SQL PROJECT

Air Quality Index Analysis

Objective

The Air Quality Monitoring System serves as an all-encompassing solution crafted to gather, store, and scrutinize air quality data derived from diverse monitoring stations situated across various states and cities. The primary objective of this initiative is to furnish valuable insights into the air quality across different regions. Such information proves instrumental for environmentalists, policymakers, and the public at large, empowering them to make well informed decisions about health and environmental matters.

Table used – Air Quality

2024

SerialNumber	State	City	StationName	CurrentAQIValue
1	Andhra Pradesh	Amaravati	Secretariat, Amaravati - APPCB	135
2	Andhra Pradesh	Anantapur	Gulzarpet, Anantapur - APPCB	62
3	Andhra Pradesh	Chittoor	Gangineni Cheruvu, Chittoor - APPCB	30
4	Andhra Pradesh	Eluru	Eluru - APPCB	95
5	Andhra Pradesh	Guntur	Collectorate, Guntur - APPCB	84
6	Andhra Pradesh	Kadapa	RTC Bus Stand, Kadapa - APPCB	102
7	Andhra Pradesh	Kakinada	LMD Colony, Kakinada - APPCB	54
8	Andhra Pradesh	Kurnool	Gandhi Nagar, Kurnool - APPCB	44
9	Andhra Pradesh	Nellore	ZP Office, Nellore - APPCB	72
10	Andhra Pradesh	Ongole	Ongole - APPCB	88
11	Andhra Pradesh	Rajamahe...	RTC Complex, Rajamahendravaram ...	73
12	Andhra Pradesh	Srikakulam	New RTC Bus Stand, Srikakulam - AP...	45
13	Andhra Pradesh	Tirupati	Tirupati - APPCB	107
14	Andhra Pradesh	Vijayawada	Income Tax Office, Vijayawada - AP...	97
15	Andhra Pradesh	Visakhapa...	GVM Corporation Office, Visakhapat...	106
16	Andhra Pradesh	Vizianaga...	Vizianagaram - APPCB	23
17	Andhra Pradesh	Yemmiganur	Yemmiganur - APPCB	83
18	Arunachal Prad...	Itanagar	Itanagar - APPCB	64
19	Assam	Guwahati	Guwahati - APCB	92
20	Assam	Nagaon	Nagaon - APCB	112
21	Assam	Nalbari	Nalbari - APCB	99
22	Assam	Sivasagar	Sivasagar - APCB	75
23	Bihar	Bhagalpur	Bhagalpur - BSPCB	113
24	Bihar	Gaya	Gaya - BSPCB	108
25	Bihar	Muzaffarpur	Muzaffarpur - BSPCB	117
26	Bihar	Patna	Harding Road, Patna - BSPCB	146

Retrieve all records for a specific city(e.g., Mumbai)

```
Select * from airquality
where city = 'Mumbai';
```

SerialNumber	State	City	StationName	CurrentAQIValue
108	Maharashtra	Mumbai	BKC, Mumbai - MPCB	151
291	Maharashtra	Mumbai	Bandra, Mumbai - MPCB	212
413	Maharashtra	Mumbai	Worli, Mumbai - MPCB	196
NULL	NULL	NULL	NULL	NULL

Find The average AQI value for each state.

```sql
SELECT state,
  AVG(currentaqivalue) AS avg_aqi
FROM airquality
GROUP BY state;
```

state	avg_aqi
Punjab	123.875
Rajasthan	118.03703703703704
Sikkim	38.666666666666664
Tamil Nadu	73.76666666666667
Telangana	96.3529411764706
Tripura	42.333333333333336
Uttar Pradesh	165.9189189189189
Uttarakhand	77.41666666666667
West Bengal	102.42105263157895
Andaman and Nicobar ...	29.5
Dadra and Nagar Have...	69
Jammu and Kashmir	66.5
Lakshadweep	29.9

Identify cities where AQI is above a certain threshold (e.g.,, AQI>200)?

```sql
select city, currentaqivalue
from airquality
where currentaqivalue>200;
```

city	currentaqivalue
Delhi	318
Faridabad	204
Ghaziabad	315
Noida	239
Delhi	262
Ahmedabad	292
Surat	241
Faridabad	272
Gurugram	277
Kalyan	215
Mumbai	212
Thane	218
Ghaziabad	289
Greater No...	264
Lucknow	203
Noida	264
Ghaziabad	213
Kanpur	207
Noida	264

Count the number of records with insufficient data?

```
select count(*) as Insufficent_datacount
from airquality
where currentaqivalue is null;
```

	Insufficent_datacount
▶	0

Retrieve records for states with more than five city.

```
select State, count(distinct City)
from  airquality
group by State
Having count(distinct City) >5;
```

State	count(distinct City)
Andhra Pradesh	17
Gujarat	12
Haryana	19
Himachal Pradesh	12
Karnataka	19
Kerala	9
Lakshadweep	10
Madhya Pradesh	8
Maharashtra	24
Odisha	9
Punjab	9
Rajasthan	11
Tamil Nadu	18
Telangana	10
Uttar Pradesh	14
West Bengal	7

Calculate the overall average AQI for the entire dataset.

```sql
select state,city,currentaqivalue
from airquality
order by currentaqivalue desc
limit 1;
```

state	city	currentaqivalue
Delhi	Delhi	318

Find the cities in a specific state with AQI less than 50?

```
select State, City, currentaqivalue
from airquality
where currentaqivalue<50
order by currentaqivalue ;
```

State	City	currentaqivalue
Kerala	Alappuzha	20
Mizoram	Aizawl	21
Andhra Pradesh	Vizianagaram	23
Lakshadweep	Andrott	27
Lakshadweep	Chetlat	27
Lakshadweep	Chetlat	27
Lakshadweep	Andrott	27
Lakshadweep	Andrott	27
Andaman and Nicobar Islands	Port Blair	27
Meghalaya	Shillong	27
Lakshadweep	Chetlat	27
Odisha	Balasore	28
Lakshadweep	Kavaratti	28
Lakshadweep	Kavaratti	28
Lakshadweep	Kavaratti	28
Lakshadweep	Amini	29
Lakshadweep	Agatti	29
Lakshadweep	Agatti	29
Kerala	Kozhikode	29
Lakshadweep	Amini	29

Categorize AQI values into different pollution levels?

```sql
select city, currentaqivalue,
case
 when currentaqivalue <= 50 then 'Good'
 when currentaqivalue <= 100 then 'Moderate'
 when currentaqivalue <= 150 then 'Unhealthy for sensitive group'
 when currentaqivalue <= 200 then 'Unhealthy'
 when currentaqivalue <= 300 then 'Very unhealthy'
 else 'Hazardous'

end as pollution_level
from airquality
```

city	currentaqivalue	pollution_level
Amaravati	135	Unhealthy for sensitive group
Anantapur	62	Moderate
Chittoor	30	Good
Eluru	95	Moderate
Guntur	84	Moderate
Kadapa	102	Unhealthy for sensitive group
Kakinada	54	Moderate
Kurnool	44	Good
Nellore	72	Moderate
Ongole	88	Moderate
Rajamahe...	73	Moderate
Srikakulam	45	Good
Tirupati	107	Unhealthy for sensitive group
Vijayawada	97	Moderate
Visakhapa...	106	Unhealthy for sensitive group
Vizianaga...	23	Good
Yemmiganur	83	Moderate
Itanagar	64	Moderate
Guwahati	92	Moderate
Nagaon	112	Unhealthy for sensitive group

Find cities with the lowest AQI values in each state and rank them.

```
select state, city,currentaqivalue,
rank() over (partition by state order by currentaqivalue) as lowest_aqi_rnk
from airquality
```

state	city	currentaqivalue	lowest_aqi_rnk
Andhra Pradesh	Chittoor	30	2
Andhra Pradesh	Kurnool	44	3
Andhra Pradesh	Srikakulam	45	4
Andhra Pradesh	Kakinada	54	5
Andhra Pradesh	Anantapur	62	6
Andhra Pradesh	Nellore	72	7
Andhra Pradesh	Rajamahendravaram	73	8
Andhra Pradesh	Yemmiganur	83	9
Andhra Pradesh	Guntur	84	10
Andhra Pradesh	Ongole	88	11
Andhra Pradesh	Eluru	95	12
Andhra Pradesh	Vijayawada	97	13
Andhra Pradesh	Kadapa	102	14
Andhra Pradesh	Visakhapatnam	106	15
Andhra Pradesh	Tirupati	107	16
Andhra Pradesh	Amaravati	135	17
Arunachal Pradesh	Itanagar	64	1
Assam	Sivasagar	75	1
Assam	Guwahati	92	2
Assam	Nalbari	99	3
Assam	Nagaon	112	4
Bihar	Gaya	108	1

Retrieve the states where the highest pollution level is recorded and the corresponding pollution level.

```
select state, max(currentaqivalue) as highest_polution
from airquality
group by state;
```

state	highest_polution
Andhra Pradesh	135
Arunachal Pradesh	64
Assam	112
Bihar	146
Chandigarh	91
Chhattisgarh	143
Dadra and Nagar Haveli	52
Daman and Diu	57
Delhi	318
Goa	59
Gujarat	292
Haryana	277
Himachal Pradesh	96
Jharkhand	125
Karnataka	97
Kerala	61
Madhya Pradesh	166
Maharashtra	218
Manipur	50
Meghalaya	47
Mizoram	45
Nagaland	48

Identify the stations where the pollution level is higher than the average pollution level across all stations.

```sql
SELECT state, currentaqivalue
FROM airquality
WHERE currentaqivalue > (SELECT AVG(currentaqivalue) FROM airquality);
```

state	currentaqivalue
Andhra Pradesh	135
Andhra Pradesh	102
Andhra Pradesh	107
Andhra Pradesh	97
Andhra Pradesh	106
Assam	112
Assam	99
Bihar	113
Bihar	108
Bihar	117
Bihar	146
Bihar	136
Delhi	318
Gujarat	185
Gujarat	132
Gujarat	136
Gujarat	139
Gujarat	104
Haryana	204
Haryana	190
Haryana	127
Haryana	102

Retrieve the names and pollution levels of stations in the National Capital Region (NCR).

```sql
SELECT state ,currentaqivalue
FROM airquality
WHERE City IN ('Delhi', 'Ghaziabad', 'Noida', 'Gurugram', 'Faridabad');
```

state	currentaqivalue
Delhi	318
Haryana	204
Haryana	190
Uttar Pradesh	315
Uttar Pradesh	239
Delhi	262
Haryana	272
Haryana	277
Uttar Pradesh	289
Uttar Pradesh	264
Uttar Pradesh	213
Uttar Pradesh	264

Find the monitoring stations in South India (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana) with pollution levels greater than 100.

```
select state, currentaqivalue
from airquality
where state in ('Andhra Pradesh','Karnataka','Kerala','Tamil Nadu','Telangana')
and currentaqivalue > 100;
```

state	currentaqivalue
Andhra Pradesh	135
Andhra Pradesh	102
Andhra Pradesh	107
Andhra Pradesh	106
Tamil Nadu	109
Telangana	128
Telangana	119
Telangana	114
Telangana	103
Telangana	108
Telangana	124

Find the states with the highest average pollution levels.

```sql
SELECT State, AVG(currentaqivalue) as highest_pollution
FROM airquality
GROUP BY State,currentaqivalue
ORDER BY highest_pollution desc,state
LIMIT 1;
```

State	highest_pollution
Delhi	318

318

Find the states with the lowest average pollution levels.

```sql
SELECT State, AVG(currentaqivalue) as lowest_pollution
FROM airquality
GROUP BY State,currentaqivalue
ORDER BY lowest_pollution,state
LIMIT 1;
```

State	lowest_pollution
Kerala	20

Thank you

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