# Using MongoDB

## Introduction

These instructions provide you with a starting point to manage a mongodb database. We’ll set-up a mongod server and manipulate some data using the *command line* mongo client.

Take your time with these instruction - there isn’t a prize for finishing first. Try to avoid copy and paste except when inserting the data into the collection. You’ll find that by typing the code you will “get it under your fingers” and, consequently, you will learn more.

**Hot tip:** Remember to save your commands in a text file before typing them in the Command Interpreter.

## Setting up the server

In order to use MongoDB you will need to run a server locally in your computer. This is done by running the mongod command using the command line.

These steps guide you through the process of downloading and starting the mongod server for the first time.

1. Visit <https://www.mongodb.com/try/download/community>. Make sure you are in the page for *On-premises* (MongoDB locally) and that you’re downloading the *MongoDB Community Server*.
2. From the section *Available Downloads* select the option ZIP and then click on Download. Double check you’re downloading the package for your platform.
3. Move the downloaded file into your workspace folder and extract the downloaded package.
   * Some people like to use a folder inside the Documents folder, for example, C:\Users\LabStudent-55-604385\Documents\Workspace.
   * It is important to make a note of the folder you are using
4. Rename the extracted folder to MongoDBServer (just to keep the name short).
   * For example, the extracted folder has the name mongodb-windows-x86\_64-6.0.1.
   * After renaming it the full absolute path for you MongoDB is C:\Users\LabStudent-55-604385\Documents\Workspace\MongoDBServer
5. Inside the MongoDBServer folder create a new folder named data.
6. From the Command Interpreter (e.g., Power Shell) run the mongod.exe command: <path to mongod.exe> --dbpath=<path to data folder> --nojournal
   * Example with full path: C:\Users\LabStudent-55-604385\Documents\Workspace\MongoDBServer\bin\mongod.exe --dbpath=C:\Users\LabStudent-55-604385\Documents\Workspace\MongoDBServer\data --nojournal
   * You should see some output in your Command Interpreter console indicating that the MondoDB server is now running.
   * You can replace the dbpath parameter with any path you want. For example, to maintain separate databases per project.

You can use the command line client to access your database or some other tools like MongoDB Compass.

## Running commands from the shell

In order to run commands from the shell you will use the mongo command line client.

These steps guide you through the process of downloading and running mongo command line client.

1. Visit <https://www.mongodb.com/try/download/community>. Make sure you are in the page for *Tools* and that you’re downloading the *MongoDB Shell*.
2. From the section *Available Downloads* select the option ZIP and then click on Download. Double check you’re downloading the package for your platform.
3. Move the downloaded file into your workspace folder and extract the downloaded package.
   * Some people like to use a folder inside the Documents folder, for example, C:\Users\LabStudent-55-604385\Documents\Workspace.
   * It is important to make a note of the folder you are using
4. Rename the extracted folder to MongoDBClient (just to keep the name short).
   * For example, the extracted folder has the name mongosh-1.5.4-win32-x64.
   * After renaming it the full absolute path for you MongoDB is C:\Users\LabStudent-55-604385\Documents\Workspace\MongoDBClient
5. From the Command Interpreter (e.g., Power Shell) run the mongosh.exe command: <path to mongosh.exe>
   * Example with full path: C:\Users\LabStudent-55-604385\Documents\Workspace\MongoDBClient\bin\mongosh.exe
   * You should see some output in your Command Interpreter console indicating that the MondoDB Shell connected to your MongoDB server finishing with a command prompt where you can enter your commands.

You now have two Command Interpreter consoles running. One with the mongod.exe server and the other with the mongosh.exe Shell client that can be used to send commands to the MongoDB server.

Some usefull commands:

* To show all databases available run the command: show dbs
* To find out your current database run the command db
* To create a database named shirts run the command: use shirts. If you run the command show dbs it will not appear on the list as it is currently empty.
* You can check your current database with the command db.

## Lecture slides

Now that you have a MondoDB server running work with the lecture slides to complete these tasks.

1. Execute the code from the lecture slides so that you have a working collection with a full set of CRUD operations
2. Modify the embedded variants structure to make it queryable
3. Show that you can query variants
4. Create a schema for your products collection
5. Add a new document to represent orders
6. Implement CRUD operations on your orders collection

## Advanced

In this task you take some data that appears to be naturally relational and implement a mongo database to hold it. Hopefully doing this will make you question your assumptions about the ways in which data is structured and in the reasons for those structures.

There isn’t a correct answer to this problem. Often there isn’t a correct answer to the data structures that one builds except where they map nicely onto the relational model after a process of normalization.

### Task

Implement a database to hold data that meets the needs of the following problem.

You are going to run an online gaming tournament. Players will compete in tournaments over a period of 4 weeks. Each competitor will play at least three different games and will play against different opponents in each game. Individual games will be structured as either knockout tournaments or as mini leagues. The knockouts will be used for games that take a relatively long time to complete. Leagues will used for games that generally finish quickly.

* Your database should handle players, games, leagues and knockouts.
* You may use embedded documents.
* You may use arrays of items where necessary.
* You may try to model the solution using schema if you wish

*Remember to use a different database for this task.*

## References and further material

* MongoDB Web site - <https://www.mongodb.com/>