MongoDB Lab

Be prepared to demonstrate your knowledge of all of the following concepts and operations.  Keep track of your scripts and any learning and notes in this document.

On the due date you will meet with the instructor to demonstrate your work and discuss what you have learned. You may use this document as reference during the pass off.

1. Get MongoDB up and running on your machine. No clustering or sharding is required.
   1. You can download MongoDB to windows or set it up on a VM with CentOS
2. What are the MongoDB equivalents of an:
   1. RDBMS database:
   2. RDBMS table:
   3. RDBMS row:
3. What is the case sensitivity of MongoDB?
4. Schema: Lets assume you are creating an Application to store a person’s Contacts (Name, Phone Numbers, Email Addresses, Nickname, etc.)
   1. Design two schemas to hold your contact information.
      1. Schema 1 should use a single collection to hold all information.
      2. Schema 2 should use multiple collections to store your contact information.
   2. What are the pros and cons of each of the above solutions?
5. What are the costs and benefits of denormalization?
6. Import all 10,000 people records from Lab 1 into MongoDB.
7. What is the significance of the \_id field on each document?
8. Demonstrate all four CRUD operations on a single document by key on the people collection in the Mongo console.
9. Demonstrate the difference between replacing a document and adding a new property to a document in the Mongo console.
10. Find and import a data set into your MongoDB instance. The more documents, the better. Make sure the data set has varying fields between its documents, or create a bunch of additional documents that have more or less fields than the others.
11. Complete the following queries on your new data set:
    1. Return a single document by \_id. (In SQL: …Where PrimaryKey = x)
    2. Return all the documents with the same value for a field. (Where SomeField = x)
    3. Return all the documents who’s field value contains a string (similar to like ‘%test%’ in SQL)
    4. Return all the documents \_having\_ a particular field. (Is there a SQL equivalent for this?)
    5. List the documents missing a particular field.
    6. Return the number of documents that have a particular value for a field. (Count(\*) …. Where Field = ‘test’)
    7. Write an aggregate (sum, average, count etc.) grouped by a particular field. (Select state, sum(population) … Group by state)
    8. Be prepared to explain the MongoDB equivalent of
       1. Select \* From Customers c Join Orders r On c.CustId = r.CustId Join OrderDetails d on r.OrderId = d.OrderId
12. Take a slower query from above and add an index to improve its performance. Take a look at <http://docs.mongodb.org/manual/tutorial/analyze-query-plan/> to help you.
13. Summarize the steps to create a sharded cluster in MongoDB. You don’t need to carry out the steps unless you want to… just be able to describe the major working components and the English-language steps to configure them.
14. Compare and contrast the strengths and weaknesses of MongoDB vs
    1. Relational Databases
    2. Serialized Files
    3. HashMap/HashTable
15. Sample Application - Create a simple application that uses your new database.
    1. In the language of your choice, implement any three queries from 9.X in your application, printing the results to the user. Allow the user to specify arguments to the query.
16. Be prepared to describe what it might take to convert from a relational database system to a MongoDB database.
17. Be prepared to discuss three examples of software systems for which Mongo would be a wise database choice.
18. Be prepared to discuss examples of software systems for which Mongo would be a poor database choice.