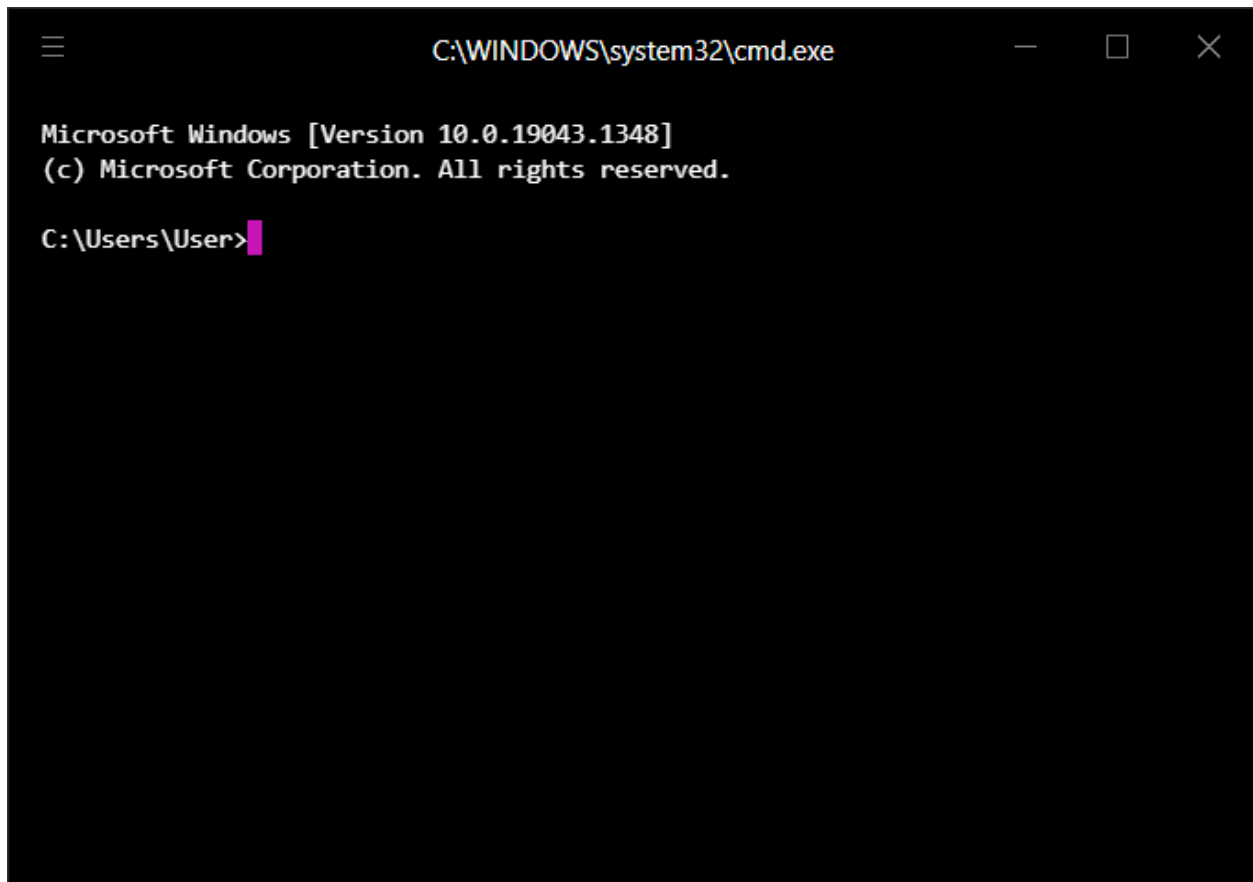# Assignment2 ทดสอบ Replica MongoDB

<u>ติดตั้งโปรแกรม</u>

ติดตั้ง Git ซึ่งได้ทำการติดตั้งไว้แล้ว
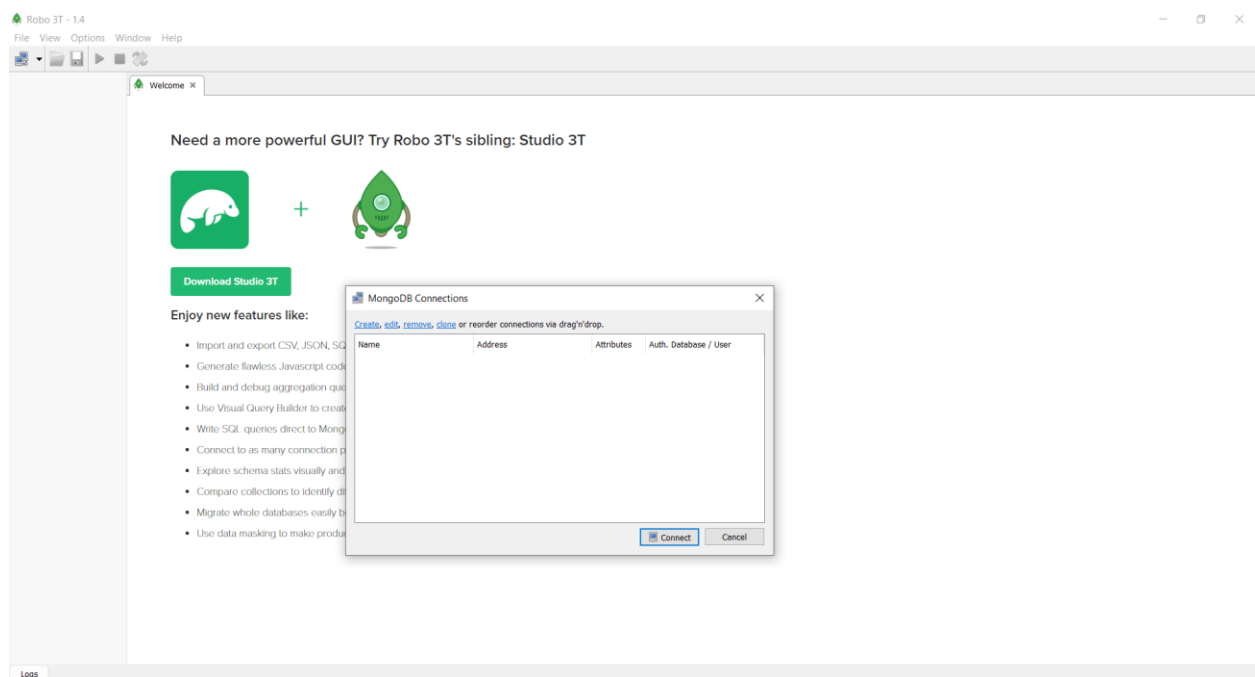
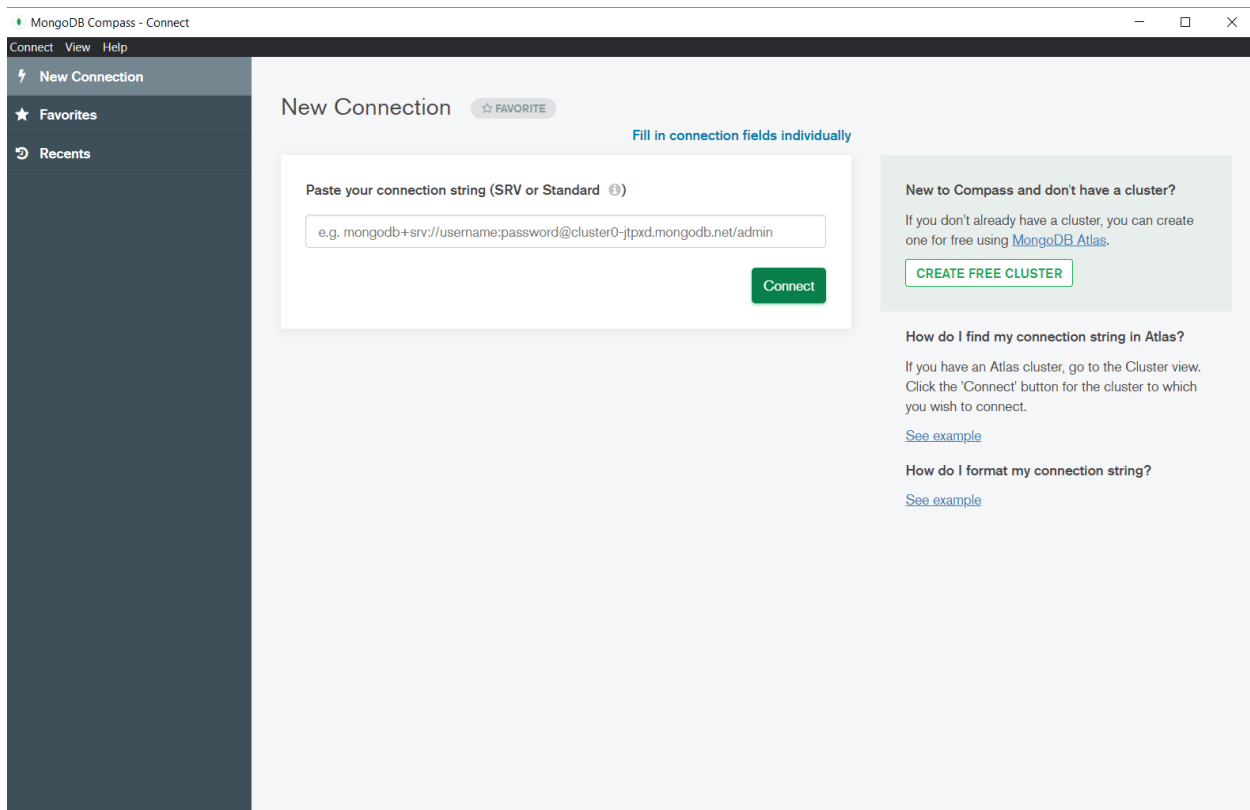ติดตั้ง Hyper Terminal

ติดตั้ง Robo3T

ติดตั้ง Mongodb
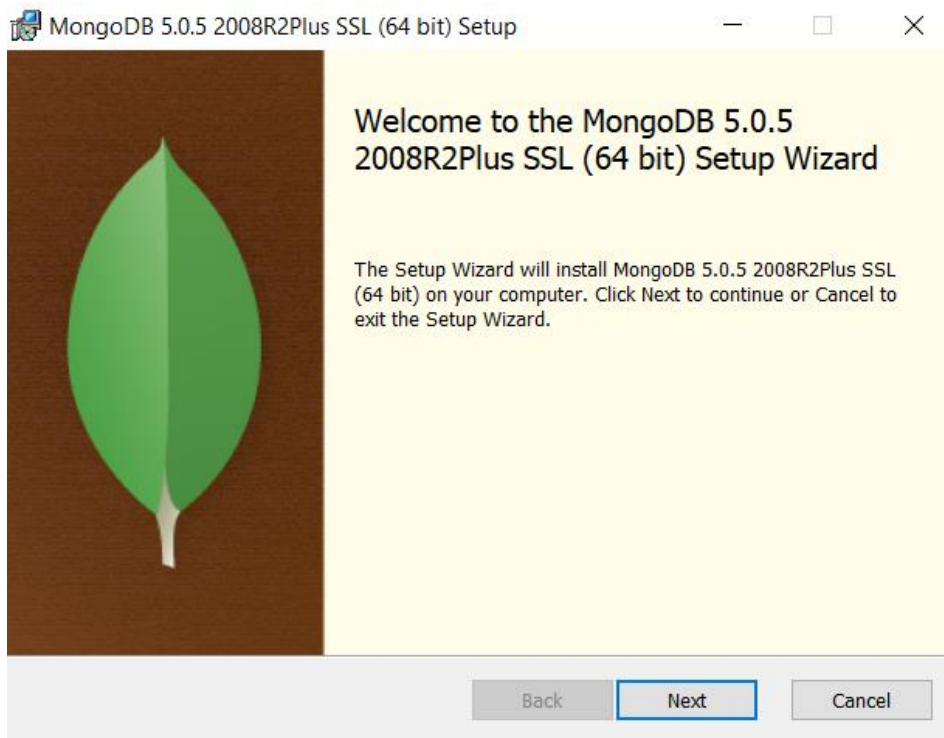
<u>ทดสอบ</u>

- สร้างโฟลเดอร์ในพื้นที่ต้องการเก็บ database
- เข้าโฟลเดอร์
- สร้าง subdirectory เก็บ database ชื่อ r1 r2 r3

```
C:\WINDOWS\system32\cmd.exe

Microsoft Windows [Version 10.0.19043.1348]
(c) Microsoft Corporation. All rights reserved.

C:\Users\User>cd desktop

C:\Users\User\Desktop> mkdir cm_replica_demo

C:\Users\User\Desktop>cd cm_replica_demo

C:\Users\User\Desktop\cm_replica_demo>mkdir r1

C:\Users\User\Desktop\cm_replica_demo>mkdir r2

C:\Users\User\Desktop\cm_replica_demo>mkdir r3

C:\Users\User\Desktop\cm_replica_demo>
```

- สร้าง replica set

```
User@DESKTOP-IQGNI08 MINGW64 ~/Desktop/cm_replica_demo
$ mongod --replSet cmpos --logpath ./r1.log --dbpath ./r1 --port 27018 &
[1] 1482

User@DESKTOP-IQGNI08 MINGW64 ~/Desktop/cm_replica_demo
$ mongod --replSet cmpos --logpath ./r2.log --dbpath ./r2 --port 27019 &
[2] 1486

User@DESKTOP-IQGNI08 MINGW64 ~/Desktop/cm_replica_demo
$ mongod --replSet cmpos --logpath ./r3.log --dbpath ./r3 --port 27020 &
[3] 1490

User@DESKTOP-IQGNI08 MINGW64 ~/Desktop/cm_replica_demo
$
```

Name	Date modified	Type
r1	11/12/2564 22:32	File folder
r2	11/12/2564 22:32	File folder
r3	11/12/2564 22:32	File folder
r1	11/12/2564 22:30	Text Document
r2	11/12/2564 22:30	Text Document
r3	11/12/2564 22:30	Text Document

- ทำการ config replicaset ใช้คำสั่ง mongo –post 27018 (เป็นการเข้าแบบ direct connection)

- แก้ไข config ใน shell

- เมื่อแก้ไขเสร็จให้ทำการ initiate replicaset ด้วยคำสั่ง rs.initiate(config);

```
> rs.initiate(config);
{ "ok" : 1 }
cmpos:SECONDARY>
```

- รอจนขึ้น cmpos : PRIMARY> ถ้านานลองกด Enter ถ้าขึ้นแล้วใช้คำสั่ง rs.status();

```
cmpos:PRIMARY> rs.status();
{
        "set" : "cmpos",
        "date" : ISODate("2021-12-11T15:52:57.956Z"),
        "myState" : 1,
        "term" : NumberLong(1),
        "syncSourceHost" : "",
        "syncSourceId" : -1,
        "heartbeatIntervalMillis" : NumberLong(2000),
        "majorityVoteCount" : 2,
        "writeMajorityCount" : 2,
        "votingMembersCount" : 3,
        "writableVotingMembersCount" : 3,
        "optimes" : {
                "lastCommittedOpTime" : {
                        "ts" : Timestamp(1639237976, 1),
                        "t" : NumberLong(1)
                },
                "lastCommittedWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
                "readConcernMajorityOpTime" : {
                        "ts" : Timestamp(1639237976, 1),
                        "t" : NumberLong(1)
                },
                "appliedOpTime" : {
                        "ts" : Timestamp(1639237976, 1),
                        "t" : NumberLong(1)
                },
                "durableOpTime" : {
                        "ts" : Timestamp(1639237976, 1),
                        "t" : NumberLong(1)
                },
                "lastAppliedWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
                "lastDurableWallTime" : ISODate("2021-12-11T15:52:56.843Z")
        },
        "lastStableRecoveryTimestamp" : Timestamp(1639237916, 1),
        "electionCandidateMetrics" : {
                "lastElectionReason" : "electionTimeout",
                "lastElectionDate" : ISODate("2021-12-11T15:47:16.789Z"),
                "electionTerm" : NumberLong(1),
                "lastCommittedOpTimeAtElection" : {
                        "ts" : Timestamp(1639237625, 1),
                        "t" : NumberLong(-1)
                },
                "lastSeenOpTimeAtElection" : {
                        "ts" : Timestamp(1639237625, 1),
```

```
                        "t" : NumberLong(-1)
                },
                "lastSeenOpTimeAtElection" : {
                        "ts" : Timestamp(1639237625, 1),
                        "t" : NumberLong(-1)
                },
                "numVotesNeeded" : 2,
                "priorityAtElection" : 1,
                "electionTimeoutMillis" : NumberLong(10000),
                "numCatchUpOps" : NumberLong(0),
                "newTermStartDate" : ISODate("2021-12-11T15:47:16.813Z"),
                "wMajorityWriteAvailabilityDate" : ISODate("2021-12-11T15:47:16.997Z")
        },
        "members" : [
                {
                        "_id" : 0,
                        "name" : "localhost:27018",
                        "health" : 1,
                        "state" : 1,
                        "stateStr" : "PRIMARY",
                        "uptime" : 1346,
                        "optime" : {
                                "ts" : Timestamp(1639237976, 1),
                                "t" : NumberLong(1)
                        },
                        "optimeDate" : ISODate("2021-12-11T15:52:56Z"),
                        "lastAppliedWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
                        "lastDurableWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
                        "syncSourceHost" : "",
                        "syncSourceId" : -1,
                        "infoMessage" : "",
                        "electionTime" : Timestamp(1639237636, 1),
                        "electionDate" : ISODate("2021-12-11T15:47:16Z"),
                        "configVersion" : 1,
                        "configTerm" : 1,
                        "self" : true,
                        "lastHeartbeatMessage" : ""
                },
                {
                        "_id" : 1,
                        "name" : "localhost:27019",
                        "health" : 1,
                        "state" : 2,
                        "stateStr" : "SECONDARY",
                        "uptime" : 352,
```

```
"optime" : {
        "ts" : Timestamp(1639237976, 1),
        "t" : NumberLong(1)
},
"optimeDurable" : {
        "ts" : Timestamp(1639237976, 1),
        "t" : NumberLong(1)
},
"optimeDate" : ISODate("2021-12-11T15:52:56Z"),
"optimeDurableDate" : ISODate("2021-12-11T15:52:56Z"),
"lastAppliedWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
"lastDurableWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
"lastHeartbeat" : ISODate("2021-12-11T15:52:56.903Z"),
"lastHeartbeatRecv" : ISODate("2021-12-11T15:52:57.419Z"),
"pingMs" : NumberLong(0),
"lastHeartbeatMessage" : "",
"syncSourceHost" : "localhost:27018",
"syncSourceId" : 0,
"infoMessage" : "",
"configVersion" : 1,
"configTerm" : 1
},
{
        "_id" : 2,
        "name" : "localhost:27020",
        "health" : 1,
        "state" : 2,
        "stateStr" : "SECONDARY",
        "uptime" : 352,
        "optime" : {
                "ts" : Timestamp(1639237976, 1),
                "t" : NumberLong(1)
        },
        "optimeDurable" : {
                "ts" : Timestamp(1639237976, 1),
                "t" : NumberLong(1)
        },
        "optimeDate" : ISODate("2021-12-11T15:52:56Z"),
        "optimeDurableDate" : ISODate("2021-12-11T15:52:56Z"),
        "lastAppliedWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
        "lastDurableWallTime" : ISODate("2021-12-11T15:52:56.843Z"),
        "lastHeartbeat" : ISODate("2021-12-11T15:52:56.903Z"),
        "lastHeartbeatRecv" : ISODate("2021-12-11T15:52:57.411Z"),
        "pingMs" : NumberLong(0),
        "lastHeartbeatMessage" : "",
        "syncSourceHost" : "localhost:27018",
```

```
                    "syncSourceId" : 0,
                    "infoMessage" : "",
                    "configVersion" : 1,
                    "configTerm" : 1
                }
        ],
        "ok" : 1,
        "$clusterTime" : {
                "clusterTime" : Timestamp(1639237976, 1),
                "signature" : {
                        "hash" : BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAA="),
                        "keyId" : NumberLong(0)
                }
        },
        "operationTime" : Timestamp(1639237976, 1)
}
cmpos:PRIMARY>
```

- ใช้คำสั่ง exit ออกจาก SHELL

```
cmpos:PRIMARY> exit
bye

User@DESKTOP-IQGNI08 MINGW64 ~/Desktop/cm_replica_demo
$
```

- เชื่อม database ด้วยวิธี recplica mode

```
User@DESKTOP-IQGNI08 MINGW64 ~/Desktop/cm_replica_demo
$ mongo --host cmpos/localhost:27018,localhost:27019,localhost:27020
MongoDB shell version v5.0.5
connecting to: mongodb://localhost:27018,localhost:27019,localhost:27020/?compressors=disabled&gssapiServiceName=m
ongodb&replicaSet=cmpos
Implicit session: session { "id" : UUID("0f2f6d12-008c-4520-a4ab-5bbc7509b262") }
MongoDB server version: 5.0.5
================
Warning: the "mongo" shell has been superseded by "mongosh",
which delivers improved usability and compatibility.The "mongo" shell has been deprecated and will be removed in
an upcoming release.
For installation instructions, see
https://docs.mongodb.com/mongodb-shell/install/
================
---
The server generated these startup warnings when booting:
        2021-12-11T22:30:31.730+07:00: Access control is not enabled for the database. Read and write access to da
ta and configuration is unrestricted
        2021-12-11T22:30:31.730+07:00: This server is bound to localhost. Remote systems will be unable to connect
 to this server. Start the server with --bind_ip <address> to specify which IP addresses it should serve responses
 from, or with --bind_ip_all to bind to all interfaces. If this behavior is desired, start the server with --bind_
ip 127.0.0.1 to disable this warning
---
---
        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()
---
cmpos:PRIMARY>
```
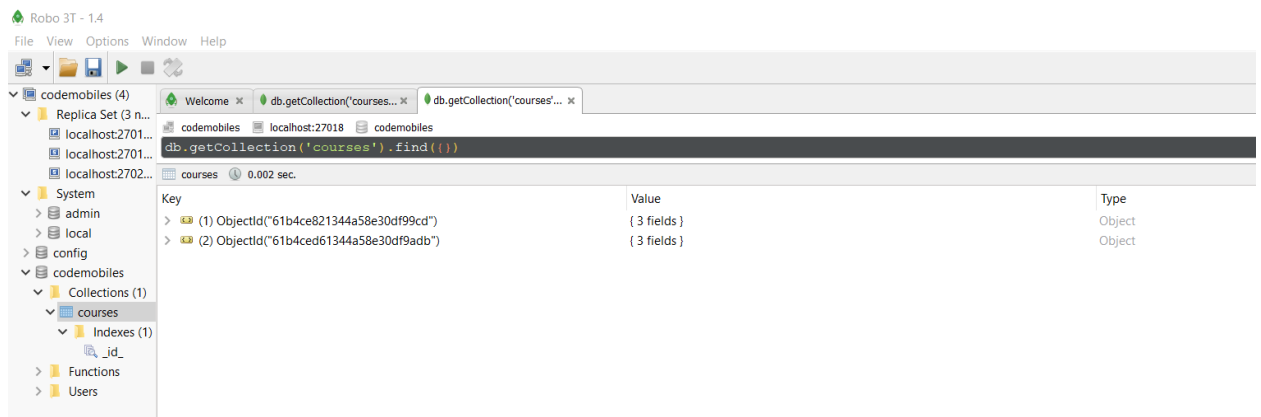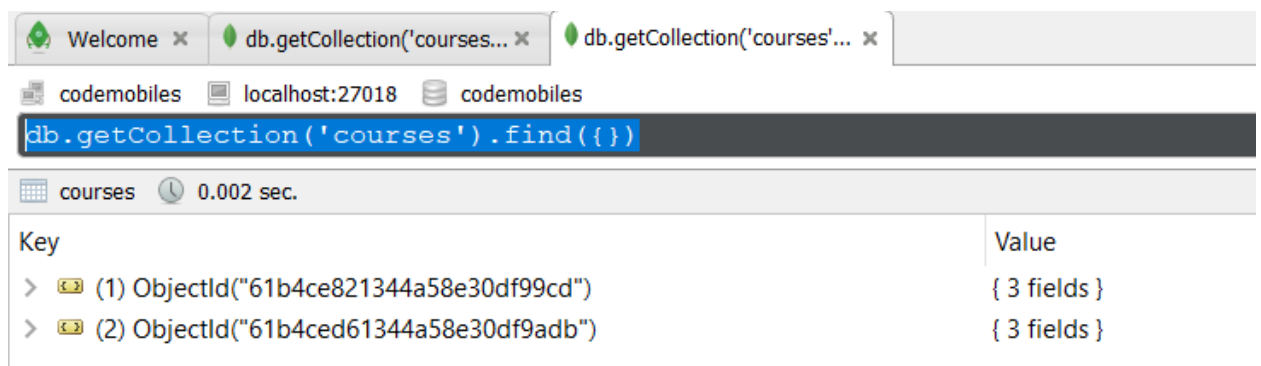
ทดสอบ FailOver ต่อโดย

- สร้าง database โดยใช้ Robo 3T
- สร้าง database ชื่อ codemobiles
- สร้าง collectionชื่อ courses
- สร้างข้อมูล 2 ชุด

- ไปที่ Hyper Terminal แล้ว connect database โดยใช้คำสั่ง use ตามด้วยชื่อ database ที่เราสร้าง


```
cmpos:PRIMARY> use codemobiles
switched to db codemobiles
```

- Copy คำสั่งข้างต้น db.getCollection('courses').find({}) จาก Robo3T

- นำคำสั่งที่ Copy มาลงใน SHELL

```
cmpos:PRIMARY> db.getCollection('courses').find({})
{ "_id" : ObjectId("61b4ce821344a58e30df99cd"), "title" : "React", "price" : 10 }
{ "_id" : ObjectId("61b4ced61344a58e30df9adb"), "title" : "Vue.js", "price" : 10 }
cmpos:PRIMARY>
```

- เปิดแท็บใหม่ แล้วเช็คว่ามี process ใดที่กำลังรันอยู่บ้าง

```
User@DESKTOP-IQGNI08 MINGW64 ~
$ ps -ef | grep mongod
    User    1486    1459 cons0    22:30:40 /c/Program Files/MongoDB/Server/5.0/bin/mongod
    User    1490    1459 cons0    22:30:48 /c/Program Files/MongoDB/Server/5.0/bin/mongod
    User    1482    1459 cons0    22:30:31 /c/Program Files/MongoDB/Server/5.0/bin/mongod
```

- ทำการ kill ลบ process 1

```
User@DESKTOP-IQGNI08 MINGW64 ~
$ kill 1486
```

- เช็ค process อีกครั้ง จะเห็นว่า process 1 หายไปแล้ว

```
User@DESKTOP-IQGNI08 MINGW64 ~
$ ps -ef | grep mongod
    User    1490    1459 cons0    22:30:48 /c/Program Files/MongoDB/Server/5.0/bin/mongod
    User    1482    1459 cons0    22:30:31 /c/Program Files/MongoDB/Server/5.0/bin/mongod
```

- กลับไปเช็คที่ SHELL เดิม จะเห็นว่า database ยังทำการ connect ได้

```
switched to db codemobiles
cmpos:PRIMARY> db.getCollection('courses').find({})
{ "_id" : ObjectId("61b4ce821344a58e30df99cd"), "title" : "React", "price" : 10 }
{ "_id" : ObjectId("61b4ced61344a58e30df9adb"), "title" : "Vue.js", "price" : 10 }
cmpos:PRIMARY> db.getCollection('courses').find({})db.getCollection('courses').find({})
uncaught exception: SyntaxError: unexpected token: identifier :
@(shell):1:36
cmpos:PRIMARY> db.getCollection('courses').find({})
{ "_id" : ObjectId("61b4ce821344a58e30df99cd"), "title" : "React", "price" : 10 }
{ "_id" : ObjectId("61b4ced61344a58e30df9adb"), "title" : "Vue.js", "price" : 10 }
cmpos:PRIMARY>
```

สรุปผลจากการทดสอบ

    MongoDB replication คือการสำรองเซิร์ฟเวอร์ หากมีเซิร์ฟเวอร์ใดล้มไป ยังสามารถกู้ข้อมูลจาก **เซิร์ฟเวอร์อื่นที่ยังทำงานอยู่ได้** หลักการของ replication คือการทำสำเนาข้อมูลให้เท่ากันทุกเครื่อง ทำให้กรณีที่มีเครื่องใดเครื่องหนึ่งไม่สามารถให้บริการได้ MongoDB จะยังสามารถให้บริการได้จาก relicaset ที่เหลือได้ด้วยความสามารถในเรื่อง Automatic Failover