

Part 1: DB Creation and Collection Creation

```

Last login: Wed Jul 25 20:31:12 on tty000
shangqings-MBP:~$ mongo
shangqings-MBP:~$ shangqings mongo
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] (wired) Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] MongoDB starting : pid=25716 port=27017 dbpath=/data/db 64-bit host=shangqings-MBP
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] db version v4.0.0
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] git version: 3a8f7d4f71a0b186d3bba1d529597d51
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] allocator: system
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] modules: none
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] build environment:
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] distarch: x86_64
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] target_arch: x86_64
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] options: {}
2018-07-25T20:39:41.269-0400 I STORAGE [initandlisten] exception in initAndListen: DBPathIndex: Unable to lock the lock file: /data/db/mongo.lock (Resource temporarily unavailable), Another mongod instance is already running on the /data/db directory, terminating
2018-07-25T20:39:41.269-0400 I CONTROL [initandlisten] shutting down with code:100
shangqings-MBP:~$ shangqings

Last login: Sun Jul 29 15:39:34 on tty000
-bash: Export: command not found
shangqings-MBP:~$ shangqings mongo
MongoDB shell version v4.0.0
connecting to: mongodb://127.0.0.1:27017
MongoDB server version: 4.0.0
Server has startup warnings:
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten]
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten] **      Read and write access to data and configuration is unrestricted.
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten]
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten] ** WARNING: This server is bound to localhost.
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten] **      Remote systems will be unable to connect to this server.
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten] **      Start the server with --bind_ip <address> to specify which IP
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten] **      addresses it should serve responses from, or with --bind_ip_all to
2018-07-25T20:31:05.249-0400 I CONTROL [initandlisten] **      bind to all interfaces. If this behavior is desired, start the
2018-07-25T20:31:05.250-0400 I CONTROL [initandlisten] **      server with --bind_ip 127.0.0.1 to disable this warning.
2018-07-25T20:31:05.250-0400 I CONTROL [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service to collect and display
metrics about your deployment (disk utilization, CPU, operation statistics,
etc).

The monitoring data will be available on a MongoDB website with a unique
URL created for you. Anyone you share the URL with will also be able to
view this page. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command:
db.enableFreeMonitoring()
---
> show dbs
admin 0.000GB
config 0.000GB
local 0.000GB
sakila 0.000GB
> use sakila
switched to db sakila
> db.createCollection("film")
{
  "ok" : 0,
  "errmsg" : "a collection 'sakila.film' already exists",
  "code" : 48,
  "codeName" : "NamespaceExists"
}
> show collections;
film
> db.film.insert({
...   "film_id" : 1,
...   "title" : "ACADEMY DINOSAUR",
...   "description" : "A Epic Drama of a Feminist And a Mad Scientist who must Battle a Teacher in The Canadian Rockies",
...   "release_year" : 2006,
...   "language_id" : 1,
...   "original_language_id" : null,
...   "rental_duration" : 6,
...   "rental_rate" : 0.99,
...   "length" : 86,
...   "replacement_cost" : 20.99,
...   "rating" : "PG",
...   "special_features" : "Deleted Scenes,Behind the Scenes",
...   "last_update" : "2006-02-15 05:03:42"
... })

```

Part 2: Queries in MongoDB

- **Select Operations in MongoDB**

Where clause in MongoDB: `db.film.find({film_id:1}).pretty()`

```
> db.film.find({film_id:1}).pretty()
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8d9"),
  "film_id" : 1,
  "title" : "ACADEMY DINOSAUR",
  "description" : "A Epic Drama of a Feminist And a Mad Scientist who must Battle a Teacher in The Canadian Rockies",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 6,
  "rental_rate" : 0.99,
  "length" : 86,
  "replacement_cost" : 20.99,
  "rating" : "PG",
  "special_features" : "Deleted Scenes,Behind the Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
```

Find films with id = 1 or 2 : `db.film.find({film_id:{$in:[1,2]}}).pretty()`

```
> db.film.find({film_id:1}).pretty()
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8d9"),
  "film_id" : 1,
  "title" : "ACADEMY DINOSAUR",
  "description" : "A Epic Drama of a Feminist And a Mad Scientist who must Battle a Teacher in The Canadian Rockies",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 6,
  "rental_rate" : 0.99,
  "length" : 86,
  "replacement_cost" : 20.99,
  "rating" : "PG",
  "special_features" : "Deleted Scenes,Behind the Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
> db.film.find({film_id:{$in:[1,2]}}).pretty()
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8d9"),
  "film_id" : 1,
  "title" : "ACADEMY DINOSAUR",
  "description" : "A Epic Drama of a Feminist And a Mad Scientist who must Battle a Teacher in The Canadian Rockies",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 6,
  "rental_rate" : 0.99,
  "length" : 86,
  "replacement_cost" : 20.99,
  "rating" : "PG",
  "special_features" : "Deleted Scenes,Behind the Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8da"),
  "film_id" : 2,
  "title" : "ACE GOLDFINGER",
  "description" : "A Astounding Epistle of a Database Administrator And a Explorer who must Find a Car in Ancient China",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 3,
  "rental_rate" : 4.99,
  "length" : 48,
  "replacement_cost" : 12.99,
  "rating" : "G",
  "special_features" : "Trailers,Deleted Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
```

Select films with `release_year=2006` and `rental_duration = 3`:

[illegible]

```
> db.film.find({rental_rate: {$gt: 4}}).count();
336
```

```
db.film.find({rental_rate: {$lt: 4 , $gt: 2}}).count();
```

```
> db.film.find({rental_rate: {$lt: 4 , $gt: 2}}).count();
323
```

Count the number of films whose rental rate is between \$2 than \$4

```
db.film.find({rental_rate: {$lt: 4, $gt: 2}}).limit(5).pretty();
```

```

> db.film.find({rental_rate: {$lt: 4 , $gt: 2}}).limit(5).pretty();
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8db"),
  "film_id" : 3,
  "title" : "ADAPTATION HOLES",
  "description" : "A Astounding Reflection of a Lumberjack And a Car who must Sink a Lumberjack in A Baloon Factory",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 7,
  "rental_rate" : 2.99,
  "length" : 50,
  "replacement_cost" : 18.99,
  "rating" : "NC-17",
  "special_features" : "Trailers,Deleted Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8dc"),
  "film_id" : 4,
  "title" : "AFFAIR PREJUDICE",
  "description" : "A Fanciful Documentary of a Frisbee And a Lumberjack who must Chase a Monkey in A Shark Tank",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 5,
  "rental_rate" : 2.99,
  "length" : 117,
  "replacement_cost" : 26.99,
  "rating" : "G",
  "special_features" : "Commentaries,Behind the Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8dd"),
  "film_id" : 6,
  "title" : "AGENT TRUMAN",
  "description" : "A Intrepid Panorama of a Robot And a Boy who must Escape a Sumo Wrestler in Ancient China",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 3,
  "rental_rate" : 2.99,
  "length" : 169,
  "replacement_cost" : 17.99,
  "rating" : "PG",
  "special_features" : "Deleted Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8df"),
  "film_id" : 5,
  "title" : "AFRICAN EGG",
  "description" : "A Fast-Paced Documentary of a Pastry Chef And a Dentist who must Pursue a Forensic Psychologist in The Gulf of Mexico",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 6,
  "rental_rate" : 2.99,
  "length" : 130,
  "replacement_cost" : 22.99,
  "rating" : "G",
  "special_features" : "Deleted Scenes",
  "last_update" : "2006-02-15 05:03:42"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8e1"),
  "film_id" : 9,
  "title" : "ALABAMA DEVIL",
  "description" : "A Thoughtful Panorama of a Database Administrator And a Mad Scientist who must Outgun a Mad Scientist in A Jet Boat",
  "release_year" : 2006,
  "language_id" : 1,
  "original_language_id" : null,
  "rental_duration" : 3,
  "rental_rate" : 2.99,
  "length" : 114,
  "replacement_cost" : 21.99,
  "rating" : "PG-13",
  "special_features" : "Trailers,Deleted Scenes",
  "last_update" : "2006-02-15 05:03:42"
}

```

Select Distinct operation : `db.film.distinct('rating')`

```
> db.film.distinct('rating')
[ "PG", "G", "NC-17", "R", "PG-13" ]
```

Projection Operation :
Select title , rating , replacement_cost from film

`db.film.find({replacement_cost : {$lt: 20}}, { _id: 0 , title:1 , rating: 1, replacement_cost : 1}).pretty()`

```
> db.film.find( {replacement_cost : {$lt: 20}}, { _id: 0 , title:1 , rating: 1, replacement_cost : 1}).pretty()
{ "title" : "ACE GOLDFINGER", "replacement_cost" : 12.99, "rating" : "G" }
{
  "title" : "ADAPTATION HOLES",
  "replacement_cost" : 18.99,
  "rating" : "NC-17"
}
{ "title" : "AGENT TRUMAN", "replacement_cost" : 17.99, "rating" : "PG" }
{ "title" : "AIRPORT POLLOCK", "replacement_cost" : 15.99, "rating" : "R" }
{ "title" : "ALAMO VIDEOTAPE", "replacement_cost" : 16.99, "rating" : "G" }
{ "title" : "ALIEN CENTER", "replacement_cost" : 10.99, "rating" : "NC-17" }
{ "title" : "ALONE TRIP", "replacement_cost" : 14.99, "rating" : "R" }
{ "title" : "AMERICAN CIRCUS", "replacement_cost" : 17.99, "rating" : "R" }
{
  "title" : "AMISTAD MIDSUMMER",
  "replacement_cost" : 10.99,
  "rating" : "G"
}
{
  "title" : "ANACONDA CONFESSIONS",
  "replacement_cost" : 9.99,
  "rating" : "R"
}
{ "title" : "ANALYZE HOOSIERS", "replacement_cost" : 19.99, "rating" : "R" }
{ "title" : "ANGELS LIFE", "replacement_cost" : 15.99, "rating" : "G" }
{
  "title" : "ANONYMOUS HUMAN",
  "replacement_cost" : 12.99,
  "rating" : "NC-17"
}
{ "title" : "ANTHEM LUKE", "replacement_cost" : 16.99, "rating" : "PG-13" }
{ "title" : "ANNIE IDENTITY", "replacement_cost" : 15.99, "rating" : "G" }
{
  "title" : "APACHE DIVINE",
  "replacement_cost" : 16.99,
  "rating" : "NC-17"
}
{
  "title" : "APOCALYPSE FLAMINGOS",
  "replacement_cost" : 11.99,
  "rating" : "R"
}
{ "title" : "APOLLO TEEN", "replacement_cost" : 15.99, "rating" : "PG-13" }
{
  "title" : "ARGONAUTS TOWN",
  "replacement_cost" : 12.99,
  "rating" : "PG-13"
}
{
  "title" : "ANTITRUST TOMATOES",
  "replacement_cost" : 11.99,
  "rating" : "NC-17"
}
```

Sort the previous result by ascending order of replacement_cost

`db.film.find({replacement_cost : {$lt: 20}}, { _id: 0 , title:1 , rating: 1, replacement_cost : 1}).sort({replacement_cost: 1}).pretty()`

```
> db.film.find( {replacement_cost : {$lt: 20}}, { _id: 0, title:1, rating:1, replacement_cost : 1}).sort( {replacement_cost: 1}).pretty()
{
  "title" : "ANACONDA CONFESSIONS",
  "replacement_cost" : 9.99,
  "rating" : "R"
}
{
  "title" : "CIDER DESIRE", "replacement_cost" : 9.99, "rating" : "PG" }
{
  "title" : "CONTROL ANTHEM", "replacement_cost" : 9.99, "rating" : "G" }
{
  "title" : "DAISY MENAGERIE", "replacement_cost" : 9.99, "rating" : "G" }
{
  "title" : "DELIVERANCE MULHOLLAND",
  "replacement_cost" : 9.99,
  "rating" : "R"
}
{
  "title" : "DUDE BLINONESS", "replacement_cost" : 9.99, "rating" : "G" }
{
  "title" : "EDGE KISSING", "replacement_cost" : 9.99, "rating" : "NC-17" }
{
  "title" : "ENCINO ELF", "replacement_cost" : 9.99, "rating" : "G" }
{
  "title" : "FACTORY DRAGON",
  "replacement_cost" : 9.99,
  "rating" : "PG-13"
}
{
  "title" : "FELLOWSHIP AUTUMN",
  "replacement_cost" : 9.99,
  "rating" : "NC-17"
}
{
  "title" : "GANDHI KHALI", "replacement_cost" : 9.99, "rating" : "PG-13" }
{
  "title" : "GUNFIGHTER MUSSOLINI",
  "replacement_cost" : 9.99,
  "rating" : "PG-13"
}
{
  "title" : "HEARTBREAKERS BRIGHT",
  "replacement_cost" : 9.99,
  "rating" : "G"
}
{
  "title" : "JASON TRAP", "replacement_cost" : 9.99, "rating" : "NC-17" }
{
  "title" : "KISSING DOLLS", "replacement_cost" : 9.99, "rating" : "R" }
{
  "title" : "LIFE TWISTED", "replacement_cost" : 9.99, "rating" : "NC-17" }
{
  "title" : "MAIDEN HOME", "replacement_cost" : 9.99, "rating" : "PG" }
{
  "title" : "MATRIX SNOWMAN",
  "replacement_cost" : 9.99,
  "rating" : "PG-13"
}
{
  "title" : "METROPOLIS COMA",
  "replacement_cost" : 9.99,
  "rating" : "PG-13"
}
{
  "title" : "NEWTON LABYRINTH", "replacement_cost" : 9.99, "rating" : "PG" }
type "it" for more
```

Logical OR operation example : `db.film.find({ $or: [{rating:"G"},{rating:"PG"}] }).count()`

```
> db.film.find( { $or: [{rating:"G"},{rating:"PG"}] } ).count()
372
```

- **Aggregate**

General Syntax : `db.<collection>.aggregate([{ <stage1> }, { <stage2> } ...])`

Select count(*) from film group by rating: `db.film.aggregate([{$group: {_id:"$rating",NumFilms:{$sum:1}}})`

```
> db.film.aggregate([{$group : {_id:"$rating",NumFilms:{$sum:1}} }])
{ "_id" : "PG-13", "NumFilms" : 223 }
{ "_id" : "R", "NumFilms" : 195 }
{ "_id" : "G", "NumFilms" : 178 }
{ "_id" : "NC-17", "NumFilms" : 210 }
{ "_id" : "PG", "NumFilms" : 194 }
```

Select min(replacement_cost) from film group by rating

`db.film.aggregate([{$group: {_id:"$rating",MinReplacementCost:{$min:"$replacement_cost"}}})`

```
> db.film.aggregate([{$group: {_id:"$rating",MinReplacementCost:{$min:"$replacement_cost"}}})
{ "_id" : "PG-13", "MinReplacementCost" : 9.99 }
{ "_id" : "R", "MinReplacementCost" : 9.99 }
{ "_id" : "G", "MinReplacementCost" : 9.99 }
{ "_id" : "NC-17", "MinReplacementCost" : 9.99 }
{ "_id" : "PG", "MinReplacementCost" : 9.99 }
```

Part 3: InClass Assignment

List the distinct rental durations across all documents in the collection

```
db.film.distinct("rental_duration")
```

```
> db.film.distinct("rental_duration")  
[ 6, 3, 7, 5, 4 ]
```

Sort the documents in the descending order of the rental duration

```
db.film.find().sort({rental_duration:-1}).pretty()
```

```
> db.film.find().sort({rental_duration:-1}).pretty()  
{  
  "_id" : ObjectId("5b58fb27260e81c4ce48f8db"),  
  "film_id" : 3,  
  "title" : "ADAPTATION HOLES",  
  "description" : "A Astounding Reflection of a Lumberjack And a Car who must Sink a Lumberjack in A Baloon Factory",  
  "release_year" : 2006,  
  "language_id" : 1,  
  "original_language_id" : null,  
  "rental_duration" : 7,  
  "rental_rate" : 2.99,  
  "length" : 50,  
  "replacement_cost" : 18.99,  
  "rating" : "NC-17",  
  "special_features" : "Trailers,Deleted Scenes",  
  "last_update" : "2006-02-15 05:03:42"  
}  
{  
  "_id" : ObjectId("5b58fb27260e81c4ce48f8f2"),  
  "film_id" : 27,  
  "title" : "ANONYMOUS HUMAN",  
  "description" : "A Amazing Reflection of a Database Administrator And a Astronaut who must Outrace a Database Administrator in A Shark Tank",  
  "release_year" : 2006,  
  "language_id" : 1,  
  "original_language_id" : null,  
  "rental_duration" : 7,  
  "rental_rate" : 0.99,  
  "length" : 179,  
  "replacement_cost" : 12.99,  
  "rating" : "NC-17",  
  "special_features" : "Deleted Scenes,Behind the Scenes",  
  "last_update" : "2006-02-15 05:03:42"  
}  
{  
  "_id" : ObjectId("5b58fb27260e81c4ce48f8fb"),  
  "film_id" : 36,  
  "title" : "ARGONAUTS TOWN",  
  "description" : "A Emotional Epistle of a Forensic Psychologist And a Butler who must Challenge a Waitress in An Abandoned Mine Shaft",  
  "release_year" : 2006,  
  "language_id" : 1,  
  "original_language_id" : null,  
  "rental_duration" : 7,  
  "rental_rate" : 0.99,  
  "length" : 127,  
  "replacement_cost" : 12.99,  
  "rating" : "PG-13",  
  "special_features" : "Trailers,Commentaries",  
  "last_update" : "2006-02-15 05:03:42"  
}  
{  
  "_id" : ObjectId("5b58fb27260e81c4ce48f91d"),  
  "film_id" : 70,  
  "title" : "BIKINI BORROWERS",  
  "description" : "A Astounding Drama of a Astronaut And a Cat who must Discover a Woman in The First Manned Space Station",  
  "release_year" : 2006,  
  "language_id" : 1,  
  "original_language_id" : null,  
  "rental_duration" : 7,  
  "rental_rate" : 4.99,  
  "length" : 142,  
  "replacement_cost" : 26.99,  
  "rating" : "NC-17",  
  "special_features" : "Commentaries,Deleted Scenes",  
  "last_update" : "2006-02-15 05:03:42"  
}
```

List the average rental rate by the rental duration

```
db.film.aggregate([{$group:{_id:"$rental_duration", total:{$avg:"$rental_rate"}}}])
```

```
> db.film.aggregate([{$group:{_id:"$rental_duration", total:{$avg:"$rental_rate"}}}])  
{ "_id" : 4, "total" : 2.9702955665024633 }  
{ "_id" : 5, "total" : 3.1994240837696335 }  
{ "_id" : 7, "total" : 3.0214136125654454 }  
{ "_id" : 3, "total" : 2.8323645320197044 }  
{ "_id" : 6, "total" : 2.8956603773584906 }
```

Select film_id and title the films whose rental_duration is >= 3 and <= 5 days

```
db.film.find( { rental_duration: {$lte:5, $gte:3}}, {_id:1, film_id:1, title:1}).sort({rental_duration: 1}).pretty()
```

```
> db.film.find( { rental_duration:{$lte:5, $gte:3}}, {_id:1, film_id:1, title:1}).sort({rental_duration: 1}).pretty()
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8da"),
  "film_id" : 2,
  "title" : "ACE GOLDFINGER"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8dd"),
  "film_id" : 6,
  "title" : "AGENT TRUMAN"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8e1"),
  "film_id" : 9,
  "title" : "ALABAMA DEVIL"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8e8"),
  "film_id" : 17,
  "title" : "ALONE TRIP"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8ec"),
  "film_id" : 21,
  "title" : "AMERICAN CIRCUS"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8ee"),
  "film_id" : 23,
  "title" : "ANACONDA CONFESSIONS"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8f1"),
  "film_id" : 25,
  "title" : "ANGELS LIFE"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8f5"),
  "film_id" : 26,
  "title" : "ANNIE IDENTITY"
}
{
  "_id" : ObjectId("5b58fb27260e81c4ce48f8fd"),
  "film_id" : 37,
  "title" : "ARIZONA BANG"
}
```

List the count of the films whose rental_duration is >= 3 and <= 5 days

```
db.film.find({rental_duration:{$lte:5, $gte:3}}).count();
```

```
Type "it" for more
> db.film.find({rental_duration:{$lte:5, $gte:3}}).count();
597
```