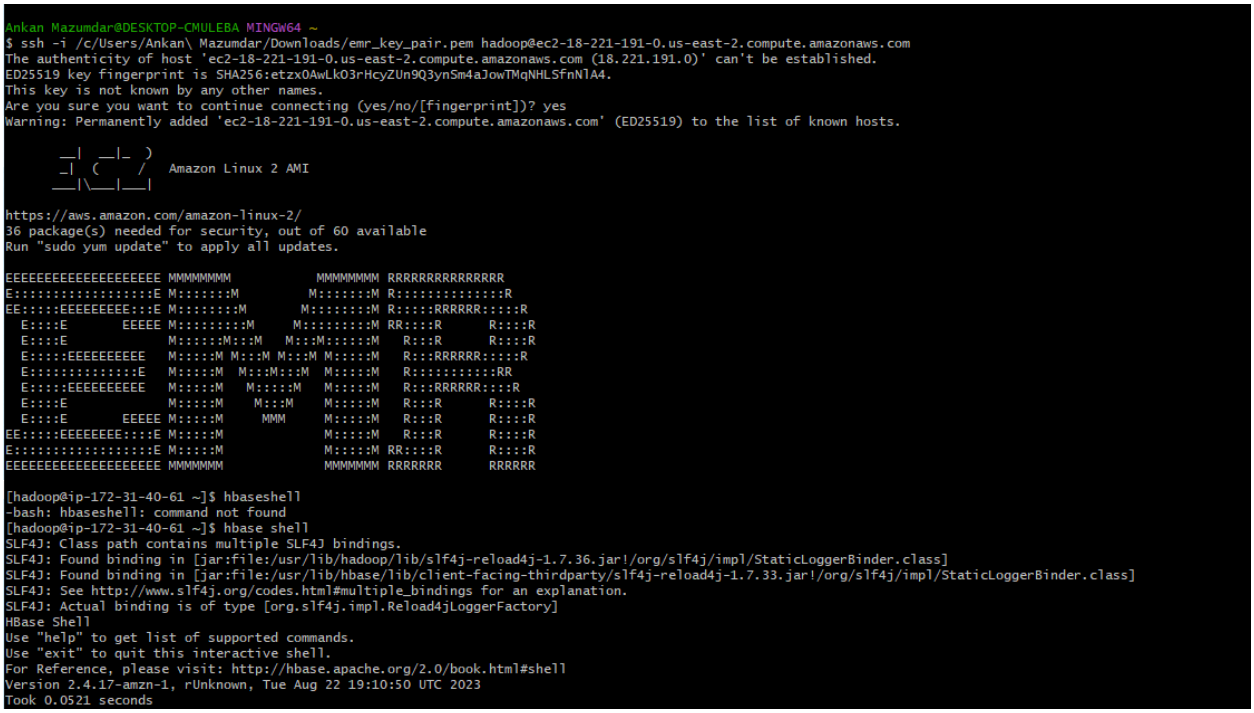
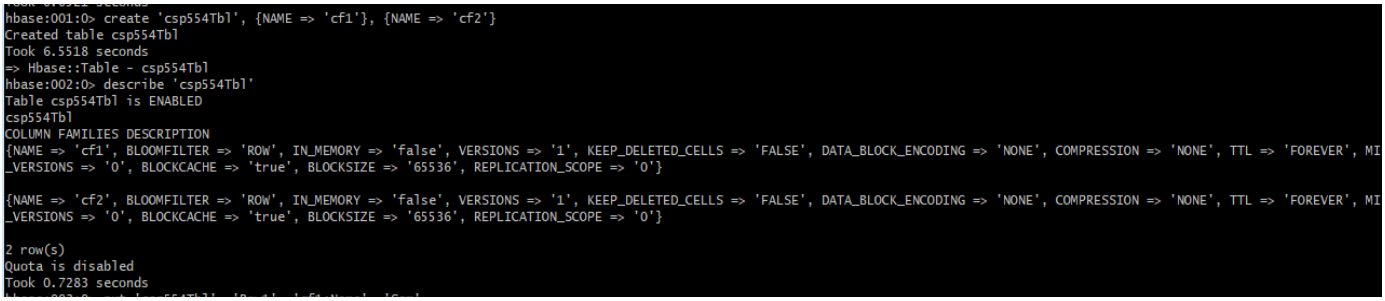
SCREENSHOTS:
HBASE

ssh -i /c/Users/Ankan\ Mazumdar/Downloads/emr_key_pair.pem
hadoop@ec2-18-190-0.us-east-2.compute.amazonaws.com

hbase shell



Exercise 1
create 'csp554Tbl', {NAME => 'cf1'}, {NAME => 'cf2'}
describe 'csp554Tbl'



Exercise 2
put 'csp554Tbl', 'Row1', 'cf1:Name', 'Sam'
put 'csp554Tbl', 'Row2', 'cf1:Name', 'Ahmed'
put 'csp554Tbl', 'Row1', 'cf2:Job', 'Pilot'
put 'csp554Tbl', 'Row2', 'cf2:Job', 'Doctor'

put 'csp554Tbl', 'Row1', 'cf2:Level', 'LZ3'
put 'csp554Tbl', 'Row2', 'cf2:Level', 'AR7'
scan 'csp554Tbl'

```
hbase:003:0> put 'csp554Tbl', 'Row1', 'cf1:Name', 'Sam'
Took 0.7883 seconds
hbase:004:0> put 'csp554Tbl', 'Row2', 'cf1:Name', 'Ahmed'
Took 0.0317 seconds
hbase:005:0> put 'csp554Tbl', 'Row1', 'cf2:Job', 'Pilot'
Exercise 4Took 0.0167 seconds

hbase:006:0> put 'csp554Tbl', 'Row2', 'cf2:Job', 'Doctor'
Took 0.0138 seconds
hbase:007:0> put 'csp554Tbl', 'Row1', 'cf2:Level', 'LZ3'
Took 0.0146 seconds
hbase:008:0> put 'csp554Tbl', 'Row2', 'cf2:Level', 'AR7'
Took 0.0125 seconds
hbase:009:0> scan 'csp554Tbl'
ROW                                     COLUMN+CELL
 Row1                                   column=cf1:Name, timestamp=2023-11-29T01:13:04.826, value=Sam
 Row1                                   column=cf2:Job, timestamp=2023-11-29T01:13:14.271, value=Pilot
 Row1                                   column=cf2:Level, timestamp=2023-11-29T01:13:14.568, value=LZ3
 Row2                                   column=cf1:Name, timestamp=2023-11-29T01:13:11.931, value=Ahmed
 Row2                                   column=cf2:Job, timestamp=2023-11-29T01:13:14.427, value=Doctor
 Row2                                   column=cf2:Level, timestamp=2023-11-29T01:13:14.733, value=AR7
2 row(s)
Took 0.4816 seconds
```

Exercise 3
get 'csp554Tbl', 'Row1', {COLUMN => ['cf1', 'cf2:Level']}

```
hbase:018:0> get 'csp554Tbl', 'Row1', {COLUMN => ['cf2:Level']}
COLUMN                                  CELL
 cf2:Level                              timestamp=2023-11-30T20:52:16.324, value=LZ3
1 row(s)
Took 0.0136 seconds
```

Exercise 4
get 'csp554Tbl', 'Row2', {COLUMN => ['cf1:Name']}

```
hbase:012:0> get 'csp554Tbl', 'Row2', {COLUMN => ['cf1:Name']}
COLUMN                                  CELL
 cf1:Name                               timestamp=2023-11-29T01:13:11.931, value=Ahmed
1 row(s)
Took 0.0195 seconds
```

Exercise 5
scan 'csp554Tbl', {LIMIT => 2}

```
hbase:013:0> scan 'csp554Tbl', {LIMIT=>2}
ROW                                     COLUMN+CELL
 Row1                                   column=cf1:Name, timestamp=2023-11-29T01:13:04.826, value=Sam
 Row1                                   column=cf2:Job, timestamp=2023-11-29T01:13:14.271, value=Pilot
 Row1                                   column=cf2:Level, timestamp=2023-11-29T01:13:14.568, value=LZ3
 Row2                                   column=cf1:Name, timestamp=2023-11-29T01:13:11.931, value=Ahmed
 Row2                                   column=cf2:Job, timestamp=2023-11-29T01:13:14.427, value=Doctor
 Row2                                   column=cf2:Level, timestamp=2023-11-29T01:13:14.733, value=AR7
2 row(s)
Took 0.0860 seconds
hbase:014:0>
```

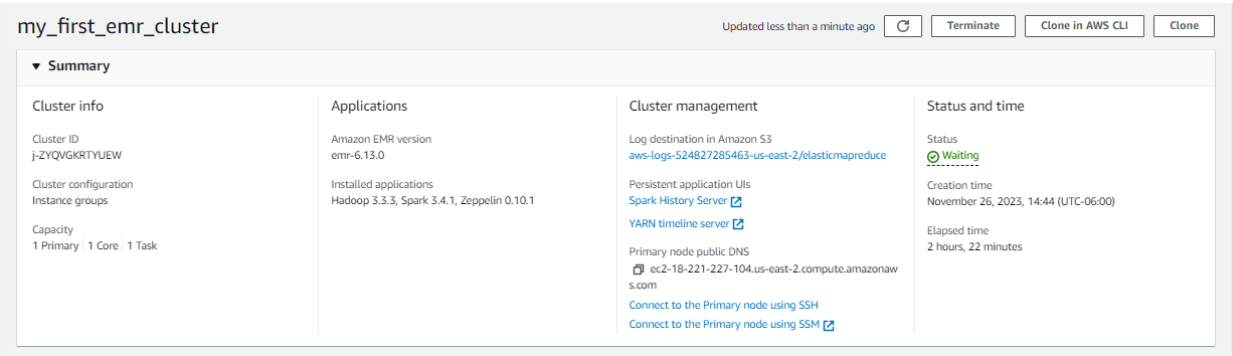
CASSANDRA
Exercise 1

Apache Cassandra stands out as a prominent distributed database, known for its transactional capabilities, scalability, and robust availability. It effectively manages some of the largest datasets globally, distributed across numerous nodes spanning multiple datacenters. The widespread adoption of Cassandra in big data applications can be attributed to various factors, including its fault-tolerant peer-to-peer architecture, adaptable data model stemming from the BigTable data model, and the user-friendly Cassandra Query Language (CQL) that simplifies declarative queries.

This paper introduces an innovative methodology for data modeling in Apache Cassandra driven by queries. It then proceeds to compare this approach with traditional data modeling techniques. The proposed methodology significantly deviates from traditional relational data modeling by prioritizing application workflow and access patterns in the modeling process. Notable distinctions include emphasis on data nesting and duplication. The paper provides a detailed exploration of the Cassandra data model, covering conceptual data modeling and application workflows. Subsequent sections delve into query-driven mapping, physical modeling, and Chebotko diagrams.

Additionally, the paper introduces a robust data modeling tool named KDM, designed to automate complex, error-prone, and time-consuming data modeling tasks. KDM also facilitates CQL generation. The paper concludes by outlining future directions and potential avenues for further enhancing their proposed solution.

Exercise 2
Step A



Step B
Cass-Term
wget https://archive.apache.org/dist/cassandra/3.11.2/apache-cassandra-3.11.2-bin.tar.gz
tar -xzvf apache-cassandra-3.11.2-bin.tar.gz

```
Ankan Mazumdar@DESKTOP-CMULEBA MINGW64 ~
$ ssh -i /c/Users/Ankan\ Mazumdar/Downloads/emr_key_pair.pem hadoop@ec2-18-224-213-198.us-east-2.compute.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
53 package(s) needed for security, out of 85 available
Run "sudo yum update" to apply all updates.

EEEEEEEEEEEEEEEEEEEE MMMMMMMM           MMMMMMMM RRRRRRRRRRRRRRR
E::::::::::::::::::E M::::::M         M::::::M R::::::::::::::R
EE:::::EEEEEEEEE:::E M:::::::M       M:::::::M R:::::RRRRRR:::::R
  E::::E       EEEEE M::::::::M     M::::::::M RR::::R      R::::R
  E::::E             M::::::M:::M   M:::M::::::M   R::::R      R::::R
  E::::::EEEEEEEEEE   M:::::M M:::M M:::M M:::::M   R::::RRRRRR:::::R
  E:::::::::::::::E   M:::::M  M:::M:::M  M:::::M   R:::::::::::RR
  E::::::EEEEEEEEEE   M:::::M   M:::::M   M:::::M   R::::RRRRRR::::R
  E::::E             M:::::M    M:::M    M:::::M   R::::R      R::::R
  E::::E       EEEEE M:::::M     MMM     M:::::M   R::::R      R::::R
EE:::::EEEEEEEE::::E M:::::M             M:::::M   R::::R      R::::R
E::::::::::::::::::E M:::::M             M:::::M RR::::R      R::::R
EEEEEEEEEEEEEEEEEEEE MMMMMMM             MMMMMMM RRRRRRR      RRRRRR

[hadoop@ip-172-31-46-79 ~]$ wget https://archive.apache.org/dist/cassandra/3.11.2/apache-cassandra-3.11.2-bin.tar.gz
--2023-11-29 03:29:06--  https://archive.apache.org/dist/cassandra/3.11.2/apache-cassandra-3.11.2-bin.tar.gz
Resolving archive.apache.org (archive.apache.org)... 65.108.204.189, 2a01:4f9:1a:a084::2
Connecting to archive.apache.org (archive.apache.org)|65.108.204.189|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 38436262 (37M) [application/x-gzip]
Saving to: 'apache-cassandra-3.11.2-bin.tar.gz'

100%[=============================================================================================================================================>] 38,436,262  16.3MB/s   in 2.2s

2023-11-29 03:29:09 (16.3 MB/s) - 'apache-cassandra-3.11.2-bin.tar.gz' saved [38436262/38436262]

[hadoop@ip-172-31-46-79 ~]$ tar -xzvf apache-cassandra-3.11.2-bin.tar.gz
apache-cassandra-3.11.2/bin/
apache-cassandra-3.11.2/conf/
apache-cassandra-3.11.2/conf/triggers/
apache-cassandra-3.11.2/doc/
apache-cassandra-3.11.2/doc/cql3/
```

apache-cassandra-3.11.2/bin/cassandra &

```
[hadoop@ip-172-31-46-79 ~]$ apache-cassandra-3.11.2/bin/cassandra &
[1] 15321
[hadoop@ip-172-31-46-79 ~]$ OpenJDK 64-Bit Server VM warning: Cannot open file apache-cassandra-3.11.2/bin/../logs/gc.log due to No such file or directory

CompilerOracle: dontinline org/apache/cassandra/db/Columns$Serializer.deserializeLargeSubset (Lorg/apache/cassandra/io/util/DataInputPlus;Lorg/apache/cassandra/db/Columns;I)Lorg/apach
e/cassandra/db/Columns;
CompilerOracle: dontinline org/apache/cassandra/db/Columns$Serializer.serializeLargeSubset (Ljava/util/Collection;ILorg/apache/cassandra/db/Columns;ILorg/apache/cassandra/io/util/Data
OutputPlus;)V
CompilerOracle: dontinline org/apache/cassandra/db/Columns$Serializer.serializeLargeSubsetSize (Ljava/util/Collection;ILorg/apache/cassandra/db/Columns;I)I
CompilerOracle: dontinline org/apache/cassandra/db/commitlog/AbstractCommitLogSegmentManager.advanceAllocatingFrom (Lorg/apache/cassandra/db/commitlog/CommitLogSegment;)V
CompilerOracle: dontinline org/apache/cassandra/db/transform/BaseIterator.tryGetMoreContents ()Z
CompilerOracle: dontinline org/apache/cassandra/db/transform/StoppingTransformation.stop ()V
CompilerOracle: dontinline org/apache/cassandra/db/transform/StoppingTransformation.stopInPartition ()V
CompilerOracle: dontinline org/apache/cassandra/io/util/BufferedDataOutputStreamPlus.doFlush (I)V
CompilerOracle: dontinline org/apache/cassandra/io/util/BufferedDataOutputStreamPlus.writeExcessSlow ()V
CompilerOracle: dontinline org/apache/cassandra/io/util/BufferedDataOutputStreamPlus.writeSlow (JI)V
CompilerOracle: dontinline org/apache/cassandra/io/util/RebufferingInputStream.readPrimitiveSlowly (I)J
CompilerOracle: inline org/apache/cassandra/db/rows/UnfilteredSerializer.serializeRowBody (Lorg/apache/cassandra/db/rows/Row;ILorg/apache/cassandra/db/SerializationHeader;Lorg/apache/
cassandra/io/util/DataOutputPlus;)V
CompilerOracle: inline org/apache/cassandra/io/util/Memory.checkBounds (JJ)V
CompilerOracle: inline org/apache/cassandra/io/util/SafeMemory.checkBounds (JJ)V
CompilerOracle: inline org/apache/cassandra/utils/AsymmetricOrdering.selectBoundary (Lorg/apache/cassandra/utils/AsymmetricOrdering/Op;II)I
CompilerOracle: inline org/apache/cassandra/utils/AsymmetricOrdering.strictnessOfLessThan (Lorg/apache/cassandra/utils/AsymmetricOrdering/Op;)I
CompilerOracle: inline org/apache/cassandra/utils/BloomFilter.indexes (Lorg/apache/cassandra/utils/IFilter/FilterKey;)[J
CompilerOracle: inline org/apache/cassandra/utils/BloomFilter.setIndexes (JJIJ[J)V
CompilerOracle: inline org/apache/cassandra/utils/ByteBufferUtil.compare (Ljava/nio/ByteBuffer;[B)I
CompilerOracle: inline org/apache/cassandra/utils/ByteBufferUtil.compare ([BLjava/nio/ByteBuffer;)I
CompilerOracle: inline org/apache/cassandra/utils/ByteBufferUtil.compareUnsigned (Ljava/nio/ByteBuffer;Ljava/nio/ByteBuffer;)I
CompilerOracle: inline org/apache/cassandra/utils/FastByteOperations$UnsafeOperations.compareTo (Ljava/lang/Object;JILjava/lang/Object;JI)I
CompilerOracle: inline org/apache/cassandra/utils/FastByteOperations$UnsafeOperations.compareTo (Ljava/lang/Object;JILjava/nio/ByteBuffer;)I
CompilerOracle: inline org/apache/cassandra/utils/FastByteOperations$UnsafeOperations.compareTo (Ljava/nio/ByteBuffer;Ljava/nio/ByteBuffer;)I
CompilerOracle: inline org/apache/cassandra/utils/vint/VIntCoding.encodeVInt (JI)[B
INFO  [main] 2023-11-29 03:29:37,546 YamlConfigurationLoader.java:89 - Configuration location: file:/home/hadoop/apache-cassandra-3.11.2/conf/cassandra.yaml
INFO  [main] 2023-11-29 03:29:38,248 Config.java:495 - Node configuration:[allocate_tokens_for_keyspace=null; authenticator=AllowAllAuthenticator; authorizer=AllowAllAuthorizer; auto_
bootstrap=true; auto_snapshot=true; back_pressure_enabled=false; back_pressure_strategy=org.apache.cassandra.net.RateBasedBackPressure{high_ratio=0.9, factor=5, flow=FAST}; batch_size
_fail_threshold_in_kb=50; batch_size_warn_threshold_in_kb=5; batchlog_replay_throttle_in_kb=1024; broadcast_address=null; broadcast_rpc_address=null; buffer_pool_use_heap_if_exhausted
=true; cas_contention_timeout_in_ms=1000; cdc_enabled=false; cdc_free_space_check_interval_ms=250; cdc_raw_directory=null; cdc_total_space_in_mb=0; client_encryption_options=<REDACTED
>; cluster_name=Test Cluster; column_index_cache_size_in_kb=2; column_index_size_in_kb=64; commit_failure_policy=stop; commitlog_compression=null; commitlog_directory=null; commitlog_
max_compression_buffers_in_pool=3; commitlog_periodic_queue_size=-1; commitlog_segment_size_in_mb=32; commitlog_sync=periodic; commitlog_sync_batch_window_in_ms=NaN; commitlog_sync_pe
```

Step C
Cqlsh-Term
apache-cassandra-3.11.2/bin/cqlsh

```
Ankan Mazumdar@DESKTOP-CMULEBA MINGW64 ~
$ ssh -i /c/Users/Ankan\ Mazumdar/Downloads/emr_key_pair.pem hadoop@ec2-18-224-213-198.us-east-2.compute.amazonaws.com

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/

EEEEEEEEEEEEEEEEEEE MMMMMMMM           MMMMMMMM RRRRRRRRRRRRRRR
E::::::::::::::::::E M::::::M         M::::::M R::::::::::::::R
EE::::::EEEEEEEEE:::E M:::::::M       M:::::::M R::::::RRRRRR:::::R
  E:::::E       EEEEE M::::::::M     M::::::::M RR:::::R      R::::R
  E:::::E             M::::::M:::M   M:::M::::::M   R:::R      R::::R
  E::::::EEEEEEEEEE   M:::::M M:::M M:::M M:::::M   R:::RRRRRR:::::R
  E::::::::::::::E    M:::::M  M:::M:::M  M:::::M   R::::::::::RR
  E::::::EEEEEEEEEE   M:::::M   M:::::M   M:::::M   R:::RRRRRR::::R
  E:::::E             M:::::M    M:::M    M:::::M   R:::R      R::::R
  E:::::E       EEEEE M:::::M     MMM     M:::::M   R:::R      R::::R
EE::::::EEEEEEEE:::E M:::::M             M:::::M   R:::R      R::::R
E::::::::::::::::::E M:::::M             M:::::M RR:::::R      R::::R
EEEEEEEEEEEEEEEEEEE MMMMMMM             MMMMMMM RRRRRRR      RRRRRR

[hadoop@ip-172-31-46-79 ~]$ apache-cassandra-3.11.2/bin/cqlsh
Connected to Test Cluster at 127.0.0.1:9042.
[cqlsh 5.0.1 | Cassandra 3.11.2 | CQL spec 3.4.4 | Native protocol v4]
Use HELP for help.
```

```
CREATE TABLE A20541357.Music (
artistName text,
albumName text,
numberSold int,
Cost int,
PRIMARY KEY (artistName, albumName)
) WITH CLUSTERING ORDER BY (albumName DESC);
```

```
Ankan Mazumdar@DESKTOP-CMULEBA MINGW64 ~/Downloads/Big data CSP 554 Assignment 6-9/Homework9
$  scp -i /c/Users/Ankan\ Mazumdar/Downloads/emr_key_pair.pem init.cql ex2.cql ex3.cql ex4.cql ex5.cql  hadoop@ec2-3-20-239-198.us-east-2.compute.amazonaws.com:/home/hadoop/
init.cql                                                                                                                                  100%  102     3.2KB/s   00:00
ex2.cql                                                                                                                                   100%  176     3.5KB/s   00:00
ex3.cql                                                                                                                                   100%  546    15.8KB/s   00:00
ex4.cql                                                                                                                                   100%   55     1.1KB/s   00:00
ex5.cql                                                                                                                                   100%   63     2.0KB/s   00:00

Ankan Mazumdar@DESKTOP-CMULEBA MINGW64 ~/Downloads/Big data CSP 554 Assignment 6-9/Homework9
```

Exer 1
source './init.cql';
describe keyspaces;
USE A20541357;

```
cqlsh> source './init.cql';
cqlsh> describe keyspaces;

a20541357  system_schema  system_auth  system  system_distributed  system_traces

cqlsh> USE 20541357
   ...
   ...
cqlsh> USE 20541357;
Improper USE command.
cqlsh> USE a20541357
   ...
cqlsh> USE a20541357;
cqlsh:a20541357> source './ex2.cql';
```

Exer 2
source './ex2.cql';
DESCRIBE TABLE Music;

```
cqlsh:a20541357> source './ex2.cql';
cqlsh:a20541357> DESCRIBE TABLE Music;

CREATE TABLE a20541357.music (
    artistname text,
    albumname text,
    cost int,
    numbersold int,
    PRIMARY KEY (artistname, albumname)
) WITH CLUSTERING ORDER BY (albumname DESC)
    AND bloom_filter_fp_chance = 0.01
    AND caching = {'keys': 'ALL', 'rows_per_partition': 'NONE'}
    AND comment = ''
    AND compaction = {'class': 'org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy', 'max_threshold': '32', 'min_threshold': '4'}
    AND compression = {'chunk_length_in_kb': '64', 'class': 'org.apache.cassandra.io.compress.LZ4Compressor'}
    AND crc_check_chance = 1.0
    AND dclocal_read_repair_chance = 0.1
    AND default_time_to_live = 0
    AND gc_grace_seconds = 864000
    AND max_index_interval = 2048
    AND memtable_flush_period_in_ms = 0
    AND min_index_interval = 128
    AND read_repair_chance = 0.0
    AND speculative_retry = '99PERCENTILE';
```

Exercise 3

source './ex3.cql';
SELECT * FROM Music;

```
cqlsh:a20541357> source './ex3.cql';
cqlsh:a20541357> SELECT * FROM Music;

 artistname   | albumname     | cost | numbersold
--------------+---------------+------+------------
       Mozart | Greatest Hits |   10 |     100000
 Black Sabath |      Paranoid |   12 |     534000
 Taylor Swift |      Fearless |   15 |    2300000
   Katy Perry | Teenage Dream |   14 |     750000
   Katy Perry |         Prism |   16 |     800000

(5 rows)
```

Exercise 4

source './ex4.cql';

```
cqlsh:a20541357> source './ex4.cql';

 artistname | albumname     | cost | numbersold
------------+---------------+------+------------
 Katy Perry | Teenage Dream |   14 |     750000
 Katy Perry |         Prism |   16 |     800000

(2 rows)
```

Exercise 5

source './ex5.cql';

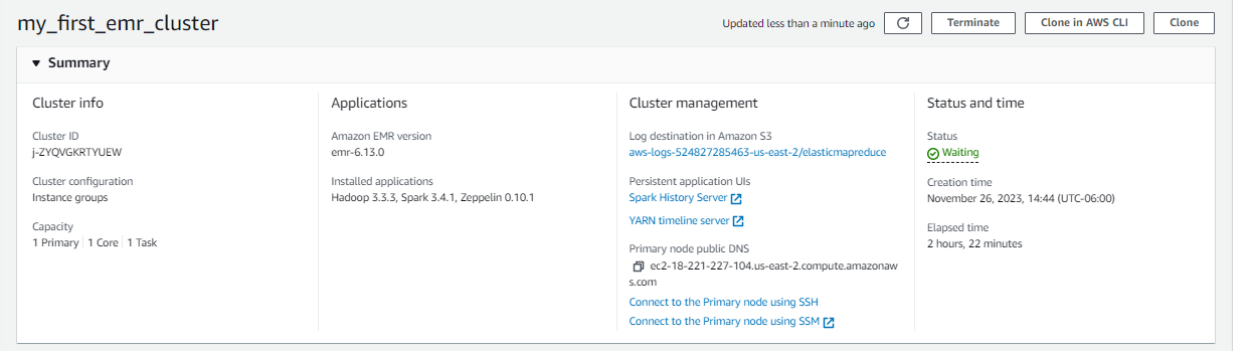
```
cqlsh:a20541357> source './ex5.cql';

 artistname   | albumname      | cost | numbersold
--------------+----------------+------+------------
 Taylor Swift |       Fearless |   15 |    2300000
   Katy Perry | Teenage Dream |   14 |     750000
   Katy Perry |          Prism |   16 |     800000

(3 rows)
cqlsh:a20541357>
```

MONGODB

Step A



STEP B

scp -i /c/Users/Ankan\ Mazumdar/Downloads/emr_key_pair.pem mongoex.tar mongodb-org-4.2.repo
hadoop@ec2-18-218-171-77.us-east-2.compute.amazonaws.com:/home/hadoop/

mongoex.tar

```
Ankan Mazumdar@DESKTOP-CMULEBA MINGW64 ~/Downloads/Big data CSP 554 Assignment 6-9/Homework9
$  scp -i /c/Users/Ankan\ Mazumdar/Downloads/emr_key_pair.pem mongoex.tar mongodb-org-4.2.repo hadoop@ec2-18-218-171-77.us-east-2.compute.amazonaws.com:/home/hadoop/
mongoex.tar                                                                                   100%   14KB 357.0KB/s   00:00
mongodb-org-4.2.repo                                                                          100%  197     6.0KB/s   00:00

Ankan Mazumdar@DESKTOP-CMULEBA MINGW64 ~/Downloads/Big data CSP 554 Assignment 6-9/Homework9
$
```

Step C

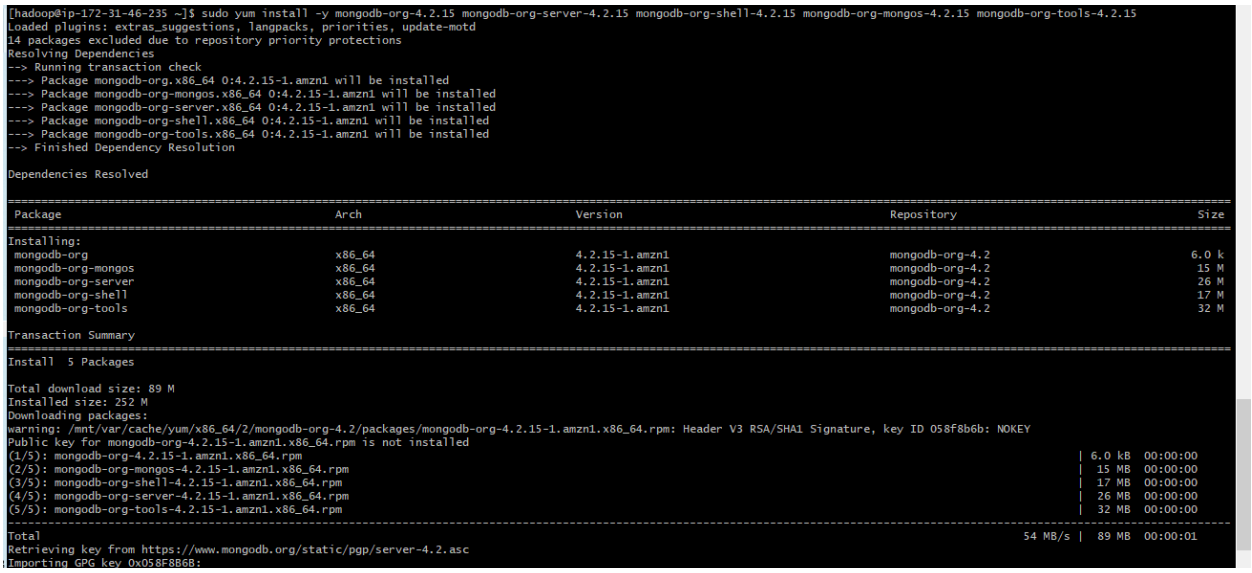
Init-Term

sudo cp mongodb-org-4.2.repo /etc/yum.repos.d

tar -xvf mongoex.tar

```
[hadoop@ip-172-31-46-235 ~]$ sudo cp mongodb-org-4.2.repo /etc/yum.repos.d
[hadoop@ip-172-31-46-235 ~]$ tar -xvf mongoex.tar
./._demo1.js
demo1.js
demo2.js
demo3.js
demo4.js
demo5.js
demo6.js
demo7.js
demo8.js
demo9.js
load.js
```

Step D – Install and start MongoDB
sudo yum install -y mongodb-org-4.2.15 mongodb-org-server-4.2.15 mongodb-org-shell-4.2.15 mongodb-org-mongos-4.2.15 mongodb-org-tools-4.2.15



sudo systemctl start mongod

```
[hadoop@ip-172-31-46-235 ~]$ sudo systemctl start mongod
[hadoop@ip-172-31-46-235 ~]$
```

Step E – Start the MongoDB Shell (Command Line Interpreter)
Mongo

```
[hadoop@ip-172-31-46-235 ~]$ mongo
MongoDB shell version v4.2.15
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("5072503e-18a7-498a-8ba7-80973958d313") }
MongoDB server version: 4.2.15
Welcome to the MongoDB shell.
For interactive help, type "help".
For more comprehensive documentation, see
        https://docs.mongodb.com/
Questions? Try the MongoDB Developer Community Forums
        https://community.mongodb.com
Server has startup warnings:
2023-11-29T05:35:00.790+0000 I  CONTROL  [initandlisten]
2023-11-29T05:35:00.790+0000 I  CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2023-11-29T05:35:00.790+0000 I  CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
2023-11-29T05:35:00.790+0000 I  CONTROL  [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).
```

Step G-
use assignment;
load('./load.js');
db.unicorns.find();
oad(./demo1.js');

```
> use assignment;
switched to db assignment
> load('./load.js');
true
> db.unicorns.find();
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928b"), "name" : "Horny", "dob" : ISODate("1992-03-13T07:47:00Z"), "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires"
 : 63 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928c"), "name" : "Aurora", "dob" : ISODate("1991-01-24T13:00:00Z"), "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires"
 : 43 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928d"), "name" : "Unicrom", "dob" : ISODate("1973-02-09T22:10:00Z"), "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampi
res" : 182 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928e"), "name" : "Roooooodles", "dob" : ISODate("1979-08-18T18:44:00Z"), "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99
 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928f"), "name" : "Solnara", "dob" : ISODate("1985-07-04T02:01:00Z"), "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "
f", "vampires" : 80 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9290"), "name" : "Ayna", "dob" : ISODate("1998-03-07T08:30:00Z"), "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampire
s" : 40 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9291"), "name" : "Kenny", "dob" : ISODate("1997-07-01T10:42:00Z"), "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" :
 39 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9292"), "name" : "Raleigh", "dob" : ISODate("2005-05-03T00:57:00Z"), "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires"
 : 2 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9293"), "name" : "Leia", "dob" : ISODate("2001-10-08T14:53:00Z"), "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampire
s" : 33 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9294"), "name" : "Pilot", "dob" : ISODate("1997-03-01T05:03:00Z"), "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampir
es" : 54 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9295"), "name" : "Nimue", "dob" : ISODate("1999-12-20T16:15:00Z"), "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9296"), "name" : "Dunx", "dob" : ISODate("1976-07-18T18:18:00Z"), "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampire
s" : 165 }
>
> load('./demo1.js');
true
```

Exercise 1
db.unicorns.find({weight:{$lt:500}})

```
true
> db.unicorns.find({weight:{$lt:500}})
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928c"), "name" : "Aurora", "dob" : ISODate("1991-01-24T13:00:00Z"), "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires"
 : 43 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9292"), "name" : "Raleigh", "dob" : ISODate("2005-05-03T00:57:00Z"), "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires"
 : 2 }
>
```

Exercise 2
db.unicorns.find({loves:"apple"})

```
> db.unicorns.find({loves:"apple"})
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928e"), "name" : "Roooooodles", "dob" : ISODate("1979-08-18T18:44:00Z"), "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99
 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b928f"), "name" : "Solnara", "dob" : ISODate("1985-07-04T02:01:00Z"), "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "
f", "vampires" : 80 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9292"), "name" : "Raleigh", "dob" : ISODate("2005-05-03T00:57:00Z"), "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires"
 : 2 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9293"), "name" : "Leia", "dob" : ISODate("2001-10-08T14:53:00Z"), "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampire
s" : 33 }
{ "_id" : ObjectId("6566cdf60f8ddc27d15b9294"), "name" : "Pilot", "dob" : ISODate("1997-03-01T05:03:00Z"), "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampir
es" : 54 }
>
```

Exercise 3

```
db.unicorns.insertOne({name:"Malini", dob:"2008-03-11", loves:["pears", "grapes"], weight:450,
        gender:"F", vampires:23, horns:1})
db.unicorns.find({name:"Malini"})
```

```
> db.unicorns.insertOne({name:"Malini", dob:"2008-03-11", loves:["pears", "grapes"],weight:450, gender:"F", vampires:23, horns:1})
{
        "acknowledged" : true,
        "insertedId" : ObjectId("65690333e2993dfcde5dae0e")
}
>
> db.unicorns.find({name:"Malini"})
{ "_id" : ObjectId("65690333e2993dfcde5dae0e"), "name" : "Malini", "dob" : "2008-03-11", "loves" : [ "pears", "grapes" ], "weight" : 450, "gender" : "F", "vampires" : 23, "horns" : 1
}
>
```

Exercise 4

```
db.unicorns.updateOne({name:"Malini"}, {$set:{loves:["pears", "grapes", "apricots"]}})
db.unicorns.find({name:"Malini"})
```

```
> db.unicorns.updateOne({name:"Malini"}, {$set:{loves:["pears", "grapes", "apricots"]}})
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
>
> db.unicorns.find({name:"Malini"})
{ "_id" : ObjectId("6566ce2a0f8ddc27d15b9298"), "name" : "Malini", "dob" : "2008-03-11", "loves" : [ "pears", "grapes", "apricots" ], "weight" : 450, "gender" : "F", "vampires" : 23,
"horns" : 1 }
>
```

Exercise 5

```
db.unicorns.deleteMany({weight:{$gt:600}})
db.unicorns.find({weight:{$gt:600}})
```

```
>
> db.unicorns.deleteMany({weight:{$gt:600}})
{ "acknowledged" : true, "deletedCount" : 6 }
> db.unicorns.find({weight:{$gt:600}})
>
```