

CSCI3287 Database Systems

Project 2 – NOSQL Database Lab -- MongoDB

Overview

This project is worth 15 points (out of 100) toward your final grade. It is due on Sunday, May 6, at 11:55 p.m. Late submissions will be penalized 50% during a 3-day grace period up until Wednesday, May 9, 11:55 p.m. After that time, no late work can be accepted. Your submission should be a PDF document submitted as a file via the link found in the **Project Assignment** section of the Week 14 Moodle April 16-22 -- which is the same place where you got this file.

This project will give you hands-on practice in working with the MongoDB “NoSQL” database software.

Citation:

Much gratitude goes out to CS Masters student **Ganesh Chandra Satish**. Ganesh prepared this MongoDB lab for us. Thank you Ganesh !!!

Objectives

1. Become familiar with MongoDB
2. Install MongoDB on your computer (Windows, Linux, Mac)
3. Create and load a MongoDB database
4. Perform several basic operations against your MongoDB database
5. Have fun !!

Deliverables

Capture screen shots to show evidence of having completed the assigned operations (1 – 8) described below. Number each screen shot with the number of the assigned operation/task (1 – 8). Assemble (Copy & Paste) all screen shots into a document. Save the document as a PDF.

Submission

Use the submission link in the **Project Assignment** section of the Week 14 Moodle April 16-22 -- which is the same place where you got this file.

If you are doing “PAIR PROGRAMMING” on this assignment, please be sure to identify the name(s) of your “programming” partner(s) on your submission.

You must EACH submit your own final deliverable document for this homework.

Introduction:

The following links are helpful for giving an Introduction and basic queries for mongoDB:

1. https://www.tutorialspoint.com/mongodb/mongodb_overview.htm : This link provides a great basic overview of mongodb and the basic queries for inserting a document, updating a document, querying/searching a collection, etc.
2. <https://www.guru99.com/mongodb-tutorials.html#1> : This is a beginner tutorial and also has links for installing and running mongoDB with images which may be helpful for students initially.
3. <https://docs.mongodb.com/manual/introduction/> : The official documentation page of mongoDB.

Installation:

The following links are helpful for giving Instructions for the installation of mongoDB:

1. MacOS: <https://docs.mongodb.com/manual/tutorial/install-mongodb-on-os-x/> : One input is that the **.bashrc** file in mac is `/Users/apple/.bash_profile`.
2. Windows: <https://docs.mongodb.com/tutorials/install-mongodb-on-windows/> : This is the official documentation for windows installation.
3. Linux: <https://docs.mongodb.com/manual/administration/install-on-linux/> : The official installation for linux installation.
4. <https://docs.mongodb.com/manual/installation/> : This link basically shows the details about the operating systems supported by mongoDB.
5. Students can install the community edition of mongoDB as it is freely available.

Database Operations:

1. Create a database:

- a. `use DATABASE_NAME`
 - i. Ex: `use new_mongo_db`
 - ii. The above command will create a database if it does not exist and uses the database if it already exists.
 - iii. Replace the `DATABASE_NAME` with the name of the database you would want to create.

2. Drop a database:

- a. `db.dropDatabase()`
 - i. Ex: `>use new_mongo_db`
`switched to db new_mongo_db`
`>db.dropDatabase()`
 - ii. First you need to switch to the database that has to be dropped. The use the above command to drop that database.

3. Creating a collection:

- a. `db.createCollection(name, options)`
 - i. Ex: `>use new_mongo_db`
`switched to db new_mongo_db`
`>db.createCollection("test_collection")`
`{ "ok" : 1 }`
 - ii. The above command creates the collection. But giving some initial options along with the “create” will be highly useful.
 1. `>db.createCollection("mycol", { capped : true, autoIndexId : true, size : 6142800, max : 10000 })`
`{ "ok" : 1 }`
 2. For more information on the options, please check the following link.
 - a. <https://docs.mongodb.com/manual/reference/method/db.createCollection/>
 - iii. In mongoDB, it is not necessary to create a collection. When a new document is inserted, mongoDB creates a collection automatically.
 - iv.

4. Dropping a collection:

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- a. `db.COLLECTION_NAME.drop()`
 - i. Ex: `>use new_mongo_db`
switched to db new_mongo_db
`>db.test_collection.drop()`
`True`
 - ii. First go to the selected database and then use the above command to drop the collection
 - iii.

5. Insert a document:

- a. `db.COLLECTION_NAME.insert(document)`
 - i. Ex: `db.test_collection.insert({
_id: ObjectId(7df78ad8902c),
title: 'Mongo Db practice',
description: 'this class is about MongoDB'
})`
 - ii. Replace the `COLLECTION_NAME` with the name of the collection of your choice
 - iii.

6. Query a document:

- a. `db.COLLECTION_NAME.find()`
 - i. Ex: `db.test_collection.find().pretty()`
 - ii. The above query will display the documents present in the collection.
 - iii.

7. Update a document:

- a. `>db.test_collection.update(SELECTION_CRITERIA, UPDATED_DATA)`
 - i. Ex: `>db.test_collection.update({'Heading': 'MongoDB Tutorials'}, {$set: {'Heading': 'New MongoDB Tutorials'}})`
 - ii. The above example is used to update the documents that contain 'Heading' as 'MongoDB Tutorials' to 'New MongoDB Tutorials'

8. Delete Document:

- a. `db.COLLECTION_NAME.remove(DELETION_CRITTERIA)`
 - i. Remove only one record:
 - 1. `db.test_collection.remove({ status : "P" },1)`
 - 2. Here the first document which has this key value pair will be deleted.
 - ii. Remove all records matching a condition:
 - 1. `db.test_collection.remove({ status : "P" })`
 - 2. Here all the documents which have this key value pair will be deleted.

Other References:

- a. https://www.tutorialspoint.com/mongodb/mongodb_create_database.htm
- b. <https://docs.mongodb.com/v3.2/crud/>

Appendix A – sample Data

Dataset for the students to play with in MongoDB:

1. Download the json dataset from(save the file shown)
<https://raw.githubusercontent.com/mongodb/docs-assets/primer-dataset/primer-dataset.json>
2. From your terminal enter the command:
 - a.

```
mongoimport --db test --collection restaurants --drop --file ~/downloads/primer-dataset.json
```

```
Apples-MacBook-Pro:~ Ganesh$ mongoimport --db test --collection restaurants --drop --file ~/downloads/primer-dataset.json
2018-04-06T18:05:26.657-0600    connected to: localhost
2018-04-06T18:05:26.659-0600    dropping: test.restaurants
2018-04-06T18:05:27.510-0600    imported 25359 documents
Apples-MacBook-Pro:~ Ganesh$
```
 - b. The above command converts the json file and stores it as a set of documents with the collection name of “restaurants”.
 - c. Then in the mongoDB terminal you can query the collections.
 - i. Ex: `db.restaurants.find().pretty()`
 - ii. The above command will display 20 records of the entire dataset.
3. Each document looks like the one below:

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```
{
  "_id" : ObjectId("5ac80b463f002953d6c6d90a"),
  "address" : {
    "building" : "7715",
    "coord" : [
      -73.9973325,
      40.61174889999999
    ],
    "street" : "18 Avenue",
    "zipcode" : "11214"
  },
  "borough" : "Brooklyn",
  "cuisine" : "American",
  "grades" : [
    {
      "date" : ISODate("2014-04-16T00:00:00Z"),
      "grade" : "A",
      "score" : 5
    },
    {
      "date" : ISODate("2013-04-23T00:00:00Z"),
      "grade" : "A",
      "score" : 2
    },
    {
      "date" : ISODate("2012-04-24T00:00:00Z"),
      "grade" : "A",
      "score" : 5
    },
    {
      "date" : ISODate("2011-12-16T00:00:00Z"),
      "grade" : "A",
      "score" : 2
    }
  ],
  "name" : "C & C Catering Service",
  "restaurant_id" : "40357437"
}
```