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Assignment 6.1

Indexes, Collection Types, and Aggregation in MongoDB

a. Display all students.

```
---
> load("houses.js")
true
> db.students.find().pretty()
{
  "_id" : ObjectId("66ef427e6aa78fd98a725ba8"),
  "firstName" : "Albus",
  "lastName" : "Dumbledore",
  "studentId" : "s1007",
  "houseId" : "h1007"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725ba9"),
  "firstName" : "Minerva",
  "lastName" : "McGonagall",
  "studentId" : "s1008",
  "houseId" : "h1007"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725baa"),
  "firstName" : "Hagrid",
  "lastName" : "Rubeus",
  "studentId" : "s1009",
  "houseId" : "h1007"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bab"),
  "firstName" : "Bridget",
  "lastName" : "Wenlock",
  "studentId" : "s1010",
  "houseId" : "h1008"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bac"),
  "firstName" : "Cedric",
  "lastName" : "Diggory",
  "studentId" : "s1011",
  "houseId" : "h1008"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bad"),
  "firstName" : "Hannah",
  "lastName" : "Abbott",
  "studentId" : "s1012",
  "houseId" : "h1008"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bae"),
  "firstName" : "Luna",
  "lastName" : "Lovegood",
  "studentId" : "s1013",
  "houseId" : "h1009"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725baf"),
  "firstName" : "Sybill",
  "lastName" : "Trelawney",
  "studentId" : "s1014",
  "houseId" : "h1009"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bb0"),
  "firstName" : "Cho",
  "lastName" : "Chang",
  "studentId" : "s1015",
  "houseId" : "h1009"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bb1"),
  "firstName" : "Lucius",
  "lastName" : "Malfoy",
  "studentId" : "s1016",
  "houseId" : "h1010"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bb2"),
  "firstName" : "Albus",
  "lastName" : "Potter",
  "studentId" : "s1017",
  "houseId" : "h1010"
}
{
  "_id" : ObjectId("66ef427e6aa78fd98a725bb3"),
  "firstName" : "Bellatrix",
  "lastName" : "Lestrange",
  "studentId" : "s1018",
  "houseId" : "h1010"
}
> 
```

b. Add a new student. Ensure the fields in the new document match the existing fields in the collection. Next, prove the new student was added successfully.

```
> newStudent = {
  "firstName" : "Harry",
  "lastName" : "Potter",
  "studentId" : "s1019",
  "houseId" : "h1007"
}
[> db.students.insertOne(newStudent)
{
  "acknowledged" : true,
  "insertedId" : ObjectId("66ef43db6aa78fd98a725bb4")
}
[> db.students.find({ "studentId": "s1019" }).pretty()
{
  "_id" : ObjectId("66ef43db6aa78fd98a725bb4"),
  "firstName" : "Harry",
  "lastName" : "Potter",
  "studentId" : "s1019",
  "houseId" : "h1007"
```

c. Update one of the properties from the student you added in step b. Next, prove the property was updated successfully.

```
> db.students.updateOne(
...   { "studentId": "s1019" },
...   { $set: { "lastName": "Weasley" } }
[...
[...
[>
[> db.students.updateOne(
...   { "studentId": "s1019" },
...   { $set: { "lastName": "Weasley" } }
[... )
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
[> db.students.find({ "studentId": "s1019" }).pretty()
{
  "_id" : ObjectId("66ef43db6aa78fd98a725bb4"),
  "firstName" : "Harry",
  "lastName" : "Weasley",
  "studentId" : "s1019",
  "houseId" : "h1007"
}
> □
```

d. Delete the student you created in step b. Next, prove the student was removed successfully.

```
[> db.students.deleteOne({ "studentId": "s1019" })
{ "acknowledged" : true, "deletedCount" : 1 }
[> db.students.find({ "studentId": "s1019" }).pretty()
[>
[> db.students.find({ "studentId": "s1019" }).pretty()
> □
```

e. Display all students by house. The order should be: Houses Students

```
> db.houses.aggregate([
...   {
...     $lookup: {
...       from: "students",
...       localField: "houseId",
...       foreignField: "houseId",
...       as: "students"
...     }
...   },
...   {
...     $project: {
...       _id: 0,
...       house: "$houseId",
...       students: "$students"
...     }
...   }
... ]).pretty()
{
  "house" : "h1007",
  "students" : [
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725ba8"),
      "firstName" : "Albus",
      "lastName" : "Dumbledore",
      "studentId" : "s1007",
      "houseId" : "h1007"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725ba9"),
      "firstName" : "Minerva",
      "lastName" : "McGonagall",
      "studentId" : "s1008",
      "houseId" : "h1007"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725baa"),
      "firstName" : "Hagrid",
      "lastName" : "Rubeus",
      "studentId" : "s1009",
      "houseId" : "h1007"
    }
  ]
}
{
  "house" : "h1008",
  "students" : [
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bab"),
      "firstName" : "Bridget",
      "lastName" : "Wenlock",
      "studentId" : "s1010",
      "houseId" : "h1008"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bac"),
      "firstName" : "Cedric",
      "lastName" : "Diggorry",
      "studentId" : "s1011",
      "houseId" : "h1008"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bad"),
      "firstName" : "Hannah",
      "lastName" : "Abbott",
      "studentId" : "s1012",
      "houseId" : "h1008"
    }
  ]
}
{
  "house" : "h1009",
  "students" : [
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bae"),
      "firstName" : "Luna",
      "lastName" : "Lovegood",
      "studentId" : "s1013",
      "houseId" : "h1009"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725baf"),
      "firstName" : "Sybill",
      "lastName" : "Trelawney",
      "studentId" : "s1014",
      "houseId" : "h1009"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bb0"),
      "firstName" : "Cho",
      "lastName" : "Chang",
      "studentId" : "s1015",
      "houseId" : "h1009"
    }
  ]
}
{
  "house" : "h1010",
  "students" : [
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bb1"),
      "firstName" : "Lucius",
      "lastName" : "Malfoy",
      "studentId" : "s1016",
      "houseId" : "h1010"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bb2"),
      "firstName" : "Albus",
      "lastName" : "Potter",
      "studentId" : "s1017",
      "houseId" : "h1010"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bb3"),
      "firstName" : "Bellatrix",
      "lastName" : "Lestrange",
      "studentId" : "s1018",
      "houseId" : "h1010"
    }
  ]
}
```

f. Display all students in house GryDindor. The order should be: GryDindor Students

```
> db.houses.aggregate([
...   {
...     $match: { "houseId": "h1007" }
...   },
...   {
...     $lookup: {
...       from: "students",
...       localField: "houseId",
...       foreignField: "houseId",
...       as: "students"
...     }
...   },
...   {
...     $project: {
...       _id: 0,
...       house: "$houseId",
...       students: "$students"
...     }
...   }
... ]).pretty()
{
  "house" : "h1007",
  "students" : [
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725ba8"),
      "firstName" : "Albus",
      "lastName" : "Dumbledore",
      "studentId" : "s1007",
      "houseId" : "h1007"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725ba9"),
      "firstName" : "Minerva",
      "lastName" : "McGonagall",
      "studentId" : "s1008",
      "houseId" : "h1007"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725baa"),
      "firstName" : "Hagrid",
      "lastName" : "Rubeus",
      "studentId" : "s1009",
      "houseId" : "h1007"
    }
  ]
}
> □
```

g. Display all students in the house with an Eagle mascot. The order should be: House Students

```
> db.houses.aggregate([
...   {
...     $match: { "mascot": "Eagle" }
...   },
...   {
...     $lookup: {
...       from: "students",
...       localField: "houseId",
...       foreignField: "houseId",
...       as: "students"
...     }
...   },
...   {
...     $project: {
...       _id: 0,
...       house: "$houseId",
...       students: "$students"
...     }
...   }
... ]).pretty()
{
  "house" : "h1009",
  "students" : [
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bae"),
      "firstName" : "Luna",
      "lastName" : "Lovegood",
      "studentId" : "s1013",
      "houseId" : "h1009"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725baf"),
      "firstName" : "Sybill",
      "lastName" : "Trelawney",
      "studentId" : "s1014",
      "houseId" : "h1009"
    },
    {
      "_id" : ObjectId("66ef427e6aa78fd98a725bb0"),
      "firstName" : "Cho",
      "lastName" : "Chang",
      "studentId" : "s1015",
      "houseId" : "h1009"
    }
  ]
}
> □
```