



# Day 27

# Insert

- Inserting a single document

```
db.tv_shows.insert({
  title: "Disenchantment", season: 1,
  episodes: [ { ... }, { ... }, { ... } ]
})
```

Missing `_id` field. MongoDB will assign an `_id` with an `ObjectId` type

Document to be inserted

- Inserting multiple documents

```
db.tv_shows.insertMany([
  { _id: 'abc', ... },
  { _id: 'def', ... },
  { ... }
])
```

Inserting multiple document simultaneously. Example shown with `_id` field. MongoDB will not assign a key



# Insert

```
@Autowired
private MongoTemplate mongoTemplate;

Document toInsert = //...
Document newDoc = mongoTemplate.insert(toInsert, "tv_shows");
```

Returns the document  
with `_id` property

Insert the new Document  
into the collection

```
ObjectId id = newDoc.getObjectId();
```

Get the new `_id`

```
List<Document> docsToInsert = new LinkedList<>();
// Add Document to list
...
```

Bulk insert. The returned  
collection will contain `_id`

```
Collection<Document> newDocs = mongoTemplate.insert(
    docsToInsert, "tv_shows");
```

# Delete

- Deleting a single document
  - Find the first document that satisfy the requirement

```
db.tv_shows.deleteOne (
  { cancelled: { $exists: true } }
)
```

- Deleting multiple documents

```
db.tv_shows.deleteMany (
  { cancelled: { $exists: true } }
)
```

```
db.tv_shows.deleteMany ( {} )
```





# Delete

```
@Autowired
private MongoTemplate mongoTemplate;

Query query = Query.query(
    Criteria.where("cancelled").exists(true));
DeleteResult result = mongoTemplate.remove(query, "tv_shows");

System.out.printf("Deleted documents: %d\n", result.getDeleteCount());

Document deleted = mongoTemplate.findAndremove(
    query, Document.class, "tv_shows");
```

Create a Query (predicate)  
by defining a predicate

Delete all documents in the collection  
that matches the predicate

remove() returns the number  
of deleted documents

Returns the deleted document

# Updates

- Update a single document

Set a predicate to filter the documents for updates

```
db.tv_shows.updateOne (
  { lang: "eng" },
  {
    $set: { lang: "English" }
  }
)
```

\$set - adds lang if it does not exists, update lang if it exists

- Update all documents

```
db.tv_shows.update (
  { lang: "eng" },
  {
    $set: { locale: "GB" }
  }
)
```

Will insert the attribute locale to all documents with the attribute lang having eng value.  
Assuming locale does not exists

# Updates

```
db.tv_shows.updateOne(  
  { title: "Arrow" },  
  {  
    $set: { status: "Ended" },  
    $inc: { "rating.average": .1 },  
    $unset: { webChannel: "" },  
    $set: { seasons: 6 }  
  }  
)
```

Remove the webChannel property

Modify the status property

Increment the average property by .1

Add a new property to document



# Update Operators

- `$currentDate`, `$inc`, `$min`, `$max`, `$unset`
- See <https://docs.mongodb.com/manual/reference/operator/update-field/>





# Updates

```
Query query = Query.query(  
    Criteria.where("title").is("Arrow")  
);
```

```
Update updateOps = new Update()  
    .set("status", "Ended")  
    .inc("rating.average", .1)  
    .unset("webChannel")  
    .set("seasons", 6);
```

List of mutations to be  
applied to documents

```
UpdateResult updateResult = mongoTemplate.updateMulti(  
    query, updateOps, Document.class, "tv_shows");
```

```
System.out.printf("Documents updated: %d\n",  
    updateResult.getModifiedCount());
```

# Updates

```
db.tv_shows.updateOne (
  { title: "Arrow" },
  {
    $push: { genres: "Mystery" },
    $pop: { genres: -1 }
  }
)
```

Appends a new value to the array `genres` property

Removes an element from the front of `genres` array

- `$pop` removes an item from an array
  - 1 removes from the back, element with the largest index
  - -1 removes from the front, element with the 0 index



# Updates

```
Query query = Query.query(  
    Criteria.where("title").is("Arrow")  
);
```

```
Update updateOps = new Update()  
    .push("genres").each("Mystery")  
    .pop("genres", Update.Position.FIRST);
```

Operations on array. Other  
operations include  
atPosition(), slice(),  
sort()

```
UpdateResult updateResult = mongoTemplate.updateMulti(  
    query, updateOps, Document.class, "tv_shows");
```

```
System.out.printf("Documents updated: %d\n",  
    updateResult.getModifiedCount());
```

# Upsert

- Combination of update and insert, upsert mode is by default off
- Insert a document if it does not match the predicate
- Update the document if it matches the predicate

```

db.tv_shows.update (
  { title: "Disenchantment", season: 1 },
  {
    title: "Disenchantment", season: 1,
    lang: "eng", genres: [ 'Animation', 'Comedy' ],
    ...
  },
  { upsert: true }
)

```

Document to insert  
or to be updated

Match the following predicate

Document cannot contain any \$set operator

Set upsert to true



# Upsert

```
Query query = Query.query(
    Criteria.where("title").is("Disenchantment")
        .and("season").is(1)
);
Update updateOps = new Update()
    .set("title", "Disenchantment")
    .set("season", 1)
    .set("lang", "eng")
    .push("genres").each(List.of("Animation", "Comedy").toArray());

UpdateResult updateResult =
    mongoTemplate.upsert(query, updateOps, "tv_shows");

System.out.printf("Documents updated: %d\n",
    updateResult.getModifiedCount());
```

# Indexes

- Like RDBMS, indexes are used by MongoDB to efficiently access document when querying MongoDB
- The `_id` field is always indexed

Create a index on the attribute `title`

```
db.tv_shows.createIndex ( {
  title: 1
})
```

↑ Ascending

Create a composite index on the attributes `title` and `imdb.rating`

```
db.tv_shows.createIndex ( {
  year: 1
  "imdb.rating": -1
})
```

↓ Descending



# Using Indexes



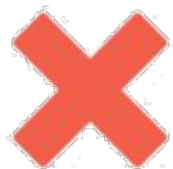
```
db.tv_shows.find({ "title": /bad/i })
```



```
db.tv_shows.find({ "year": { $gte: 1990 } })
```



```
db.tv_shows.find({  
  "year": { $gte: 1990 } },  
  "imdb.rating": { $gte: 5 }  
})
```



```
db.tv_shows.find({  
  "title": /bad/i },  
  "imdb.rating": { $gte: 5 }  
})
```



# Covered Queries

- Result can be returned entirely from the index

```
db.tv_shows.find(  
  {  
    "year": { $gte: 1990 }  
  },  
  {  
    _id: 0,  
    "imdb.rating": 1  
  }  
)
```





# Text Searches

- MongoDB supports text searches rather than just matching with regular expression
  - Eg. language, accents, etc.
- `$text` - special operator for searching text
- Need a text index but only limited to 1 text index per collection
  - Text index are expensive

Create a text index  
on attribute `plot` → `db.tv_shows.createIndex ( {  
plot: "text"  
} )`

# Text Searches

```
db.tv_shows.find({  
  $text: {  
    $search: "fIgHt"  
  }  
})
```

Search the `plot` attribute  
using text search.  
Case insensitive

```
db.tv_shows.find({  
  $text: {  
    $search: "fight run",  
    $caseSensitivity: true  
  }  
})
```

Treated as individual words  
viz. bag of words



# Text Searches

```
TextCriteria textCriterial = TextCriteria.forDefaultLanguage()  
    .matchingPhrase("fIgHt");
```

```
TextQuery query = TextQuery.queryText(textCriterial);
```

```
List<Document> results = mongoTemplate.find(query,  
    Document.class, "tv_shows");
```

Use TextCriteria  
and TextQuery for  
text searches

```
TextCriteria textCriterial =  
TextCriteria.forDefaultLanguage()  
    .matchingPhrase("fight run")  
    .caseSensitive(true);
```

Match the phrase viz. words appear in the  
listed order not bag of words

Case sensitive search



# Text Searches

- `TextCriteria` has other methods for searching text
  - `matchingAny(String... words)` - match any of the given words, bag of words
  - `matchingPhrase(String phrase)` - match a phrase
  - `notMatchingAny(String... words)` - not matching any of the given words
  - `notMatchingPhrase(String phrase)` - do not match the phrase

```
List<String> matches = new LinkedList<>();
List<String> notMatch = new LinkedList<>();
for (String word: listOfWords.split(", ")) {
    String w = word.trim();
    if (w.startsWith("-"))
        notMatch.add(w.substring(1));
    else
        matches.add(w);
}
TextCriteria textCriteria = TextCriteria.forDefaultLanguage()
    .matchingAny(matches)
    .notMatchingAny(notMatch);
```



# Text Searches

```
db.tv_shows.find(  
  {  
    $text: { $search: "fight run" }  
  },  
  { score: {  
    $meta: "textScore"  
  }  
})
```

Adds a new attribute `score` to the search result. The `score` attribute holds the a value telling how well the document matches the search terms. The high the better



# Text Searches

```
TextCriteria textCriteria = TextCriteria.forDefaultLanguage()  
    .matchingPhrase("fIghT");
```

```
TextQuery query = TextQuery.queryText(textCriteria)  
    .sortByScore()  
    .includeScore("score");
```

```
List<Document> results = mongoTemplate.find(query,  
    Document.class, "tv_shows");
```

Sort the result by  
the text score

Add a new property in the result  
called `score` for the text score

Text scoring algorithm

<https://ananya281294.medium.com/mongo-maths-676469e55f78>



Unused



# Performing Inserts



```
client.db('movies')  
  .collection('inventory')  
  .insert({  
    item: 'game console',  
    instock: [  
      { warehouse: 'Ang Mo Kio', qty: 10 },  
      { warehouse: 'Eunos', qty: 30 }  
    ]  
  })  
  .then(result => {  
    // result  
  })  
  .catch(error => {  
    // handle error  
  })
```

Select the database

Specify the collection

Document to be inserted

```
db.tv_shows.insert({  
  item: 'game console',  
  instock: [  
    { warehouse: 'Ang Mo Kio', qty: 10 },  
    { warehouse: 'Eunos', qty: 30 }  
  ]  
})
```

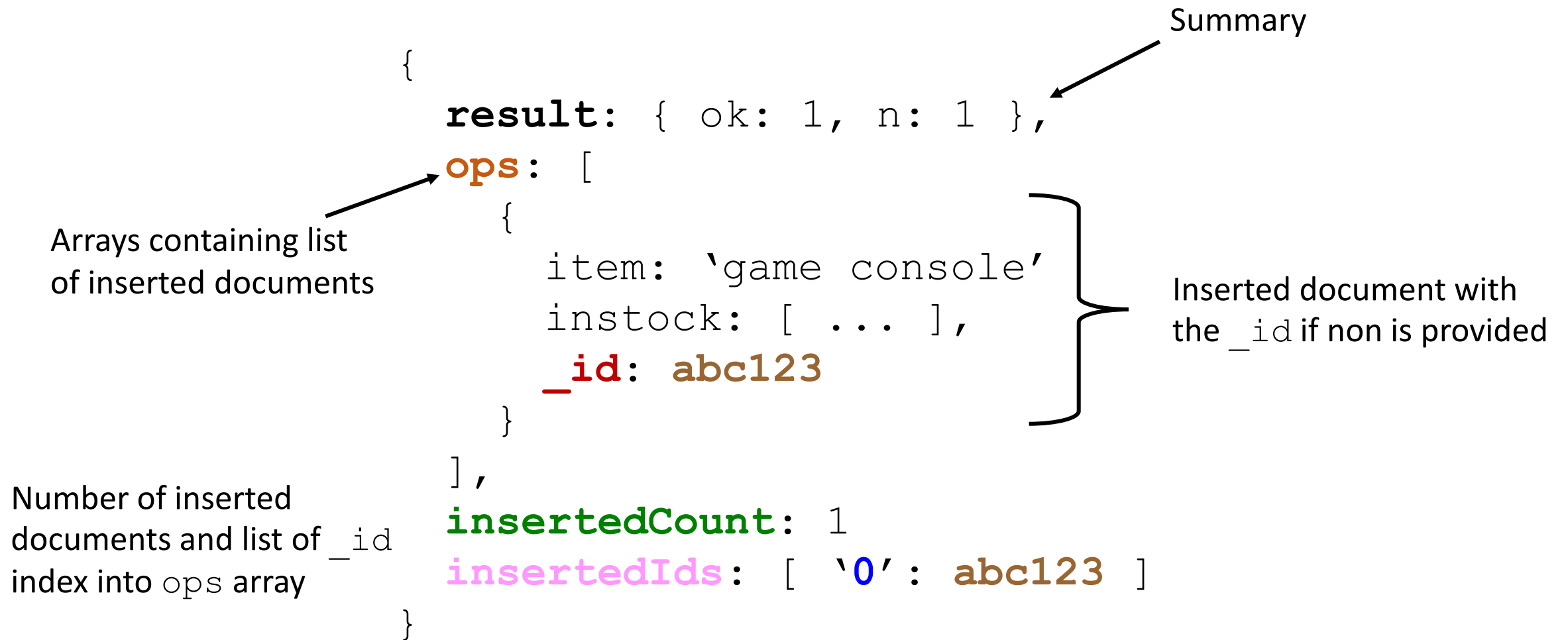


mongoDB





# Result from Insert





# Arrays - Primitives

```
{ ... genres: [ "Science-Fiction", "Drama", "Crime" ] },  
{ ... genres: [ "Drama", "Crime" ] },  
{ ... genres: [ "Thriller", "Drama", "Crime" ] },
```

```
db.inventory.find({ "genres": "Crime" })
```

Find any document with Drama

```
db.inventory.find({ "genres":  
  { $in: [ "Science-Fiction", "Crime" ] } })
```

Find any document with Science-Fiction or Crime

```
db.inventory.find({ "genres":  
  { $all: [ "Science-Fiction", "Crime" ] } })
```

Find any document with Science-Fiction and Crime



# Arrays

```
{ item: "journal", instock: [
  { warehouse: "Ang Mo Kio", qty: 5 },
  { warehouse: "Clementi", qty: 15 } ]
},
{ item: "notebook", instock: [
  { warehouse: "Clementi", qty: 5 } ]
},
{ item: "paper", instock: [
  { warehouse: "Ang Mo Kio", qty: 60 },
  { warehouse: "Bedok", qty: 15 } ]
},
{ item: "planner", instock: [
  { warehouse: "Ang Mo Kio", qty: 40 },
  { warehouse: "Bedok", qty: 5 } ]
},
{ item: "postcard", instock: [
  { warehouse: "Bedok", qty: 15 },
  { warehouse: "Clementi", qty: 35 } ]
}
```



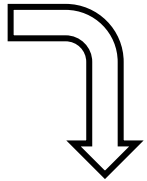
# Arrays - Embedded Document

```
db.inventory.find({  
  $and: [  
    { "instock.warehouse": "Ang Mo Kio" },  
    { "instock.qty": { $gte: 15 }  
  ]  
})
```

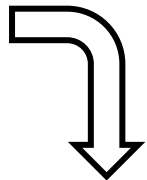
Addressing an embedded document

```
db.inventory.find({  
  instock: {  
    $elemMatch: {  
      warehouse: "Ang Mo Kio",  
      qty: { $gte: 5 }  
    }  
  }  
})
```

Will find documents filtered by warehouse and qty  
But the 2 conditions applies to any document in the array



```
{ item: "journal", instock: [  
  { warehouse: "Ang Mo Kio", qty: 5 },  
  { warehouse: "Clementi", qty: 15 } ]  
}
```



```
{ item: "paper", instock: [  
  { warehouse: "Ang Mo Kio", qty: 60 },  
  { warehouse: "Bedok", qty: 15 } ]  
}
```



# Updates

```
db.inventory.update (
  { "instock.warehouse": "Ang Mo Kio" },
  {
    $inc: {
      "instock.$[].qty": 10
    }
  }
)
```

Every embedded document in the array increment the `qty` field by 10

```
db.inventory.update (
  { "_id": ObjectId("abc123") },
  {
    $set: {
      "instock.$[1].qty": 10
    }
  }
)
```

Set the second document's `qty` attribute in the `instock` array to 10



# Updates

```
db.inventory.update (
  { "_id": ObjectId("abc123") },
  {
    $push: {
      instock: { warehouse: "Eunos", qty: 30 }
    }
  }
)
```

Append the new document  
to the array `instock`

```
db.inventory.update (
  { "_id": ObjectId("abc123") },
  {
    $pop: { instock: -1 }
  }
)
```

Remove an element from the front  
of an array. 1 is from the back



# Updates

```
db.inventory.update (
  { "instock.warehouse": "Ang Mo Kio" },
  {
    $set: {
      "instock.$[elem].qty": 0 }
    },
    {
      arrayFilters: [
        { "elem.qty": { $lte: -1 } }
      ]
    }
  )
```

elem acts like a control variable in a for loop

For every matched document, set the instock.qty to zero if the instock.qty is <= -1