DATABASE CONCEPTS ASSIGNMENT 4

Part D

Task D.1

a)

```
SELECT
Location.location_name AS Country_Name,
'2021-01-01' AS Date_1,
COALESCE(
MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),
MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END)
) AS Vaccine_OD1,
'2021-06-01' AS Date_2,
COALESCE(
MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),
MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END)
) AS Vaccine_OD2,
'2022-01-01' AS Date_3,
COALESCE(
MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2022-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),
MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END)
) AS Vaccine_OD3,
-- Calculate absolute percentage change between dates, ensuring result is always positive
ABS(
(
```

```
(COALESCE(MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),

MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END)) -

COALESCE(MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),

MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END))) /

COALESCE(MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),

MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END))

) -

(

(COALESCE(MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2022-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),

MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END)) -

COALESCE(MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),

MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END))) /

COALESCE(MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-06-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END),

MAX(CASE WHEN Daily_Vaccination_Record.record_date = '2021-01-01' THEN
Daily_Vaccination_Record.total_vaccinations ELSE NULL END))

)

) AS Percentage_Change

FROM

Location

JOIN

Daily_Vaccination_Record ON Location.iso_code = Daily_Vaccination_Record.iso_code

WHERE

Daily_Vaccination_Record.record_date IN ('2021-01-01', '2021-06-01', '2022-01-01')

AND Location.location_type = 'country' -- Added filter for countries only
```

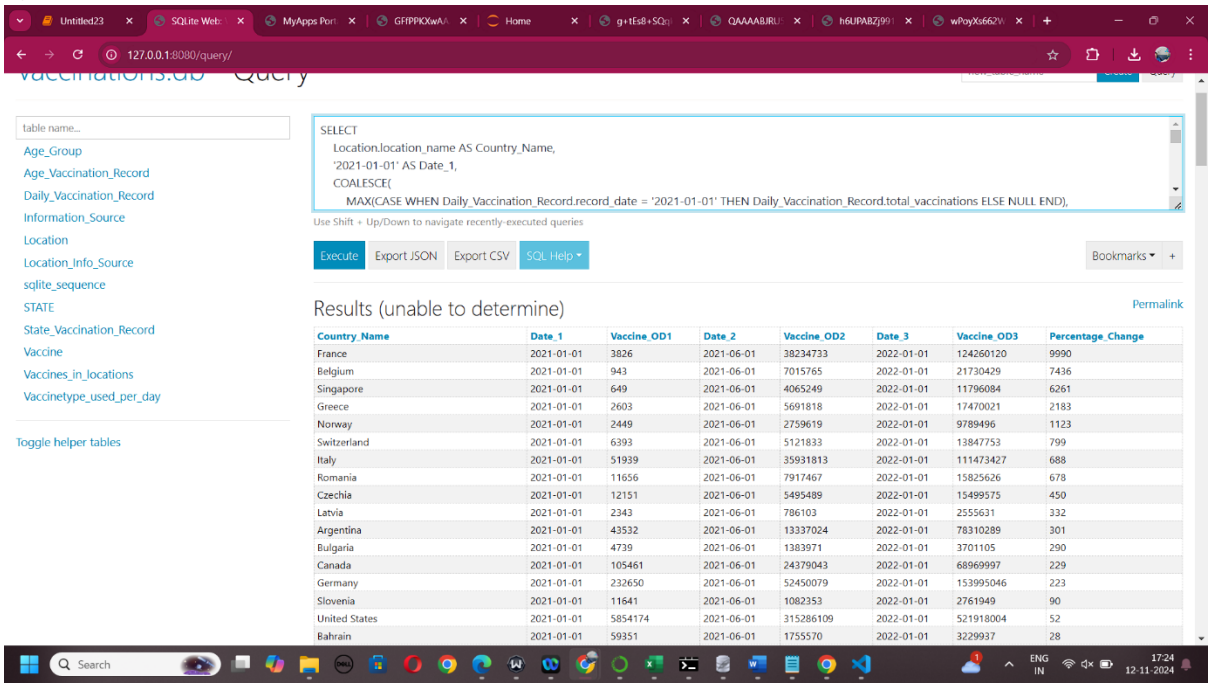
GROUP BY

Location.location_name

ORDER BY

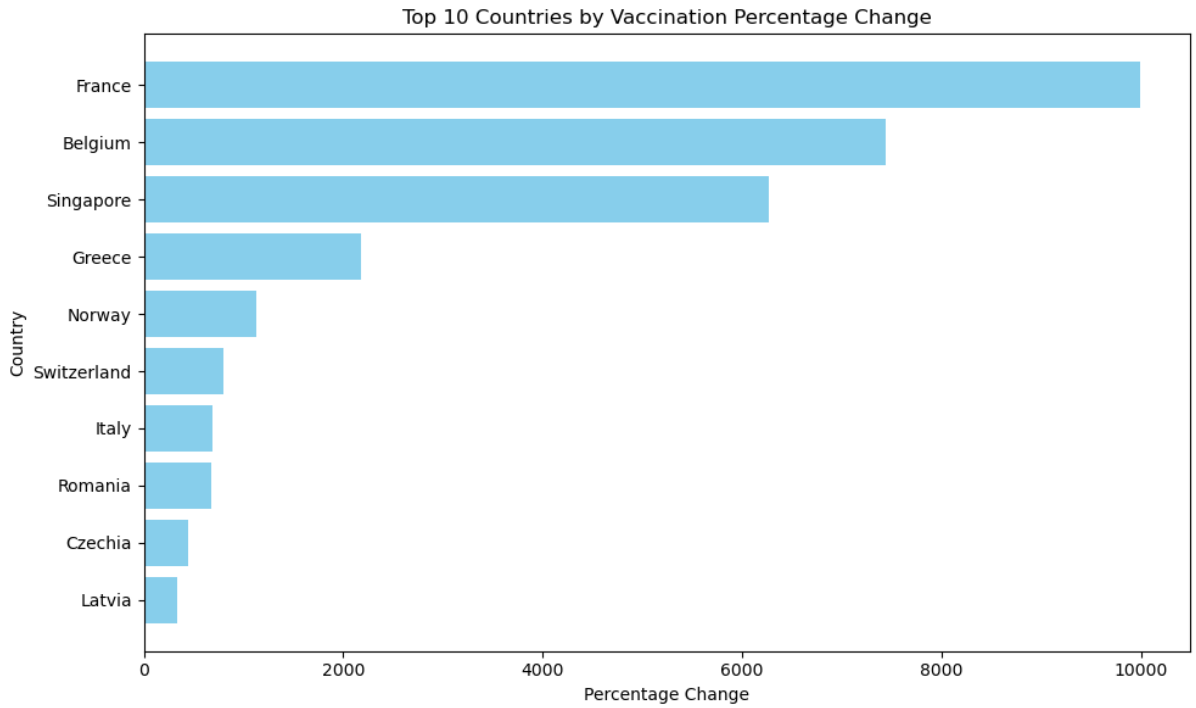
Percentage_Change DESC;

b)



Country_Name	Date_1	Vaccine_OD1	Date_2	Vaccine_OD2	Date_3	Vaccine_OD3	Percentage_Change
France	2021-01-01	3826	2021-06-01	38234733	2022-01-01	124260120	9990
Belgium	2021-01-01	943	2021-06-01	7015765	2022-01-01	21730429	7436
Singapore	2021-01-01	649	2021-06-01	4065249	2022-01-01	11796084	6261
Greece	2021-01-01	2603	2021-06-01	5691818	2022-01-01	17470021	2183
Norway	2021-01-01	2449	2021-06-01	2759619	2022-01-01	9789496	1123
Switzerland	2021-01-01	6393	2021-06-01	5121833	2022-01-01	13847753	799
Italy	2021-01-01	51939	2021-06-01	35931813	2022-01-01	111473427	688
Romania	2021-01-01	11656	2021-06-01	7917467	2022-01-01	15825626	678
Czechia	2021-01-01	12151	2021-06-01	5495489	2022-01-01	15499575	450
Latvia	2021-01-01	2343	2021-06-01	786103	2022-01-01	2555631	332
Argentina	2021-01-01	43532	2021-06-01	13337024	2022-01-01	78310289	301
Bulgaria	2021-01-01	4739	2021-06-01	1383971	2022-01-01	3701105	290
Canada	2021-01-01	105461	2021-06-01	24379043	2022-01-01	68969997	229
Germany	2021-01-01	232650	2021-06-01	52450079	2022-01-01	153995046	223
Slovenia	2021-01-01	11641	2021-06-01	1082353	2022-01-01	2761949	90
United States	2021-01-01	5854174	2021-06-01	315286109	2022-01-01	521918004	52
Bahrain	2021-01-01	59351	2021-06-01	1755570	2022-01-01	3229937	28

c)



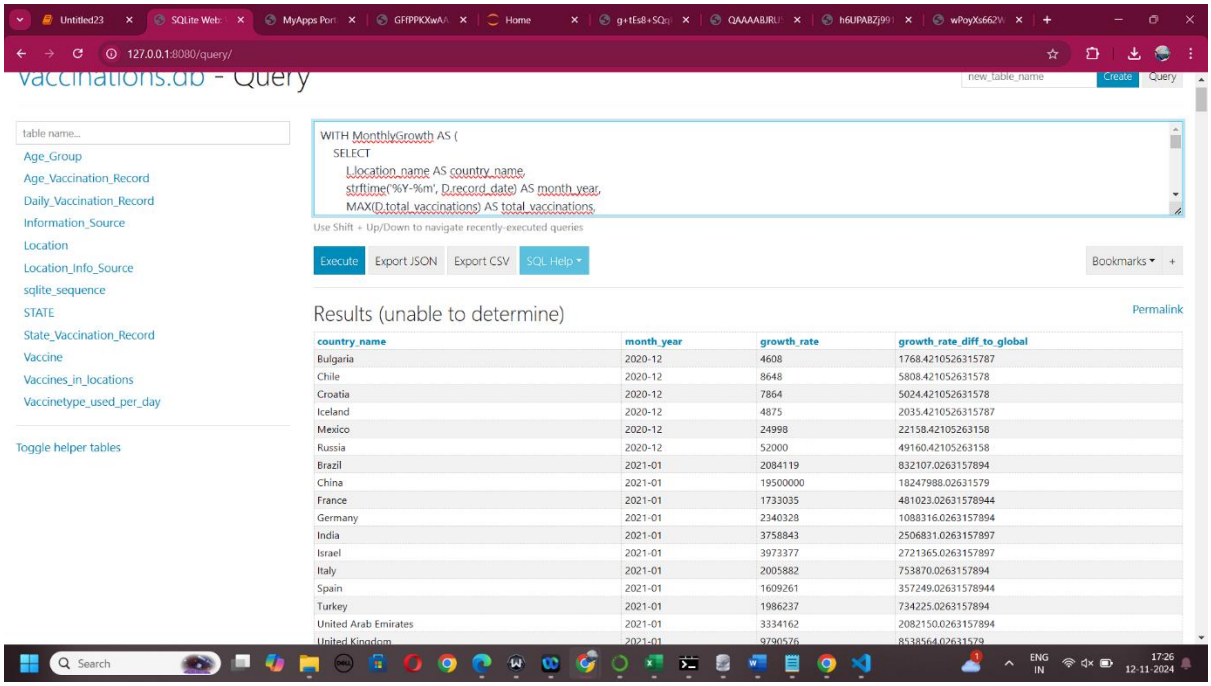
Task D.2

a)

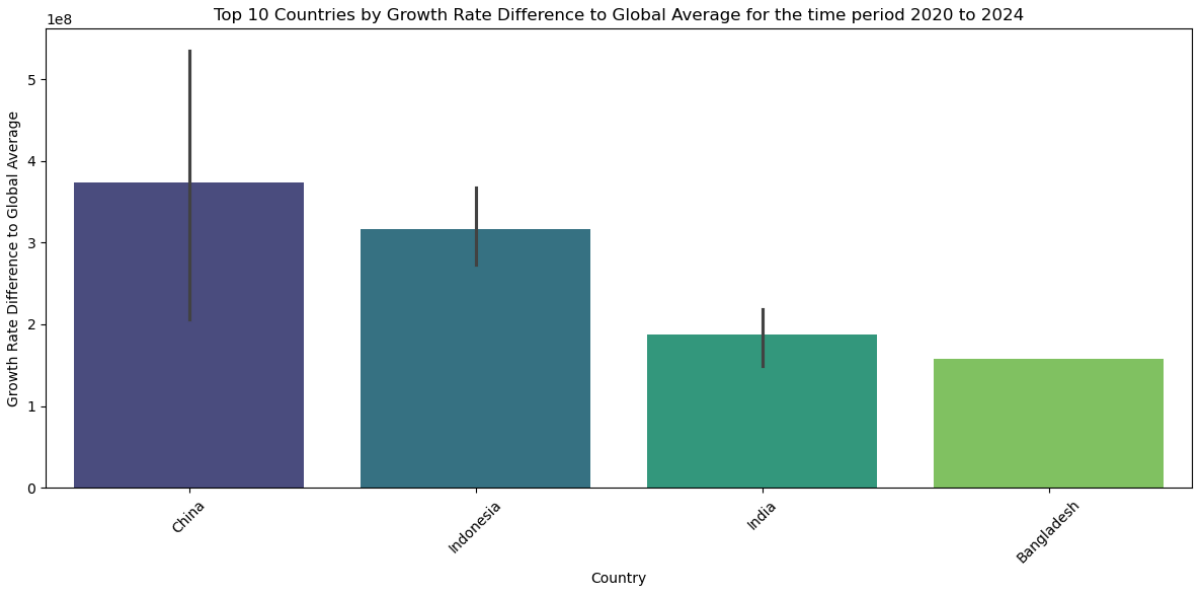
```
WITH MonthlyGrowth AS (
SELECT
L.location_name AS country_name,
strftime('%Y-%m', D.record_date) AS month_year,
MAX(D.total_vaccinations) AS total_vaccinations,
MAX(D.total_vaccinations) -
COALESCE(
(SELECT MAX(D2.total_vaccinations)
FROM Daily_Vaccination_Record D2
WHERE D2.iso_code = D.iso_code
AND strftime('%Y-%m', D2.record_date) = strftime('%Y-%m', DATE(D.record_date, '-1 month'))),
0) AS growth_rate
FROM Daily_Vaccination_Record D
JOIN Location L ON D.iso_code = L.iso_code
WHERE L.location_type = 'country'
```

```
GROUP BY L.location_name, month_year
),
GlobalGrowth AS (
SELECT
month_year,
AVG(growth_rate) AS global_avg_growth_rate
FROM MonthlyGrowth
GROUP BY month_year
)
SELECT
MG.country_name,
MG.month_year,
MG.growth_rate,
(MG.growth_rate - GG.global_avg_growth_rate) AS growth_rate_diff_to_global
FROM MonthlyGrowth MG
JOIN GlobalGrowth GG
ON MG.month_year = GG.month_year
WHERE MG.growth_rate > GG.global_avg_growth_rate
ORDER BY MG.month_year, MG.country_name;
```

b)



C)



Task D.3

a)

SELECT

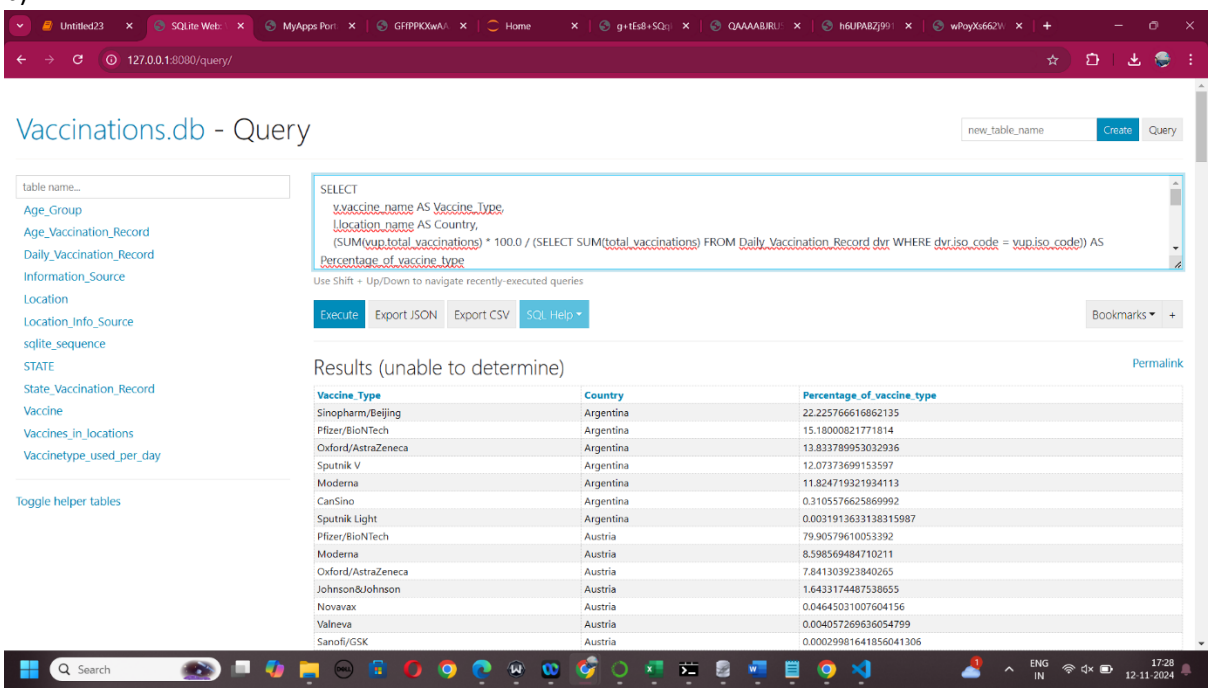
v.vaccine_name AS Vaccine_Type,

l.location_name AS Country,

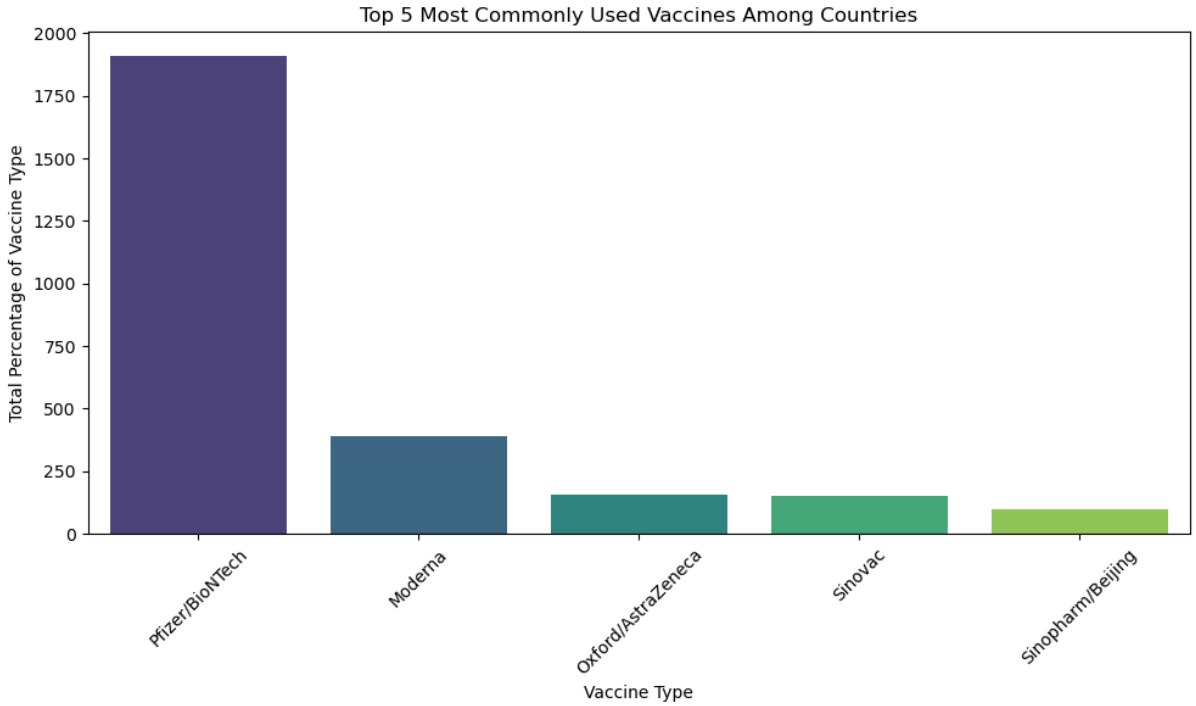
(SUM(vup.total_vaccinations) * 100.0 / (SELECT SUM(total_vaccinations) FROM Daily_Vaccination_Record dvr WHERE dvr.iso_code = vup.iso_code)) AS Percentage_of_vaccine_type

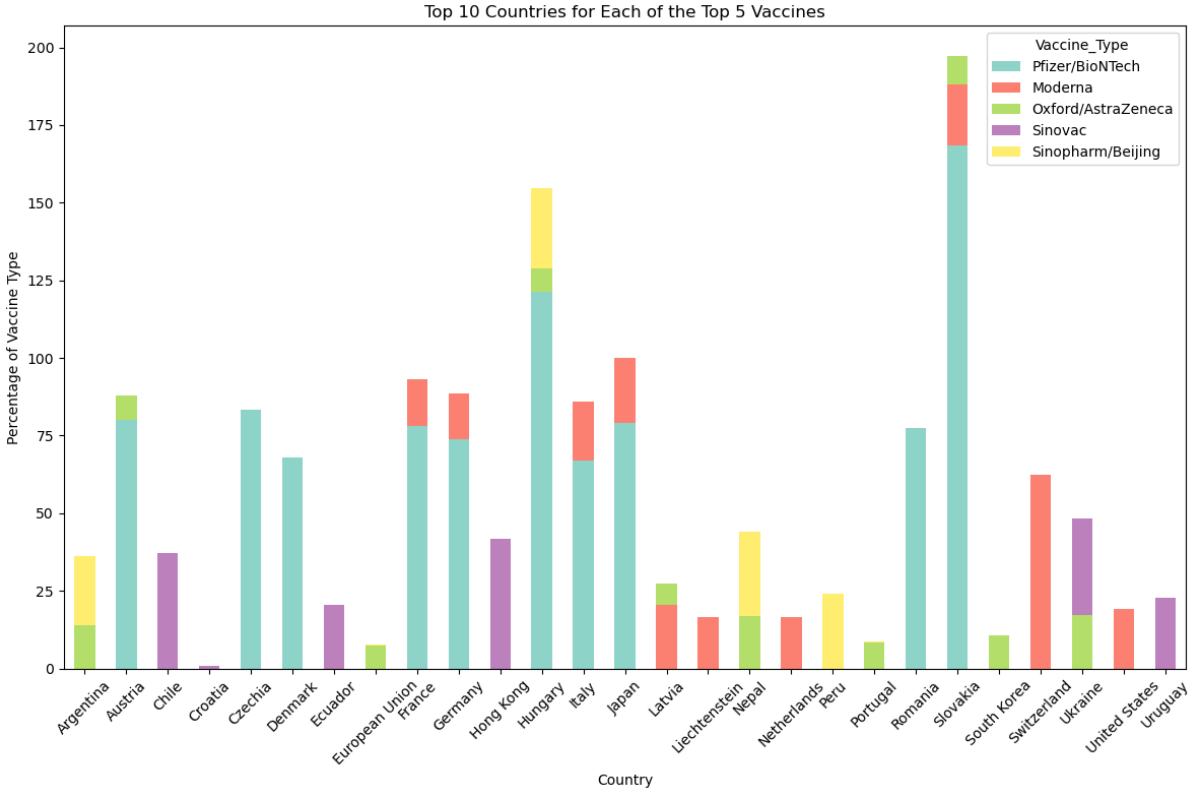
```
FROM
Vaccinetype_used_per_day vup
JOIN
Vaccine v ON vup.vaccine_id = v.vaccine_id
JOIN
Location l ON vup.iso_code = l.iso_code
GROUP BY
v.vaccine_name, l.location_name, vup.iso_code
ORDER BY
l.location_name, Percentage_of_vaccine_type DESC;
```

b)



c)





Task D.4

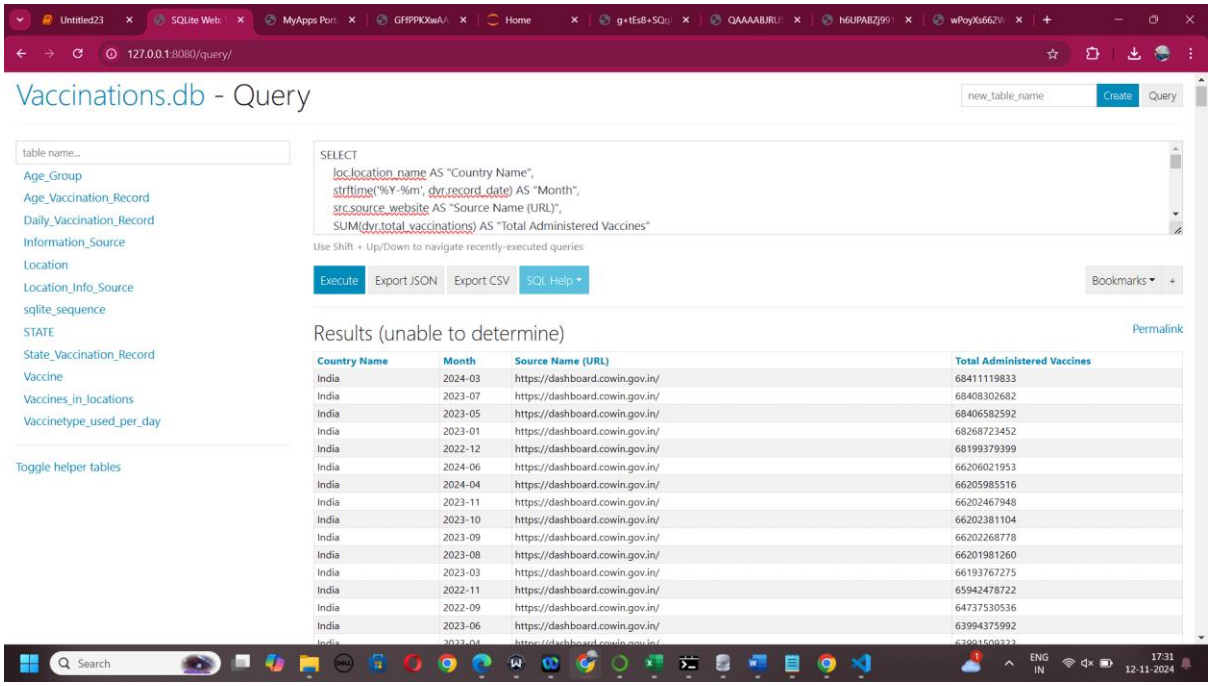
a)

SELECT

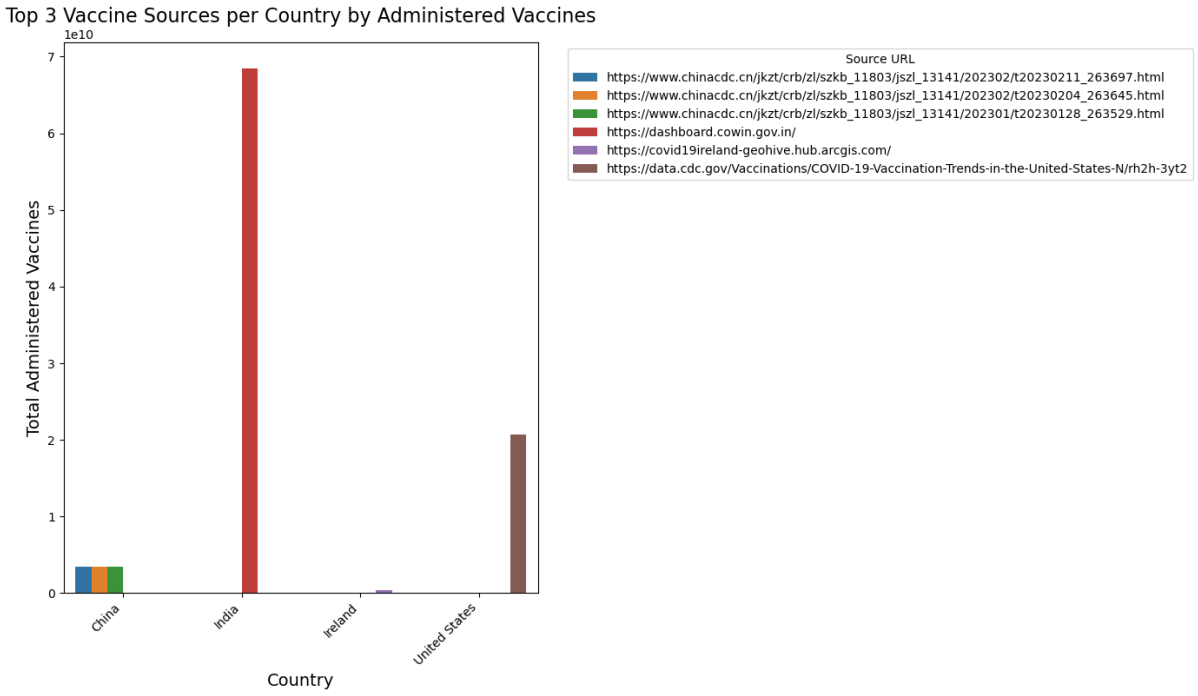
loc.location_name AS "Country Name",

```
strftime('%Y-%m', dvr.record_date) AS "Month",
src.source_website AS "Source Name (URL)",
SUM(dvr.total_vaccinations) AS "Total Administered Vaccines"
FROM
Daily_Vaccination_Record dvr
JOIN
Location loc ON dvr.iso_code = loc.iso_code
JOIN
Information_Source src ON dvr.source_id = src.source_id
GROUP BY
loc.location_name,
strftime('%Y-%m', dvr.record_date),
src.source_website
ORDER BY
"Total Administered Vaccines" DESC,
loc.location_name ASC,
strftime('%Y-%m', dvr.record_date) ASC;
```

b)



c)



Task D.5

a)

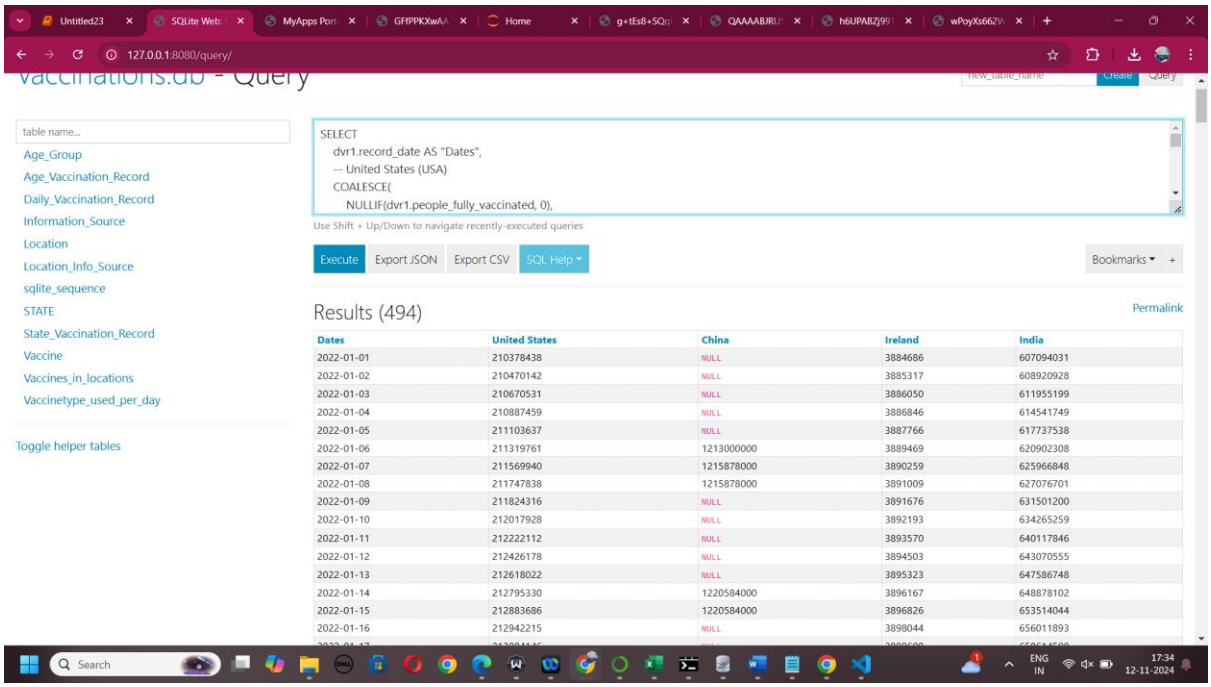
SELECT

dvr1.record_date AS "Dates",

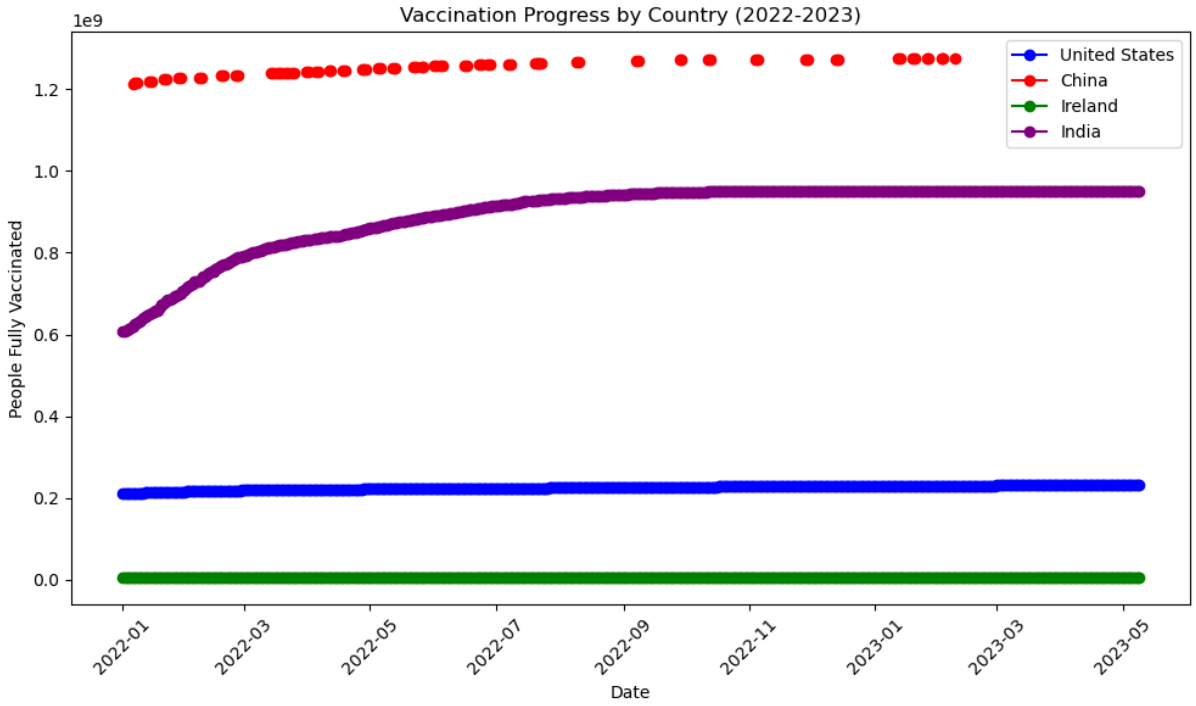
```
-- United States (USA)
COALESCE(
NULLIF(dvr1.people_fully_vaccinated, 0),
LAG(NULLIF(dvr1.people_fully_vaccinated, 0))
OVER (PARTITION BY dvr1.iso_code ORDER BY dvr1.record_date)
) AS "United States",
-- China (CHN)
COALESCE(
NULLIF(dvr2.people_fully_vaccinated, 0),
LAG(NULLIF(dvr2.people_fully_vaccinated, 0))
OVER (PARTITION BY dvr2.iso_code ORDER BY dvr2.record_date)
) AS "China",
-- Ireland (IRL)
COALESCE(
NULLIF(dvr3.people_fully_vaccinated, 0),
LAG(NULLIF(dvr3.people_fully_vaccinated, 0))
OVER (PARTITION BY dvr3.iso_code ORDER BY dvr3.record_date)
) AS "Ireland",
-- India (IND)
COALESCE(
NULLIF(dvr4.people_fully_vaccinated, 0),
LAG(NULLIF(dvr4.people_fully_vaccinated, 0))
OVER (PARTITION BY dvr4.iso_code ORDER BY dvr4.record_date)
) AS "India"
FROM
Daily_Vaccination_Record dvr1
LEFT JOIN
Daily_Vaccination_Record dvr2 ON dvr1.record_date = dvr2.record_date AND dvr2.iso_code = 'CHN'
LEFT JOIN
Daily_Vaccination_Record dvr3 ON dvr1.record_date = dvr3.record_date AND dvr3.iso_code = 'IRL'
LEFT JOIN
```

```
Daily_Vaccination_Record dvr4 ON dvr1.record_date = dvr4.record_date AND dvr4.iso_code = 'IND'
WHERE
dvr1.iso_code = 'USA' -- Filter for United States data
AND strftime('%Y', dvr1.record_date) IN ('2022', '2023') -- Filter for 2022 and 2023
ORDER BY
dvr1.record_date;
```

b)



c)


Vaccination Progress by Country (2022-2023)
1e9
People Fully Vaccinated
Date
United States
China
Ireland
India
0.0
0.2
0.4
0.6
0.8
1.0
1.2
2022-01
2022-03
2022-05
2022-07
2022-09
2022-11
2023-01
2023-03
2023-05