PHASE 1 – Mini Project 4

Setup and Configuration of Mongodb

```
2018-04-18T20:13:45.930-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:54934 #1 (1 connection now open)
2018-04-18T20:14:10.279-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:54985 #2 (2 connections now open)
2018-04-18T20:14:10.294-0400 I NETWORK  [conn2] received client metadata from 127.0.0.1:54985 conn: { driver: { name: "P
yMongo", version: "3.6.1" }, os: { type: "Windows", name: "Windows 10", architecture: "AMD64", version: "10.0.16299-SP0"
 }, platform: "CPython 3.5.4.final.0" }
2018-04-18T20:14:10.302-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:54986 #3 (3 connections now open)
2018-04-18T20:14:10.303-0400 I NETWORK  [conn3] received client metadata from 127.0.0.1:54986 conn: { driver: { name: "P
yMongo", version: "3.6.1" }, os: { type: "Windows", name: "Windows 10", architecture: "AMD64", version: "10.0.16299-SP0"
 }, platform: "CPython 3.5.4.final.0" }
2018-04-18T20:14:10.809-0400 I NETWORK  [conn2] end connection 127.0.0.1:54985 (2 connections now open)
2018-04-18T20:14:10.809-0400 I NETWORK  [conn3] end connection 127.0.0.1:54986 (1 connection now open)
2018-04-18T20:16:37.931-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:55319 #4 (2 connections now open)
2018-04-18T20:16:37.932-0400 I NETWORK  [conn4] received client metadata from 127.0.0.1:55319 conn: { application: { nam
e: "MongoDB Shell" }, driver: { name: "MongoDB Internal Client", version: "3.6.3" }, os: { type: "Windows", name: "Micro
soft Windows 10", architecture: "x86_64", version: "10.0 (build 16299)" } }
2018-04-18T20:19:45.939-0400 I NETWORK  [conn1] end connection 127.0.0.1:54934 (1 connection now open)
2018-04-18T20:19:47.945-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:55706 #5 (2 connections now open)
2018-04-18T20:25:47.945-0400 I NETWORK  [conn5] end connection 127.0.0.1:55706 (1 connection now open)
2018-04-18T20:25:49.955-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:56438 #6 (2 connections now open)
2018-04-18T20:28:26.474-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:56887 #7 (3 connections now open)
2018-04-18T20:28:26.497-0400 I NETWORK  [conn7] received client metadata from 127.0.0.1:56887 conn: { driver: { name: "P
yMongo", version: "3.6.1" }, os: { type: "Windows", name: "Windows 10", architecture: "AMD64", version: "10.0.16299-SP0"
 }, platform: "CPython 3.5.4.final.0" }
2018-04-18T20:28:26.506-0400 I NETWORK  [listener] connection accepted from 127.0.0.1:56888 #8 (4 connections now open)
2018-04-18T20:28:26.506-0400 I NETWORK  [conn8] received client metadata from 127.0.0.1:56888 conn: { driver: { name: "P
yMongo", version: "3.6.1" }, os: { type: "Windows", name: "Windows 10", architecture: "AMD64", version: "10.0.16299-SP0"
 }, platform: "CPython 3.5.4.final.0" }
2018-04-18T20:28:27.009-0400 I NETWORK  [conn7] end connection 127.0.0.1:56887 (3 connections now open)
2018-04-18T20:28:27.009-0400 I NETWORK  [conn8] end connection 127.0.0.1:56888 (2 connections now open)
```

Importing airports.json to Mongodb database by using python program.

```python
import json
import pymongo
from pprint import pprint


connection = pymongo.MongoClient('mongodb://localhost:27017/')
db = connection.book
record1 = db.book_collection
page = open("airports.json", 'r')
parsed = json.load(page)

record1.insert_many(parsed)
```

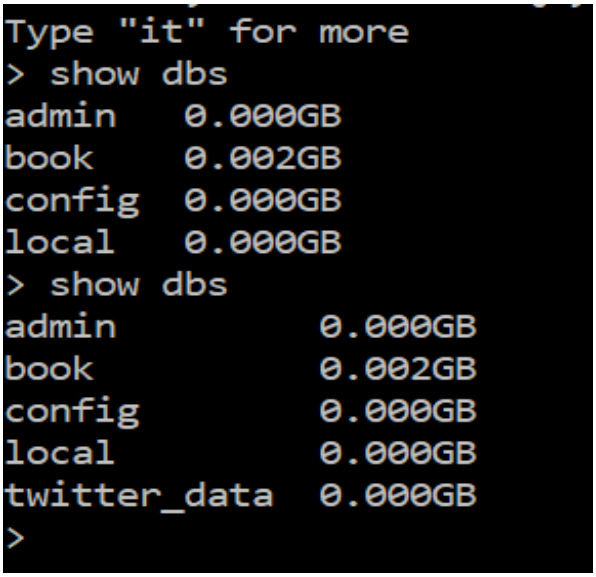
After importing of the airports.json, we can access the file that has been imported through the Mongo Shell which is saved as a book. Inside a book, by accessing collections, we can display on the mongo shell the contents of airports.json as is shown here.

```
> show dbs
admin   0.000GB
book    0.002GB
config  0.000GB
local   0.000GB
> show book
2018-04-18T20:29:38.532-0400 E QUERY    [thread1] Error: don't know how to show [book] :
shellHelper.show@src/mongo/shell/utils.js:953:11
shellHelper@src/mongo/shell/utils.js:706:15
@(shellhelp2):1:1
> show collections
> use book
switched to db book
> show collections
book_collection
> db.book_collection.find()
{ "_id" : ObjectId("5abc05d6595614f200da5cfa"), "woeid" : "12512819", "name" : "Anaa Airport", "email" : "", "lat" : "-17.3595", "type" : "Airports", "phone" : "",
 "elev" : "7", "city" : "Anaa", "carriers" : "1", "runway_length" : "4921", "code" : "AAA", "state" : "Tuamotu-Gambier", "tz" : "Pacific/Midway", "icao" : "NTGA",
"lon" : "-145.494", "direct_flights" : "2", "url" : "", "country" : "French Polynesia" }
{ "_id" : ObjectId("5abc05d6595614f200da5cfb"), "woeid" : "12510325", "name" : "El Mellah Airport", "email" : "", "lat" : "36.8236", "type" : "Airports", "phone" :
 "", "elev" : "16", "city" : "El Tarf", "carriers" : "2", "runway_length" : "9843", "code" : "AAE", "state" : "Annaba", "tz" : "Africa/Algiers", "icao" : "DABB", "
lon" : "7.8103", "direct_flights" : "6", "url" : "", "country" : "Algeria" }
{ "_id" : ObjectId("5abc05d6595614f200da5cfc"), "woeid" : "12512587", "name" : "Aalborg Airport", "email" : "", "lat" : "57.0952", "type" : "Airports", "phone" : "
", "elev" : "10", "city" : "Norresundby", "carriers" : "10", "runway_length" : "8700", "code" : "AAL", "state" : "Nordjylland", "tz" : "Europe/Copenhagen", "icao"
: "EKYT", "lon" : "9.85606", "direct_flights" : "7", "url" : "http://www.aal.dk/", "country" : "Denmark" }
{ "_id" : ObjectId("5abc05d6595614f200da5cfd"), "woeid" : "55921381", "name" : "Mala Mala", "email" : "", "lat" : "-24.8", "type" : "Airports", "phone" : "", "elev
" : "1200", "city" : "Mala Mala", "carriers" : "1", "runway_length" : "4420", "code" : "AAM", "state" : "", "tz" : "Africa/Johannesburg", "icao" : "FAMD", "lon" :
"31.5333", "direct_flights" : "1", "url" : "", "country" : "South Africa" }
{ "_id" : ObjectId("5abc05d6595614f200da5cfe"), "woeid" : "12523371", "name" : "Al Ain Airport", "email" : "", "lat" : "24.25", "type" : "Airports", "phone" : "",
"elev" : null, "city" : "Ayn al Faydah", "carriers" : "9", "runway_length" : null, "code" : "AAN", "state" : "Abu Dhabi", "tz" : "Asia/Dubai", "icao" : "OMAL", "lo
n" : "55.75", "direct_flights" : "12", "url" : "", "country" : "United Arab Emirates" }
{ "_id" : ObjectId("5abc05d6595614f200da5cff"), "woeid" : "12516605", "name" : "Olkhovka Airport", "email" : "", "lat" : "44.9", "type" : "Airports", "phone" : "",
 "elev" : null, "city" : "Novorossiysk", "carriers" : "15", "runway_length" : null, "code" : "AAQ", "state" : "Krasnodarskiy Kray", "tz" : "Europe/Moscow", "icao"
: "URKA", "lon" : "37.3167", "direct_flights" : "24", "url" : "", "country" : "Russia" }
{ "_id" : ObjectId("5abc05d6595614f200da5d00"), "woeid" : "12512604", "name" : "Tirstrup Airport", "email" : "", "lat" : "56.3088", "type" : "Airports", "phone" :
"+45 8775 7000", "elev" : "81", "city" : "Kolind", "carriers" : "8", "runway_length" : "9127", "code" : "AAR", "state" : "Midtjylland", "tz" : "Europe/Copenhagen",
 "icao" : "EKAH", "lon" : "10.6154", "direct_flights" : "9", "url" : "http://www.aar.dk", "country" : "Denmark" }
{ "_id" : ObjectId("5abc05d6595614f200da5d01"), "woeid" : "12511977", "name" : "Altay Airport", "email" : "", "lat" : "47.7406", "type" : "Airports", "phone" : "",
 "elev" : null, "city" : "Altay", "carriers" : "1", "runway_length" : null, "code" : "AAT", "state" : "Xinjiang", "tz" : "Asia/Urumqi", "icao" : "ZWAT", "lon" : "8
8.0845", "direct_flights" : "1", "url" : "", "country" : "China" }
{ "_id" : ObjectId("5abc05d6595614f200da5d02"), "woeid" : "12511034", "name" : "Romeu Zuma Airport", "email" : "", "lat" : "-19.5603", "type" : "Airports", "phone"
```

```
{ "_id" : ObjectId("5abc05d6595614f200da5d00"), "woeid" : "12512604", "name" : "Tirstrup Airport", "email" : "", "lat" : "56.3088", "type" : "Airports", "phone" :
"+45 8775 7000", "elev" : "81", "city" : "Kolind", "carriers" : "8", "runway_length" : "9127", "code" : "AAR", "state" : "Midtjylland", "tz" : "Europe/Copenhagen",
 "icao" : "EKAH", "lon" : "10.6154", "direct_flights" : "9", "url" : "http://www.aar.dk", "country" : "Denmark" }
{ "_id" : ObjectId("5abc05d6595614f200da5d01"), "woeid" : "12511977", "name" : "Altay Airport", "email" : "", "lat" : "47.7406", "type" : "Airports", "phone" : "",
 "elev" : null, "city" : "Altay", "carriers" : "1", "runway_length" : null, "code" : "AAT", "state" : "Xinjiang", "tz" : "Asia/Urumqi", "icao" : "ZWAT", "lon" : "8
8.0845", "direct_flights" : "1", "url" : "", "country" : "China" }
{ "_id" : ObjectId("5abc05d6595614f200da5d02"), "woeid" : "12511034", "name" : "Romeu Zuma Airport", "email" : "", "lat" : "-19.5603", "type" : "Airports", "phone"
: "", "elev" : "3274", "city" : "Araxá", "carriers" : "1", "runway_length" : "6230", "code" : "AAX", "state" : "Minas Gerais", "tz" : "America/Sao_Paulo", "icao"
: "SBAX", "lon" : "-46.9653", "direct_flights" : "2", "url" : "", "country" : "Brazil" }
{ "_id" : ObjectId("5abc05d6595614f200da5d03"), "woeid" : "12523000", "name" : "Al Gaidah Airport", "email" : "", "lat" : "16.1947", "type" : "Airports", "phone" :
 "", "elev" : "98", "city" : "Al Ghaydah", "carriers" : "2", "runway_length" : "8858", "code" : "AAY", "state" : "Hadramawt", "tz" : "Asia/Aden", "icao" : "OYGD",
"lon" : "52.1694", "direct_flights" : "3", "url" : "", "country" : "Yemen" }
{ "_id" : ObjectId("5abc05d6595614f200da5d04"), "woeid" : "2119917", "name" : "Abakan", "email" : "", "lat" : "53.7167", "type" : "Airports", "phone" : "", "elev"
: null, "city" : "Abakan", "carriers" : "3", "runway_length" : null, "code" : "ABA", "state" : "Khakasiya", "tz" : "Asia/Krasnoyarsk", "icao" : "UNAA", "lon" : "91
.4333", "direct_flights" : "4", "url" : "", "country" : "Russian Federation" }
{ "_id" : ObjectId("5abc05d6595614f200da5d05"), "woeid" : "20081243", "name" : "Los Llanos", "email" : "", "lat" : "38.9833", "type" : "Airports", "phone" : "", "e
lev" : null, "city" : "Albacete", "carriers" : "2", "runway_length" : null, "code" : "ABC", "state" : "Castilla-la Mancha", "tz" : "Europe/Madrid", "icao" : "LEAB
", "lon" : "-1.85", "direct_flights" : "3", "url" : "", "country" : "Spain" }
{ "_id" : ObjectId("5abc05d6595614f200da5d06"), "woeid" : "2254271", "name" : "", "email" : "", "lat" : "30.3374", "type" : "Airports", "phone" : "", "elev" : "10"
, "city" : "Abadan", "carriers" : "3", "runway_length" : "10170", "code" : "ABD", "state" : "Khuzestan", "tz" : "Asia/Tehran", "icao" : "OIAA", "lon" : "48.3032",
"direct_flights" : "5", "url" : "", "country" : "Iran" }
{ "_id" : ObjectId("5abc05d6595614f200da5d07"), "woeid" : "12518581", "name" : "Lehigh Valley International Airport", "email" : "", "lat" : "40.6514", "type" : "Ai
rports", "phone" : "610-266-6000", "elev" : null, "city" : "Allentown", "carriers" : "11", "runway_length" : null, "code" : "ABE", "state" : "Pennsylvania", "tz" :
 "America/New_York", "icao" : "KABE", "lon" : "-75.4342", "direct_flights" : "14", "url" : "http://www.lvia.org/", "country" : "United States" }
{ "_id" : ObjectId("5abc05d6595614f200da5d08"), "woeid" : "12518518", "name" : "Abilene Regional Airport", "email" : "", "lat" : "32.4164", "type" : "Airports", "p
hone" : "", "elev" : "1790", "city" : "Abilene", "carriers" : "4", "runway_length" : "7199", "code" : "ABI", "state" : "Texas", "tz" : "America/Chicago", "icao" :
"KABI", "lon" : "-99.6803", "direct_flights" : "2", "url" : "", "country" : "United States" }
{ "_id" : ObjectId("5abc05d6595614f200da5d09"), "woeid" : "12513870", "name" : "Abidjan Port Bouet Airport", "email" : "", "lat" : "5.2556", "type" : "Airports", "
phone" : "", "elev" : "20", "city" : "Abidjan", "carriers" : "29", "runway_length" : "8858", "code" : "ABJ", "state" : "Abidjan", "tz" : "Africa/Abidjan", "icao" :
 "DIAP", "lon" : "-3.9292", "direct_flights" : "22", "url" : "", "country" : "Ivory Coast" }
{ "_id" : ObjectId("5abc05d6595614f200da5d0a"), "woeid" : "1317686", "name" : "Kabri Dar", "email" : "", "lat" : "6.73719", "type" : "Airports", "phone" : "", "ele
v" : "1800", "city" : "Kabri Dar", "carriers" : "1", "runway_length" : "10935", "code" : "ABK", "state" : "Ogaden", "tz" : "Africa/Addis_Ababa", "icao" : "HAKD", "
lon" : "44.2797", "direct_flights" : "1", "url" : "", "country" : "Ethiopia" }
{ "_id" : ObjectId("5abc05d6595614f200da5d0b"), "woeid" : "12518600", "name" : "Ambler Airport", "email" : "", "lat" : "67.1058", "type" : "Airports", "phone" : ""
, "elev" : "289", "city" : "Kiana", "carriers" : "3", "runway_length" : "2600", "code" : "ABL", "state" : "Alaska", "tz" : "America/Anchorage", "icao" : "", "lon"
: "-157.854", "direct_flights" : "2", "url" : "", "country" : "United States" }
{ "_id" : ObjectId("5abc05d6595614f200da5d0c"), "woeid" : "12510598", "name" : "Bamaga Airport", "email" : "", "lat" : "-10.9438", "type" : "Airports", "phone" : "
", "elev" : "49", "city" : "Seisia", "carriers" : "1", "runway_length" : "6700", "code" : "ABM", "state" : "Queensland", "tz" : "Australia/Brisbane", "icao" : "YBA
M", "lon" : "142.453", "direct_flights" : "1", "url" : "", "country" : "Australia" }
{ "_id" : ObjectId("5abc05d6595614f200da5d0d"), "woeid" : "12518564", "name" : "Albuquerque International Airport", "email" : "", "lat" : "35.0494", "type" : "Airp
orts", "phone" : "", "elev" : "5352", "city" : "Albuquerque", "carriers" : "25", "runway_length" : "13375", "code" : "ABQ", "state" : "New Mexico", "tz" : "America
/Denver", "icao" : "KABQ", "lon" : "-106.625", "direct_flights" : "41", "url" : "", "country" : "United States" }
Type "it" for more
```

PHASE II (Implementing Mongo DB for the Mini Project 1)

- The first step in this process of implementing and using MongoDB in the Mini Project 1.
- The Mini Project 1 involves building of an API Library using Twitter API and Google Vision API.
- The API library, on being given a handle takes in the input as the twitter handle and then outputs a video containing images downloaded from the twitter handle and then annotates them, puts them in a video using ffmpeg with annotated landmarks using google vision API.
- In the implementation of MongoDB, python was used as the implementing language. The code combines the original API library along with additional instructions to take the twitter handle and pass information about all the downloaded content into the



Next we added the following script to our original project in order to enable it to push the command along with the twitter data of the handle we are downloading. All of this needs to go into our Mongo DB. We can see that the data gets appended in the Mongo database.

```
from pymongo import MongoClient
import json
from pprint import pprint

client = MongoClient()
client = MongoClient('localhost', 27017)
db = client.twitter_data
posts = db.posts

#file = open("airports.json","r")
#airports_data = json.load(file)
data = {
    "twitter handle": @jk_rowling,
    "tweets count": 100

}
posts.insert_one(data)
```

We can see from below that the data gets appended into the mongo database


```
 "Airports", "email" : "", "url" : "", "runway_length" : null, "elev" : null, "icao" : "U
NAA", "direct_flights" : "4", "carriers" : "3" }
{ "_id" : ObjectId("5abc33a63aebb50fd357446f"), "code" : "ABC", "lat" : "38.9833", "lon"
: "-1.85", "name" : "Los Llanos", "city" : "Albacete", "state" : "Castilla-la Mancha", "c
ountry" : "Spain", "woeid" : "20081243", "tz" : "Europe/Madrid", "phone" : "", "type" : "
Airports", "email" : "", "url" : "", "runway_length" : null, "elev" : null, "icao" : "LEA
B", "direct_flights" : "3", "carriers" : "2" }
{ "_id" : ObjectId("5abc33a63aebb50fd3574470"), "code" : "ABD", "lat" : "30.3374", "lon"
: "48.3032", "name" : "", "city" : "Abadan", "state" : "Khuzestan", "country" : "Iran", "
woeid" : "2254271", "tz" : "Asia/Tehran", "phone" : "", "type" : "Airports", "email" : ""
, "url" : "", "runway_length" : "10170", "elev" : "10", "icao" : "OIAA", "direct_flights"
 : "5", "carriers" : "3" }
{ "_id" : ObjectId("5abc33a63aebb50fd3574471"), "code" : "ABE", "lat" : "40.6514", "lon"
: "-75.4342", "name" : "Lehigh Valley International Airport", "city" : "Allentown", "stat
e" : "Pennsylvania", "country" : "United States", "woeid" : "12518581", "tz" : "America/N
ew_York", "phone" : "610-266-6000", "type" : "Airports", "email" : "", "url" : "http://ww
w.lvia.org/", "runway_length" : null, "elev" : null, "icao" : "KABE", "direct_flights" :
"14", "carriers" : "11" }
{ "_id" : ObjectId("5abc33a63aebb50fd3574472"), "code" : "ABI", "lat" : "32.4164", "lon"
: "-99.6803", "name" : "Abilene Regional Airport", "city" : "Abilene", "state" : "Texas",
 "country" : "United States", "woeid" : "12518518", "tz" : "America/Chicago", "phone" : "
", "type" : "Airports", "email" : "", "url" : "", "runway_length" : "7199", "elev" : "179
0", "icao" : "KABI", "direct_flights" : "2", "carriers" : "4" }
{ "_id" : ObjectId("5abc33a63aebb50fd3574473"), "code" : "ABJ", "lat" : "5.2556", "lon" :
 "-3.9292", "name" : "Abidjan Port Bouet Airport", "city" : "Abidjan", "state" : "Abidjan
", "country" : "Ivory Coast", "woeid" : "12513870", "tz" : "Africa/Abidjan", "phone" : ""
, "type" : "Airports", "email" : "", "url" : "", "runway_length" : "8858", "elev" : "20",
 "icao" : "DIAP", "direct_flights" : "22", "carriers" : "29" }
{ "_id" : ObjectId("5abc33a63aebb50fd3574474"), "code" : "ABK", "lat" : "6.73719", "lon"
: "44.2797", "name" : "Kabri Dar", "city" : "Kabri Dar", "state" : "Ogaden", "country" :
"Ethiopia", "woeid" : "1317686", "tz" : "Africa/Addis_Ababa", "phone" : "", "type" : "Air
ports", "email" : "", "url" : "", "runway_length" : "10935", "elev" : "1800", "icao" : "H
AKD", "direct_flights" : "1", "carriers" : "1" }
{ "_id" : ObjectId("5abc33a63aebb50fd3574475"), "code" : "ABL", "lat" : "67.1058", "lon"
: "-157.854", "name" : "Ambler Airport", "city" : "Kiana", "state" : "Alaska", "country"
: "United States", "woeid" : "12518600", "tz" : "America/Anchorage", "phone" : "", "type"
 : "Airports", "email" : "", "url" : "", "runway_length" : "2600", "elev" : "289", "icao"
 : "", "direct_flights" : "2", "carriers" : "3" }
{ "_id" : ObjectId("5abc33a63aebb50fd3574476"), "code" : "ABM", "lat" : "-10.9438", "lon"
 : "142.453", "name" : "Bamaga Airport", "city" : "Seisia", "state" : "Queensland", "coun
try" : "Australia", "woeid" : "12510598", "tz" : "Australia/Brisbane", "phone" : "", "typ
e" : "Airports", "email" : "", "url" : "", "runway_length" : "6700", "elev" : "49", "icao
" : "YBAM", "direct_flights" : "1", "carriers" : "1" }
```


This concludes Phase II of the Database Mini project.

Comparison with SQL:

I implemented the Phase I of the Database Project with SQL as well. However, the flexibility that the Mongo database offers is missing from SQL.

For importing airports.json data into MongoDB, all that was required was a python script. However, for SQL, first we had to convert the data into that data representation for SQL which requires a row and column format. All you need to do in Mongo DB is drop the documents without defining any schema.

However, in SQL, it is much easier to fetch data because of the ease in relational queries especially the JOIN operation.

MongoDB's performance is better than that of SQL in terms of speed.

However, to test scalability, the airports.json file was not enough. The dependability and the long time for which SQL has been used by large enterprises suggests that it's reliability in terms of scalability is greater.