```
/*
 * @Author: Sidharth Mishra
 * @Date:   2017-03-08 18:59:45
 * @Last Modified by:   Sidharth Mishra
 * @Last Modified time: 2017-03-10 23:59:09
 */
```

Screenshots for Task#1

~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --host Sidharths-MacBook-Pro.local --port 27021 — bash — Homebrew — ttys000 — 181×49 — ⌘1

mongo --host Sidharths-MacBook-Pro.local --po...   mongod --port 27021 --dbpath ~/Documents/SJ...   mongod --port 28022 --dbpath ~/Documents/SJ...   mongod --port 29023 --dbpath ~/Documents/SJ... +

testset:PRIMARY> rs.status()
{
        "set" : "testset",
        "date" : ISODate("2017-03-09T19:12:21.819Z"),
        "myState" : 1,
        "term" : NumberLong(1),
        "heartbeatIntervalMillis" : NumberLong(2000),
        "optimes" : {
                "lastCommittedOpTime" : {
                        "ts" : Timestamp(1489086733, 1),
                        "t" : NumberLong(1)
                },
                "appliedOpTime" : {
                        "ts" : Timestamp(1489086733, 1),
                        "t" : NumberLong(1)
                },
                "durableOpTime" : {
                        "ts" : Timestamp(1489086733, 1),
                        "t" : NumberLong(1)
                }
        },
        "members" : [
                {
                        "_id" : 0,
                        "name" : "Sidharths-MacBook-Pro.local:27021",
                        "health" : 1,
                        "state" : 1,
                        "stateStr" : "PRIMARY",
                        "uptime" : 41,
                        "optime" : {
                                "ts" : Timestamp(1489086733, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-09T19:12:13Z"),
                        "infoMessage" : "could not find member to sync from",
                        "electionTime" : Timestamp(1489086722, 2),
                        "electionDate" : ISODate("2017-03-09T19:12:02Z"),
                        "configVersion" : 1,
                        "self" : true
                }
        ],
        "ok" : 1
}
testset:PRIMARY> rs.add("Sidharths-MacBook-Pro.local:28022")
{ "ok" : 1 }
testset:PRIMARY> rs.add("Sidharths-MacBook-Pro.local:29023")
{ "ok" : 1 }
testset:PRIMARY> rs.status()
{

~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --host Sidharths-MacBook-Pro.local --port 27021 — bash — Homebrew — ttys000 — 181×49 — ⌘1

mongo --host Sidharths-MacBook-Pro.local --po...   mongod --port 27021 --dbpath ~/Documents/SJ...   mongod --port 28022 --dbpath ~/Documents/SJ...   mongod --port 29023 --dbpath ~/Documents/SJ... +

testset:PRIMARY> rs.status()
{
        "set" : "testset",
        "date" : ISODate("2017-03-09T19:12:57.996Z"),
        "myState" : 1,
        "term" : NumberLong(1),
        "heartbeatIntervalMillis" : NumberLong(2000),
        "optimes" : {
                "lastCommittedOpTime" : {
                        "ts" : Timestamp(1489086772, 1),
                        "t" : NumberLong(1)
                },
                "appliedOpTime" : {
                        "ts" : Timestamp(1489086772, 1),
                        "t" : NumberLong(1)
                },
                "durableOpTime" : {
                        "ts" : Timestamp(1489086772, 1),
                        "t" : NumberLong(1)
                }
        },
        "members" : [
                {
                        "_id" : 0,
                        "name" : "Sidharths-MacBook-Pro.local:27021",
                        "health" : 1,
                        "state" : 1,
                        "stateStr" : "PRIMARY",
                        "uptime" : 77,
                        "optime" : {
                                "ts" : Timestamp(1489086772, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-09T19:12:52Z"),
                        "infoMessage" : "could not find member to sync from",
                        "electionTime" : Timestamp(1489086722, 2),
                        "electionDate" : ISODate("2017-03-09T19:12:02Z"),
                        "configVersion" : 3,
                        "self" : true
                },
                {
                        "_id" : 1,
                        "name" : "Sidharths-MacBook-Pro.local:28022",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 17,
                        "optime" : {
                                "ts" : Timestamp(1489086772, 1),

```
~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --host Sidharths-MacBook-Pro.local --port 27021 — bash — Homebrew — ttys000 — 181×49 — ⌘1

mongo --host Sidharths-MacBook-Pro.local --po...  |  mongod --port 27021 --dbpath ~/Documents/SJ... ...  |  mongod --port 28022 --dbpath ~/Documents/SJ... ...  |  mongod --port 29023 --dbpath ~/Documents/SJ... ...  +

                {
                        "_id" : 1,
                        "name" : "Sidharths-MacBook-Pro.local:28022",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 17,
                        "optime" : {
                                "ts" : Timestamp(1489086772, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDurable" : {
                                "ts" : Timestamp(1489086772, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-09T19:12:52Z"),
                        "optimeDurableDate" : ISODate("2017-03-09T19:12:52Z"),
                        "lastHeartbeat" : ISODate("2017-03-09T19:12:56.204Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-09T19:12:57.207Z"),
                        "pingMs" : NumberLong(0),
                        "syncingTo" : "Sidharths-MacBook-Pro.local:27021",
                        "configVersion" : 3
                },
                {
                        "_id" : 2,
                        "name" : "Sidharths-MacBook-Pro.local:29023",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 5,
                        "optime" : {
                                "ts" : Timestamp(1489086772, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDurable" : {
                                "ts" : Timestamp(1489086772, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-09T19:12:52Z"),
                        "optimeDurableDate" : ISODate("2017-03-09T19:12:52Z"),
                        "lastHeartbeat" : ISODate("2017-03-09T19:12:56.204Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-09T19:12:53.172Z"),
                        "pingMs" : NumberLong(0),
                        "configVersion" : 3
                }
        ],
        "ok" : 1
)
testset:PRIMARY>
```

```
~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --port 27021 — bash — Homebrew — ttys000 — 155×45 — ⌘1

mongo --port 27021 — ttys000  |  mongod --port 27021 --dbpat...  |  mongod --port 28022 --dbpa...  |  mongod --port 29023 --dbpa...  |  ...omework1 — -bash — ttys004  +

testset:PRIMARY>
testset:PRIMARY> function create_collection_1000() {
...
...     var docs = []
...
...     for(var i = 0; i < 1000; i ++) {
...
...       docs.push({
...         "_id": i,
...         "name": "student#" + i
...       })
...     }
...
...     // print(JSON.stringify(docs))
...     // inserts the records into `students` collection of `usdata` db
...     db.students.insertMany(docs)
... }
testset:PRIMARY> create_collection_1000()
testset:PRIMARY> db.getCollectionNames()
[ "cityinfo", "students" ]
testset:PRIMARY> db.students.find()
{ "_id" : 0, "name" : "student#0" }
{ "_id" : 1, "name" : "student#1" }
{ "_id" : 2, "name" : "student#2" }
{ "_id" : 3, "name" : "student#3" }
{ "_id" : 4, "name" : "student#4" }
{ "_id" : 5, "name" : "student#5" }
{ "_id" : 6, "name" : "student#6" }
{ "_id" : 7, "name" : "student#7" }
{ "_id" : 8, "name" : "student#8" }
{ "_id" : 9, "name" : "student#9" }
{ "_id" : 10, "name" : "student#10" }
{ "_id" : 11, "name" : "student#11" }
{ "_id" : 12, "name" : "student#12" }
{ "_id" : 13, "name" : "student#13" }
{ "_id" : 14, "name" : "student#14" }
{ "_id" : 15, "name" : "student#15" }
{ "_id" : 16, "name" : "student#16" }
{ "_id" : 17, "name" : "student#17" }
{ "_id" : 18, "name" : "student#18" }
{ "_id" : 19, "name" : "student#19" }
Type "it" for more
testset:PRIMARY> db.students.find().toArray().length
1000
testset:PRIMARY>
```

Screenshots for Task#2 (My machine couldn't handle VMs so I'm using AWS EC2 instances instead.)

```
~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --host ec2-52-41-163-132.us-west-2.compute.ama...

  mongo --host ec2-52-41-163-13...     ubuntu@ec2-52-41-163-132: ~ —...  ...     ubuntu@ec2-54-202-76-188: ~...  ...     ubuntu@ec2-52-35-55-89: ~ — s...  ...  +

                {
                        "_id" : 1,
                        "name" : "ec2-54-202-76-188.us-west-2.compute.amazonaws.com:28022",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 26,
                        "optime" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDurable" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-11T07:16:21Z"),
                        "optimeDurableDate" : ISODate("2017-03-11T07:16:21Z"),
                        "lastHeartbeat" : ISODate("2017-03-11T07:16:27.826Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-11T07:16:26.829Z"),
                        "pingMs" : NumberLong(0),
                        "configVersion" : 3
                },
                {
                        "_id" : 2,
                        "name" : "ec2-52-35-55-89.us-west-2.compute.amazonaws.com:29023",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 7,
                        "optime" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDurable" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-11T07:16:21Z"),
                        "optimeDurableDate" : ISODate("2017-03-11T07:16:21Z"),
                        "lastHeartbeat" : ISODate("2017-03-11T07:16:27.831Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-11T07:16:28.236Z"),
                        "pingMs" : NumberLong(0),
                        "configVersion" : 3
                }
```

```
~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --host ec2-52-41-163-132.us-west-2.compute.ama...

  mongo --host ec2-52-41-163-13...     ubuntu@ec2-52-41-163-132: ~ —...  ...     ubuntu@ec2-54-202-76-188: ~...  ...     ubuntu@ec2-52-35-55-89: ~ — s...  ...  +

                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 26,
                        "optime" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDurable" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-11T07:16:21Z"),
                        "optimeDurableDate" : ISODate("2017-03-11T07:16:21Z"),
                        "lastHeartbeat" : ISODate("2017-03-11T07:16:27.826Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-11T07:16:26.829Z"),
                        "pingMs" : NumberLong(0),
                        "configVersion" : 3
                },
                {
                        "_id" : 2,
                        "name" : "ec2-52-35-55-89.us-west-2.compute.amazonaws.com:29023",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 7,
                        "optime" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDurable" : {
                                "ts" : Timestamp(1489216581, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-11T07:16:21Z"),
                        "optimeDurableDate" : ISODate("2017-03-11T07:16:21Z"),
                        "lastHeartbeat" : ISODate("2017-03-11T07:16:27.831Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-11T07:16:28.236Z"),
                        "pingMs" : NumberLong(0),
                        "configVersion" : 3
                }
        ],
        "ok" : 1
}
testset:PRIMARY> []
```

```
~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --host ec2-52-41-163-132.us-west-2.compute.ama...

  mongo --host ec2-52-41...    ubuntu@ec2-52-41-163-...    ubuntu@ec2-54-202-76-...    ubuntu@ec2-52-35-55-...    ubuntu@ec2-52-41-163-...  +

[testset:PRIMARY> rs.addArb('ec2-52-41-163-132.us-west-2.compute.amazonaws.com:27024')
{ "ok" : 1 }
testset:PRIMARY> rs.status()
{
        "set" : "testset",
        "date" : ISODate("2017-03-11T07:23:13.937Z"),
        "myState" : 1,
        "term" : NumberLong(1),
        "heartbeatIntervalMillis" : NumberLong(2000),
        "optimes" : {
                "lastCommittedOpTime" : {
                        "ts" : Timestamp(1489216983, 1),
                        "t" : NumberLong(1)
                },
                "appliedOpTime" : {
                        "ts" : Timestamp(1489216988, 1),
                        "t" : NumberLong(1)
                },
                "durableOpTime" : {
                        "ts" : Timestamp(1489216988, 1),
                        "t" : NumberLong(1)
                }
        },
        "members" : [
                {
                        "_id" : 0,
                        "name" : "ec2-52-41-163-132.us-west-2.compute.amazonaws.com:27021",
                        "health" : 1,
                        "state" : 1,
                        "stateStr" : "PRIMARY",
                        "uptime" : 604,
                        "optime" : {
                                "ts" : Timestamp(1489216988, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-11T07:23:08Z"),
                        "electionTime" : Timestamp(1489216502, 2),
                        "electionDate" : ISODate("2017-03-11T07:15:02Z"),
                        "configVersion" : 4,
                        "self" : true
                },
                {
                        "_id" : 1,
                        "name" : "ec2-54-202-76-188.us-west-2.compute.amazonaws.com:28022",
```

```
~/Documents/SJSU/ClassesSpring2017/CS_185_C_NoSQL/homeworks/homework2 — mongo --host ec2-52-41-163-132.us-west-2.compute.ama...

  mongo --host ec2-52-41...    ubuntu@ec2-52-41-163-...    ubuntu@ec2-54-202-76-...    ubuntu@ec2-52-35-55-...    ubuntu@ec2-52-41-163-...  +

                        "lastHeartbeat" : ISODate("2017-03-11T07:23:12.437Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-11T07:23:13.449Z"),
                        "pingMs" : NumberLong(0),
                        "syncingTo" : "ec2-52-35-55-89.us-west-2.compute.amazonaws.com:29023",
                        "configVersion" : 3
                },
                {
                        "_id" : 2,
                        "name" : "ec2-52-35-55-89.us-west-2.compute.amazonaws.com:29023",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 412,
                        "optime" : {
                                "ts" : Timestamp(1489216988, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDurable" : {
                                "ts" : Timestamp(1489216988, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2017-03-11T07:23:08Z"),
                        "optimeDurableDate" : ISODate("2017-03-11T07:23:08Z"),
                        "lastHeartbeat" : ISODate("2017-03-11T07:23:12.437Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-11T07:23:13.447Z"),
                        "pingMs" : NumberLong(0),
                        "configVersion" : 3
                },
                {
                        "_id" : 3,
                        "name" : "ec2-52-41-163-132.us-west-2.compute.amazonaws.com:27024",
                        "health" : 1,
                        "state" : 7,
                        "stateStr" : "ARBITER",
                        "uptime" : 5,
                        "lastHeartbeat" : ISODate("2017-03-11T07:23:12.442Z"),
                        "lastHeartbeatRecv" : ISODate("2017-03-11T07:23:13.461Z"),
                        "pingMs" : NumberLong(0),
                        "configVersion" : 4
                }
        ],
        "ok" : 1
}
testset:PRIMARY>
```