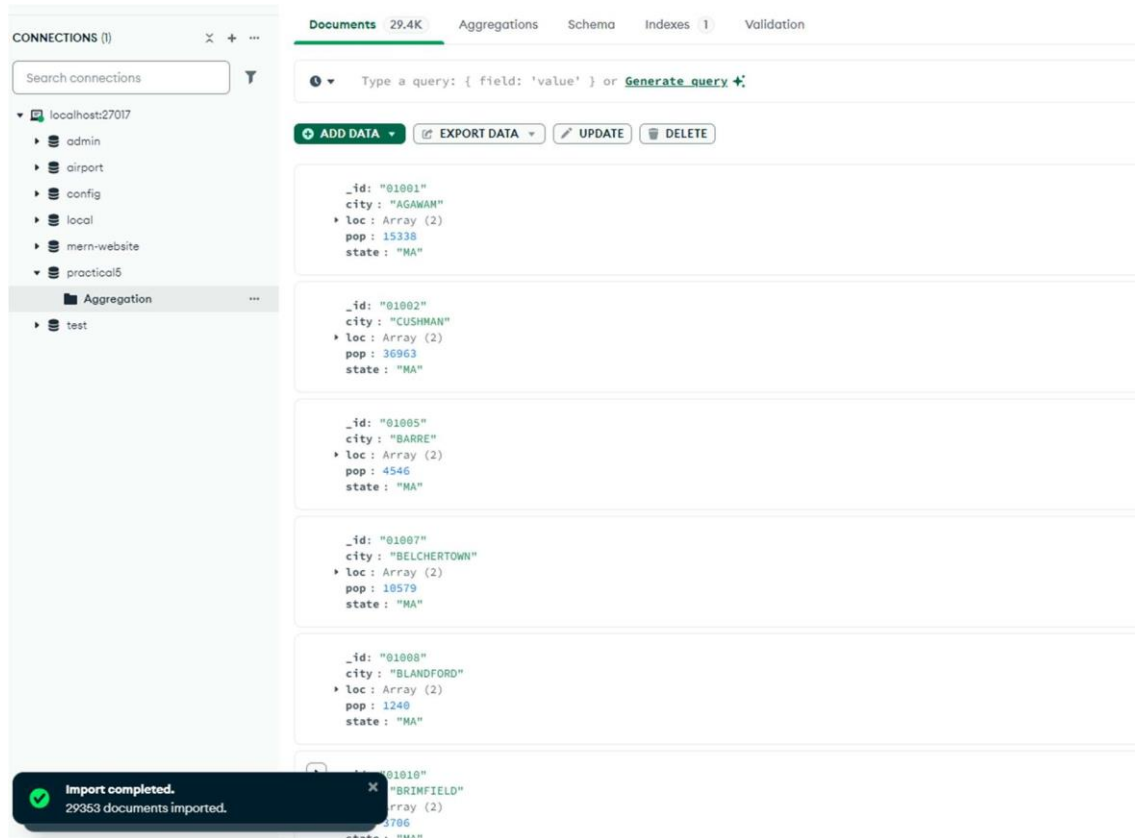


# PRACTICAL 5

## AGGREGATION USING MONGODB



### 1.comparison operators:

\$eq Matches values that are equal to a specified value.

## PRACTICAL 5

```
> db["Aggregation"].find({pop:{$eq: 1350}});
< {
  _id: '01053',
  city: 'LEEDS',
  loc: [
    -72.703403,
    42.354292
  ],
  pop: 1350,
  state: 'MA'
}
{
  _id: '15538',
  city: 'GLENCOE',
  loc: [
    -78.827522,
    39.909046
  ],
  pop: 1350,
  state: 'PA'
}
{
  _id: '21654',
  city: 'OXFORD',
  loc: [
    -76.153783,
    38.686358
  ],
  pop: 1350,
  state: 'MD'
}
```

```
{
  _id: '47326',
  city: 'BRYANT',
  loc: [
    -84.911748,
    40.54462
  ],
  pop: 1350,
  state: 'IN'
}
```

\$gt-Matches values that are greater than a specified value.

## PRACTICAL 5

```
> db["Aggregation"].find({pop:{$gt: 40117}});
< {
  _id: '01040',
  city: 'HOLYOKE',
  loc: [
    -72.626193,
    42.202007
  ],
  pop: 43704,
  state: 'MA'
}
{
  _id: '01201',
  city: 'PITTSFIELD',
  loc: [
    -73.247088,
    42.453086
  ],
  pop: 50655,
  state: 'MA'
}
{
  _id: '01420',
  city: 'FITCHBURG',
  loc: [
    -71.803133,
    42.579563
  ],
  pop: 41194,
  state: 'MA'
}
```

\$lt-Matches values that are less than a specified value.

## PRACTICAL 5

```
> db["Aggregation"].find({pop:{$lte: 20}});
< {
  _id: '01338',
  city: 'BUCKLAND',
  loc: [
    -72.764124,
    42.615174
  ],
  pop: 16,
  state: 'MA'
}
{
  _id: '02163',
  city: 'CAMBRIDGE',
  loc: [
    -71.141879,
    42.364005
  ],
  pop: 0,
  state: 'MA'
}
{
  _id: '04013',
  city: 'BUSTINS ISLAND',
  loc: [
    -70.042247,
    43.79602
  ],
  pop: 0,
  state: 'ME'
}
```

**\$lte**      Matches values that are less than or equal to a specified value.

## PRACTICAL 5

```
<
> db["Aggregation"].find({pop:{$lte: 50000}});
< {
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
{
  _id: '01002',
  city: 'CUSHMAN',
  loc: [
    -72.51565,
    42.377017
  ],
  pop: 36963,
  state: 'MA'
}
{
  _id: '01005',
  city: 'BARRE',
  loc: [
    -72.108354,
    42.409698
  ],
  pop: 4546,
  state: 'MA'
}
}
```

```
{
  _id: '01034',
  city: 'TOLLAND',
  loc: [
    -72.908793,
    42.070234
  ],
  pop: 1652,
  state: 'MA'
}
{
  _id: '01035',
  city: 'HADLEY',
  loc: [
    -72.571499,
    42.36062
  ],
  pop: 4231,
  state: 'MA'
}
}
```

\$in Matches any of the values specified in an array.

## PRACTICAL 5

```
> db["Aggregation"].find({loc:{$in: [-72.520001, 42.255704]}});
< {
  _id: '01033',
  city: 'GRANBY',
  loc: [
    -72.520001,
    42.255704
  ],
  pop: 5526,
  state: 'MA'
}
```

\$ne Matches all values that are not equal to a specified value.

```
> db["Aggregation"].find({state:{$ne: "MA"}});
< {
  _id: '02804',
  city: 'ASHAWAY',
  loc: [
    -71.783745,
    41.423054
  ],
  pop: 2472,
  state: 'RI'
}
{
  _id: '02806',
  city: 'BARRINGTON',
  loc: [
    -71.317497,
    41.744334
  ],
  pop: 15849,
  state: 'RI'
}
```

### 2.Logical Operators:

Name	Description
\$and	Joins query clauses with a logical AND returns all documents that match the conditions of both clauses.
\$or	Joins query clauses with a logical OR returns all documents that match the conditions of either clause.
\$not	Inverts the effect of a query expression and returns documents that do not match the query expression.
\$nor	Joins query clauses with a logical NOR returns all documents that fail to match both clauses.

a) \$and

## PRACTICAL 5

```
> db["Aggregation"].find({$and:[{state: {$eq: "MA"}}, {city: {$eq: "HADLEY"}}]});  
< {  
  _id: '01035',  
  city: 'HADLEY',  
  loc: [  
    -72.571499,  
    42.36062  
  ],  
  pop: 4231,  
  state: 'MA'  
}
```

b) \$or

```
> db["Aggregation"].find({$or:[{state: {$eq: "MA"}}, {city: {$eq: "HADLEY"}}]});  
< {  
  _id: '01001',  
  city: 'AGAWAM',  
  loc: [  
    -72.622739,  
    42.070206  
  ],  
  pop: 15338,  
  state: 'MA'  
}  
{  
  _id: '01002',  
  city: 'CUSHMAN',  
  loc: [  
    -72.51565,  
    42.377017  
  ],  
  pop: 36963,  
  state: 'MA'  
}
```

## PRACTICAL 5

```
{
  _id: '01034',
  city: 'TOLLAND',
  loc: [
    -72.908793,
    42.070234
  ],
  pop: 1652,
  state: 'MA'
}
{
  _id: '01035',
  city: 'HADLEY',
  loc: [
    -72.571499,
    42.36062
  ],
  pop: 4231,
  state: 'MA'
}
```

c) \$not

```
> db["Aggregation"].find({$and: [{state: {$not: { $eq: "MA" } } }, {city: {$not: { $eq: "HADLEY" }}}]});
< {
  _id: '02804',
  city: 'ASHAWAY',
  loc: [
    -71.783745,
    41.423054
  ],
  pop: 2472,
  state: 'RI'
}
{
  _id: '02806',
  city: 'BARRINGTON',
  loc: [
    -71.317497,
    41.744334
  ],
  pop: 15849,
  state: 'RI'
}
```



## PRACTICAL 5

```
{
  _id: '02832',
  city: 'RICHMOND',
  loc: [
    -71.734862,
    41.506974
  ],
  pop: 3466,
  state: 'RI'
}
{
  _id: '02835',
  city: 'JAMESTOWN',
  loc: [
    -71.376108,
    41.516405
  ],
  pop: 4999,
  state: 'RI'
}
```

d) \$nor

```
> db["Aggregation"].find({$nor:[{state: {$eq: "MA"}}, {city: {$eq: "HADLEY"}}]});
< {
  _id: '02804',
  city: 'ASHAWAY',
  loc: [
    -71.783745,
    41.423054
  ],
  pop: 2472,
  state: 'RI'
}
{
  _id: '02806',
  city: 'BARRINGTON',
  loc: [
    -71.317497,
    41.744334
  ],
  pop: 15849,
  state: 'RI'
}
```

## PRACTICAL 5

```
{
  _id: '02832',
  city: 'RICHMOND',
  loc: [
    -71.734862,
    41.506974
  ],
  pop: 3466,
  state: 'RI'
}
{
  _id: '02835',
  city: 'JAMESTOWN',
  loc: [
    -71.376108,
    41.516405
  ],
  pop: 4999,
  state: 'RI'
}
```

### 3.Element Operators:

Name	Description
\$exists	Matches documents that have the specified field.
\$type	Selects documents if a field is of the specified type.

#### a) \$exists

```
> db["Aggregation"].find({state: { $exists: true }});
< {
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
{
  _id: '01002',
  city: 'CUSHMAN',
  loc: [
    -72.51565,
    42.377017
  ],
  pop: 36963,
  state: 'MA'
}
```

## PRACTICAL 5

```
{
  _id: '01034',
  city: 'TOLLAND',
  loc: [
    -72.908793,
    42.070234
  ],
  pop: 1652,
  state: 'MA'
}
{
  _id: '01035',
  city: 'HADLEY',
  loc: [
    -72.571499,
    42.36062
  ],
  pop: 4231,
  state: 'MA'
}
```

b) \$type

```
> db["Aggregation"].find({city: { $type: "string" }});
< {
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
{
  _id: '01002',
  city: 'CUSHMAN',
  loc: [
    -72.51565,
    42.377017
  ],
  pop: 36963,
  state: 'MA'
}
```

## PRACTICAL 5

```
{
  _id: '01034',
  city: 'TOLLAND',
  loc: [
    -72.908793,
    42.070234
  ],
  pop: 1652,
  state: 'MA'
}
{
  _id: '01035',
  city: 'HADLEY',
  loc: [
    -72.571499,
    42.36062
  ],
  pop: 4231,
  state: 'MA'
}
```

### 4. Array Operators:

Name	Description
\$all	Matches arrays that contain all elements specified in the query.
\$elemMatch	Selects documents if element in the array field matches all the specified \$elemMatch conditions.
\$size	Selects documents if the array field is a specified size.

#### a) \$all

```
> db["Aggregation"].find({loc: {$all: [-72.571499, 42.36062]}});
< {
  _id: '01035',
  city: 'HADLEY',
  loc: [
    -72.571499,
    42.36062
  ],
  pop: 4231,
  state: 'MA'
}
```

#### b) \$elematch

## PRACTICAL 5

```
> db["Aggregation"].find({loc: {$elemMatch: { $gt: 42, $gt:50 }}});
< {
  _id: '99501',
  city: 'ANCHORAGE',
  loc: [
    -149.876077,
    61.211571
  ],
  pop: 14436,
  state: 'AK'
}
{
  _id: '99502',
  city: 'ANCHORAGE',
  loc: [
    -150.093943,
    61.096163
  ],
  pop: 15891,
  state: 'AK'
}
```

```
{
  _id: '99556',
  city: 'NIKOLAEVSK',
  loc: [
    -151.732933,
    59.788818
  ],
  pop: 1698,
  state: 'AK'
}
{
  _id: '99557',
  city: 'CHUATHBALUK',
  loc: [
    -157.758502,
    61.691648
  ],
  pop: 352,
  state: 'AK'
}
```

c.\$size

## PRACTICAL 5

```
> db["Aggregation"].find({loc:{size: 2}});
< {
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
{
  _id: '01002',
  city: 'CUSHMAN',
  loc: [
    -72.51565,
    42.377017
  ],
  pop: 36963,
  state: 'MA'
}
```

```
{
  _id: '01034',
  city: 'TOLLAND',
  loc: [
    -72.908793,
    42.070234
  ],
  pop: 1652,
  state: 'MA'
}
{
  _id: '01035',
  city: 'HADLEY',
  loc: [
    -72.571499,
    42.36062
  ],
  pop: 4231,
  state: 'MA'
}
```

## ADVANCED QUERIES

### 1. "\$group" Operator:

## PRACTICAL 5

```
> db.Aggregation.aggregate([
  {
    "$group": {
      "_id": "$state",
      "totalPopulation": { "$sum": "$pop" },
      "cityCount": { "$sum": 1 }
    }
  }
])
< {
  _id: 'ID',
  totalPopulation: 1006749,
  cityCount: 244
}
{
  _id: 'CA',
  totalPopulation: 29754890,
  cityCount: 1516
}
```

```

{
  _id: 'AR',
  totalPopulation: 2350725,
  cityCount: 578
}
{
  _id: 'UT',
  totalPopulation: 1722850,
  cityCount: 205
}
{
  _id: 'NC',
  totalPopulation: 6628637,
  cityCount: 705
}
{
  _id: 'NJ',
  totalPopulation: 7730188,
  cityCount: 540
}
show
```

### 2. "\$sort" Operator:

## PRACTICAL 5

```
> db.Aggregation.aggregate([
  {
    "$sort": { "pop": -1 }
  })
< {
  _id: '60623',
  city: 'CHICAGO',
  loc: [
    -87.7157,
    41.849015
  ],
  pop: 112047,
  state: 'IL'
}
{
  _id: '11226',
  city: 'BROOKLYN',
  loc: [
    -73.956985,
    40.646694
  ],
  pop: 111396,
  state: 'NY'
}
```

```
{
  _id: '11385',
  city: 'RIDGEWOOD',
  loc: [
    -73.896122,
    40.703613
  ],
  pop: 85732,
  state: 'NY'
}
{
  _id: '10467',
  city: 'BRONX',
  loc: [
    -73.871242,
    40.873671
  ],
  pop: 85710,
  state: 'NY'
}
```

3. "\$unwind" operator:



## PRACTICAL 5

```
> db.Aggregation.aggregate([
  {
    "$unwind": "$loc"
  })
< {
  _id: '01001',
  city: 'AGAWAM',
  loc: -72.622739,
  pop: 15338,
  state: 'MA'
}
{
  _id: '01001',
  city: 'AGAWAM',
  loc: 42.070206,
  pop: 15338,
  state: 'MA'
}
```

```
{
  _id: '01013',
  city: 'CHICOPEE',
  loc: 42.162046,
  pop: 23396,
  state: 'MA'
}
{
  _id: '01020',
  city: 'CHICOPEE',
  loc: -72.576142,
  pop: 31495,
  state: 'MA'
}
{
  _id: '01020',
  city: 'CHICOPEE',
  loc: 42.176443,
  pop: 31495,
  state: 'MA'
}
```

4. "\$match" operator:

## PRACTICAL 5

```
> db.Aggregation.aggregate([
  {
    "$match": {
      "state": "MA",
      "pop": { "$gt": 10000 }
    }
  }
])
< {
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
{
  _id: '01002',
  city: 'CUSHMAN',
  loc: [
    -72.51565,
    42.377017
  ],
  pop: 36963,
  state: 'MA'
}
```

```
{
  _id: '01107',
  city: 'SPRINGFIELD',
  loc: [
    -72.606544,
    42.117907
  ],
  pop: 12739,
  state: 'MA'
}
{
  _id: '01108',
  city: 'SPRINGFIELD',
  loc: [
    -72.558432,
    42.085314
  ],
  pop: 25519,
  state: 'MA'
}
```

### 5. Combing operator:

## PRACTICAL 5

```
> db.Aggregation.aggregate([
  {
    "$match": { "state": "MA" }
  },
  {
    "$group": {
      "_id": "$city",
      "totalPopulation": { "$sum": "$pop" }
    }
  },
  {
    "$sort": { "totalPopulation": -1 }
  }
])
< {
  _id: 'WORCESTER',
  totalPopulation: 169856
}
{
  _id: 'SPRINGFIELD',
  totalPopulation: 148062
}
{
  _id: 'DORCHESTER',
  totalPopulation: 126821
}
{
  _id: 'LOWELL',
  totalPopulation: 103439
}
```

```
{
  _id: 'MEDFORD',
  totalPopulation: 57338
}
{
  _id: 'BROOKLINE',
  totalPopulation: 56614
}
{
  _id: 'CHICOPEE',
  totalPopulation: 54891
}
{
  _id: 'MALDEN',
  totalPopulation: 54114
}
{
  _id: 'WEYMOUTH',
  totalPopulation: 54063
}
```