

MongoDB Mini Project

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In this project, you have two options, you can choose either of the two options to exercise MongoDB. The first one would require bit more work but there are plenty of available resources that should guide you. The second one is bit simpler but would give you some hands on experience with MongoDB.

Option 2 [100 pts]:

Use MongoDB as a DB to store University DB that we used in the class. Use Python to connect to the MongoDB and insert, update and query data from MongoDB.

In either case please submit the code and screenshots of your execution.

Import pymongo, connect to MongoDB local, and create the university database:

```
import pymongo
```

```
connection = pymongo.MongoClient("mongodb://localhost")
```

```
db = connection.university  
department = db.university
```

Insert the data into MongoDB university database. Only a portino of the data is shown for input below, the full code is at the end of this document.

```
db.classroom.insert_many([
    {'building': 'Packard', 'room_number': '101', 'capacity': '500'},
    {'building': 'Painter', 'room_number': '514', 'capacity': '10'},
    {'building': 'Taylor', 'room_number': '3128', 'capacity': '70'},
    {'building': 'Watson', 'room_number': '100', 'capacity': '30'},
    {'building': 'Watson', 'room_number': '120', 'capacity': '50'}])

db.department.insert_many([
    {'dept_name': 'Biology', 'building': 'Watson', 'budget': '90000'},
    {'dept_name': 'Comp. Sci.', 'building': 'Taylor', 'budget': '100000'},
    {'dept_name': 'Elec. Eng.', 'building': 'Taylor', 'budget': '85000'},
    {'dept_name': 'Finance', 'building': 'Painter', 'budget': '120000'},
    {'dept_name': 'History', 'building': 'Painter', 'budget': '50000'},
    {'dept_name': 'Music', 'building': 'Packard', 'budget': '80000'},
    {'dept_name': 'Physics', 'building': 'Watson', 'budget': '70000'}])

db.course.insert_many([
    {'course_id': 'BIO-101', 'title': 'Intro. to Biology', 'dept_name': 'Biology', 'credits': '4'},
    {'course_id': 'BIO-301', 'title': 'Genetics', 'dept_name': 'Biology', 'credits': '4'},
    {'course_id': 'BIO-399', 'title': 'Computational Biology', 'dept_name': 'Biology', 'credits': '3'},
    {'course_id': 'CS-101', 'title': 'Intro. to Computer Science', 'dept_name': 'Comp. Sci.', 'credits': '4'},
    {'course_id': 'CS-190', 'title': 'Game Design', 'dept_name': 'Comp. Sci.', 'credits': '4'},
    {'course_id': 'CS-315', 'title': 'Robotics', 'dept_name': 'Comp. Sci.', 'credits': '3'},
    {'course_id': 'CS-319', 'title': 'Image Processing', 'dept_name': 'Comp. Sci.', 'credits': '3'},
    {'course_id': 'CS-347', 'title': 'Database System Concepts', 'dept_name': 'Comp. Sci.', 'credits': '3'},
    {'course_id': 'EE-181', 'title': 'Intro. to Digital Systems', 'dept_name': 'Elec. Eng.', 'credits': '3'},
    {'course_id': 'FIN-201', 'title': 'Investment Banking', 'dept_name': 'Finance', 'credits': '3'},
    {'course_id': 'HIS-351', 'title': 'World History', 'dept_name': 'History', 'credits': '3'},
    {'course_id': 'MU-199', 'title': 'Music Video Production', 'dept_name': 'Music', 'credits': '3'},
    {'course_id': 'PHY-101', 'title': 'Physical Principles', 'dept_name': 'Physics', 'credits': '4'}])

db.instructor.insert_many([
    {'ID': '10101', 'name': 'Srinivasan', 'dept_name': 'Comp. Sci.', 'salary': 65000},
    {'ID': '12121', 'name': 'Wu', 'dept_name': 'Finance', 'salary': 90000},
    {'ID': '15151', 'name': 'Mozart', 'dept_name': 'Music', 'salary': 40000},
    {'ID': '22222', 'name': 'Einstein', 'dept_name': 'Physics', 'salary': 95000},
    {'ID': '32343', 'name': 'El Said', 'dept_name': 'History', 'salary': 60000},
    {'ID': '33456', 'name': 'Gold', 'dept_name': 'Physics', 'salary': 87000},
    {'ID': '45565', 'name': 'Katz', 'dept_name': 'Comp. Sci.', 'salary': 75000},
    {'ID': '58583', 'name': 'Califieri', 'dept_name': 'History', 'salary': 62000},
    {'ID': '76543', 'name': 'Singh', 'dept_name': 'Finance', 'salary': 80000},
    {'ID': '76766', 'name': 'Crick', 'dept_name': 'Biology', 'salary': 72000},
    {'ID': '83821', 'name': 'Brandt', 'dept_name': 'Comp. Sci.', 'salary': 92000},
    {'ID': '98345', 'name': 'Kim', 'dept_name': 'Elec. Eng.', 'salary': 80000}])
```

Insert myself as an instructor:

```
try:
    db = connection.university
    instructor = db.instructor
    instructor.insert_one({'ID': '99990', 'name': 'Damon', 'dept_name': 'Data Science', 'salary': '101000'})
    print('Success')
except Exception as e:
    print('Failed to add instructor')
```

Success

Run a query on instructors and print all instructors. You can see I was added at the end.

```
try:
    db = connection.university
    instructor = db.instructor
    c = instructor.find()
    for i in c:
        print(i)
except Exception as e:
    print(str(e))
```

```
{'name': 'Srinivasan', 'dept_name': 'Comp. Sci.', 'salary': 65000, '_id': ObjectId('58e2e0b1383b612c80951111'), 'ID': '10101'}
{'name': 'Wu', 'dept_name': 'Finance', 'salary': 90000, '_id': ObjectId('58e2e0b1383b612c80951112'), 'ID': '12121'}
{'name': 'Mozart', 'dept_name': 'Music', 'salary': 40000, '_id': ObjectId('58e2e0b1383b612c80951113'), 'ID': '15151'}
{'name': 'Einstein', 'dept_name': 'Physics', 'salary': 95000, '_id': ObjectId('58e2e0b1383b612c80951114'), 'ID': '22222'}
{'name': 'El Said', 'dept_name': 'History', 'salary': 60000, '_id': ObjectId('58e2e0b1383b612c80951115'), 'ID': '32343'}
{'name': 'Gold', 'dept_name': 'Physics', 'salary': 87000, '_id': ObjectId('58e2e0b1383b612c80951116'), 'ID': '33456'}
{'name': 'Katz', 'dept_name': 'Comp. Sci.', 'salary': 75000, '_id': ObjectId('58e2e0b1383b612c80951117'), 'ID': '45565'}
{'name': 'Califieri', 'dept_name': 'History', 'salary': 62000, '_id': ObjectId('58e2e0b1383b612c80951118'), 'ID': '58583'}
{'name': 'Singh', 'dept_name': 'Finance', 'salary': 80000, '_id': ObjectId('58e2e0b1383b612c80951119'), 'ID': '76543'}
{'name': 'Crick', 'dept_name': 'Biology', 'salary': 72000, '_id': ObjectId('58e2e0b1383b612c8095111a'), 'ID': '76766'}
{'name': 'Brandt', 'dept_name': 'Comp. Sci.', 'salary': 92000, '_id': ObjectId('58e2e0b1383b612c8095111b'), 'ID': '83821'}
{'name': 'Kim', 'dept_name': 'Elec. Eng.', 'salary': 80000, '_id': ObjectId('58e2e0b1383b612c8095111c'), 'ID': '98345'}
{'name': 'Trace', 'dept_name': 'Data Science', 'salary': '100000', '_id': ObjectId('58e2e0c1383b612c80951182'), 'ID': '99999'}
{'name': 'Srinivasan', 'dept_name': 'Comp. Sci.', 'salary': 65000, '_id': ObjectId('58e2e277383b612c8095119d'), 'ID': '10101'}
{'name': 'Wu', 'dept_name': 'Finance', 'salary': 90000, '_id': ObjectId('58e2e277383b612c8095119e'), 'ID': '12121'}
{'name': 'Mozart', 'dept_name': 'Music', 'salary': 40000, '_id': ObjectId('58e2e277383b612c8095119f'), 'ID': '15151'}
{'name': 'Einstein', 'dept_name': 'Physics', 'salary': 95000, '_id': ObjectId('58e2e277383b612c809511a0'), 'ID': '22222'}
{'name': 'El Said', 'dept_name': 'History', 'salary': 60000, '_id': ObjectId('58e2e277383b612c809511a1'), 'ID': '32343'}
{'name': 'Gold', 'dept_name': 'Physics', 'salary': 87000, '_id': ObjectId('58e2e277383b612c809511a2'), 'ID': '33456'}
{'name': 'Katz', 'dept_name': 'Comp. Sci.', 'salary': 75000, '_id': ObjectId('58e2e277383b612c809511a3'), 'ID': '45565'}
{'name': 'Califieri', 'dept_name': 'History', 'salary': 62000, '_id': ObjectId('58e2e277383b612c809511a4'), 'ID': '58583'}
{'name': 'Singh', 'dept_name': 'Finance', 'salary': 80000, '_id': ObjectId('58e2e277383b612c809511a5'), 'ID': '76543'}
{'name': 'Crick', 'dept_name': 'Biology', 'salary': 72000, '_id': ObjectId('58e2e277383b612c809511a6'), 'ID': '76766'}
{'name': 'Brandt', 'dept_name': 'Comp. Sci.', 'salary': 92000, '_id': ObjectId('58e2e277383b612c809511a7'), 'ID': '83821'}
{'name': 'Kim', 'dept_name': 'Elec. Eng.', 'salary': 80000, '_id': ObjectId('58e2e277383b612c809511a8'), 'ID': '98345'}
{'name': 'Damon', 'dept_name': 'Data Science', 'salary': '101000', '_id': ObjectId('58e2e286383b612c8095120e'), 'ID': '99990'}
```

Run a query on instructors with a salary greater than \$50,000:

```
try:
    db = connection.university
    instructor = db.instructor
    c = instructor.find({'dept_name': 'Comp. Sci.', 'salary': {'$gt': 50000}}).sort('salary', pymongo.DESCENDING)
    for i in c:
        print(i)
except Exception as e:
    print(str(e))
```

```
{'name': 'Brandt', 'dept_name': 'Comp. Sci.', 'salary': 92000, '_id': ObjectId('58e2e0b1383b612c8095111b'), 'ID': '83821'}
{'name': 'Brandt', 'dept_name': 'Comp. Sci.', 'salary': 92000, '_id': ObjectId('58e2e277383b612c809511a7'), 'ID': '83821'}
{'name': 'Katz', 'dept_name': 'Comp. Sci.', 'salary': 75000, '_id': ObjectId('58e2e0b1383b612c80951117'), 'ID': '45565'}
{'name': 'Katz', 'dept_name': 'Comp. Sci.', 'salary': 75000, '_id': ObjectId('58e2e277383b612c809511a3'), 'ID': '45565'}
{'name': 'Srinivasan', 'dept_name': 'Comp. Sci.', 'salary': 65000, '_id': ObjectId('58e2e0b1383b612c80951111'), 'ID': '10101'}
{'name': 'Srinivasan', 'dept_name': 'Comp. Sci.', 'salary': 65000, '_id': ObjectId('58e2e277383b612c8095119d'), 'ID': '10101'}
```

Run a query on students with B in 2010:

```
try:
    db = connection.university
    takes = db.takes
    c = takes.find({'grade':{'$eq':'B'},'year':{'$eq':'2010'}})
    for i in c:
        print(i)
except Exception as e:
    print(str(e))

{'sec_id': '1', 'course_id': 'HIS-351', 'year': '2010', 'ID': '19991', 'grade': 'B', '_id': ObjectId('58e2e0b1383b612c8095114e')}, {'semester': 'Spring'}
{'sec_id': '1', 'course_id': 'CS-319', 'year': '2010', 'ID': '45678', 'grade': 'B', '_id': ObjectId('58e2e0b1383b612c80951153')}, {'semester': 'Spring'}
{'sec_id': '1', 'course_id': 'CS-315', 'year': '2010', 'ID': '98765', 'grade': 'B', '_id': ObjectId('58e2e0b1383b612c8095115b')}, {'semester': 'Spring'}
{'sec_id': '1', 'course_id': 'HIS-351', 'year': '2010', 'ID': '19991', 'grade': 'B', '_id': ObjectId('58e2e277383b612c809511da')}, {'semester': 'Spring'}
{'sec_id': '1', 'course_id': 'CS-319', 'year': '2010', 'ID': '45678', 'grade': 'B', '_id': ObjectId('58e2e277383b612c809511df')}, {'semester': 'Spring'}
{'sec_id': '1', 'course_id': 'CS-315', 'year': '2010', 'ID': '98765', 'grade': 'B', '_id': ObjectId('58e2e277383b612c809511e7')}, {'semester': 'Spring'}
```

```

import pymongo

connection = pymongo.MongoClient("mongodb://localhost")

db = connection.university
department = db.university

db.classroom.insert_many([
    {'building': 'Packard', 'room_number': '101', 'capacity': '500'},
    {'building': 'Painter', 'room_number': '514', 'capacity': '10'},
    {'building': 'Taylor', 'room_number': '3128', 'capacity': '70'},
    {'building': 'Watson', 'room_number': '100', 'capacity': '30'},
    {'building': 'Watson', 'room_number': '120', 'capacity': '50'}])

db.department.insert_many([
    {'dept_name': 'Biology', 'building': 'Watson', 'budget': '90000'},
    {'dept_name': 'Comp. Sci.', 'building': 'Taylor', 'budget': '100000'},
    {'dept_name': 'Elec. Eng.', 'building': 'Taylor', 'budget': '85000'},
    {'dept_name': 'Finance', 'building': 'Painter', 'budget': '120000'},
    {'dept_name': 'History', 'building': 'Painter', 'budget': '50000'},
    {'dept_name': 'Music', 'building': 'Packard', 'budget': '80000'},
    {'dept_name': 'Physics', 'building': 'Watson', 'budget': '70000'}])

db.course.insert_many([
    {'course_id': 'BIO-101', 'title': 'Intro. to Biology', 'dept_name': 'Biology', 'credits': '4'},
    {'course_id': 'BIO-301', 'title': 'Genetics', 'dept_name': 'Biology', 'credits': '4'},
    {'course_id': 'BIO-399', 'title': 'Computational Biology', 'dept_name': 'Biology', 'credits': '3'},
    {'course_id': 'CS-101', 'title': 'Intro. to Computer Science', 'dept_name': 'Comp. Sci.', 'credits': '4'},
    {'course_id': 'CS-190', 'title': 'Game Design', 'dept_name': 'Comp. Sci.', 'credits': '4'},
    {'course_id': 'CS-315', 'title': 'Robotics', 'dept_name': 'Comp. Sci.', 'credits': '3'},
    {'course_id': 'CS-319', 'title': 'Image Processing', 'dept_name': 'Comp. Sci.', 'credits': '3'},
    {'course_id': 'CS-347', 'title': 'Database System Concepts', 'dept_name': 'Comp. Sci.', 'credits': '3'},
    {'course_id': 'EE-181', 'title': 'Intro. to Digital Systems', 'dept_name': 'Elec. Eng.', 'credits': '3'},
    {'course_id': 'FIN-201', 'title': 'Investment Banking', 'dept_name': 'Finance', 'credits': '3'},
    {'course_id': 'HIS-351', 'title': 'World History', 'dept_name': 'History', 'credits': '3'},
    {'course_id': 'MU-199', 'title': 'Music Video Production', 'dept_name': 'Music', 'credits': '3'},
    {'course_id': 'PHY-101', 'title': 'Physical Principles', 'dept_name': 'Physics', 'credits': '4'}])

db.instructor.insert_many([
    {'ID': '10101', 'name': 'Srinivasan', 'dept_name': 'Comp. Sci.', 'salary': 65000},
    {'ID': '12121', 'name': 'Wu', 'dept_name': 'Finance', 'salary': 90000},
    {'ID': '15151', 'name': 'Mozart', 'dept_name': 'Music', 'salary': 40000},
    {'ID': '22222', 'name': 'Einstein', 'dept_name': 'Physics', 'salary': 95000},
    {'ID': '32343', 'name': 'El Said', 'dept_name': 'History', 'salary': 60000},
    {'ID': '33456', 'name': 'Gold', 'dept_name': 'Physics', 'salary': 87000},
    {'ID': '45565', 'name': 'Katz', 'dept_name': 'Comp. Sci.', 'salary': 75000},
    {'ID': '58583', 'name': 'Califieri', 'dept_name': 'History', 'salary': 62000},

```

```
{'ID': '76543', 'name': 'Singh', 'dept_name': 'Finance', 'salary': 80000},
{'ID': '76766', 'name': 'Crick', 'dept_name': 'Biology', 'salary': 72000},
{'ID': '83821', 'name': 'Brandt', 'dept_name': 'Comp. Sci.', 'salary': 92000},
{'ID': '98345', 'name': 'Kim', 'dept_name': 'Elec. Eng.', 'salary': 80000}}])
```

```
db.section.insert_many([
    {'course_id': 'BIO-101', 'sec_id': '1', 'semester': 'Summer', 'year': '2009', 'building': 'Painter', 'room_number':
'514', 'time_slot_id': 'B'},
    {'course_id': 'BIO-301', 'sec_id': '1', 'semester': 'Summer', 'year': '2010', 'building': 'Painter', 'room_number':
'514', 'time_slot_id': 'A'},
    {'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'building': 'Packard', 'room_number': '101',
'time_slot_id': 'H'},
    {'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'building': 'Packard', 'room_number':
'101', 'time_slot_id': 'F'},
    {'course_id': 'CS-190', 'sec_id': '1', 'semester': 'Spring', 'year': '2009', 'building': 'Taylor', 'room_number':
'3128', 'time_slot_id': 'E'},
    {'course_id': 'CS-190', 'sec_id': '2', 'semester': 'Spring', 'year': '2009', 'building': 'Taylor', 'room_number':
'3128', 'time_slot_id': 'A'},
    {'course_id': 'CS-315', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'building': 'Watson', 'room_number':
'120', 'time_slot_id': 'D'},
    {'course_id': 'CS-319', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'building': 'Watson', 'room_number':
'100', 'time_slot_id': 'B'},
    {'course_id': 'CS-319', 'sec_id': '2', 'semester': 'Spring', 'year': '2010', 'building': 'Taylor', 'room_number':
'3128', 'time_slot_id': 'C'},
    {'course_id': 'CS-347', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'building': 'Taylor', 'room_number': '3128',
'time_slot_id': 'A'},
    {'course_id': 'EE-181', 'sec_id': '1', 'semester': 'Spring', 'year': '2009', 'building': 'Taylor', 'room_number':
'3128', 'time_slot_id': 'C'},
    {'course_id': 'FIN-201', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'building': 'Packard', 'room_number':
'101', 'time_slot_id': 'B'},
    {'course_id': 'HIS-351', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'building': 'Painter', 'room_number':
'514', 'time_slot_id': 'C'},
    {'course_id': 'MU-199', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'building': 'Packard', 'room_number':
'101', 'time_slot_id': 'D'},
    {'course_id': 'PHY-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'building': 'Watson', 'room_number': '100',
'time_slot_id': 'A'}}])
```

```
db.teaches.insert_many([
    {'ID': '10101', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009'},
    {'ID': '10101', 'course_id': 'CS-315', 'sec_id': '1', 'semester': 'Spring', 'year': '2010'},
    {'ID': '10101', 'course_id': 'CS-347', 'sec_id': '1', 'semester': 'Fall', 'year': '2009'},
    {'ID': '12121', 'course_id': 'FIN-201', 'sec_id': '1', 'semester': 'Spring', 'year': '2010'},
    {'ID': '15151', 'course_id': 'MU-199', 'sec_id': '1', 'semester': 'Spring', 'year': '2010'},
    {'ID': '22222', 'course_id': 'PHY-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009'},
    {'ID': '32343', 'course_id': 'HIS-351', 'sec_id': '1', 'semester': 'Spring', 'year': '2010'},
    {'ID': '45565', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Spring', 'year': '2010'},
    {'ID': '45565', 'course_id': 'CS-319', 'sec_id': '1', 'semester': 'Spring', 'year': '2010'},
```

```
{'ID': '76766', 'course_id': 'BIO-101', 'sec_id': '1', 'semester': 'Summer', 'year': '2009'},
{'ID': '76766', 'course_id': 'BIO-301', 'sec_id': '1', 'semester': 'Summer', 'year': '2010'},
{'ID': '83821', 'course_id': 'CS-190', 'sec_id': '1', 'semester': 'Spring', 'year': '2009'},
{'ID': '83821', 'course_id': 'CS-190', 'sec_id': '2', 'semester': 'Spring', 'year': '2009'},
{'ID': '83821', 'course_id': 'CS-319', 'sec_id': '2', 'semester': 'Spring', 'year': '2010'},
{'ID': '98345', 'course_id': 'EE-181', 'sec_id': '1', 'semester': 'Spring', 'year': '2009']}]}
```

```
db.student.insert_many([
    {'ID': '00128', 'name': 'Zhang', 'dept_name': 'Comp. Sci.', 'tot_cred': '102'},
    {'ID': '12345', 'name': 'Shankar', 'dept_name': 'Comp. Sci.', 'tot_cred': '32'},
    {'ID': '19991', 'name': 'Brandt', 'dept_name': 'History', 'tot_cred': '80'},
    {'ID': '23121', 'name': 'Chavez', 'dept_name': 'Finance', 'tot_cred': '110'},
    {'ID': '44553', 'name': 'Peltier', 'dept_name': 'Physics', 'tot_cred': '56'},
    {'ID': '45678', 'name': 'Levy', 'dept_name': 'Physics', 'tot_cred': '46'},
    {'ID': '54321', 'name': 'Williams', 'dept_name': 'Comp. Sci.', 'tot_cred': '54'},
    {'ID': '55739', 'name': 'Sanchez', 'dept_name': 'Music', 'tot_cred': '38'},
    {'ID': '70557', 'name': 'Snow', 'dept_name': 'Physics', 'tot_cred': '0'},
    {'ID': '76543', 'name': 'Brown', 'dept_name': 'Comp. Sci.', 'tot_cred': '58'},
    {'ID': '76653', 'name': 'Aoi', 'dept_name': 'Elec. Eng.', 'tot_cred': '60'},
    {'ID': '98765', 'name': 'Bourikas', 'dept_name': 'Elec. Eng.', 'tot_cred': '98'},
    {'ID': '98988', 'name': 'Tanaka', 'dept_name': 'Biology', 'tot_cred': '120'}])}
```

```
db.takes.insert_many([
    {'ID': '00128', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'A'},
    {'ID': '00128', 'course_id': 'CS-347', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'A-'},
    {'ID': '12345', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'C'},
    {'ID': '12345', 'course_id': 'CS-190', 'sec_id': '2', 'semester': 'Spring', 'year': '2009', 'grade': 'A'},
    {'ID': '12345', 'course_id': 'CS-315', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'grade': 'A'},
    {'ID': '12345', 'course_id': 'CS-347', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'A'},
    {'ID': '19991', 'course_id': 'HIS-351', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'grade': 'B'},
    {'ID': '23121', 'course_id': 'FIN-201', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'grade': 'C+'},
    {'ID': '44553', 'course_id': 'PHY-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'B-'},
    {'ID': '45678', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'F'},
    {'ID': '45678', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'grade': 'B+'},
    {'ID': '45678', 'course_id': 'CS-319', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'grade': 'B'},
    {'ID': '54321', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'A-'},
    {'ID': '54321', 'course_id': 'CS-190', 'sec_id': '2', 'semester': 'Spring', 'year': '2009', 'grade': 'B+'},
    {'ID': '55739', 'course_id': 'MU-199', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'grade': 'A-'},
    {'ID': '76543', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'A'},
    {'ID': '76543', 'course_id': 'CS-319', 'sec_id': '2', 'semester': 'Spring', 'year': '2010', 'grade': 'A'},
    {'ID': '76653', 'course_id': 'EE-181', 'sec_id': '1', 'semester': 'Spring', 'year': '2009', 'grade': 'C'},
    {'ID': '98765', 'course_id': 'CS-101', 'sec_id': '1', 'semester': 'Fall', 'year': '2009', 'grade': 'C-'},
    {'ID': '98765', 'course_id': 'CS-315', 'sec_id': '1', 'semester': 'Spring', 'year': '2010', 'grade': 'B'},
    {'ID': '98988', 'course_id': 'BIO-101', 'sec_id': '1', 'semester': 'Summer', 'year': '2009', 'grade': 'A'},
    {'ID': '98988', 'course_id': 'BIO-301', 'sec_id': '1', 'semester': 'Summer', 'year': '2010', 'grade': 'None'}])}
```

```
db.advisor.insert_many([
    {'s_id': '00128', 'i_id': '45565'},
    {'s_id': '12345', 'i_id': '10101'},
    {'s_id': '23121', 'i_id': '76543'},
    {'s_id': '44553', 'i_id': '22222'},
    {'s_id': '45678', 'i_id': '22222'},
    {'s_id': '76543', 'i_id': '45565'},
    {'s_id': '76653', 'i_id': '98345'},
    {'s_id': '98765', 'i_id': '98345'},
    {'s_id': '98988', 'i_id': '76766'}])
```

```
db.time_slot.insert_many([
    {'time_slot_id': 'A', 'day': 'M', 'start_time': '8:00', 'end_time': '8:50'},
    {'time_slot_id': 'A', 'day': 'W', 'start_time': '8:00', 'end_time': '8:50'},
    {'time_slot_id': 'A', 'day': 'F', 'start_time': '8:00', 'end_time': '8:50'},
    {'time_slot_id': 'B', 'day': 'M', 'start_time': '9:00', 'end_time': '9:50'},
    {'time_slot_id': 'B', 'day': 'W', 'start_time': '9:00', 'end_time': '9:50'},
    {'time_slot_id': 'B', 'day': 'F', 'start_time': '9:00', 'end_time': '9:50'},
    {'time_slot_id': 'C', 'day': 'M', 'start_time': '11:00', 'end_time': '11:50'},
    {'time_slot_id': 'C', 'day': 'W', 'start_time': '11:00', 'end_time': '11:50'},
    {'time_slot_id': 'C', 'day': 'F', 'start_time': '11:00', 'end_time': '11:50'},
    {'time_slot_id': 'D', 'day': 'M', 'start_time': '13:00', 'end_time': '13:50'},
    {'time_slot_id': 'D', 'day': 'W', 'start_time': '13:00', 'end_time': '13:50'},
    {'time_slot_id': 'D', 'day': 'F', 'start_time': '13:00', 'end_time': '13:50'},
    {'time_slot_id': 'E', 'day': 'T', 'start_time': '10:30', 'end_time': '11:45'},
    {'time_slot_id': 'E', 'day': 'R', 'start_time': '10:30', 'end_time': '11:45'},
    {'time_slot_id': 'F', 'day': 'T', 'start_time': '14:30', 'end_time': '15:45'},
    {'time_slot_id': 'F', 'day': 'R', 'start_time': '14:30', 'end_time': '15:45'},
    {'time_slot_id': 'G', 'day': 'M', 'start_time': '16:00', 'end_time': '16:50'},
    {'time_slot_id': 'G', 'day': 'W', 'start_time': '16:00', 'end_time': '16:50'},
    {'time_slot_id': 'G', 'day': 'F', 'start_time': '16:00', 'end_time': '16:50'},
    {'time_slot_id': 'H', 'day': 'W', 'start_time': '10:00', 'end_time': '12:30'}])
```

```
db.prereq.insert_many([
    {'course_id': 'BIO-301', 'prereq_id': 'BIO-101'},
    {'course_id': 'BIO-399', 'prereq_id': 'BIO-101'},
    {'course_id': 'CS-190', 'prereq_id': 'CS-101'},
    {'course_id': 'CS-315', 'prereq_id': 'CS-101'},
    {'course_id': 'CS-319', 'prereq_id': 'CS-101'},
    {'course_id': 'CS-347', 'prereq_id': 'CS-101'},
    {'course_id': 'EE-181', 'prereq_id': 'PHY-101'}])
```

try:

```
db = connection.university
instructor = db.instructor
instructor.insert_one({'ID': '99990', 'name': 'Damon', 'dept_name': 'Data Science', 'salary': '101000'})
```



```
    print('Success')
except Exception as e:
    print('Failed to add instructor')
```

```
try:
    db = connection.university
    instructor = db.instructor
    c = instructor.find()
    for i in c:
        print(i)
except Exception as e:
    print(str(e))
```

```
try:
    db = connection.university
    instructor = db.instructor
    c = instructor.find({'dept_name': 'Comp. Sci.', 'salary': {'$gt': 50000}}).sort('salary', pymongo.DESENDING)
    for i in c:
        print(i)
except Exception as e:
    print(str(e))
```

```
try:
    db = connection.university
    takes = db.takes
    c = takes.find({'grade': {'$eq': 'B'}, 'year': {'$eq': 2010}})
    for i in c:
        print(i)
except Exception as e:
    print(str(e))
```