

CMSC335

Web Application Development with JavaScript



MongoDB

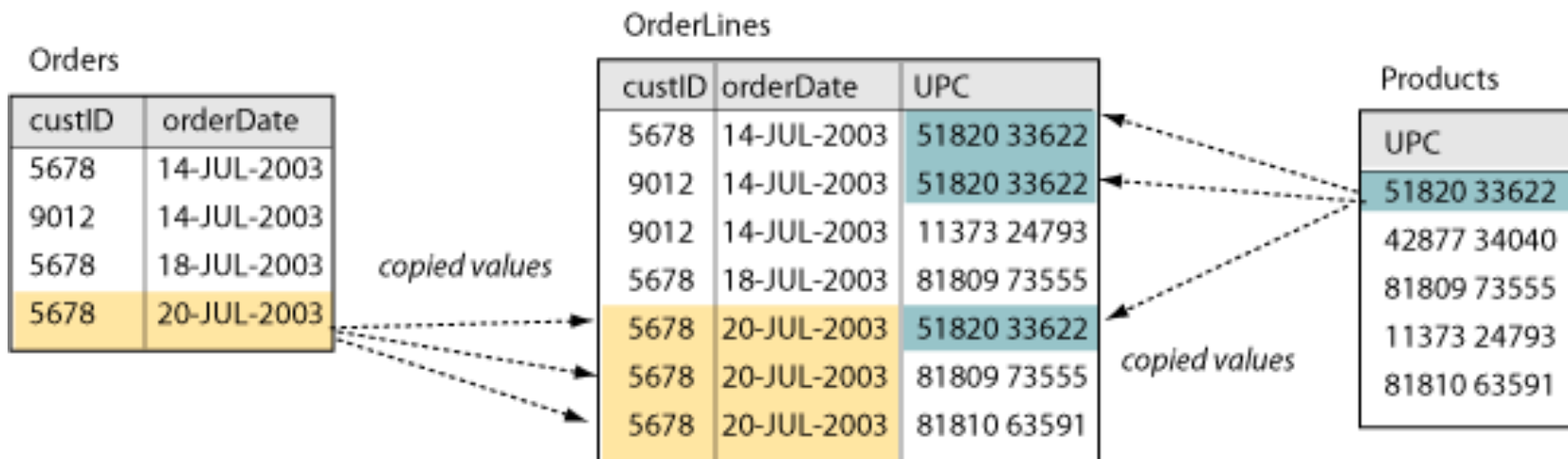
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Databases

- An organized collection of data/information
- Relational database (SQL based)(e.g., MySQL)
 - Store data as tables (Excel spreadsheets)
 - **Structured**, low redundancy of information across tables



Non-relational Database

- Called **NoSQL** databases
 - Examples: MongoDB, Cassandra, Redis, ...
- Less structured (or... may say **flexible** data structure)

```
{  
  name: "Pikachu",  
  imageUrl: "https://assets.pokemon.com/assets25.png",  
  stats: {  
    hp: 3,  
    attack: 5,  
    defense: 3,  
    speed: 6  
  }  
}
```

CRUD Operations on Resources

- **CRUD** - Create, Read, Update, Destroy (or Delete)
- Typical examples of resources:
 - Data stored in a database
 - Pages
 - Files



- MongoDB (<https://www.mongodb.com/>)
 - Document database
 - Schema is optional
- A record in MongoDB is a document
- **Example:**
 - a data structure composed of field and value pairs

```
{  
  name: "sue",  
  age: 26,  
  status: "A",  
  groups: [ "news", "sports" ]  
}
```

← field: value
← field: value
← field: value
← field: value

- **MongoDB stores documents in “Collections”**
 - Similar to tables in relational databases
- Short MongoDB video at <https://tinyurl.com/yck2mkuj>
- We can install MongoDB locally but will use the Cloud version (mongoDB Atlas)
- MongoDB Atlas: <https://cloud.mongodb.com/>

Examples

- **Examples:** MongoDBCode
 - Remember to run **npm i**
- Please read the items below and on the next slide before you start creating an account
- To run the examples you need to create an account in MongoDB Atlas (<https://cloud.mongodb.com/>), create a username and password to access a database (do not confuse them with the username and password to get an Atlas account), and a connection string (provided by Atlas)
- Information on how to create an account can be found at <https://www.cs.umd.edu/~nelson/classes/resources/web/mongodb/>
 - Note: The Atlas interface may have changed since this video was created, but the process described in the video is similar
- **Please continue on the next slide**

Examples

- Check the **README.md**, which is part of the code distribution, for additional information on how to connect and run the database examples
- The database examples rely on a connection string. In the code distribution provided, you will place the string in the `.env` file that resides in the **credentialsDontPost** folder. To make this string available to the examples, we are using the **dotenv** module that allows us to define environment variables you can use in your application
- Using `require("dotenv").config()` will allow access to environment variables via **`process.env.VARIABLE_NAME`** (see the code distribution for an example)
- To install the **dotenv** module execute **`npm i dotenv`**
- If you are using the code distribution provided running **`npm i`** will install this module for you

Examples

- You can create a database by selecting the “+Create Database” button. For the examples below, you don’t need to create a database as a database called “CMSC335DB” and a collection called “moviesCollection” will be created when you run the example **node .\insertMovies.js**. **Run this example, before you run any other example**
- After running the examples, you can **drop** (remove) in Atlas the CMSC335DB database by selecting the trash bin icon you see when you hover over CMSC335DB
- The following examples illustrate **CRUD** operations. They are recipes that you can use for your project(s)
- **Examples:** insertMovies.js, listDatabases.js, listAllMovies.js, lookUpMovies.js, updateMovie.js, deleteMovie.js, clearCollection.js
- See the troubleshooting information on the next slide

Troubleshooting

- Some students had problems connecting to MongoDB Atlas because their DNS blocked srv responses from MongoDB Atlas. The solution is to change the DNS to a different one (e.g., <https://use.opendns.com/>)
- If you get an error similar to the following:
MongoParseError: URI does not have hostname, domain name and tld
- The problem could be the use of a password that has a character that needs to be encoded. For example, in the .env file, instead of using Pot@to the password should be Pot%40to because %40 is the hexadecimal value for the @ character

References

- <https://www.youtube.com/watch?v=fbYExfeFsl0&t=1815s>
- <https://www.youtube.com/watch?v=5WFyhsnU4Ik>