The National School of Artificial Intelligence
المدرسة الوطنية العليا للذكاء الاصطناعي
Intelligent Systems Engineering Department
2023/2024

Advanced DataBase Labs
Third Year Semester 6
Lab 8

MongoDB: Installation, Initiation and Manipulation

NoSQL refers to *Not Only SQL*. It represents a database design and management approach that varies from *traditional relational databases (SQL databases)*. *NoSQL* databases are often *non-tabular*(Document, key-value...), distributed, and horizontally scalable, designed to handle large volumes of data and provide flexible schemas for dynamic data structures. They are commonly used in *web applications and big data environments* where performance, scalability, and agility are paramount. *MongoDB* is a *NoSQL* database that stores data in flexible documents
In this Lab we will install and run the fundamental operations: Create, Read, Update, and Delete (CRUD), to interact with data in a *MongoDB*.

(1) Useful Notions

(a) Installation & Manipulation

i) *MongoDB* is a popular *NoSQL* database. That stores data in *JSON*-like documents with dynamic schemas, offering flexibility and scalability for modern applications. These flexible documents allow the storage of diverse information collections.

ii) *JSON (JavaScript Object Notation)* is a lightweight data-interchange format, widely employed across different platforms and technologies, not just in *MongoDB*. It's an understandable text format that symbolizes data objects as *key-value* pairs and *arrays*, making it easy to transmit and examine data between different systems.

iii) *MongoDB* can be used both *online* (*Cloud*) via **(i)** https://www.mongodb.com/try?tck=community_atlas_ct, by creating an account on *MongoDB Atlas* to get access to several functionalities, once you complete the registration, choose the *Free plan with (512)MB*. Or **(ii)** by installing it locally on your machine, from https://www.mongodb.com/try/download/community. Or **(iii)** by using the document already shared in the classroom for Windows users.

(b) Queries & Assistance

i) To learn the basic commands, is recommend reading the *getting started* from the link: https://docs.mongodb.com/manual/tutorial/getting-started/, from the official MongoDB documentation.
Remember that the *help command* displays a list of available commands and that you can obtain more information on a command by typing *command.help()*.

(2) Lab Work

i) Instal Mongodb (**Before the Lab Session**), or you can work online.

ii) Creating a *Mongodb* database and Perform the *CRUD* Operations, using the queries and syntax from the previously provided link:

1- Create a new database named *ProductsDB* and check that it is selected;

2- Create a new *collection* named *products* and insert the following documents:

Name: Macbook Pro
Company: Apple
Price: 11435,99
Options:
Intel Core i5
Retina Display
Long life battery

Name: Macbook Air
Company: Apple
Price: 125794,73
Ultrabook: true
Options:
Intel Core i7
SSD
Long life battery

Name: Thinkpad X230
Company: Lenovo
Price: 114358,74
Ultrabook: true
Options:
Intel Core i5
SSD
Long life battery

3- Perform the following read requests:

- Retrieve all products.
- Retrieve the first product
- Find the *Thinkpad* ID and make the request to retrieve this product with its ID.
- Retrieve products with a price greater than *13723 DA*
- Retrieve the first product with the *ultrabook* field set to *true*.
- Retrieve the first product whose name contains *Macbook*.
- Retrieve products whose name begins with *Macbook*.
- Increment by *200 DA* the price of products that already have the *ultrabook field*.
- Delete the two products whose company is *Apple*.
- Delete the *Lenovo X230* using only its ID.

(3) Homework

By the end of each Lab, a report should be done, that contains all the details of the elaborate work during the Lab session. The report is going to be submitted later on. **You can work in groups of three maximum**.