Lab 3: MongoDB

Switch to dsci551 database

* use dsci551

# Question 1

Find out how many entries (documents) there are for USA in August of 2022.

db.aqi.aggregate([

{

$match:

{

Country: "United States of America",

Date: /2022-08/,

},

},

{

$count:

"count",

},

])

OUTPUT:

|  |
| --- |
| { |
| count: 32 |
| } |

# Question 2

Find out which date for USA in 08/2022 has more than one entry in the aqi collection.

db.aqi.aggregate([

{

$match: {

Country: "United States of America",

Date: /2022-08/,

},

},

{

$sortByCount: "$Date",

},

{

$match: {

count: {

$gt: 1,

},

},

},

])

OUTPUT:

|  |
| --- |
| { |
| \_id: **'2022-08-23'**, |
| count: 2 |
| } |

# Question 3

Remove the entry you found in the previous question with a lower aqi value from the collection.

db.aqi.findAndModify(

{

query: {

Country: "United States of America",

Date: "2022-08-23"

},

sort: { aqi: 1 },

remove: true

}

)

OUTPUT:

|  |
| --- |
| { |
| \_id: ObjectId(**"640ed94f073c3cb4f31467b8"**), |
| Date: **'2022-08-23'**, |
| Country: **'United States of America'**, |
| Status: **'Moderate'**, |
| **'AQI Value'**: 85 |
| } |

# Question 4

Compute the average AQI for USA in 08/2022.

db.aqi.aggregate([

{

$match: {

Country: "United States of America",

Date: /2022-08/,

},

},

{

$group: {

\_id: null,

avg\_aqi: {

$avg: "$AQI Value",

},

},

},

{

$project: {

\_id: 0,

},

},

])

OUTPUT:

|  |
| --- |
| { |
| “avg\_aqi”: 86.45161290322581 |
| } |

# Question 5

Find out how many different countries there are in the aqi collection

db.aqi.distinct("Country").length

OUTPUT:

142

# Question 6

Find out how many entries there are in 2023 for each country.

db.aqi.aggregate([

{

$match: {

Date: /2023/,

},

},

{

$group: {

\_id: "$Country",

count: {

$sum: 1,

},

},

},

{

$group: {

\_id: null,

counts: {

$push: {

k: "$\_id",

v: "$count",

},

},

},

},

{

$replaceRoot: {

newRoot: {

$arrayToObject: "$counts",

},

},

},

])

OUTPUT:

{

"Netherlands": 1,

"Turkey": 1,

"Pakistan": 1,

"Greece": 1,

"Ethiopia": 1,

"Trinidad and Tobago": 1,

"United Arab Emirates": 1,

"Grenada": 1,

"Slovenia": 1,

"Venezuela": 1,

"Burkina Faso": 1,

"Hong Kong": 1,

"Puerto Rico": 1,

"Kyrgyzstan": 1,

"France": 1,

"Georgia": 1,

"Uganda": 1,

"Angola": 1,

"Macao": 1,

"Montenegro": 1,

"Bermuda": 1,

"Jersey": 1,

"Malta": 1,

"New Caledonia": 1,

"Albania": 1,

"Singapore": 1,

"Sri Lanka": 1,

"Italy": 1,

"Andorra": 1,

"Armenia": 1,

"Sweden": 1,

"Qatar": 1,

"Honduras": 1,

"India": 1,

"Lithuania": 1,

"New Zealand": 1,

"Israel": 1,

"Czech Republic": 1,

"Sudan": 1,

"Iraq": 1,

"Cape Verde": 1,

"Kazakhstan": 1,

"Thailand": 1,

"Tajikistan": 1,

"Vietnam": 1,

"El Salvador": 1,

"Canada": 1,

"Denmark": 1,

"Brazil": 1,

"Indonesia": 1,

"Costa Rica": 1,

"Kosovo": 1,

"Australia": 1,

"Philippines": 1,

"Lebanon": 1,

"Cyprus": 1,

"Norway": 1,

"Chad": 1,

"Kenya": 1,

"Iceland": 1,

"Estonia": 1,

"Belarus": 1,

"Brunei": 1,

"South Africa": 1,

"Ukraine": 1,

"Liechtenstein": 1,

"Guam": 1,

"Germany": 1,

"Austria": 1,

"Turkmenistan": 1,

"Gabon": 1,

"Japan": 1,

"Bosnia and Herzegovina": 1,

"United States of America": 1,

"Russia": 1,

"Saudi Arabia": 1,

"Luxembourg": 1,

"Ghana": 1,

"Reunion": 1,

"Zambia": 1,

"Mexico": 1,

"Azerbaijan": 1,

"Martinique": 1,

"Belgium": 1,

"Iran": 1,

"Moldova": 1,

"French Guiana": 1,

"Mongolia": 1,

"Senegal": 1,

"Malaysia": 1,

"Uzbekistan": 1,

"Vatican": 1,

"Kuwait": 1,

"Nepal": 1,

"Belize": 1,

"Portugal": 1,

"Guatemala": 1,

"Algeria": 1,

"Serbia": 1,

"Bangladesh": 1,

"Taiwan": 1,

"Laos": 1,

"Chile": 1,

"China": 1,

"Liberia": 1,

"Finland": 1,

"Cambodia": 1,

"Ivory Coast": 1,

"Palestinian Territory": 1,

"Bulgaria": 1,

"Dominican Republic": 1,

"Spain": 1,

"United Kingdom of Great Britain and Northern Ireland": 1,

"Macedonia": 1,

"Romania": 1,

"Central African Republic": 1,

"Monaco": 1,

"San Marino": 1,

"Ireland": 1,

"Slovakia": 1,

"Egypt": 1,

"Poland": 1,

"Switzerland": 1,

"Colombia": 1,

"Jordan": 1,

"Myanmar": 1,

"Croatia": 1,

"Guadeloupe": 1,

"Nigeria": 1,

"South Korea": 1,

"Peru": 1,

"Latvia": 1,

"Madagascar": 1,

"Argentina": 1,

"Ecuador": 1

}

# Question 7

Find out the average AQI value for each country in 2023.

db.aqi.aggregate([

{

$match: {

Date: /2023/,

},

},

{

$group: {

\_id: "$Country",

avg\_aqi: {

$avg: "$AQI Value",

},

},

},

{

$sort: {

avg\_aqi: -1,

},

},

{

$group: {

\_id: null,

counts: {

$push: {

k: "$\_id",

v: "$avg\_aqi",

},

},

},

},

{

$replaceRoot: {

newRoot: {

$arrayToObject: "$counts",

},

},

},

])

OUTPUT:

{

"China": 339,

"India": 332,

"Burkina Faso": 326,

"Iraq": 307,

"Central African Republic": 261,

"Qatar": 183,

"Turkey": 180,

"Serbia": 165,

"Mexico": 162,

"South Korea": 161,

"Chad": 159,

"Bosnia and Herzegovina": 159,

"Uzbekistan": 152,

"Tajikistan": 151,

"Ethiopia": 150,

"Thailand": 149,

"Uganda": 143,

"Bangladesh": 141,

"Kyrgyzstan": 138,

"Myanmar": 138,

"Iran": 131,

"United States of America": 130,

"Romania": 129,

"Japan": 128,

"Taiwan": 119,

"Nepal": 114,

"Sudan": 107,

"Ivory Coast": 107,

"Kazakhstan": 105,

"Vietnam": 105,

"Nigeria": 105,

"Russia": 103,

"Gabon": 102,

"Saudi Arabia": 102,

"Kenya": 97,

"Spain": 96,

"Armenia": 95,

"Indonesia": 93,

"Sri Lanka": 92,

"Pakistan": 91,

"Peru": 91,

"Mongolia": 88,

"Liberia": 88,

"Egypt": 86,

"Poland": 86,

"Canada": 85,

"Philippines": 83,

"South Africa": 83,

"Ghana": 83,

"Slovakia": 83,

"Ukraine": 82,

"Montenegro": 80,

"Colombia": 80,

"Laos": 78,

"Lebanon": 76,

"Israel": 75,

"Slovenia": 72,

"Italy": 72,

"Turkmenistan": 68,

"France": 67,

"Czech Republic": 66,

"Algeria": 65,

"Macedonia": 65,

"Macao": 63,

"Jersey": 62,

"Cape Verde": 62,

"Madagascar": 62,

"Australia": 59,

"Zambia": 59,

"Kosovo": 58,

"United Arab Emirates": 57,

"Brazil": 57,

"Belarus": 55,

"Kuwait": 54,

"Hong Kong": 52,

"El Salvador": 52,

"Chile": 51,

"Greece": 48,

"Georgia": 47,

"Guatemala": 47,

"Malaysia": 46,

"Vatican": 46,

"United Kingdom of Great Britain and Northern Ireland": 46,

"Angola": 45,

"Belize": 45,

"Trinidad and Tobago": 44,

"Cyprus": 43,

"Ireland": 38,

"Martinique": 36,

"Malta": 34,

"Moldova": 33,

"Senegal": 33,

"Honduras": 32,

"Azerbaijan": 32,

"Denmark": 30,

"Germany": 30,

"Netherlands": 29,

"Singapore": 29,

"French Guiana": 29,

"Monaco": 29,

"Latvia": 29,

"Ecuador": 29,

"Croatia": 28,

"Lithuania": 27,

"Palestinian Territory": 26,

"Venezuela": 24,

"Sweden": 24,

"Austria": 24,

"Luxembourg": 24,

"San Marino": 24,

"Switzerland": 24,

"Norway": 23,

"Grenada": 22,

"Estonia": 22,

"Puerto Rico": 21,

"Bulgaria": 21,

"Dominican Republic": 21,

"Jordan": 21,

"New Caledonia": 20,

"New Zealand": 20,

"Portugal": 20,

"Argentina": 19,

"Reunion": 18,

"Finland": 16,

"Cambodia": 15,

"Liechtenstein": 14,

"Guadeloupe": 14,

"Costa Rica": 13,

"Belgium": 11,

"Brunei": 10,

"Albania": 9,

"Andorra": 9,

"Iceland": 7,

"Bermuda": 1,

"Guam": 1

}

# Question 8

Find out which countries had the highest AQI in the year 2022. Report country names and dates.

db.aqi.aggregate([

{

$project: {

\_id: 0,

Status: 0,

},

},

{

$match: {

Date: /2022/,

},

},

{

$sort: {

"AQI Value": -1,

},

},

{

$project: {

"AQI Value": 0

},

},

{

$limit: 1,

},

])

OUTPUT:

{

"Date": "2022-08-15",

"Country": "United Arab Emirates"

}

# Question 9

Find out which countries had the largest number of days with Moderate status in 2023.

db.aqi.aggregate([

{

$project: {

\_id: 0,

},

},

{

$match: {

Date: /2023/,

Status: "Moderate",

},

},

{

$group: {

\_id: "$Country",

num\_days: {

$sum: 1,

},

},

},

{

$sort: {

num\_days: -1,

},

},

{

$group: {

\_id: null,

num\_days: {

$push: {

k: "$\_id",

v: "$num\_days",

},

},

},

},

{

$replaceRoot: {

newRoot: {

$arrayToObject: "$num\_days",

},

},

},

])

OUTPUT:

{

"Lebanon": 1,

"Slovakia": 1,

"El Salvador": 1,

"Jersey": 1,

"Ghana": 1,

"Pakistan": 1,

"Australia": 1,

"Kosovo": 1,

"Liberia": 1,

"Peru": 1,

"South Africa": 1,

"Zambia": 1,

"Chile": 1,

"Egypt": 1,

"Algeria": 1,

"Sri Lanka": 1,

"Cape Verde": 1,

"Kuwait": 1,

"Armenia": 1,

"Hong Kong": 1,

"Israel": 1,

"Macedonia": 1,

"Italy": 1,

"Poland": 1,

"Canada": 1,

"Madagascar": 1,

"Belarus": 1,

"Slovenia": 1,

"Ukraine": 1,

"Mongolia": 1,

"Turkmenistan": 1,

"Philippines": 1,

"France": 1,

"Kenya": 1,

"Montenegro": 1,

"Indonesia": 1,

"Czech Republic": 1,

"Spain": 1,

"United Arab Emirates": 1,

"Brazil": 1,

"Laos": 1,

"Colombia": 1,

"Macao": 1

}

# Question 10

Find out the number of countries whose AQI values were between 90 and 100 (inclusive) in December of 2022.

db.aqi.aggregate([

{

$project: {

\_id: 0,

Status: 0,

},

},

{

$match: {

Date: /2022-12/,

"AQI Value": {

$gte: 90,

$lte: 100,

},

},

},

{

$group: {

\_id: "$Country",

num\_days: {

$sum: 1,

},

},

},

{

$count: "num\_countries",

},

])

OUTPUT:

N/A