	559200	456880	-102320.00

b- Which 5 countries saw the largest percent decrease in forest area from 1990 to 2016 and the percent change to 2 decimal places for each

```
WITH forest_area AS (
    SELECT country_name,
           MIN(CASE WHEN year = 1990 THEN forest_area_sqkm END) AS
forest_area_1990,
           MIN(CASE WHEN year = 2016 THEN forest_area_sqkm END) AS
forest_area_2016
    FROM forestation
    GROUP BY country_name
),
percentage_dec AS (
    SELECT country_name,
           forest_area_1990,
           forest_area_2016,
           ROUND(((forest_area_1990 - forest_area_2016) /
forest_area_1990),2) * 100 AS percentage_decrease
    FROM forest_area
    WHERE forest_area_1990 IS NOT NULL
    AND forest_area_2016 IS NOT NULL
)
SELECT country_name,
       forest_area_1990,
       forest_area_2016,
       percentage_decrease
FROM percentage_dec
ORDER BY percentage_decrease DESC
LIMIT 5;
```

#	country_name	forest_area_1990	forest_area_2016	percentage_decrease
1	Togo	6850	1681.999969	75.00
2	Nigeria	172340	65833.99902	62.00
3	Uganda	47510	19418.00049	59.00
4	Mauritania	4150	2210	47.00
5	Honduras	81360	44720	45.00

c- Countries that had a percent forestation higher than the United States in 2016 :

```
SELECT count(*)
```

```
FROM forestation
WHERE forest_percentage > (SELECT forest_percentage FROM forestation WHERE
country_name =
'United States' AND year = 2016)
AND year = 2016;
```

#	count
1	94

Final Report

“ Part 1 - Global Situation “ :

a- Total forest area (in sq km) of the world in 1990 —-> 41282694.9 sq km .

b- Total forest area (in sq km) of the world in 2016 —-> 39958245.9 sq km .

c- The change (in sq km) in the forest area of the world from 1990 to 2016 —> it decreased by 1324449 sq km .

d- the percent change in forest area of the world between 1990 and 2016 —-> it decreased by 3.21%

e- Country's total area in 2016 is closest to the amount of forest area lost between 1990 and 2016 —-> Peru with ‘ 1280000 ‘ sq km .

“ Part 2 - Regional Outlook “ :

a- The percent forest of the entire world in 2016 —> 31.38 % .
Region with HIGHEST percent forest —-> Latin america & caribbean with 46.16 % .
Region with LOWEST percent forest —-> Middle East & North Africa with 2.07 % .

b- The percent forest of the entire world in 1990 —> 32.42 % .
Region with HIGHEST percent forest —-> Latin america & caribbean with 51.03 % .
Region with LOWEST percent forest —-> Middle East & North Africa with 1.78 % .

c- Regions of the world that decreased in forest area from 1990 to 2016 :

- Latin America & caribbean
- Sub-Saharan Africa

“ Part 3 - Country-Level Detail “

a- 5 countries saw the largest amount decrease in forest area from 1990 to 2016 :

#	country_name	forest_1990	forest_2016	forest_area_change
1	Brazil	5467050	4925540	-541510.00
2	Indonesia	1185450	903256.0156	-282193.98
3	Myanmar	392180	284945.9961	-107234.00
4	Nigeria	172340	65833.99902	-106506.00
5	Tanzania	559200	456880	-102320.00

b- 5 countries saw the largest percent decrease in forest area from 1990 to 2016 :

#	country_name	forest_area_1990	forest_area_2016	percentage_decrease
1	Togo	6850	1681.999969	75.00
2	Nigeria	172340	65833.99902	62.00
3	Uganda	47510	19418.00049	59.00
4	Mauritania	4150	2210	47.00
5	Honduras	81360	44720	45.00

C- Numbers of countries that had a percent forestation higher than the ‘ United States ‘ in 2016 —> 94 .