Introduction to Modern Databases with MongoDB

Course Overview

This course provides an introduction to modern general purpose databases, with MongoDB used as the example database system. The course compares and contrasts non-relational and relational databases, outlines MongoDB's architecture, and presents best practices for modeling data in MongoDB, among other topics.

Lessons: 21
Length: 16 hours
Level: Beginner to Intermediate

Course Content

This course consists of twenty-one lessons in slide format. Each lesson has a slide deck with lecture notes and a PDF handout. Quiz questions with explained answers and instructions for hands-on exercises are included on slides interspersed throughout. All course content can be accessed in the Google Drive folder. PDF handouts are also available to download.

Prerequisite Knowledge

This course is designed for learners new to MongoDB and the document model. Prior knowledge of relational databases and SQL will be helpful for the learner.

Topics Covered

Learning objectives for each lesson are included in the lesson slide decks. At a high level, the course covers the following topics:

- The elements of a modern general purpose database
- The differences between relational and non-relational databases
- Querying data using MongoBD Query Language (MQL)
- Performing CRUD operations in MongoDB
- Data modeling and schema design patterns
- Using the MongoDB aggregation framework
- Sharding, indexing, transactions, and change streams in MongoDB

Suggested Uses

Educators are welcome to teach the entire course sequentially or select individual lessons and/or slides as needed. The course materials can be incorporated into your curriculum in a variety of ways:

- Slide decks can easily be used during a lecture class.
- Lessons can be combined with self-paced online learning and labs. Each lesson includes suggestions for complementary learning content.
- The PDF handouts can be used for asynchronous learning or as supplemental material to be completed outside of class.
- The slides and handouts can be used for self-paced learning for students and educators alike.

The course materials can be used in conjunction with self-paced learning and labs to create a complete semester-long curriculum. It will take approximately 16 hours of lecture time to cover all of the lessons. This course pairs well with the online, self-paced Introduction to MongoDB course, offered for free in MongoDB University.

Lessons

Directly access the slide deck for each lesson using the links below.

1 - What is a Modern General Purpose Database?
2 - Relational vs. Non-Relational Databases
3 - Non-Relational Database Types
4 - When to Use Non-Relational Databases
5 - The Document Model and MongoDB
6 - MongoDB Architecture
7 - MongoDB Atlas
8 - Querying in Relational and Non-Relational Databases
9 - MongoDB Query Language (MQL)
10 - Querying Complex Data in MongoDB with MQL
11 - Querying Data with Operators and Compound Conditions
12 - Inserting and Updating Data in MongoDB
13 - Deleting Data in MongoDB
14 - The MongoDB Aggregation Framework
15 - Querying Data in MongoDB with the Aggregation Framework
16 - Data Modeling and Schema Design Patterns
17 - Sharding in MongoDB
18 - Indexing in MongoDB
19 - Transactions in MongoDB
20 - Change Streams in MongoDB
21 - Drivers, Connectors, and the Ecosystem

Hands-On Exercises
The hands-on exercises in this course use the MongoDB Shell. Users who prefer to use a GUI to interact with their data can do so using MongoDB Compass or the MongoDB Atlas UI.

Share Your Feedback
We hope these curriculum materials will be a valuable resource for you and your learners. Let us know how the materials work for you, what we can improve on, and how MongoDB for Academia can support you via our brief feedback form.

MongoDB for Academia
MongoDB for Academia offers resources for educators and students to support teaching and learning MongoDB. Check out our educator resources and join the Educator Community. Students can receive $50 in Atlas credits and free certification through the Github Student Developer Pack.

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