Practical 5
31-01-25
Aggregation USING Mongodb

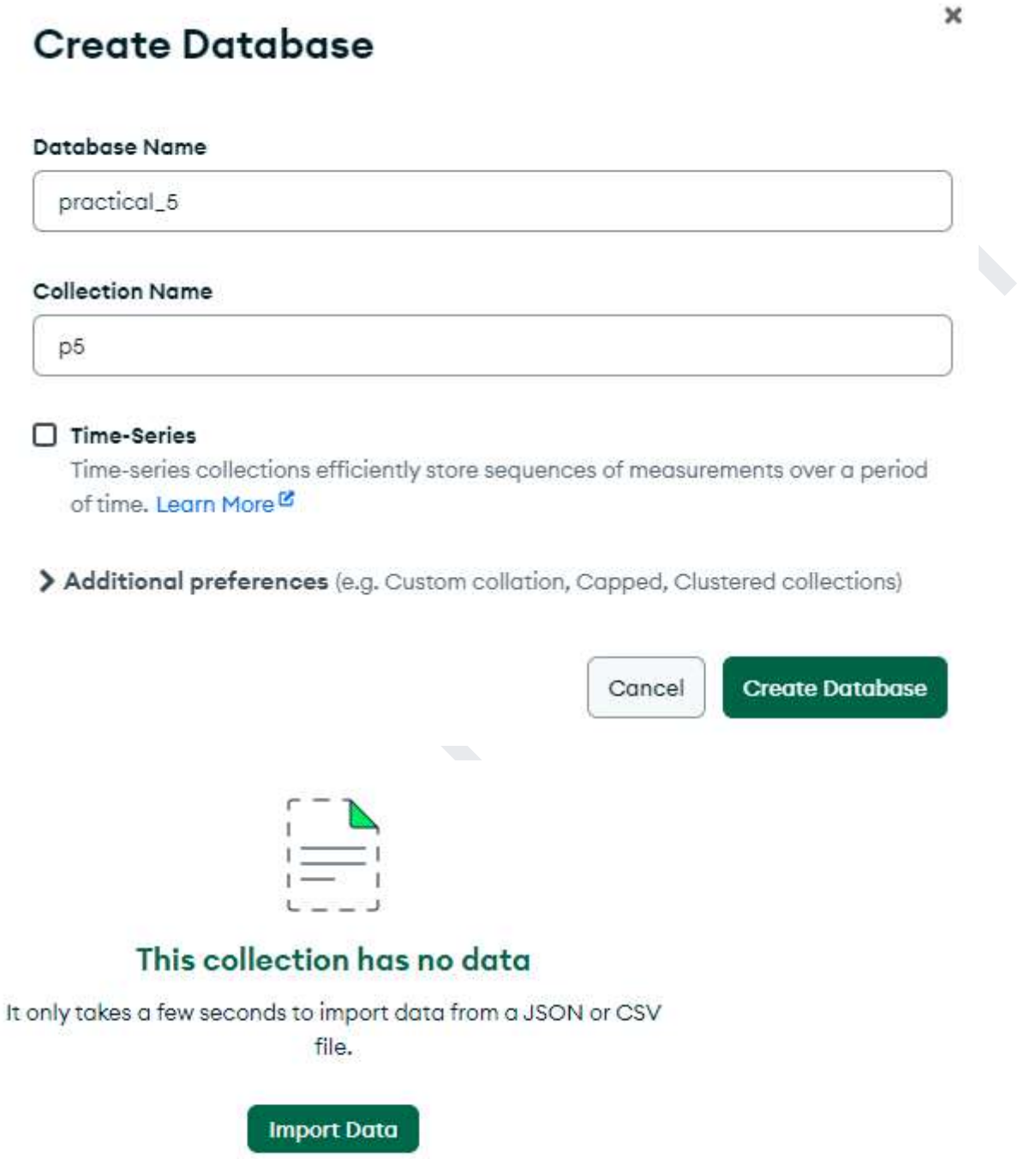
Write- up:

- Comparison Operators
- Logical Operators
- Element Operators
- Array Operators

MONGO IMPORT

- How to download and use mongodb import utility
- https://www.mongodb.com/try/download/database-tools
- download database-tools and unzip.
- Copy database tools to MongoDB bin location.
- start cmd. mongoimport
- Download sample json file from
- https://media.mongodb.org/zips.json
- mongoimport --db sampledata collection samplecollection --file C:\sample_data_from_mongodb.jason

Solve the case from :
https://github.com/mattdavis0351/mongodb-labs/blob/master/exercises/02_intermediate-mongo-queries.md


Create Database
Database Name
practical_5
Collection Name
p5
Time-Series
Time-series collections efficiently store sequences of measurements over a period of time. Learn More
Additional preferences (e.g. Custom collation, Capped, Clustered collections)
Cancel
Create Database
This collection has no data
It only takes a few seconds to import data from a JSON or CSV file.
Import Data


Import
To collection practical_5.p5
Import file:
datap5.json
Options
Stop on errors
Cancel
Import


ADD DATA
EXPORT DATA
UPDATE
DELETE


_id: "01001"
city : "AGAWAM"
loc : Array (2)
pop : 15338
state : "MA"
_id: "01002"
city : "CUSHMAN"
loc : Array (2)
pop : 36963
state : "MA"
_id: "01005"
city : "BARRE"

```
db.p5.find().pretty()
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…
```

Comparison Operators

Name	Description
$eq	Matches values that are equal to a specified value.
$gt	Matches values that are greater than a specified value.
$gte	Matches values that are greater than or equal to a specified value.
$in	Matches any of the values specified in an array.
$lt	Matches values that are less than a specified value.
$lte	Matches values that are less than or equal to a specified value.
$ne	Matches all values that are not equal to a specified value.
$nin	Matches none of the values specified in an array.

```
db.p5.find({ "pop": { "$eq": 15338 } })
{
  _id: '01001',
  city: 'AGAWAM',
```

```
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…

db.p5.find({ "pop": { "$ne": 15338 } })
{
  _id: '01002',
  city: 'CUSHMAN',
  loc: [
    -72.51565,
    42.377017
  ],
  pop: 36963,
  state: 'MA'
}
…

db.p5.find({ "pop": { "$gt": 15000 } })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
```

…

```
db.p5.find({ "pop": { "$lt": 5000 } })
{
  _id: '01005',
  city: 'BARRE',
  loc: [
    -72.108354,
    42.409698
  ],
  pop: 4546,
  state: 'MA'
}
…

db.p5.find({ "state": { "$in": ["MA", "NY"] } })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…
```

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.

```
db.p5.find({ "$and": [ { "pop": { "$gt": 5000 } }, { "state": "MA" } ] })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…

db.p5.find({ "$or": [ { "pop": { "$gt": 5000 } }, { "state": "MA" } ] })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
```

```
  ],
  pop: 15338,
  state: 'MA'
}
…

db.p5.find({ "pop": { "$not": { "$gt": 5000 } } })
{
  _id: '01005',
  city: 'BARRE',
  loc: [
    -72.108354,
    42.409698
  ],
  pop: 4546,
  state: 'MA'
}
…
```

Element Operators

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

```
db.p5.find({ "loc": { "$exists": true } })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
```

```
  ],
  pop: 15338,
  state: 'MA'
}
…

db.p5.find({ "pop": { "$type": "int" } })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…
```

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.

```
db.p5.find({ "loc": { "$all": [ -72.622739, 42.070206 ] } })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
```

```
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}

db.p5.find({ "loc": { "$elemMatch": { "$gt": -73, "$gt": 42 } } })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…

db.p5.find({ "loc": { "$size": 2 } })
{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…
```

The "$group" operator

The $group operator groups the documents by an identifier specified by _id field, and based on that distinct grouping, performs an aggregation like $sum and returns the resulting documents.

```
db.p5.aggregate([
  {
    "$group": {
      "_id": "$state",          // Group by state
      "total_population": { "$sum": "$pop" }  // Sum of population
    }
  }
])
```

```
{
  _id: 'IN',
  total_population: 5544136
}
{
  _id: 'NC',
  total_population: 6628637
}
…
```

The "$match" operator

The $match operator matches input documents to a given criteria and passes those matched documents to the next stage of the pipeline.

```
db.p5.aggregate([
  {
    "$match": { "pop": { "$gt": 10000 } }  // Match cities where population is greater than 10,000
  }
```

```
])

{
  _id: '01001',
  city: 'AGAWAM',
  loc: [
    -72.622739,
    42.070206
  ],
  pop: 15338,
  state: 'MA'
}
…
```

The "$sort" operator

```
db.p5.aggregate([
  {
    "$sort": { "pop": -1 }  // -1 for descending, 1 for ascending
  }
])

{
  _id: '60623',
  city: 'CHICAGO',
  loc: [
    -87.7157,
    41.849015
  ],
  pop: 112047,
  state: 'IL'
}
```

The "$unwind" operator

The $unwind operator deconstructs an array resulting in a document for each array element. The concept will become more evident through the exercise.

```
db.p5.aggregate([
  {
    "$unwind": "$loc"  // Unwinds the 'loc' array, so each element gets its own document
  }
])
```

```
{
  _id: '01001',
  city: 'AGAWAM',
  loc: -72.622739,
  pop: 15338,
  state: 'MA'
}
…
```

Combined Example: Using $match, $group, $sort, and $unwind together

```
db.p5.aggregate([
  {
    "$match": { "pop": { "$gt": 5000 } }  // First, match cities with population > 5000
  },
  {
    "$group": {
      "_id": "$state",   // Group by state
      "total_population": { "$sum": "$pop" }  // Calculate total population for each state
    }
```

```
  },
  {
    "$sort": { "total_population": -1 }  // Sort states by total population in descending order
  }
])
```

```
{
  _id: 'CA',
  total_population: 29009632
}
{
  _id: 'NY',
  total_population: 16462946
}
.,..
```