

Lab 12 – NoSQL using MongoDB

Student Name: Mustafa Farhan Qureshi

Student ID: mq09644

Questions:

Note: For each Question, you are required to write the Query as well as attach a screenshot of the output. Make sure your screenshots include the executed query.

1. Display all students.

```
db.students.find({})
```

The screenshot shows a MongoDB shell interface. On the left, there is a text input field with placeholder text "Enter a title...". Below it, a dropdown menu is set to "MongoDB". To the right of the input field are two buttons: "Run" and "Save". The code area contains the command `db.students.find({})`. The output area on the right displays the results of the query, which is a list of student documents. One document is shown in full:

```
mycompiler_mongodb>
mycompiler_mongodb> [
  {
    _id: ObjectId('691d88961305b65e686b128c'),
    FirstName: 'Hina',
    LastName: 'Baig',
    CGPA: 3.5,
    Major: 'CS',
    Address: {
      Street: 'Puran Nagar',
      City: 'Faisalabad',
      Province: 'Punjab',
      Country: 'Pakistan'
    },
    Phone: '3233389064',
    Courses: [
      { course_id: 'CS101', course_name: 'Pfun', credits: 4 },
      { course_id: 'CS121', course_name: 'OOP', credits: 4 }
    ]
  }
]
```

2. Display all the students with CS major.

```
db.students.find({'Major': 'CS'})
```

The screenshot shows a MongoDB shell interface. On the left, there is a text input field with placeholder text "Enter a title...". Below it, a dropdown menu is set to "MongoDB". To the right of the input field are two buttons: "Run" and "Save". The code area contains the command `db.students.find({'Major': 'CS'})`. The output area on the right displays the results of the query, which is a list of student documents. One document is shown in full:

```
mycompiler_mongodb>
mycompiler_mongodb> [
  {
    _id: ObjectId('691d890c265e8b94ca6b128c'),
    FirstName: 'Hina',
    LastName: 'Baig',
    CGPA: 3.5,
    Major: 'CS',
    Address: {
      Street: 'Puran Nagar',
      City: 'Faisalabad',
      Province: 'Punjab',
      Country: 'Pakistan'
    },
    Phone: '3233389064',
    Courses: [
      { course_id: 'CS101', course_name: 'Pfun', credits: 4 },
      { course_id: 'CS121', course_name: 'OOP', credits: 4 }
    ]
  }
]
```

3. Display all the students with SDP major.

```
db.students.find({'Major': 'SDP'})
```

The screenshot shows the MongoDB Compass interface. On the left, the code for the query is displayed:

```
1 db.students.insertMany([
2   { 'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': { 'Street': 'Puran Nagar', 'City': 'Faisalabad' },
3   { 'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': { 'Street': 'Off Nishter Road', 'City': 'Islamabad' },
4   { 'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SDP', 'Address': { 'Street': 'ST-2, North Nazimabad', 'City': 'Karachi' },
5   { 'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': { 'Street': '3-Khalid Centre, Wahdati', 'City': 'Islamabad' },
6   { 'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': { 'Street': 'Malik Park Islam', 'City': 'Islamabad' },
7   { 'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': { 'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan' }
8 ]
9 )
10 db.students.find({ 'Major': 'SDP' })
```

On the right, the "Output" pane displays the results of the query. It shows one student document:

```
{ "_id": ObjectId('691d895e7401775eb6b128e'), "FirstName": "Abid", "LastName": "Kasim", "CGPA": 2.9, "Major": "SDP", "Address": { "Street": "ST-2, North Nazimabad", "City": "Karachi", "Province": "Sindh", "Country": "Pakistan" }, "Phone": "9221-6678442", "Courses": [ { "course_id": "CS411", "course_name": "AI", "credits": 3 }, { "course_id": "CS121", "course_name": "OOP", "credits": 4 }, { "course_id": "CS411", "course_name": "AI", "credits": 3 } ] }
```

The output is labeled "mycompiler_mongodb".

4. Display all the students from Karachi City.

```
db.students.find({'Address.City' : 'Karachi'})
```

The screenshot shows the MongoDB Compass interface. On the left, the code for the query is displayed:

```
1 db.students.insertMany([
2   { 'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': { 'Street': 'Puran Nagar', 'City': 'Faisalabad' },
3   { 'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': { 'Street': 'Off Nishter Road', 'City': 'Islamabad' },
4   { 'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SDP', 'Address': { 'Street': 'ST-2, North Nazimabad', 'City': 'Karachi' },
5   { 'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': { 'Street': '3-Khalid Centre, Wahdati', 'City': 'Islamabad' },
6   { 'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': { 'Street': 'Malik Park Islam', 'City': 'Islamabad' },
7   { 'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': { 'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan' }
8 ]
9 )
10 db.students.find({ 'Address.City' : 'Karachi' })
```

On the right, the "Output" pane displays the results of the query. It shows two student documents:

```
{ "_id": ObjectId('691d895e7401775eb6b128e'), "FirstName": "Abid", "LastName": "Kasim", "CGPA": 2.9, "Major": "SDP", "Address": { "Street": "ST-2, North Nazimabad", "City": "Karachi", "Province": "Sindh", "Country": "Pakistan" }, "Phone": "9221-6678442", "Courses": [ { "course_id": "CS411", "course_name": "AI", "credits": 3 }, { "course_id": "CS121", "course_name": "OOP", "credits": 4 }, { "course_id": "CS411", "course_name": "AI", "credits": 3 } ] }, { "_id": ObjectId('691d8a54feb6cc3a5e6b128f'), "FirstName": "Zainab", "LastName": "Karim", "CGPA": 3.1 }
```

5. Display all the students not from Karachi City.

```
db.students.find({'Address.City' :{$ne : 'Karachi'}})
```

MongoDB Run Save

```
1 db.students.insertMany([
2 {"FirstName": "Hina", "LastName": "Baig", "CGPA": 3.5, "Major": "CS", "Address": {"Street": "Puran Nagar", "City": "Faisalabad", "Province": "Punjab", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}
3 {"FirstName": "Karim", "LastName": "Khan", "CGPA": 3.2, "Major": "EE", "Address": {"Street": "Off Nishter Road", "City": "Rawalpindi", "Province": "Punjab", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}
4 {"FirstName": "Abid", "LastName": "Kasim", "CGPA": 2.9, "Major": "SDP", "Address": {"Street": "ST-2, North Nazimabad", "City": "Karachi", "Province": "Sindh", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}
5 {"FirstName": "Zainab", "LastName": "Karim", "CGPA": 3.1, "Major": "CS", "Address": {"Street": "3-Khalid Centre, Wahdat-i-Quran", "City": "Karachi", "Province": "Sindh", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}
6 {"FirstName": "Kumar", "LastName": "Rani", "CGPA": 2.8, "Major": "EE", "Address": {"Street": "Malik Park Islam", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}
7 {"FirstName": "Fahim", "LastName": "Alam", "CGPA": 3.7, "Major": "CSE", "Address": {"Street": "Wilbert Squares", "City": "Hunza", "Province": "Gilgit-Baltistan", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
8 {"FirstName": "Muhammad", "LastName": "Ali", "CGPA": 3.4, "Major": "CIVIL", "Address": {"Street": "Sector 10, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
9 {"FirstName": "Sohail", "LastName": "Iqbal", "CGPA": 3.6, "Major": "ECE", "Address": {"Street": "Sector 12, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
10 {"FirstName": "Asif", "LastName": "Riaz", "CGPA": 3.3, "Major": "MECHANICAL", "Address": {"Street": "Sector 15, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
11 {"FirstName": "Naveed", "LastName": "Ahmed", "CGPA": 3.8, "Major": "CIVIL", "Address": {"Street": "Sector 18, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
12 {"FirstName": "Rehan", "LastName": "Khan", "CGPA": 3.9, "Major": "ECE", "Address": {"Street": "Sector 20, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
13 {"FirstName": "Mehran", "LastName": "Mirza", "CGPA": 3.5, "Major": "CIVIL", "Address": {"Street": "Sector 22, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
14 {"FirstName": "Fahad", "LastName": "Khan", "CGPA": 3.7, "Major": "ECE", "Address": {"Street": "Sector 25, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
15 {"FirstName": "Muhammad", "LastName": "Riaz", "CGPA": 3.2, "Major": "CIVIL", "Address": {"Street": "Sector 28, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "3233389064", "Courses": [{"course_id": "CS101", "course_name": "Pfun", "credits": 4}, {"course_id": "CS121", "course_name": "OOP", "credits": 4}]}])
16 db.students.find({'Address.City' :{$ne : 'Karachi'}})
```

6. Display all the students having CGPA more than 3.

```
db.students.find({'CGPA' : {$gt: 3.0}})
```

7. Display all the students having CGPA equal to 3.5

```
db.students.find({'CGPA' : {$eq: 3.5}})
```

MongoDB Run Save

```
1
2 db.students.insertMany([
3   {'Firstname':'Hina', 'LastName':'Baig','CGPA':3.5,'Major':'CS','Address':{'Street':'Puran Nagar','City': 'Faisalabad', 'Province': 'Punjab', 'Country': 'Pakistan'}, 'Phone': '3233389064', 'Courses': [
4     {'course_id': 'CS101', 'course_name': 'Fun', 'credits': 4 },
5     {'course_id': 'CS121', 'course_name': 'OOP', 'credits': 4 }
6   ]},
7   {'Firstname':'Karim', 'LastName':'Khan','CGPA':3.2,'Major':'EE','Address':{'Street': 'Off Nishter Road','City': 'Rawalpindi', 'Province': 'Punjab', 'Country': 'Pakistan'}, 'Phone': '3233389064', 'Courses': [
8     {'course_id': 'EE101', 'course_name': 'Digital Electronics', 'credits': 4 },
9     {'course_id': 'EE102', 'course_name': 'Analog Electronics', 'credits': 4 }
10   ]},
11   {'Firstname':'Abid', 'LastName':'Kasim','CGPA':2.9,'Major':'SDP','Address':{'Street': 'ST-2, North Nazimabad', 'City': 'Karachi', 'Province': 'Sindh', 'Country': 'Pakistan'}, 'Phone': '3233389064', 'Courses': [
12     {'course_id': 'SDP101', 'course_name': 'Software Development', 'credits': 4 },
13     {'course_id': 'SDP102', 'course_name': 'Database Management', 'credits': 4 }
14   ]},
15 ],
16 db.students.find({'CGPA' : {$eq: 3.5}})
```

Output

```
{
  "id": ObjectId('691d8d40c6f10bb0d16b128c'),
  "Firstname": "Hina",
  "LastName": "Baig",
  "CGPA": 3.5,
  "Major": "CS",
  "Address": {
    "street": "Puran Nagar",
    "city": "Faisalabad",
    "Province": "Punjab",
    "Country": "Pakistan"
  },
  "Phone": "3233389064",
  "Courses": [
    {
      "course_id": "CS101",
      "course_name": "Fun",
      "credits": 4
    },
    {
      "course_id": "CS121",
      "course_name": "OOP",
      "credits": 4
    }
  ]
}
```

8. Display all the students from Karachi with a CS Major.

```
db.students.find({$and: [{Address.City: 'Karachi'}, {Major: 'CS'}]})
```

```
1 db.students.insertMany([
2   {'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': {'Street': 'Puran Nagar', 'City': 'Faisalabad', 'Province': 'Punjab', 'Country': 'Pakistan'},
3   {'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': {'Street': 'Off Nishter Road', 'City': 'Lahore', 'Province': 'Punjab', 'Country': 'Pakistan'},
4   {'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SDP', 'Address': {'Street': 'ST-2, North Nazimabad', 'City': 'Karachi', 'Province': 'Sindh', 'Country': 'Pakistan'},
5   {'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': {'Street': '3-Khalid Centre, Wahdat-i-Roshni', 'City': 'Karachi', 'Province': 'Sindh', 'Country': 'Pakistan'},
6   {'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': {'Street': 'Malik Park Islam', 'City': 'Lahore', 'Province': 'Punjab', 'Country': 'Pakistan'},
7   {'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': {'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan', 'Country': 'Pakistan'}
8 ])
9
10
11
12
13
14 ])
15
16 db.students.find({$and: [{$Address.City': 'Karachi'}, {'Major': 'CS'}]})
```

9. Display all the students for the SDP and EE majors

```
db.students.find({$or: [{Major : 'SDP'}, {Major : 'EE'}]})
```

10. Display only the first and last name of all students

Result: FirstName, LastName

```
db.students.find({}, {'FirstName': 1, 'LastName': 1})
```

```
1
2 db.students.insertMany([
3   {"FirstName": "Hina", "LastName": "Baig", "CGPA": 3.5, "Major": "CS", "Address": {"Street": "Puran Nagar", "City": "Faisalabad"}, "Phone": "0333-1234567", "Email": "hina.baig@example.com", "Age": 20, "Gender": "Female", "CreatedOn": "2023-01-01T12:00:00Z", "UpdatedOn": "2023-01-01T12:00:00Z", "Status": "Active", "Score": 85, "GPA": 3.5, "Semester": "Semester 1", "Year": "2022-2023", "Section": "A", "Subject": "Computer Science", "Grade": "A", "Attendance": 95, "LastLogin": "2023-01-01T12:00:00Z", "ProfilePic": "https://example.com/hina_baig.jpg", "Notes": "Good student, needs improvement in practicals.", "Tags": ["Computer Science", "Software Development", "Database Management"]},
4   {"FirstName": "Karim", "LastName": "Khan", "CGPA": 3.2, "Major": "EE", "Address": {"Street": "Off Nishter Road", "City": "Lahore", "Province": "Punjab", "Country": "Pakistan"}, "Phone": "0333-1234568", "Email": "karim.khan@example.com", "Age": 21, "Gender": "Male", "CreatedOn": "2023-01-02T12:00:00Z", "UpdatedOn": "2023-01-02T12:00:00Z", "Status": "Active", "Score": 80, "GPA": 3.2, "Semester": "Semester 1", "Year": "2022-2023", "Section": "B", "Subject": "Electrical Engineering", "Grade": "B", "Attendance": 90, "LastLogin": "2023-01-02T12:00:00Z", "ProfilePic": "https://example.com/karim_khan.jpg", "Notes": "Consistent performer, could work on theoretical concepts.", "Tags": ["Electrical Engineering", "Power Systems", "Control Systems"]},
5   {"FirstName": "Abid", "LastName": "Kasim", "CGPA": 2.9, "Major": "SPP", "Address": {"Street": "ST-2, North Nazimabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234569", "Email": "abid.kasim@example.com", "Age": 22, "Gender": "Male", "CreatedOn": "2023-01-03T12:00:00Z", "UpdatedOn": "2023-01-03T12:00:00Z", "Status": "Active", "Score": 75, "GPA": 2.9, "Semester": "Semester 1", "Year": "2022-2023", "Section": "C", "Subject": "Software Project Planning", "Grade": "B-", "Attendance": 85, "LastLogin": "2023-01-03T12:00:00Z", "ProfilePic": "https://example.com/abid_kasim.jpg", "Notes": "Shows potential, needs more practical experience.", "Tags": ["Software Project Planning", "System Analysis", "Database Design"]},
6   {"FirstName": "Zainab", "LastName": "Karim", "CGPA": 3.1, "Major": "CS", "Address": {"Street": "3-Khalid Centre, Wahdat-i-Qadria", "City": "Rawalpindi", "Province": "Punjab", "Country": "Pakistan"}, "Phone": "0333-1234570", "Email": "zainab.karim@example.com", "Age": 20, "Gender": "Female", "CreatedOn": "2023-01-04T12:00:00Z", "UpdatedOn": "2023-01-04T12:00:00Z", "Status": "Active", "Score": 82, "GPA": 3.1, "Semester": "Semester 1", "Year": "2022-2023", "Section": "D", "Subject": "Computer Science", "Grade": "A-", "Attendance": 92, "LastLogin": "2023-01-04T12:00:00Z", "ProfilePic": "https://example.com/zainab_karim.jpg", "Notes": "Very good student, excels in practicals.", "Tags": ["Computer Science", "Machine Learning", "Cloud Computing"]},
7   {"FirstName": "Kumar", "LastName": "Rani", "CGPA": 2.8, "Major": "EE", "Address": {"Street": "Malik Park Islam", "City": "Lahore", "Province": "Punjab", "Country": "Pakistan"}, "Phone": "0333-1234571", "Email": "kumar.rani@example.com", "Age": 21, "Gender": "Male", "CreatedOn": "2023-01-05T12:00:00Z", "UpdatedOn": "2023-01-05T12:00:00Z", "Status": "Active", "Score": 78, "GPA": 2.8, "Semester": "Semester 1", "Year": "2022-2023", "Section": "E", "Subject": "Electrical Engineering", "Grade": "B+", "Attendance": 88, "LastLogin": "2023-01-05T12:00:00Z", "ProfilePic": "https://example.com/kumar_rani.jpg", "Notes": "Shows promise, needs more theoretical understanding.", "Tags": ["Electrical Engineering", "Power Electronics", "Control Systems"]},
8   {"FirstName": "Fahim", "LastName": "Alam", "CGPA": 3.7, "Major": "CS", "Address": {"Street": "Wilbert Squares", "City": "Hunza", "Province": "Gilgit-Baltistan", "Country": "Pakistan"}, "Phone": "0333-1234572", "Email": "fahim.alam@example.com", "Age": 22, "Gender": "Male", "CreatedOn": "2023-01-06T12:00:00Z", "UpdatedOn": "2023-01-06T12:00:00Z", "Status": "Active", "Score": 88, "GPA": 3.7, "Semester": "Semester 1", "Year": "2022-2023", "Section": "F", "Subject": "Computer Science", "Grade": "A", "Attendance": 98, "LastLogin": "2023-01-06T12:00:00Z", "ProfilePic": "https://example.com/fahim_alam.jpg", "Notes": "Excellent student, top of the class.", "Tags": ["Computer Science", "Data Structures", "Algorithm Analysis"]},
9   {"FirstName": "Naveed", "LastName": "Iqbal", "CGPA": 3.4, "Major": "SPP", "Address": {"Street": "Sector 10, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234573", "Email": "naveed.iqbal@example.com", "Age": 21, "Gender": "Male", "CreatedOn": "2023-01-07T12:00:00Z", "UpdatedOn": "2023-01-07T12:00:00Z", "Status": "Active", "Score": 84, "GPA": 3.4, "Semester": "Semester 1", "Year": "2022-2023", "Section": "G", "Subject": "Software Project Planning", "Grade": "A-", "Attendance": 94, "LastLogin": "2023-01-07T12:00:00Z", "ProfilePic": "https://example.com/naveed_iqbal.jpg", "Notes": "Consistent performer, needs more practical experience.", "Tags": ["Software Project Planning", "System Analysis", "Database Design"]},
10  {"FirstName": "Sohail", "LastName": "Khan", "CGPA": 3.0, "Major": "EE", "Address": {"Street": "Sector 15, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234574", "Email": "sohail.khan@example.com", "Age": 22, "Gender": "Male", "CreatedOn": "2023-01-08T12:00:00Z", "UpdatedOn": "2023-01-08T12:00:00Z", "Status": "Active", "Score": 80, "GPA": 3.0, "Semester": "Semester 1", "Year": "2022-2023", "Section": "H", "Subject": "Electrical Engineering", "Grade": "B", "Attendance": 90, "LastLogin": "2023-01-08T12:00:00Z", "ProfilePic": "https://example.com/sohail_khan.jpg", "Notes": "Shows potential, needs more practical experience.", "Tags": ["Electrical Engineering", "Power Systems", "Control Systems"]},
11  {"FirstName": "Fatima", "LastName": "Ali", "CGPA": 3.3, "Major": "CS", "Address": {"Street": "Sector 20, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234575", "Email": "fatima.ali@example.com", "Age": 21, "Gender": "Female", "CreatedOn": "2023-01-09T12:00:00Z", "UpdatedOn": "2023-01-09T12:00:00Z", "Status": "Active", "Score": 86, "GPA": 3.3, "Semester": "Semester 1", "Year": "2022-2023", "Section": "I", "Subject": "Computer Science", "Grade": "A-", "Attendance": 96, "LastLogin": "2023-01-09T12:00:00Z", "ProfilePic": "https://example.com/fatima_ali.jpg", "Notes": "Very good student, excels in practicals.", "Tags": ["Computer Science", "Machine Learning", "Cloud Computing"]},
12  {"FirstName": "Muhammad", "LastName": "Rehman", "CGPA": 3.6, "Major": "EE", "Address": {"Street": "Sector 25, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234576", "Email": "muhammad.rehman@example.com", "Age": 22, "Gender": "Male", "CreatedOn": "2023-01-10T12:00:00Z", "UpdatedOn": "2023-01-10T12:00:00Z", "Status": "Active", "Score": 89, "GPA": 3.6, "Semester": "Semester 1", "Year": "2022-2023", "Section": "J", "Subject": "Electrical Engineering", "Grade": "A", "Attendance": 97, "LastLogin": "2023-01-10T12:00:00Z", "ProfilePic": "https://example.com/muhammad_rehman.jpg", "Notes": "Excellent student, top of the class.", "Tags": ["Electrical Engineering", "Power Electronics", "Control Systems"]},
13  {"FirstName": "Sara", "LastName": "Khan", "CGPA": 3.8, "Major": "CS", "Address": {"Street": "Sector 30, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234577", "Email": "sara.khan@example.com", "Age": 21, "Gender": "Female", "CreatedOn": "2023-01-11T12:00:00Z", "UpdatedOn": "2023-01-11T12:00:00Z", "Status": "Active", "Score": 91, "GPA": 3.8, "Semester": "Semester 1", "Year": "2022-2023", "Section": "K", "Subject": "Computer Science", "Grade": "A", "Attendance": 98, "LastLogin": "2023-01-11T12:00:00Z", "ProfilePic": "https://example.com/sara_khan.jpg", "Notes": "Excellent student, top of the class.", "Tags": ["Computer Science", "Machine Learning", "Cloud Computing"]},
14  {"FirstName": "Asif", "LastName": "Iqbal", "CGPA": 3.5, "Major": "SPP", "Address": {"Street": "Sector 35, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234578", "Email": "asif.iqbal@example.com", "Age": 22, "Gender": "Male", "CreatedOn": "2023-01-12T12:00:00Z", "UpdatedOn": "2023-01-12T12:00:00Z", "Status": "Active", "Score": 87, "GPA": 3.5, "Semester": "Semester 1", "Year": "2022-2023", "Section": "L", "Subject": "Software Project Planning", "Grade": "A-", "Attendance": 93, "LastLogin": "2023-01-12T12:00:00Z", "ProfilePic": "https://example.com/asif_iqbal.jpg", "Notes": "Consistent performer, needs more practical experience.", "Tags": ["Software Project Planning", "System Analysis", "Database Design"]},
15  {"FirstName": "Umair", "LastName": "Khan", "CGPA": 3.9, "Major": "EE", "Address": {"Street": "Sector 40, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234579", "Email": "umair.khan@example.com", "Age": 21, "Gender": "Male", "CreatedOn": "2023-01-13T12:00:00Z", "UpdatedOn": "2023-01-13T12:00:00Z", "Status": "Active", "Score": 90, "GPA": 3.9, "Semester": "Semester 1", "Year": "2022-2023", "Section": "M", "Subject": "Electrical Engineering", "Grade": "A", "Attendance": 96, "LastLogin": "2023-01-13T12:00:00Z", "ProfilePic": "https://example.com/umair_khan.jpg", "Notes": "Excellent student, top of the class.", "Tags": ["Electrical Engineering", "Power Systems", "Control Systems"]},
16  {"FirstName": "Fatima", "LastName": "Khan", "CGPA": 3.7, "Major": "CS", "Address": {"Street": "Sector 45, Islamabad", "City": "Islamabad", "Province": "Islamabad Capital Territory", "Country": "Pakistan"}, "Phone": "0333-1234580", "Email": "fatima.khan@example.com", "Age": 22, "Gender": "Female", "CreatedOn": "2023-01-14T12:00:00Z", "UpdatedOn": "2023-01-14T12:00:00Z", "Status": "Active", "Score": 88, "GPA": 3.7, "Semester": "Semester 1", "Year": "2022-2023", "Section": "N", "Subject": "Computer Science", "Grade": "A-", "Attendance": 95, "LastLogin": "2023-01-14T12:00:00Z", "ProfilePic": "https://example.com/fatima_khan.jpg", "Notes": "Very good student, excels in practicals.", "Tags": ["Computer Science", "Machine Learning", "Cloud Computing"]}], {"FirstName": "Hina", "LastName": "Baig"}]
```

11. Display only the first name, last name, and city for all students.
Result: FirstName, LastName, City

```
db.students.find({}, {'FirstName': 1, 'LastName': 1, 'Address.City': 1})
```

```
1 db.students.insertMany([
2   {FirstName:'Hina', LastName:'Baig', CGPA:3.5, Major:'CS', Address:{'Street': 'Puran Nagar', 'City': 'Faisalabad'},
3   {FirstName:'Karim', LastName:'Khan', CGPA:3.2, Major:'EE', Address:{'Street': 'Off Nishter Road', 'City': 'Faisalabad'},
4   {FirstName:'Abid', LastName:'Kasim', CGPA:2.9, Major:'SOP', Address:{'Street': 'ST-2, North Nazimabad', 'City': 'Faisalabad'},
5   {FirstName:'Zainab', LastName:'Karim', CGPA:3.1, Major:'CS', Address:{'Street': '3-Khalid Centre, Wahdat Iqbal Road', 'City': 'Faisalabad'},
6   {FirstName:'Kumar', LastName:'Rani', CGPA:2.8, Major:'EE', Address:{'Street': 'Malik Park Islam', 'City': 'Faisalabad'},
7   {FirstName:'Fahim', LastName:'Alam', CGPA:3.7, Address:{'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan'},
8   {FirstName:'Ayesha', LastName:'Iqbal', CGPA:3.4, Major:'CS', Address:{'Street': 'Gulberg Green', 'City': 'Lahore', 'Province': 'Punjab'},
9   {FirstName:'Muhammad', LastName:'Ali', CGPA:3.0, Major:'EE', Address:{'Street': 'DHA Phase 8', 'City': 'Lahore', 'Province': 'Punjab'},
10  {FirstName:'Fatima', LastName:'Javed', CGPA:3.6, Major:'SOP', Address:{'Street': 'DHA Phase 5', 'City': 'Lahore', 'Province': 'Punjab'},
11  {FirstName:'Asif', LastName:'Khan', CGPA:2.7, Major:'EE', Address:{'Street': 'DHA Phase 10', 'City': 'Lahore', 'Province': 'Punjab'},
12  {FirstName:'Naveed', LastName:'Ahmed', CGPA:3.3, Major:'CS', Address:{'Street': 'DHA Phase 6', 'City': 'Lahore', 'Province': 'Punjab'},
13  {FirstName:'Sohail', LastName:'Riaz', CGPA:3.8, Major:'EE', Address:{'Street': 'DHA Phase 9', 'City': 'Lahore', 'Province': 'Punjab'},
14  {FirstName:'Rehman', LastName:'Khan', CGPA:3.5, Major:'SOP', Address:{'Street': 'DHA Phase 7', 'City': 'Lahore', 'Province': 'Punjab'},
15  {FirstName:'Umer', LastName:'Khan', CGPA:3.2, Major:'EE', Address:{'Street': 'DHA Phase 11', 'City': 'Lahore', 'Province': 'Punjab'},
16  {FirstName:'Mehreen', LastName:'Khan', CGPA:3.9, Major:'CS', Address:{'Street': 'DHA Phase 4', 'City': 'Lahore', 'Province': 'Punjab'}
])
```

```
Output
  FirstName: 'Karim',
  LastName: 'Khan',
  Address: { City: 'Karachi' }
},
{
  _id: ObjectId('691d8f4ce0bf1d7d306b128e'),
  FirstName: 'Abid',
  LastName: 'Kasim',
  Address: { City: 'Karachi' }
},
{
  _id: ObjectId('691d8f4ce0bf1d7d306b128f'),
  FirstName: 'Zainab',
  LastName: 'Karim',
  Address: { City: 'Karachi' }
},
{
  _id: ObjectId('691d8f4ce0bf1d7d306b1290'),
  FirstName: 'Kuman',
  LastName: 'Rani',
  Address: { City: 'Lahore' }
```

12. Display only the first name, last name for all the students with CGPA greater than or equal to 3.5 (without Object IDs)

```
db.students.find({'CGPA': {$gte: 3.5}}, {'_id': 0, 'FirstName': 1, 'LastName': 1})
```

```
MongoDB    
1 db.students.insertMany([  
2   { 'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': { 'Street': 'Puran Nagar', 'City': 'Faisalabad' }, 'Phone': '0345-1234567' },  
3   { 'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': { 'Street': 'Off Nishter Road', 'City': 'Lahore' }, 'Phone': '0311-1234567' },  
4   { 'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SOP', 'Address': { 'Street': 'ST-2, North Nazimabad', 'City': 'Karachi' }, 'Phone': '021-1234567' },  
5   { 'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': { 'Street': '3-Khalid Centre, Wahdat-i-Qadria', 'City': 'Lahore' }, 'Phone': '0311-1234567' },  
6   { 'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': { 'Street': 'Malik Park Islam', 'City': 'Lahore' }, 'Phone': '0311-1234567' },  
7   { 'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': { 'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan' }, 'Phone': '0345-1234567' }  
8 ])  
9  
10 db.students.find({ 'CGPA': { '$gte': 3.5 } }, { '_id': 0, 'FirstName': 1, 'LastName': 1 })  
11  
12
```

```
Output

a
mycompiler_mongodb>
: mycompiler_mongodb> . . . . . . . . . . . . . . . .
acknowledged: true,
insertedIds: [
  '0': ObjectId('691d8fee55fd028ae0eb128c'),
  '1': ObjectId('691d8fee55fd028ae0eb128d'),
  '2': ObjectId('691d8fee55fd028ae0eb128e'),
  '3': ObjectId('691d8fee55fd028ae0eb128f'),
  '4': ObjectId('691d8fee55fd028ae0eb1290'),
  '5': ObjectId('691d8fee55fd028ae0eb1291')
}
mycompiler_mongodb>
mycompiler_mongodb> [
  { FirstName: 'Hina', LastName: 'Baig' },
  { FirstName: 'Fahim', LastName: 'Alam' }
]
mycompiler_mongodb>
```

13. Insert a student record with the following information (refer to manual)

```
db.students.insert({'FirstName' : 'Fatima', 'LastName': 'Tariq', 'Phone': '03124567891',  
'Address':{'Street': 'Zainab Street Saddar', 'City': 'Karachi'}})
```

```
1
2
3 :{"Street":'Puran Nagar','City': 'Faisalabad','Province': 'Punjab','Country': 'Pakistan'}, 'Phone': '3233389064', 'Co
4
5 :{'Street': ' Off Nishter Road', 'City': 'Karachi', 'Province': 'Sindh', 'Country': 'Pakistan'}, 'Phone': '9221-7733790
6
7 :{"Street":'ST-2, North Nazimabad','City': 'Karachi','Province': 'Sindh', 'Country': 'Pakistan'}, 'Phone': '9221-6
8
9 :ss:{'Street': '3-Khalid Centre, Wahdat Road','City': 'Karachi', 'Province': 'Sindh', 'Country': 'Pakistan'}, 'Phone':
10
11 :{"Street":'Malik Park Islam','City': 'Lahore', 'Province': 'Punjab','Country': 'Pakistan'}, 'Phone': '042-7113284',
12
13 Wilbert Squares','City': 'Hunza', 'Province': 'Gilgit-Baltistan', 'Country': 'Pakistan'}, 'Phone': '359-99997'}
14
15
16 : '03124567891', 'Address': {'Street': 'Zainab Street Saddar', 'City': 'Karachi'}}]
```

```
Output
Co      CGPA: 3.7,
Address: {
  Street: 'Wilbert Squares',
  City: 'Hunza',
  Province: 'Gilgit-Baltistan',
  Country: 'Pakistan'
},
Phone: '359-99997'
},
{
  _id: ObjectId('691d91323051faa80a6b1292'),
  FirstName: 'Fatima',
  LastName: 'Tariq',
  Phone: '03124567891',
  Address: { Street: 'Zainab Street Saddar', City: 'Karachi'
}
]
mycompiler_mongodb>
```

14. Display all the student who do not have major property.

```
db.students.find({'Major': {$exists: 0}})
```

The screenshot shows a MongoDB shell interface with the following details:

- Input:** The command entered is `db.students.find({'Major': {\$exists: 0}})`.
- Output:** The results show one document from the collection "mycompiler_mongodb".

```
_id: ObjectId('691d91d5e537e546626b1291'),  
FirstName: 'Fahim',  
LastName: 'Alam',  
CGPA: 3.7,  
Address: {  
    Street: 'Wilbert Squares',  
    City: 'Hunza',  
    Province: 'Gilgit-Baltistan',  
    Country: 'Pakistan'  
},  
Phone: '359-99997'  
}
```
- Status:** [Execution complete with exit code 0]

15. Insert the following students using insertMany (refer to manual)

```
db.students.insertMany([{'FirstName': 'Zahid', 'LastName' : 'Hakim', 'Major' : 'CS'},  
'{'FirstName': 'Ayesha', 'LastName': 'Asif'}, {'FirstName': 'Faheem', 'LastName' : 'Faiz',  
'Phone': '0213456789'}])
```

The screenshot shows a MongoDB shell interface with the following details:

- Input:** The command entered is `db.students.insertMany([{'FirstName': 'Zahid', 'LastName' : 'Hakim', 'Major' : 'CS'}, '->{'FirstName': 'Ayesha', 'LastName': 'Asif'}, {'FirstName': 'Faheem', 'LastName' : 'Faiz', 'Phone': '0213456789'}])`.
- Output:** The results show three new documents inserted into the collection "mycompiler_mongodb".

```
_id: ObjectId('691d92fb21a6c9d42a6b1292'),  
FirstName: 'Zahid',  
LastName: 'Hakim',  
Major: 'CS'  
,  
{  
_id: ObjectId('691d92fb21a6c9d42a6b1293'),  
FirstName: 'Ayesha',  
LastName: 'Asif'  
,  
{  
_id: ObjectId('691d92fb21a6c9d42a6b1294'),  
FirstName: 'Faheem',  
LastName: 'Faiz',  
Phone: '0213456789'  
}  
]
```
- Status:** [Execution complete with exit code 0]

16. Display all the students have taken the CS355 course.

```
db.students.find({'Courses.course_id': 'CS355'})
```

```
1 db.students.insertMany([
2   {'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': {'Street': 'Puran Nagar', 'City': 'Faisalabad'},
3   {'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': {'Street': 'Off Nishter Road', 'City': 'Lahore'},
4   {'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SOP', 'Address': {'Street': 'ST-2, North Nazimabad', 'City': 'Karachi'},
5   {'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': {'Street': '3-Khalid Centre, Wahdat-i-Quran', 'City': 'Islamabad'},
6   {'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': {'Street': 'Malik Park Islam', 'City': 'Hunza'},
7   {'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': {'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan'},
8   {'FirstName': 'Khalid', 'LastName': 'Ali', 'CGPA': 3.0, 'Major': 'EE', 'Address': {'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan'}
9 ])
10 db.students.find({'Courses.course_id': 'CS355'})
```

```
Output
      '5': ObjectId('691d93747cc81f8bcc6b1291')
    }
  }
mycompiler_mongodb>
mycompiler_mongodb> [
  {
    '_id': ObjectId('691d93747cc81f8bcc6b128d'),
    'FirstName': 'Karim',
    'LastName': 'Khan',
    'CGPA': 3.2,
    'Major': 'EE',
    'Address': {
      'Street': 'Off Nishter Road',
      'City': 'Karachi',
      'Province': 'Sindh',
      'Country': 'Pakistan'
    },
    'Phone': '9221-7733790',
    'Courses': [
      { 'course_id': 'CH111', 'course_name': 'PMAS', 'credits: 3 },
      { 'course_id': 'CS355', 'course_name': 'DB', 'credits: 4 }
    ]
  }
```

17. Display all the students have not taken the CS355 course.

```
db.students.find({'Courses.course_id': {$ne : 'CS355'}})
```

```
1 db.students.insertMany([
2   {'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': {'Street': 'Puran Nagar', 'City': 'Faisalabad'},
3   {'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': {'Street': 'Off Nishter Road', 'City': 'Lahore'},
4   {'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SOP', 'Address': {'Street': 'ST-2, North Nazimabad', 'City': 'Karachi'},
5   {'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': {'Street': '3-Khalid Centre, Wahdat-i-Quran', 'City': 'Islamabad'},
6   {'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': {'Street': 'Malik Park Islam', 'City': 'Hunza'},
7   {'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': {'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan'},
8   {'FirstName': 'Khalid', 'LastName': 'Ali', 'CGPA': 3.0, 'Major': 'EE', 'Address': {'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan'}
9 ])
10 db.students.find({'Courses.course_id': {$ne : 'CS355'}})
```

```
Output
      '4': ObjectId('691d93b1e37add50376b1291'),
      'Address': {
        'Street': 'Malik Park Islam',
        'City': 'Lahore',
        'Province': 'Punjab',
        'Country': 'Pakistan'
      },
      'Phone': '042-7113284',
      'Courses': [ { 'course_id': 'CS101', 'course_name': 'Pfun', 'credits: 4 } ]
    },
    {
      '_id': ObjectId('691d93b1e37add50376b1291'),
      'FirstName': 'Fahim',
      'LastName': 'Alam',
      'CGPA': 3.7,
      'Address': {
        'Street': 'Wilbert Squares',
        'City': 'Hunza',
        'Province': 'Gilgit-Baltistan',
        'Country': 'Pakistan'
      },
      'Phone': '9221-7733790'
    }
```

18. Increment the CGPA of all students by 0.1.

```
db.students.updateMany({}, { $inc : {'CGPA': 0.1}})
```

```
1 db.students.insertMany([
2   {'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': {'Street': 'Puran Nagar', 'City': 'Faisalabad'},
3   {'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': {'Street': 'Off Nishter Road', 'City': 'Lahore'},
4   {'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SOP', 'Address': {'Street': 'ST-2, North Nazimabad', 'City': 'Karachi'},
5   {'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': {'Street': '3-Khalid Centre, Wahdat-i-Quran', 'City': 'Islamabad'},
6   {'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': {'Street': 'Malik Park Islam', 'City': 'Hunza'},
7   {'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': {'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan'},
8   {'FirstName': 'Khalid', 'LastName': 'Ali', 'CGPA': 3.0, 'Major': 'EE', 'Address': {'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan'}
9 ])
10 db.students.updateMany({}, { $inc : {'CGPA': 0.1}})
```

```
Output
      'insertedIds: [
        '0': ObjectId('691d946eac3869e1086b128c'),
        '1': ObjectId('691d946eac3869e1086b128d'),
        '2': ObjectId('691d946eac3869e1086b128e'),
        '3': ObjectId('691d946eac3869e1086b128f'),
        '4': ObjectId('691d946eac3869e1086b1290'),
        '5': ObjectId('691d946eac3869e1086b1291')
      ]
    }
mycompiler_mongodb>
mycompiler_mongodb> {
  acknowledged: true,
  insertedId: null,
  matchedCount: 6,
  modifiedCount: 6,
  upsertedCount: 0
}
mycompiler_mongodb>
```

[Execution complete with exit code 0]

19. Set the CGPA of all students to 0.1

```
db.students.updateMany({}, {$set : {'CGPA': 0.1}})
```

MongoDB

 Run Save

```
1 db.students.insertMany([
2   { 'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': { 'Street': 'Puran Nagar', 'City': 'Faisalabad' },
3   { 'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': { 'Street': 'Off Nishter Road', 'City': 'Faisalabad' },
4   { 'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SOP', 'Address': { 'Street': 'ST-2, North Nazimabad', 'City': 'Faisalabad' },
5   { 'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': { 'Street': '3-Khalid Centre, Wahdat-e-Qadri', 'City': 'Faisalabad' },
6   { 'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': { 'Street': 'Malik Park Islam', 'City': 'Faisalabad' },
7   { 'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': { 'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan' }
8 ])
9
10 db.students.updateMany({}, { $set : { 'CGPA': 0.1 } })
11 db.students.find({})
```

```
Output
a:
  {
    City: 'Karachi',
    Province: 'Sindh',
    Country: 'Pakistan'
  },
  Phone: '9221-7733790',
  Courses: [
    { course_id: 'CH111', course_name: 'PMAS', credits: 3 },
    { course_id: 'CS355', course_name: 'DB', credits: 4 }
  ],
  {
    _id: ObjectId('e91d94a6ad4dacb97a6b128e'),
    FirstName: 'Abid',
    LastName: 'Kasim',
    CGPA: 0.1,
    Major: 'SDP',
    Address: {
      Street: 'ST-2, North Nazimabad,',
      City: 'Karachi',
      Province: 'Sindh',
      Country: 'Pakistan'
    }
  }
}
```

20. Introduce a new attribute Minor for the students with the value CH

```
db.students.updateMany({}, {$set : {'Minor': "CH"}})
```

MongoDB ▾

 Run Save

```
1 db.students.insertMany([
2   { "FirstName": "Hina", "LastName": "Baig", "CGPA": 3.5, "Major": "CS", "Address": { "Street": "Puran Nagar", "City": "Faisalabad" },
3   { "FirstName": "Karim", "LastName": "Khan", "CGPA": 3.2, "Major": "EE", "Address": { "Street": "off Nishter Road", "City": "Rawalpindi" },
4   { "FirstName": "Abid", "LastName": "Kasim", "CGPA": 2.9, "Major": "SOP", "Address": { "Street": "ST-2, North Nazimabad", "City": "Islamabad" },
5   { "FirstName": "Zainab", "LastName": "Karim", "CGPA": 3.1, "Major": "CS", "Address": { "Street": "3-Khalid Centre, Wahdat-e-Quran" },
6   { "FirstName": "Kumar", "LastName": "Rani", "CGPA": 2.8, "Major": "EE", "Address": { "Street": "Malik Park Islam", "City": "Lahore" },
7   { "FirstName": "Fahim", "LastName": "Alam", "CGPA": 3.7, "Address": { "Street": "Wilbert Squares", "City": "Hunza", "Province": "Gilgit-Baltistan" }
8 ]
9 )
10
11 db.students.updateMany({}, { $set: { "Minor": "CH" } })
12 db.students.find({})
13
14
15
16
17
18
```

```
Output
a      Province: 'Punjab',
:        Country: 'Pakistan'
:    },
: Phone: '3233380064',
: Courses: [
:     { course_id: 'CS101', course_name: 'Pfun', credits: 4 },
:     { course_id: 'CS121', course_name: 'OOP', credits: 4 }
: ],
: Minor: 'CH'
: },
: {
:     _id: ObjectId('691d960973b8c675496b128d'),
:     FirstName: 'Karim',
:     LastName: 'Khan',
:     CGPA: 3.2,
:     Major: 'EE',
:     Address: {
:         Street: 'Off Nishter Road',
:         City: 'Karachi',
:         Province: 'Sindh',
:         Country: 'Pakistan'
```

21. Add a new course all students with the following information (refer to manual)

```
db.students.updateMany({}, {$push : {'Courses': {'course_id' : 'CH101', 'course_name' : 'Liberal Core', 'credits': 1}}})
```

The screenshot shows the MongoDB Compass interface. The left panel contains a query in the MongoDB shell syntax:

```
1 db.students.insertMany([
2   { 'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': { 'street': 'Puran Nagar', 'city': 'Faisalabad' },
3   { 'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': { 'street': 'Off Nishter Road', 'city': 'Rawalpindi' },
4   { 'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SDP', 'Address': { 'street': 'ST-2, North Nazimabad', 'city': 'Islamabad' },
5   { 'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': { 'street': '3-Khalid Centre, Wahdat-e-Islam', 'city': 'Islamabad' },
6   { 'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': { 'street': 'Malik Park Islam', 'city': 'Islamabad' }
7 ]
8 )
9 { 'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': { 'street': 'Wilbert Squares', 'city': ' Hunza', 'Province': 'Gilgit-Baltistan', 'Country': 'Pakistan' }
10 }
11 )
12 { 'push': { 'Courses': { 'course_id': 'CH101', 'course_name': 'Liberal Core', 'credits': 1 } }
13 }
14 ]
15 )
16 db.students.updateMany( {}, { $push : { 'Courses': { 'course_id': 'CH101', 'course_name': 'Liberal Core', 'credits': 1 } } }
17 db.students.find({})
```

The right panel, titled "Output", displays the results of the query. It shows a single document representing a student named Fahim Alam with a CGPA of 3.7. He has one course entry in his array, which is "Liberal Core" with a credit value of 1. The output is formatted as JSON:

```
courses: [
  { course_id: 'CS101', course_name: 'Pfun', credits: 4 },
  { course_id: 'CH101', course_name: 'Liberal Core', credits: 1 }
]
{
  _id: ObjectId('691d9b323fbf039f1b6b1291'),
  FirstName: 'Fahim',
  LastName: 'Alam',
  CGPA: 3.7,
  Address: {
    Street: 'Wilbert Squares',
    City: ' Hunza',
    Province: 'Gilgit-Baltistan',
    Country: 'Pakistan'
  },
  Phone: '359-99997',
  Courses: [ { course_id: 'CH101', course_name: 'Liberal Core', credits: 1 } ]
}
mycompiler_mongodb>
```

22. Delete all the students with CGPA less than 3.0

```
db.students.deleteMany({'CGPA' : {$lt: 3.0}})
```

```
1 db.students.insertMany([
2   { 'FirstName': 'Hina', 'LastName': 'Baig', 'CGPA': 3.5, 'Major': 'CS', 'Address': { 'Street': 'Puran Nagar', 'City': 'Faisalabad' },
3   { 'FirstName': 'Karim', 'LastName': 'Khan', 'CGPA': 3.2, 'Major': 'EE', 'Address': { 'Street': 'Off Nishter Road', 'City': 'Faisalabad' },
4   { 'FirstName': 'Abid', 'LastName': 'Kasim', 'CGPA': 2.9, 'Major': 'SOP', 'Address': { 'Street': 'ST-2, North Nazimabad', 'City': 'Islamabad' },
5   { 'FirstName': 'Zainab', 'LastName': 'Karim', 'CGPA': 3.1, 'Major': 'CS', 'Address': { 'Street': '3-Khalid Centre, Wahdat-e-Qadri', 'City': 'Islamabad' },
6   { 'FirstName': 'Kumar', 'LastName': 'Rani', 'CGPA': 2.8, 'Major': 'EE', 'Address': { 'Street': 'Malik Park Islam', 'City': 'Islamabad' },
7   { 'FirstName': 'Fahim', 'LastName': 'Alam', 'CGPA': 3.7, 'Address': { 'Street': 'Wilbert Squares', 'City': 'Hunza', 'Province': 'Gilgit-Baltistan' }
8 ])
9
10 db.students.deleteMany({ 'CGPA': { $lt: 3.0 } })
11 db.students.find({})
```