

CS-5513 Advance Database Management

Homework 3

Submitted By

Shyam Sundar Murali Krishnan

shyamkrishnan@ou.edu

113475983

- a) This dataset should have a size of at least 50 entries. Once you generate this dataset, print out its first 5 entries.

The screenshot shows the PyCharm IDE interface. The project navigation bar at the top lists 'File', 'Edit', 'View', 'Navigate', 'Code', 'Refactor', 'Run', 'Tools', 'VCS', 'Window', 'Help', and 'Homeworks - txt_parser.py'. Below the navigation bar is a toolbar with icons for file operations like 'New', 'Open', 'Save', and 'Run'. The main workspace shows a 'txt_parser.py' file open, which contains the following code:

```
import json
import ast
import pandas as pd
f = open("MovieData.txt", "r")
file1 = f.read()
file_list = ast.literal_eval(file1)
with open('movieData.json', 'w') as s:
    json.dump(file_list, s)
dataset = pd.read_json('movieData.json')
print(dataset.head(5))
```

Below the code editor is a terminal window titled 'Local' showing the command 'python txt_parser.py' being run and the resulting output:

```
Requirement already satisfied: pytz>=2017.2 in c:\users\shyam\anaconda3\lib\site-packages (from pandas) (2020.1)
Requirement already satisfied: six>=1.5 in c:\users\shyam\anaconda3\lib\site-packages (from python-dateutil>=2.7.3->pandas) (1.15.0)

(base) E:\Adbms\Homeworks>python txt_parser.py
```

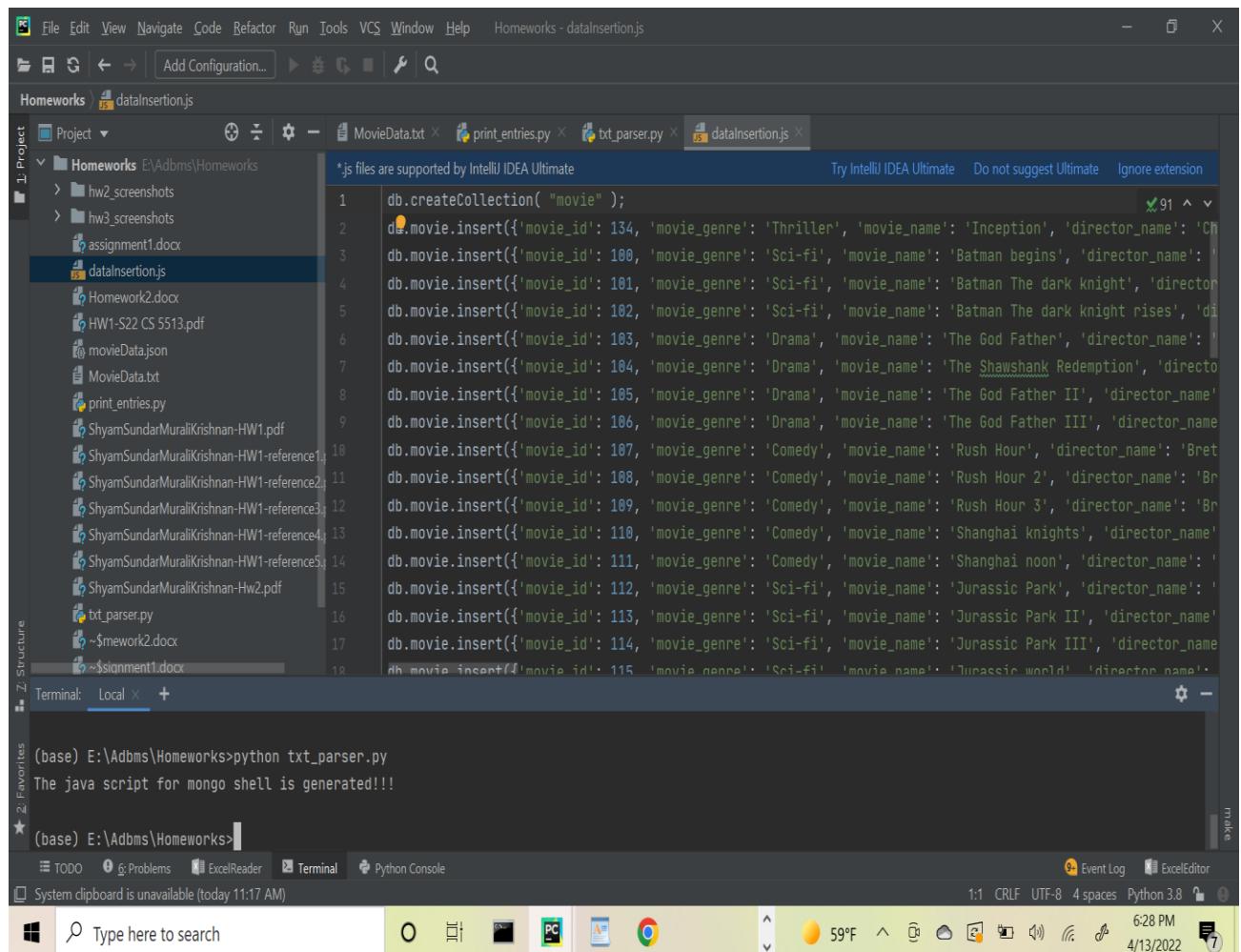
The terminal then displays the first 5 rows of the dataset as a pandas DataFrame:

	movie_id	movie_genre	movie_name	budget	gross	review
0	134	Thriller	Inception	160	830	[[65, 134, [11, 8, 2010, 12:56:58], This is th...
1	100	Sci-fi	Batman begins	100	500	[[15, 100, [16, 6, 2005, 12:56:58], Best super...
2	101	Sci-fi	Batman The dark knight	200	900	[[65, 101, [16, 6, 2008, 18:50:51], heath ledg...
3	102	Sci-fi	Batman The dark knight rises	300	1000	[[15, 102, [16, 9, 2012, 11:00:00], Too long o...
4	103	Drama	The God Father	10	100	[[53, 103, [16, 9, 1972, 11:00:00], Deserves a...

[5 rows x 14 columns]

At the bottom of the PyCharm interface, there are tabs for 'TODO', 'Problems', 'ExcelReader', 'Terminal', 'Python Console', 'Event Log', 'ExcelEditor', and a status bar showing '10:17 CRLF UTF-8 4 spaces Python 3.8' and the date '4/13/2022'.

- b) write a program ‘txt_parser’ that takes your dataset file movieData.txt as input, and then generates a MongoDB script named ‘dataInsertion.js’ that contains the “MongoDB commands” to create the collection(s) that implement the database**



The screenshot shows the IntelliJ IDEA Ultimate interface. The code editor displays a MongoDB script named `dataInsertion.js` which contains numerous `db.movie.insert()` statements for creating documents in a `movie` collection. The terminal window shows the command `python txt_parser.py` was run, and the output indicates that a Java script for the mongo shell was generated successfully. The system tray at the bottom right shows the date as 4/13/2022, time as 6:28 PM, and battery level at 59%.

```

1 db.createCollection( "movie" );
2 db.movie.insert({ movie_id: 134, movie_genre: 'Thriller', movie_name: 'Inception', director_name: 'Christopher Nolan' });
3 db.movie.insert({ movie_id: 100, movie_genre: 'Sci-fi', movie_name: 'Batman begins', director_name: 'Christopher Nolan' });
4 db.movie.insert({ movie_id: 101, movie_genre: 'Sci-fi', movie_name: 'Batman The dark knight', director_name: 'Christopher Nolan' });
5 db.movie.insert({ movie_id: 102, movie_genre: 'Sci-fi', movie_name: 'Batman The dark knight rises', director_name: 'Christopher Nolan' });
6 db.movie.insert({ movie_id: 103, movie_genre: 'Drama', movie_name: 'The God Father', director_name: 'Francis Ford Coppola' });
7 db.movie.insert({ movie_id: 104, movie_genre: 'Drama', movie_name: 'The Shawshank Redemption', director_name: 'Frank Darabont' });
8 db.movie.insert({ movie_id: 105, movie_genre: 'Drama', movie_name: 'The God Father II', director_name: 'Francis Ford Coppola' });
9 db.movie.insert({ movie_id: 106, movie_genre: 'Drama', movie_name: 'The God Father III', director_name: 'Francis Ford Coppola' });
10 db.movie.insert({ movie_id: 107, movie_genre: 'Comedy', movie_name: 'Rush Hour', director_name: 'Brett Ratner' });
11 db.movie.insert({ movie_id: 108, movie_genre: 'Comedy', movie_name: 'Rush Hour 2', director_name: 'Brett Ratner' });
12 db.movie.insert({ movie_id: 109, movie_genre: 'Comedy', movie_name: 'Rush Hour 3', director_name: 'Brett Ratner' });
13 db.movie.insert({ movie_id: 110, movie_genre: 'Comedy', movie_name: 'Shanghai Knights', director_name: 'Stephen Herek' });
14 db.movie.insert({ movie_id: 111, movie_genre: 'Comedy', movie_name: 'Shanghai noon', director_name: 'Stephen Herek' });
15 db.movie.insert({ movie_id: 112, movie_genre: 'Sci-fi', movie_name: 'Jurassic Park', director_name: 'Steven Spielberg' });
16 db.movie.insert({ movie_id: 113, movie_genre: 'Sci-fi', movie_name: 'Jurassic Park II', director_name: 'Steve Conrad' });
17 db.movie.insert({ movie_id: 114, movie_genre: 'Sci-fi', movie_name: 'Jurassic Park III', director_name: 'Steve Conrad' });
18 db.movie.insert({ movie_id: 115, movie_genre: 'Sci-fi', movie_name: 'Jurassic world', director_name: 'J. A. Bayona' });

```

c) Populate your MongoDB database by running 'dataInsertion.js' at the MongoDB shell.

```
mura0007@gmail.com: ~

Enable MongoDB's free cloud-based monitoring service, which will then receive 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 accessible to you
and anyone you share the URL with. 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()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()

> db.movie.find({})
> db.movie.find({})
> db.movie.find({"director_name": "Christopher Nolan"})
> use mydb
switched to db mydb
> db.movie.find({})
> db.movie.find({})

{
  "_id": ObjectId("6257654c0c3a2c4eb275e4c7"),
  "movie_id": 134,
  "movie_genre": "Thriller",
  "movie_name": "Inception",
  "director_name": "Christopher Nolan",
  "producers": [
    {"Emma Thomas", "Christopher Nolan"]
  ],
  "studio_name": "Warner Bros",
  "release_date": [10, 7, 2010],
  "duration": 148,
  "similar_movies": [
    ["The Matrix", "Source Code", "Shutter Island"],
    {
      "avg_rating": 9.1,
      "plot": "Protagonist Dom needs to invade peoples dreams for him secure his freedom"
    },
    {
      "budget": 160,
      "gross": 830,
      "review": [
        [65, 134, [11, 8, 2010, "12:56:58"]],
        "This is the greatest thriller that is ever made"
      ],
      "id": ObjectId("6257654c0c3a2c4eb275e4c8")
    }
  ],
  "movie_id": 100,
  "movie_genre": "Sci-fi",
  "movie_name": "Batman begins",
  "director_name": "Christopher Nolan",
  "producers": [
    {"Emma Thomas", "Christopher Nolan"]
  ],
  "studio_name": "Warner Bros",
  "release_date": [15, 6, 2005],
  "duration": 150,
  "similar_movies": [
    ["The Matrix", "Man of steel"],
    {
      "avg_rating": 8,
      "plot": "The prince of Gotham tries to avenge his parents death by fighting the crime in cape",
      "budget": 100,
      "gross": 500,
      "review": [
        [15, 100, [16, 6, 2005, "12:56:58"]],
        "Best super hero movie seen"
      ],
      "id": ObjectId("6257654c0c3a2c4eb275e4c9")
    }
  ],
  "movie_id": 101,
  "movie_genre": "Sci-fi",
  "movie_name": "Batman The dark knight",
  "director_name": "Christopher Nolan",
  "producers": [
    {"Emma Thomas", "Christopher Nolan"]
  ],
  "studio_name": "Warner Bros",
  "release_date": [15, 6, 2008],
  "duration": 170,
  "similar_movies": [
    ["Avengers", "Man of steel"],
    {
      "avg_rating": 9,
      "plot": "The batman has taunting task of fighting the joker",
      "budget": 200,
      "gross": 900,
      "review": [
        [65, 101, [16, 6, 2008, "18:50:51"]],
        "heath ledger steals the show"
      ],
      "id": ObjectId("6257654c0c3a2c4eb275e4ca")
    }
  ],
  "movie_id": 102,
  "movie_genre": "Sci-fi",
  "movie_name": "Batman The dark knight rises",
  "director_name": "Christopher Nolan",
  "producers": [
    {"Emma Thomas", "Christopher Nolan"]
  ],
  "studio_name": "Warner Bros",
  "release_date": [15, 9, 2012],
  "duration": 180,
  "similar_movies": [
    ["Blade", "Man of steel"],
    {
      "avg_rating": 7.8,
      "plot": "The cape crusaders final fight to save Gotham from a mercenary",
      "budget": 300,
      "gross": 1000,
      "review": [
        [15, 102, [16, 9, 2012, "11:00:00"]],
        "Too long of a struggle"
      ],
      "id": ObjectId("6257654c0c3a2c4eb275e4cb")
    }
  ],
  "movie_id": 103,
  "movie_genre": "Drama",
  "movie_name": "The God Father",
  "director_name": "Francis Ford Coppola",
  "producers": [
    {"Mario Puzo", "Francis Ford Coppola"]
  ],
  "studio_name": "Paramount",
  "release_date": [20, 1, 1972],
  "duration": 150,
  "similar_movies": [
    ["The Shawshank Redemption", "Pulp Fiction"],
    {
      "avg_rating": 9.1,
      "plot": "The aging patriarch transfers control of his clandestine empire to his reluctant youngest son",
      "budget": 10,
      "gross": 100,
      "review": [
        [53, 103, [16, 9, 1972, "11:00:00"]],
        "Deserves an Oscar"
      ],
      "id": ObjectId("6257654c0c3a2c4eb275e4cc")
    }
  ],
  "movie_id": 104,
  "movie_genre": "Drama",
  "movie_name": "The Shawshank Redemption",
  "director_name": "Frank Darabont",
  "producers": [
    {"Stephen King", "Frank Darabont"]
  ],
  "studio_name": "Warner Bros",
  "release_date": [18, 5, 1994],
  "duration": 140,
  "similar_movies": [
    ["God Father", "Pulp Fiction"],
    {
      "avg_rating": 8.8,
      "plot": "Two imprisoned men finding solace and eventual redemption through acts of common decency",
      "budget": 80,
      "gross": 200,
      "review": [
        [18, 104, [15, 6, 1994, "12:00:00"]],
        "The true redemption movie"
      ],
      "id": ObjectId("6257654c0c3a2c4eb275e4cd")
    }
  ],
  "movie_id": 105,
  "movie_genre": "Drama",
  "movie_name": "The God Father II",
  "director_name": "Francis Ford Coppola",
  "producers": [
    {"Mario Puzo", "Francis Ford Coppola"]
  ],
  "studio_name": "Paramount",
  "release_date": [20, 1, 1974],
  "duration": 220,
  "similar_movies": [
    ["The Shawshank Redemption", "The God Father"],
    {
      "avg_rating": 9.1,
      "plot": "The early life and career of Vito Corleone in 1920s New York City"
    }
  ]
}
```

d) Implement the five queries (1-5)

Query 1:

```
mura0007@gmail.com - Type here to search 7:39 PM 4/13/2022

e", "producers": [ "Melissa Rosenberg", "Stephenie Meyer" ], "studio_name": "Summit Entertainment", "release_date": [ 16, 1, 2008 ], "duration": 122, "similar_movies": [ "Titanic", "Godzilla" ], "avg_rating": 5.8, "plot": "When Bella Swan moves to a small town in the Pacific Northwest, she falls in love with Edward Cullen, a mysterious classmate who reveals himself to be a 108-year-old vampire.", "budget": 200, "gross": 500, "review": [ [ 18, 144, [ 31, 5, 2008, "12:00:00" ], "A well made romantic drama", 5.8 ] ] }
    { "id": ObjectId("6257654c03a2c4eb275e4f4") }, "movie_id": 145, "movie_genre": "Romance", "movie_name": "Twilight 2", "director_name": "Catherine Hardwicke", "producers": [ "Melissa Rosenberg", "Stephenie Meyer" ], "studio_name": "Summit Entertainment", "release_date": [ 16, 1, 2009 ], "duration": 130, "similar_movies": [ "Titanic", "Godzilla" ], "avg_rating": 4.7, "plot": "Edward leaves Bella after an attack that nearly claimed her life, and, in her depression, she falls into yet another difficult relationship - this time with her close friend, Jacob Black.", "budget": 200, "gross": 500, "review": [ [ 18, 145, [ 31, 5, 2009, "12:00:00" ], "A well made romantic drama", 4.7 ] ] }
    { "id": ObjectId("6257654c03a2c4eb275e4f5") }, "movie_id": 146, "movie_genre": "Romance", "movie_name": "Twilight 3", "director_name": "Catherine Hardwicke", "producers": [ "Melissa Rosenberg", "Stephenie Meyer" ], "studio_name": "Summit Entertainment", "release_date": [ 16, 1, 2010 ], "duration": 124, "similar_movies": [ "Titanic", "Godzilla" ], "avg_rating": 5, "plot": "As a string of mysterious killings grips Seattle, Bella, whose high school graduation is fast approaching, is forced to choose between her love for vampire Edward and her friendship with werewolf Jacob.", "budget": 200, "gross": 500, "review": [ [ 18, 146, [ 31, 5, 2010, "12:00:00" ], "A well made romantic drama", 4.7 ] ] }
    { "id": ObjectId("6257654c03a2c4eb275e4f6") }, "movie_id": 147, "movie_genre": "Romance", "movie_name": "Twilight 4", "director_name": "Catherine Hardwicke", "producers": [ "Melissa Rosenberg", "Stephenie Meyer" ], "studio_name": "Summit Entertainment", "release_date": [ 16, 1, 2011 ], "duration": 117, "similar_movies": [ "Titanic", "Godzilla" ], "avg_rating": 5, "plot": "The Quileutes close in on expecting parents Edward and Bella, whose unborn child poses a threat to the Wolf Pack and the towns people of Forks.", "budget": 200, "gross": 500, "review": [ [ 18, 147, [ 31, 5, 2011, "12:00:00" ], "A well made romantic drama", 4.9 ] ] }
    { "id": ObjectId("6257654c03a2c4eb275e4f7") }, "movie_id": 148, "movie_genre": "Romance", "movie_name": "Twilight 5", "director_name": "Catherine Hardwicke", "producers": [ "Melissa Rosenberg", "Stephenie Meyer" ], "studio_name": "Summit Entertainment", "release_date": [ 16, 1, 2012 ], "duration": 115, "similar_movies": [ "Titanic", "Godzilla" ], "avg_rating": 5.6, "plot": "After the birth of Renesmee/Nessie, the Cullens gather other vampire clans in order to protect the child from a false allegation that puts the family in front of the Volturi.", "budget": 200, "gross": 500, "review": [ [ 18, 148, [ 31, 5, 2012, "12:00:00" ], "A well made romantic drama", 5.9 ] ] }
    { "id": ObjectId("6257654c03a2c4eb275e4f8") }, "movie_id": 149, "movie_genre": "Romance", "movie_name": "Twilight 6", "director_name": "Catherine Hardwicke", "producers": [ "Melissa Rosenberg", "Stephenie Meyer" ], "studio_name": "Summit Entertainment", "release_date": [ 16, 1, 2014 ], "duration": 115, "similar_movies": [ "Titanic", "Godzilla" ], "avg_rating": 5.6, "plot": "After the birth of Renesmee/Nessie, the Cullens gather other vampire clans in order to protect the child from a false allegation that puts the family in front of the Volturi.", "budget": 200, "gross": 500, "review": [ [ 18, 149, [ 31, 5, 2012, "12:00:00" ], "A well made romantic drama", 5 ] ] }

> use mydb
switched to db mydb
> db.movie.insert({ 'movie_id': 150, 'movie_genre': 'Thriller', 'movie_name': 'Pulp fiction', 'director_name': 'Catherine Hardwicke', 'producers': ['Melissa Rosenberg', 'Stephenie Meyer'], 'studio_name': 'Summit Entertainment', 'release_date': [16, 1, 1980], 'duration': 115, 'similar_movies': ['Titanic', 'Godzilla'], 'avg_rating': 8.8, 'plot': "After the birth of Renesmee/Nessie, the Cullens gather other vampire clans in order that puts the family in front of the Volturi.", 'budget': 50, 'gross': 200, 'review': [[18, 150, [31, 5, 1980, '12:00:00']], 'A well made romantic drama', 9.0]}));
WriteResult({ "nInserted": 1 })
> db.movie.find({ 'movie_name': 'Pulp fiction' })
{ "_id": ObjectId("625765ce39d25c487d6a22e3e"), "movie_id": 150, "movie_genre": "Thriller", "movie_name": "Pulp fiction", "director_name": "Catherine Hardwicke", "producers": [ "Melissa Rosenberg", "Stephenie Meyer" ], "studio_name": "Summit Entertainment", "release_date": [ 16, 1, 1980 ], "duration": 115, "similar_movies": [ "Titanic", "Godzilla" ], "avg_rating": 8.8, "plot": "After the birth of Renesmee/Nessie, the Cullens gather other vampire clans in order to protect the child from a false allegation that puts the family in front of the Volturi.", "budget": 50, "gross": 200, "review": [ [ 18, 150, [ 31, 5, 1980, "12:00:00" ], "A well made romantic drama", 9 ] ] }
> 
```

Query 2:

Query 3:

Query 4:

Query 5:

- e) Implement the change by inserting two new movies into the existing MongoDB collection with their complete information along with the names of their actors

Inserting first movie:

Inserting second movie:

f) Design a suitable replication scheme to answer your queries.

In this case three machines are used for replications namely [gpel9.cs.nor.ou.edu](#), [gpel10.cs.nor.ou.edu](#), [gpel11.cs.nor.ou.edu](#). The gpel 9 machine is the primary node whereas gpel 10 and 11 is the secondary node.

The method to do this replication is as follows

1. mkdir -p ~/data/gpel9 at gpel9 machine.
 2. mkdir -p ~/data/gpel10 at gpel10 machine.
 3. mkdir -p ~/data/gpel11 at gpel11 machine.
 4. chown mura0007 ~/data/gpel9
 5. chown mura0007 ~/data/gpel10
 6. chown mura0007 ~/data/gpel11
 7. mongod --fork --dbpath ~/data/gpel9/ --port 25983 --logpath mongodb.log --replSet myDBReplicaSet --bind_ip_all
 8. mongod --fork --dbpath ~/data/gpel10/ --port 25983 --logpath mongodb.log --replSet myDBReplicaSet --bind_ip_all
 9. mongod --fork --dbpath ~/data/gpel11/ --port 25983 --logpath mongodb.log --replSet myDBReplicaSet --bind_ip_all
 10. Now in the primary instance in this case gpel 9 these commands are executed which is Mongo -host gpel9.cs.nor.ou.edu –port 25983 mydb

```
> rs.initiate({ _id: "myDBReplicaSet", version: 1, members: [{ _id: 0, host : "gpel9.cs.nor.ou.edu:25983" }, { _id: 1, host : "gpel10.cs.nor.ou.edu:25983" }, { _id: 2, host : "gpel11.cs.nor.ou.edu:25983" } ]})
```

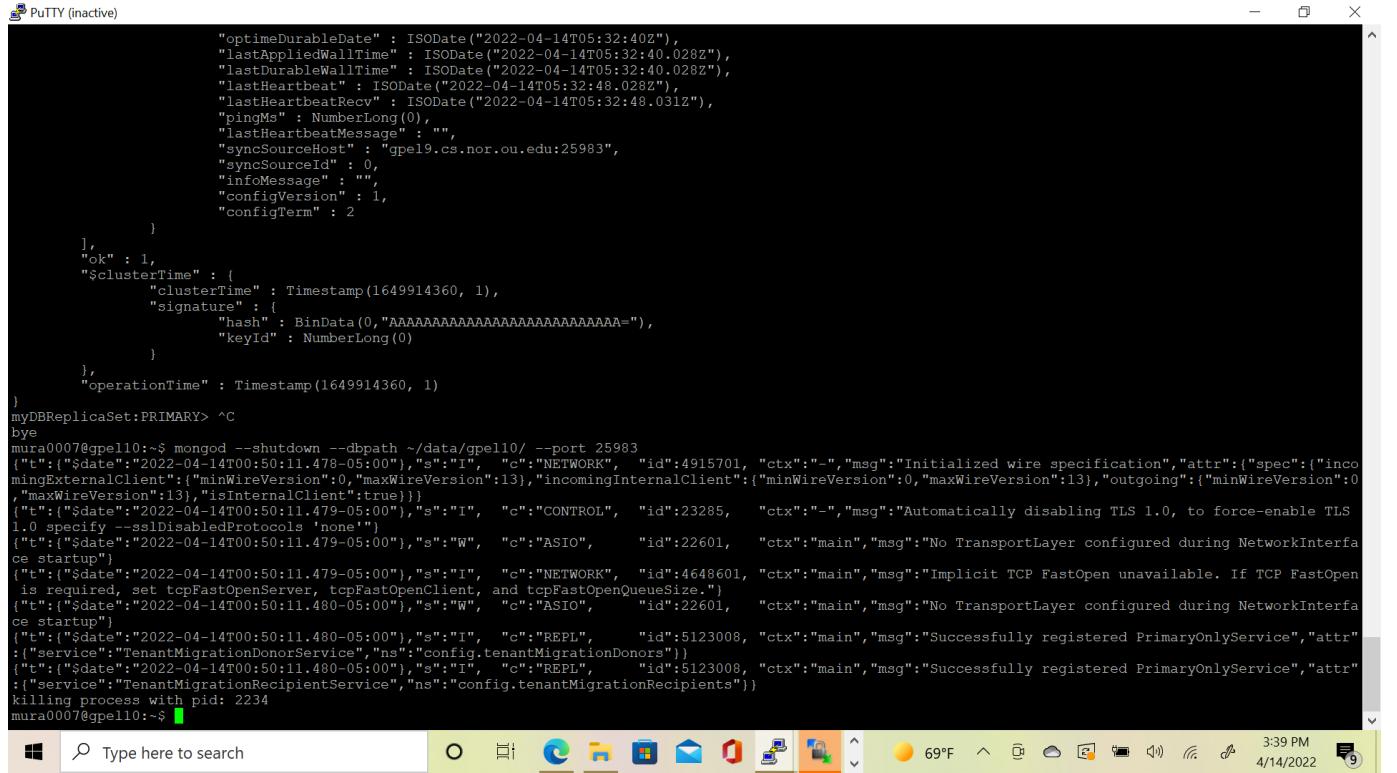
11. Now type `rs.status()` in the secondary replica set.

```
mura0007@gpel10:~ and anyone you share the URL with. 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()  
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()  
---  
myDBReplicaSet:SECONDARY> rs.status()  
{  
    "set" : "myDBReplicaSet",  
    "date" : ISODate("2022-04-14T05:13:41.570Z"),  
    "myState" : 2,  
    "term" : NumberLong(1),  
    "syncSourceHost" : "gpel9.cs.nor.ou.edu:25983",  
    "syncSourceId" : 0,  
    "heartbeatIntervalMillis" : NumberLong(2000),  
    "majorityVoteCount" : 2,  
    "writeMajorityCount" : 2,  
    "votingMembersCount" : 3,  
    "writableVotingMembersCount" : 3,  
    "optimes" : {  
        "lastCommittedOpTime" : {  
            "ts" : Timestamp(1649913218, 1),  
            "t" : NumberLong(1)  
        },  
        "lastCommittedWallTime" : ISODate("2022-04-14T05:13:38.937Z"),  
        "readConcernMajorityOpTime" : {  
            "ts" : Timestamp(1649913218, 1),  
            "t" : NumberLong(1)  
        },  
        "appliedOpTime" : {  
            "ts" : Timestamp(1649913218, 1),  
            "t" : NumberLong(1)  
        },  
        "durableOpTime" : {  
            "ts" : Timestamp(1649913218, 1),  
            "t" : NumberLong(1)  
        },  
        "lastAppliedWallTime" : ISODate("2022-04-14T05:13:38.937Z"),  
        "lastDurableWallTime" : ISODate("2022-04-14T05:13:38.937Z")  
    },  
    "lastStableRecoveryTimestamp" : Timestamp(1649913168, 1),  
    "electionParticipantMetrics" : {  
        "votedForCandidate" : true,  
        "electionTerm" : NumberLong(1),  
    },  
    "votedForCandidate" : true,  
    "electionTerm" : NumberLong(1),  
},  
Type here to search 12:13 AM  
mura0007@gpel11:~  
and anyone you share the URL with. 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()  
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()  
---  
myDBReplicaSet:SECONDARY> rs.status()  
{  
    "set" : "myDBReplicaSet",  
    "date" : ISODate("2022-04-14T05:15:40.580Z"),  
    "myState" : 2,  
    "term" : NumberLong(1),  
    "syncSourceHost" : "gpel9.cs.nor.ou.edu:25983",  
    "syncSourceId" : 0,  
    "heartbeatIntervalMillis" : NumberLong(2000),  
    "majorityVoteCount" : 2,  
    "writeMajorityCount" : 2,  
    "votingMembersCount" : 3,  
    "writableVotingMembersCount" : 3,  
    "optimes" : {  
        "lastCommittedOpTime" : {  
            "ts" : Timestamp(1649913338, 1),  
            "t" : NumberLong(1)  
        },  
        "lastCommittedWallTime" : ISODate("2022-04-14T05:15:38.943Z"),  
        "readConcernMajorityOpTime" : {  
            "ts" : Timestamp(1649913338, 1),  
            "t" : NumberLong(1)  
        },  
        "appliedOpTime" : {  
            "ts" : Timestamp(1649913338, 1),  
            "t" : NumberLong(1)  
        },  
        "durableOpTime" : {  
            "ts" : Timestamp(1649913338, 1),  
            "t" : NumberLong(1)  
        },  
        "lastAppliedWallTime" : ISODate("2022-04-14T05:15:38.943Z"),  
        "lastDurableWallTime" : ISODate("2022-04-14T05:15:38.943Z")  
    },  
    "lastStableRecoveryTimestamp" : Timestamp(1649913278, 2),  
    "electionParticipantMetrics" : {  
        "votedForCandidate" : true,  
        "electionTerm" : NumberLong(1),  
    },  
    "votedForCandidate" : true,  
    "electionTerm" : NumberLong(1),  
},  
Type here to search 12:15 AM  
4/14/2022
```

g) Simple simulation of the failure of the primary node

In this experiment I have gpel 10 as the primary code and other two nodes as secondary namely 9 and 11. To kill the primary process the following command is executed on primary machine in my case is gpel 10.

```
mongod --shutdown --dbpath ~/data/gpel10/ --port 25983
```



The screenshot shows a PuTTY session titled "PuTTY (inactive)". The terminal window displays the following text:

```
optimeDurability : ISODate("2022-04-14T05:32:40Z"),
lastAppliedWallTime : ISODate("2022-04-14T05:32:40.028Z"),
lastDurableWallTime : ISODate("2022-04-14T05:32:40.028Z"),
lastHeartbeat : ISODate("2022-04-14T05:32:48.028Z"),
lastHeartbeatRecv : ISODate("2022-04-14T05:32:48.031Z"),
pingMs : NumberLong(0),
lastHeartbeatMessage : "",
syncSourceHost : "gpel9.cs.nor.ou.edu:25983",
syncSourceId : 0,
syncSourceVersion : 0,
infoMessage : "",
configVersion : 1,
configTerm : 2
],
"ok" : 1,
"$clusterTime" : {
"clusterTime" : Timestamp(1649914360, 1),
"signature" : {
"hash" : BinData(0, "AAAAAAAAAAAAAAAAAAAAA="),
"keyId" : NumberLong(0)
}
},
"operationTime" : Timestamp(1649914360, 1)
}
myDBReplicaSet:PRIMARY> ^C
bye
mura0007@gpel10:~$ mongod --shutdown --dbpath ~/data/gpel10/ --port 25983
{"t": {"$date": "2022-04-14T00:50:11.478-05:00"}, "s": "I", "c": "NETWORK", "id": 4915701, "ctx": "-", "msg": "Initialized wire specification", "attr": {"spec": {"incomingExternalClient": {"minWireVersion": 0, "maxWireVersion": 13}, "incomingInternalClient": {"minWireVersion": 0, "maxWireVersion": 13}, "outgoing": {"minWireVersion": 0, "maxWireVersion": 13}, "isInternalClient": true}}}
{"t": {"$date": "2022-04-14T00:50:11.479-05:00"}, "s": "I", "c": "CONTROL", "id": 23285, "ctx": "-", "msg": "Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t": {"$date": "2022-04-14T00:50:11.479-05:00"}, "s": "W", "c": "ASIO", "id": 22601, "ctx": "main", "msg": "No TransportLayer configured during NetworkInterface startup"}
{"t": {"$date": "2022-04-14T00:50:11.479-05:00"}, "s": "I", "c": "NETWORK", "id": 4648601, "ctx": "main", "msg": "Implicit TCP FastOpen unavailable. If TCP FastOpen is required, set tcpFastOpenServer, tcpFastOpenClient, and tcpFastOpenQueueSize."}
{"t": {"$date": "2022-04-14T00:50:11.480-05:00"}, "s": "W", "c": "ASIO", "id": 22601, "ctx": "main", "msg": "No TransportLayer configured during NetworkInterface startup"}
{"t": {"$date": "2022-04-14T00:50:11.480-05:00"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "main", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationDonorService", "ns": "config.tenantMigrationDonors"}}
{"t": {"$date": "2022-04-14T00:50:11.480-05:00"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "main", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationRecipientService", "ns": "config.tenantMigrationRecipients"}}
killing process with pid: 2234
mura0007@gpel10:~$
```

The rs.status() after shutdown is done.

```
PuTTY (inactive)
{
    "electionCandidateMemberId" : 1,
    "voteReason" : "",
    "lastAppliedOpTimeAtElection" : {
        "ts" : Timestamp(1649914329, 1),
        "t" : NumberLong(1)
    },
    "maxAppliedOpTimeInSet" : {
        "ts" : Timestamp(1649914329, 1),
        "t" : NumberLong(1)
    },
    "priorityAtElection" : 1
},
"members" : [
    {
        "_id" : 0,
        "name" : "gpel9.cs.nor.ou.edu:25983",
        "health" : 1,
        "state" : 1,
        "stateStr" : "PRIMARY",
        "uptime" : 3662,
        "optime" : {
            "ts" : Timestamp(1649915431, 1),
            "t" : NumberLong(3)
        },
        "optimeDate" : ISODate("2022-04-14T05:50:31Z"),
        "lastAppliedWallTime" : ISODate("2022-04-14T05:50:31.495Z"),
        "lastDurableWallTime" : ISODate("2022-04-14T05:50:31.495Z"),
        "syncSourceHost" : "",
        "syncSourceId" : -1,
        "infoMessage" : "",
        "electionTime" : Timestamp(1649915411, 1),
        "electionDate" : ISODate("2022-04-14T05:50:11Z"),
        "configVersion" : 1,
        "configTerm" : 3,
        "self" : true,
        "lastHeartbeatMessage" : ""
    },
    {
        "_id" : 1,
        "name" : "gpel10.cs.nor.ou.edu:25983",
        "health" : 0,
        "state" : 8,
        "stateStr" : "(not reachable/healthy)",
        "uptime" : 0,
        "optime" : {
            "ts" : NumberLong(3)
        },
        "optimeDate" : ISODate("2022-04-14T05:50:31Z"),
        "lastAppliedWallTime" : ISODate("2022-04-14T05:50:31.495Z"),
        "lastDurableWallTime" : ISODate("2022-04-14T05:50:31.495Z"),
        "syncSourceHost" : "",
        "syncSourceId" : -1,
        "infoMessage" : "",
        "electionTime" : Timestamp(1649915411, 1),
        "electionDate" : ISODate("2022-04-14T05:50:11Z"),
        "configVersion" : 1,
        "configTerm" : 3,
        "self" : true,
        "lastHeartbeatMessage" : ""
    }
],
"t" : NumberLong(3),
"optimeDate" : ISODate("2022-04-14T05:50:31Z"),
"lastAppliedWallTime" : ISODate("2022-04-14T05:50:31.495Z"),
"lastDurableWallTime" : ISODate("2022-04-14T05:50:31.495Z"),
"syncSourceHost" : "",
"syncSourceId" : -1,
"infoMessage" : "",
"electionTime" : Timestamp(1649915411, 1),
"electionDate" : ISODate("2022-04-14T05:50:11Z"),
"configVersion" : 1,
"configTerm" : 3,
"self" : true,
"lastHeartbeatMessage" : ""}

{
    "_id" : 1,
    "name" : "gpel10.cs.nor.ou.edu:25983",
    "health" : 0,
    "state" : 8,
    "stateStr" : "(not reachable/healthy)",
    "uptime" : 0,
    "optime" : {
        "ts" : Timestamp(0, 0),
        "t" : NumberLong(-1)
    },
    "optimeDurable" : {
        "ts" : Timestamp(0, 0),
        "t" : NumberLong(-1)
    },
    "optimeDate" : ISODate("1970-01-01T00:00:00Z"),
    "optimeDurableView" : ISODate("1970-01-01T00:00:00Z"),
    "lastAppliedWallTime" : ISODate("2022-04-14T05:50:21.494Z"),
    "lastDurableWallTime" : ISODate("2022-04-14T05:50:21.494Z"),
    "lastHeartbeat" : ISODate("2022-04-14T05:50:39.528Z"),
    "lastHeartbeatRecv" : ISODate("2022-04-14T05:50:24.499Z"),
    "pingMs" : NumberLong(0),
    "lastHeartbeatMessage" : "Error connecting to gpel10.cs.nor.ou.edu:25983 (10.194.8.52:25983) :: caused by :: Connection refused",
    "syncSourceHost" : "",
    "syncSourceId" : -1,
    "infoMessage" : "",
    "configVersion" : 1,
    "configTerm" : 3
},
"t" : NumberLong(-1)

PuTTY (inactive)
Type here to search 9:49 AM
4/14/2022
```

```
mura0007@gpel0:~  
{"ok": 1,  
 "$clusterTime": {  
     "clusterTime": Timestamp(1649914690, 1),  
     "signature": {  
         "hash": BinData(0,"AAAAAAAAAAAAAAAAAAAAAA="),  
         "keyId": NumberLong(0)  
     }  
 },  
 "operationTime": Timestamp(1649914690, 1)  
}  
myDBReplicaSet:SECONDARY> rs.status()  
{  
    "set": "myDBReplicaSet",  
    "date": ISODate("2022-04-14T05:50:40.720Z"),  
    "myState": 1,  
    "term": NumberLong(3),  
    "syncSourceHost": "",  
    "syncSourceId": -1,  
    "heartbeatIntervalMillis": NumberLong(2000),  
    "majorityVoteCount": 2,  
    "writeMajorityCount": 2,  
    "votingMembersCount": 3,  
    "writableVotingMembersCount": 3,  
    "optimes": {  
        "lastCommittedOpTime": {  
            "ts": Timestamp(1649915431, 1),  
            "t": NumberLong(3)  
        },  
        "lastCommittedWallTime": ISODate("2022-04-14T05:50:31.495Z"),  
        "readConcernMajorityOpTime": {  
            "ts": Timestamp(1649915431, 1),  
            "t": NumberLong(3)  
        },  
        "appliedOpTime": {  
            "ts": Timestamp(1649915431, 1),  
            "t": NumberLong(3)  
        },  
        "durableOpTime": {  
            "ts": Timestamp(1649915431, 1),  
            "t": NumberLong(3)  
        },  
        "lastAppliedWallTime": ISODate("2022-04-14T05:50:31.495Z"),  
        "lastDurableWallTime": ISODate("2022-04-14T05:50:31.495Z")  
    },  
    ...  
}  
Windows Search Type here to search 0:1251 AM 4/14/2022
```

The execution of all 5 queries:


```
mura0007@gpel9: ~
myDBReplicaSet:PRIMARY>
myDBReplicaSet:PRIMARY> db.movie.update({"movie_genre":"Thriller"}, {"avg_rating":{$gte:7.0}}, {"$avg_rating":{$lte:8.0}}, {$push:{"similar_movies":"Inception"}})
uncaught exception: Error: Fourth argument must be empty when specifying upsert and multi with an object. :
DBCollection.prototype._parseUpdate@src/mongo/shell/collection.js:472:19
DBCollection.prototype.update@src/mongo/shell/collection.js:510:18
@(shell):1:1
myDBReplicaSet:PRIMARY> db.movie.update({"movie_genre":"Thriller", "avg_rating":{$gte:7.0}, "avg_rating":{$lte:8.0}}, {$push:{"similar_movies":"Inception"}})
WriteResult({ "nMatched": 1, "nUpserted": 0, "nModified": 1 })
myDBReplicaSet:PRIMARY> db.movie.find("similar_movies":"Inception")
uncaught exception: SyntaxError: missing ) after argument list :
@(shell):1:30
myDBReplicaSet:PRIMARY> db.movie.find("similar_movies":"Inception")
( "_id" : ObjectId("6257bb9b08d2e27948dd8f3d"), "movie_id" : 117, "movie_genre" : "Thriller", "movie_name" : "John Wick", "director_name" : "Chad Stahelski", "producers" : [ "Derek Kolstad" ], "studio_name" : "Summit international", "release_date" : [ 13, 2, 2014 ], "duration" : 101, "similar_movies" : [ "Seven", "Deadpool", "Inception" ], "avg_rating" : 7.4, "plot" : "An ex-hit-man comes out of retirement to track down the gangsters that killed his dog and took everything from him.", "budget" : 150, "gross" : 500, "review" : [ [ 16, 117, [ 27, 2, 2014, "11:00:00" ], "A good thriller movie", 7 ] ] )
myDBReplicaSet:PRIMARY>
```

