CIS 5500: Database and Information Systems

MongoDB Handout

1. Introduction

This handout provides information on how to use a local MongoDB installation and MongoDB Compass (MongoDB's GUI client) in the context of Homework 6 - NoSQL and Vectors in Postgres (Part 1).

More specifically, this document describes the processes for:

- Installing and running the MongoDB
- Getting started with MongoDB Compass

Note: It is possible to use other clients like DataGrip (although DataGrip does not support the MapReduce function since it has been deprecated). To use DataGrip, you will need to install the drivers for Mongo (see the DataGrip Handout from Homework 1).

This guide is meant to serve as a general reference - minor changes in steps might arise due to updates from the publisher or due to differences in specific devices/operating systems. While the processes described in this document should remain largely the same, we encourage you to refer to the publisher's documentation or other online resources to troubleshoot. If online resources fail to help, you may ask a member of the course staff for assistance.

2. Installing and Running MongoDB Server

Download and install MongoDB Community Server using the official guide relevant to your operating system (you can install the latest version 8.2 as on the website). On Windows, you are able to run MongoDB either as a service or through the Windows command interpreter. We recommend the former. Once installed, **start the service**. (check the MongoDB official guide on how to start)

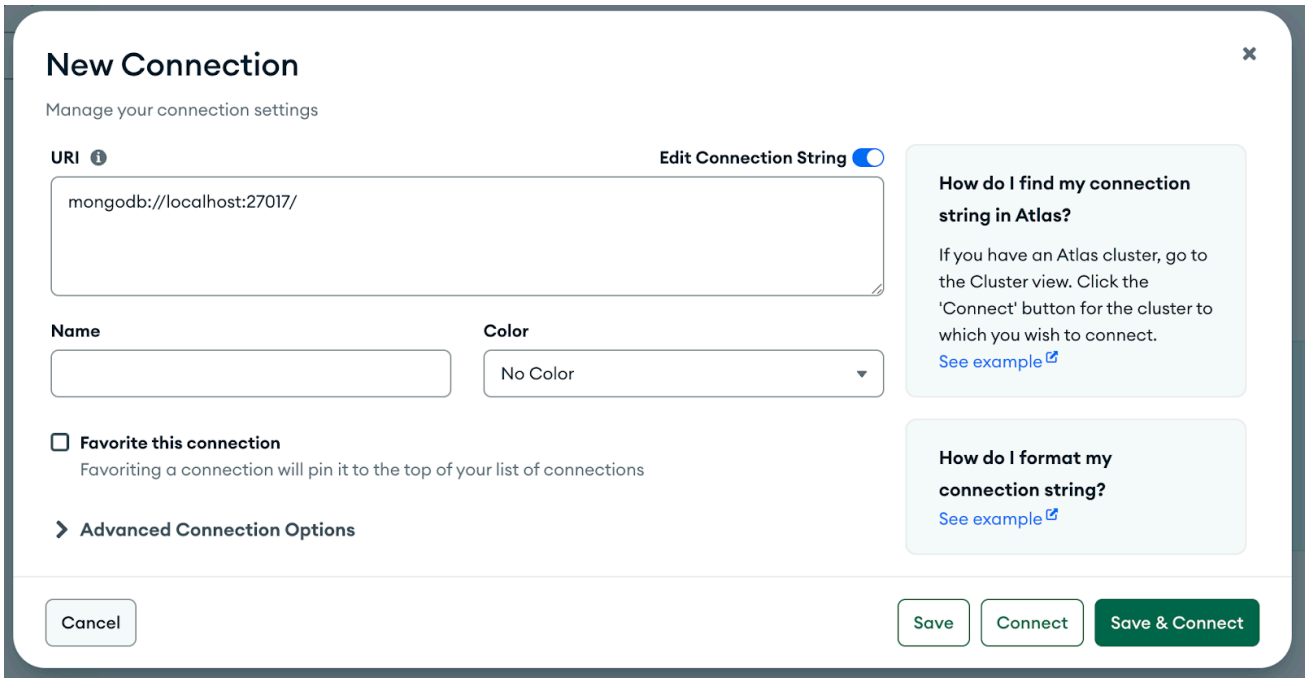
This handout describes one client that can be used with the MongoDB service above:

- MongoDB Compass is an interactive GUI for MongoDB and has many tools that will come in handy for data-based tasks in general, and students often find it simpler and more intuitive than the shell. The Compass installation also includes a built-in shell. Alternatively, one could use mongosh (their command line interface).

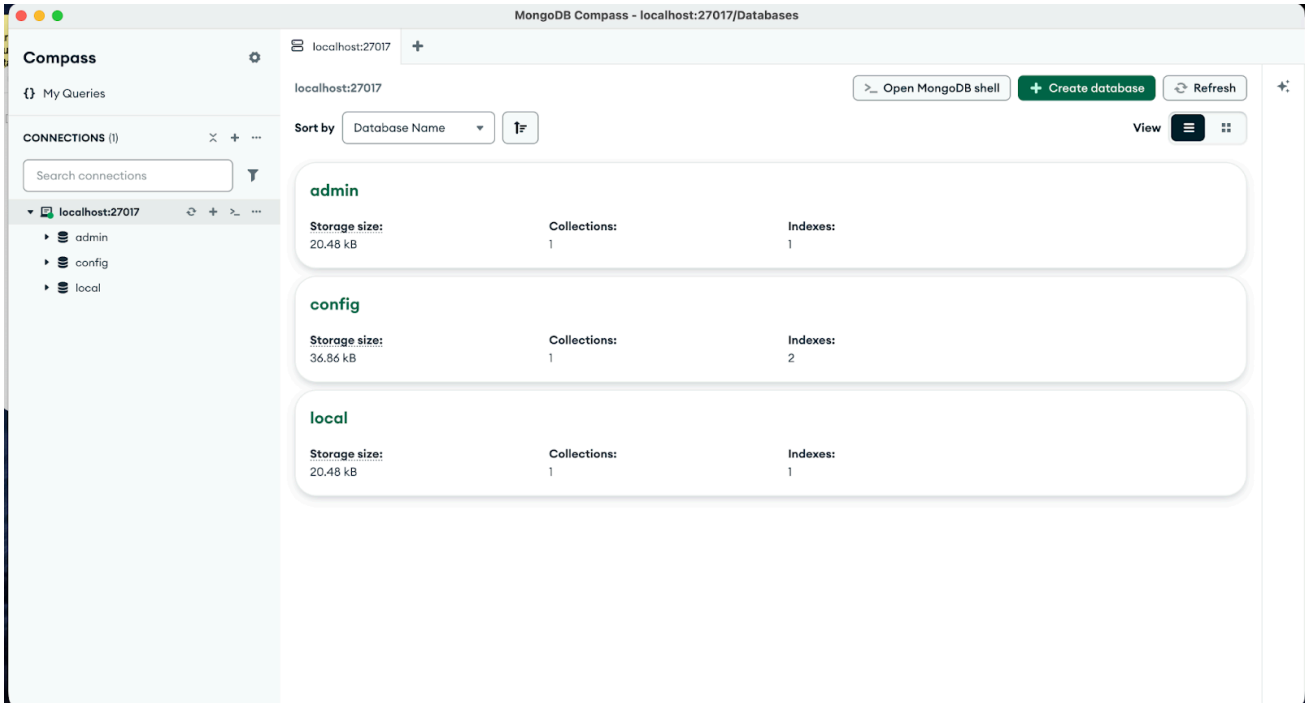
3. Getting Started with MongoDB Compass

Download and install the latest stable version of Compass for your device from here.

Ensure that the MongoDB service is running, then open Compass. You should see a connection prompt as shown below:

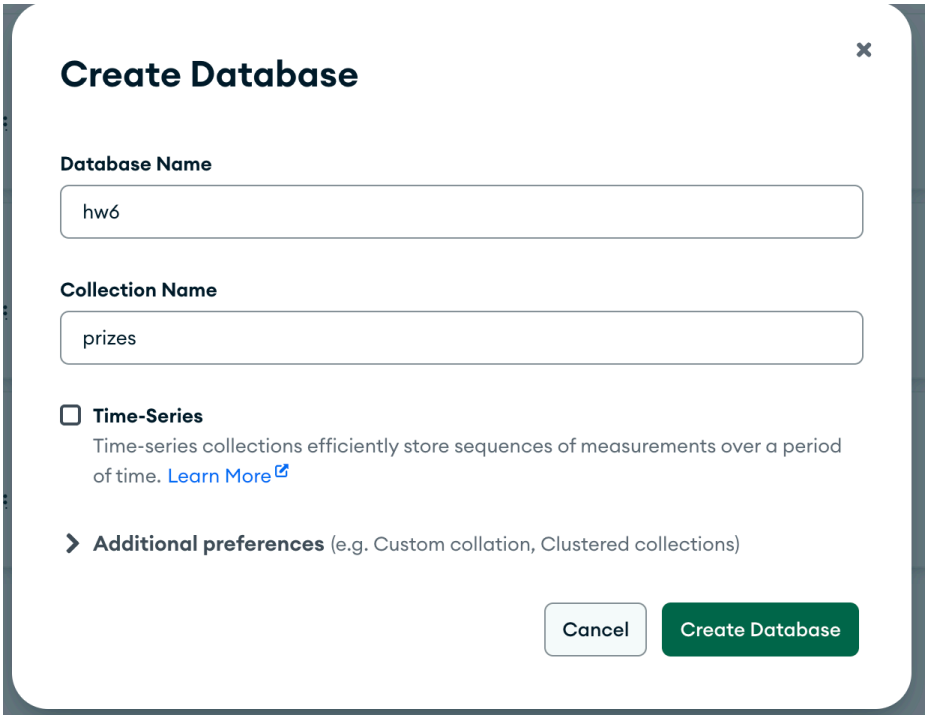


If using the default settings (with the service running on localhost:27017), leave the connection string black and simply press ‘Connect’. Otherwise, you can also choose the option to ‘Fill in connection fields individually’. This will bring you to the ‘Databases’ page.

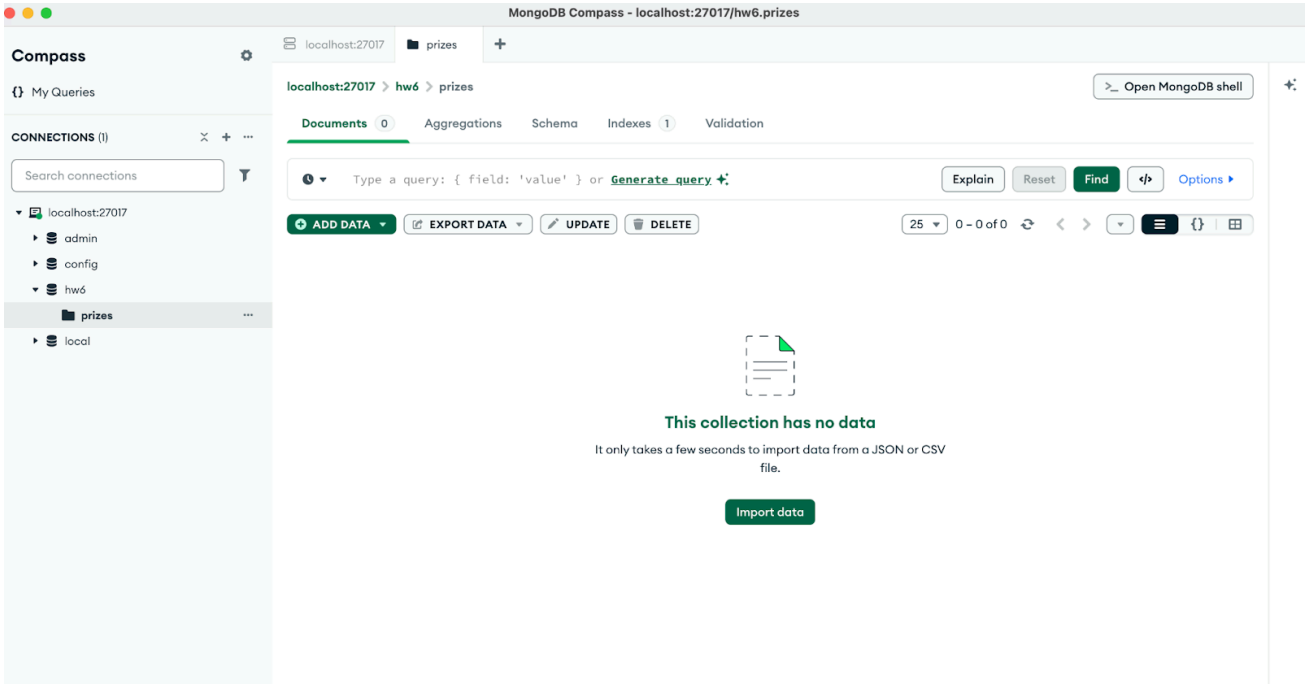


To create a new database, click the ‘create database’ button and proceed as needed. A single database in MongoDB can have multiple ‘collections’, similar to how a single database in SQL can contain multiple ‘tables’. However, you must specify at least an initial collection at the time of database.

For example, you could create a collection called prizes in the (say) database ‘HW6’



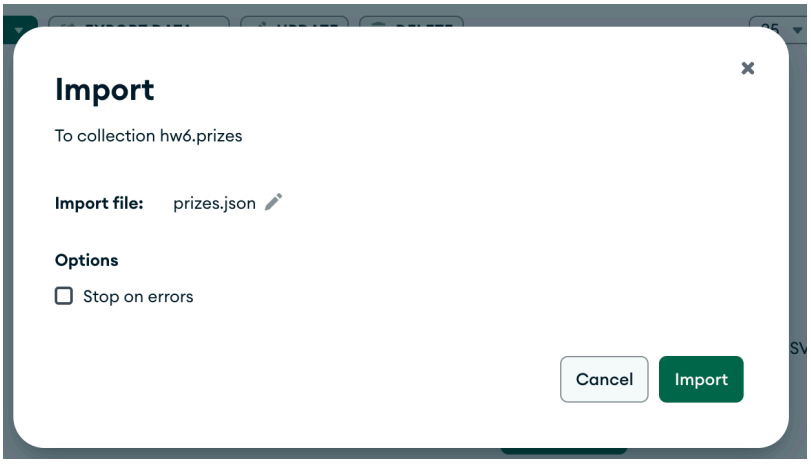
This database should now show up on the databases list. Click on the item corresponding to your newly created database. This should bring up the collections page for your database.



CSV and JSON files can be imported into existing collections on Compass using the built in import wizard.

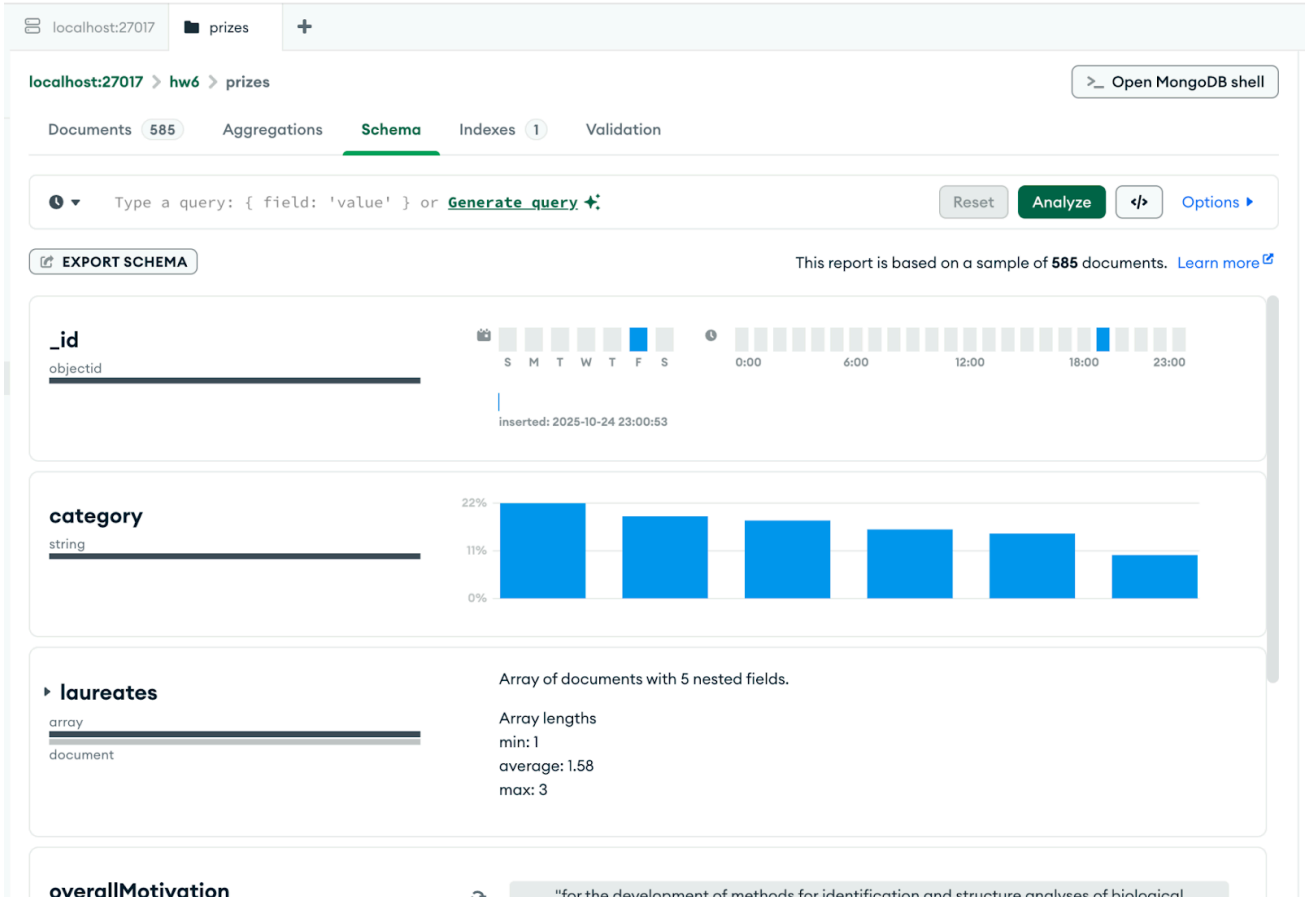
Once you have the necessary files downloaded (prizes.json and laureates.json in the example below – but you should use the ones given in the homework), navigate to the page corresponding to that collection by clicking on the entry corresponding to the collection on the left pane. Then, click on the add data button then 'Import File'.

Browse and select the file and the type (json in this case) and then 'Import'. A message at the bottom of the import window will show the status of the import (for example, 'import completed'). Once imported, verify that the number of documents is correct (in this example, it would be 585 for prizes.json, 916 for laureates.json)



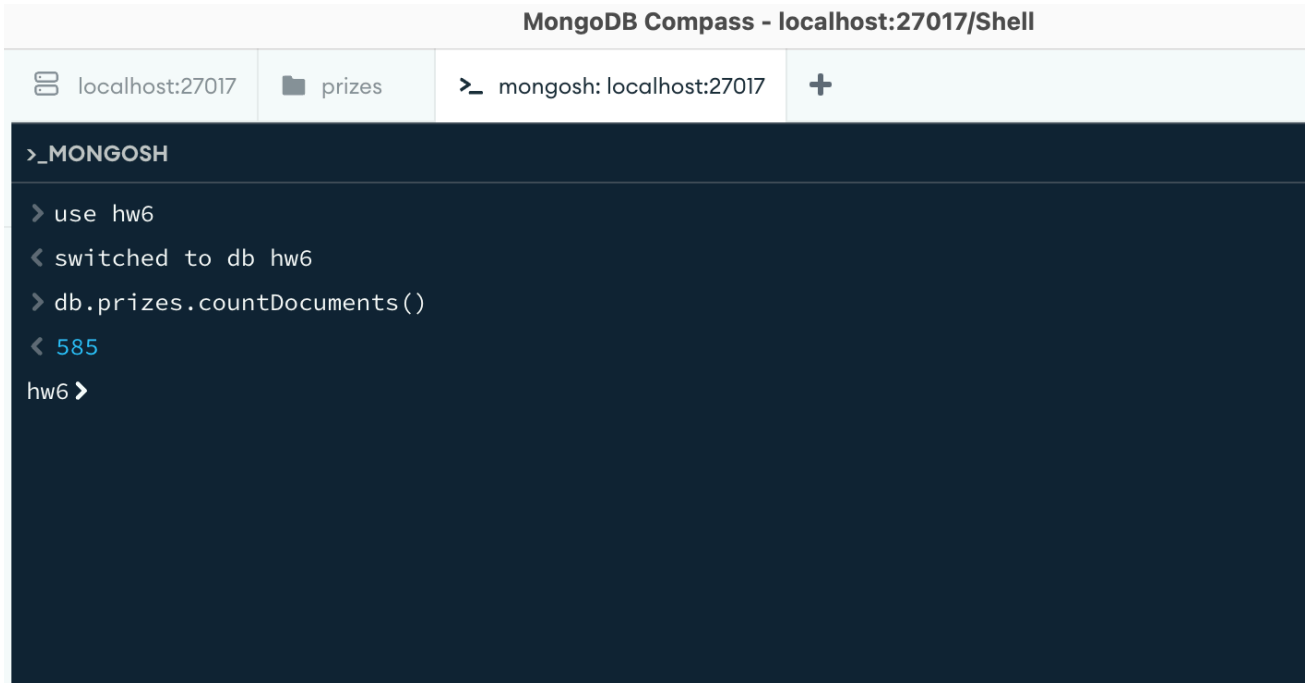
Analyzing Schema

Head over to the 'Schema' tab and click on 'Analyze schema' to get a schema analysis. You will find this helpful for understanding the (possibly nested) structures and other important details about the data.


localhost:27017
prizes
localhost:27017 > hw6 > prizes
Open MongoDB shell
Documents 585
Aggregations
Schema
Indexes 1
Validation
Type a query: { field: 'value' } or Generate query
Reset
Analyze
Options
EXPORT SCHEMA
This report is based on a sample of 585 documents. Learn more
_id
objectid
S M T W T F S
0:00 6:00 12:00 18:00 23:00
inserted: 2025-10-24 23:00:53
category
string
22%
11%
0%
laureates
array
document
Array of documents with 5 nested fields.
Array lengths
min: 1
average: 1.58
max: 3
overallMotivation

Running Queries

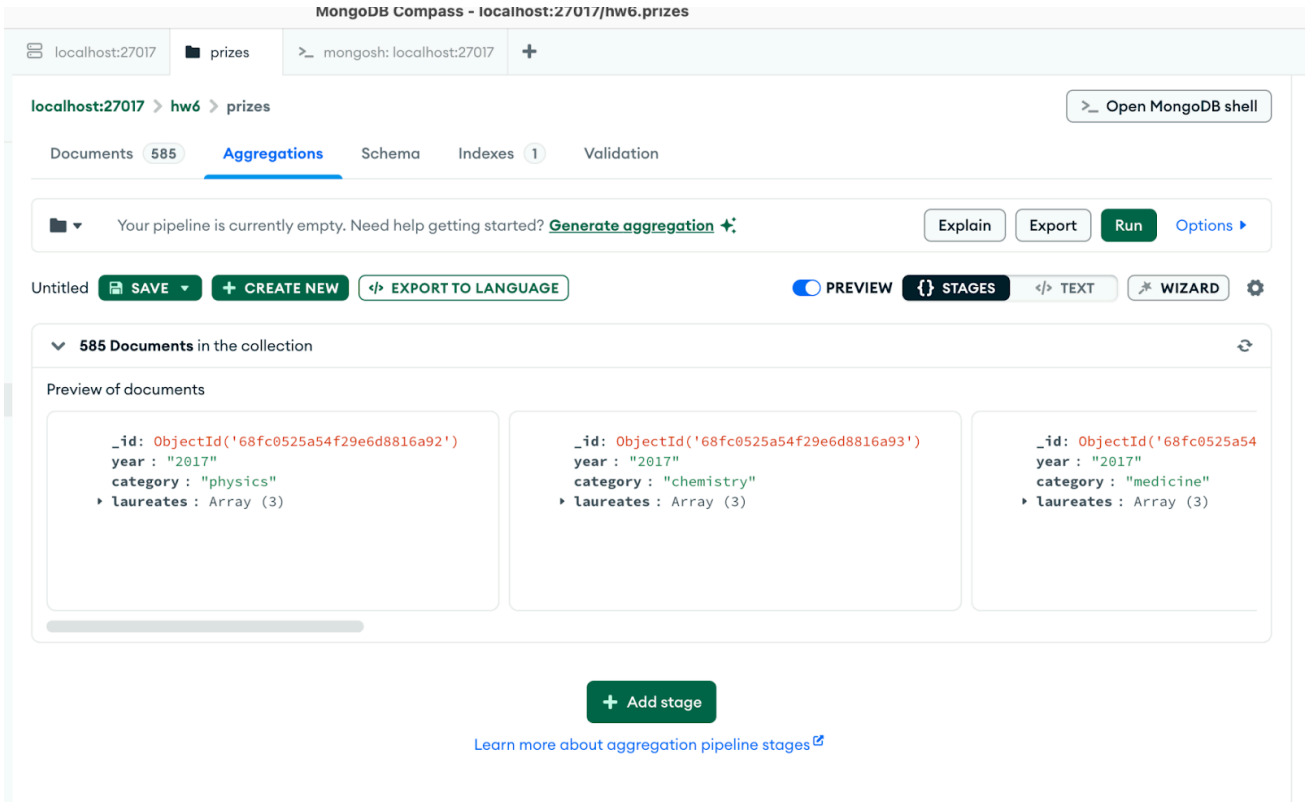
All queries (including aggregations) can be run via the built in shell (MongoSH) that reveals on clicking ‘Open MongoDB shell’ header at the top of the window:



Remember to select a database before running queries using the ‘use <db-name>’ command, where <db-name> is the name of the database in which the collections are created.

Please note that the Mongo shell is case-sensitive!

Additionally, more complex aggregation pipelines can be written and executed in the ‘Aggregations’ tab if you prefer to use their GUI to construct them:


MongoDB Compass - localhost:27017/hw6.prizes
localhost:27017
prizes
mongosh: localhost:27017
localhost:27017 > hw6 > prizes
Open MongoDB shell
Documents 585
Aggregations
Schema
Indexes 1
Validation
Your pipeline is currently empty. Need help getting started? Generate aggregation
Explain
Export
Run
Options
Untitled
SAVE
CREATE NEW
EXPORT TO LANGUAGE
PREVIEW
STAGES
TEXT
WIZARD
585 Documents in the collection
Preview of documents
_id: ObjectId('68fc0525a54f29e6d8816a92')
year : "2017"
category : "physics"
laureates : Array (3)
_id: ObjectId('68fc0525a54f29e6d8816a93')
year : "2017"
category : "chemistry"
laureates : Array (3)
_id: ObjectId('68fc0525a54
year : "2017"
category : "medicine"
laureates : Array (3)
Add stage
Learn more about aggregation pipeline stages