# myFlix web app

## Backend development process

`auth.js`

`index.js`

`models.js`

`passport.js`

`package-lock.json`

`package.json`

| June | 2023 |
| --- | --- |

*All usernames, passwords or other similar information shown in this presentation is fictive and for illustrative purpose only

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# 01

**Setting up** the Node.js development environment

Skills used

Research

# **WHY** WAS THIS STEP IMPORTANT

Organizing the development / coding environment for efficient and well-oriented work from the beginning is not only necessary, but is also one of the keys to ensure smooth workflow and limit avoidable time loss due to inefficient project initialization.

# **WHAT** WAS THE GOAL

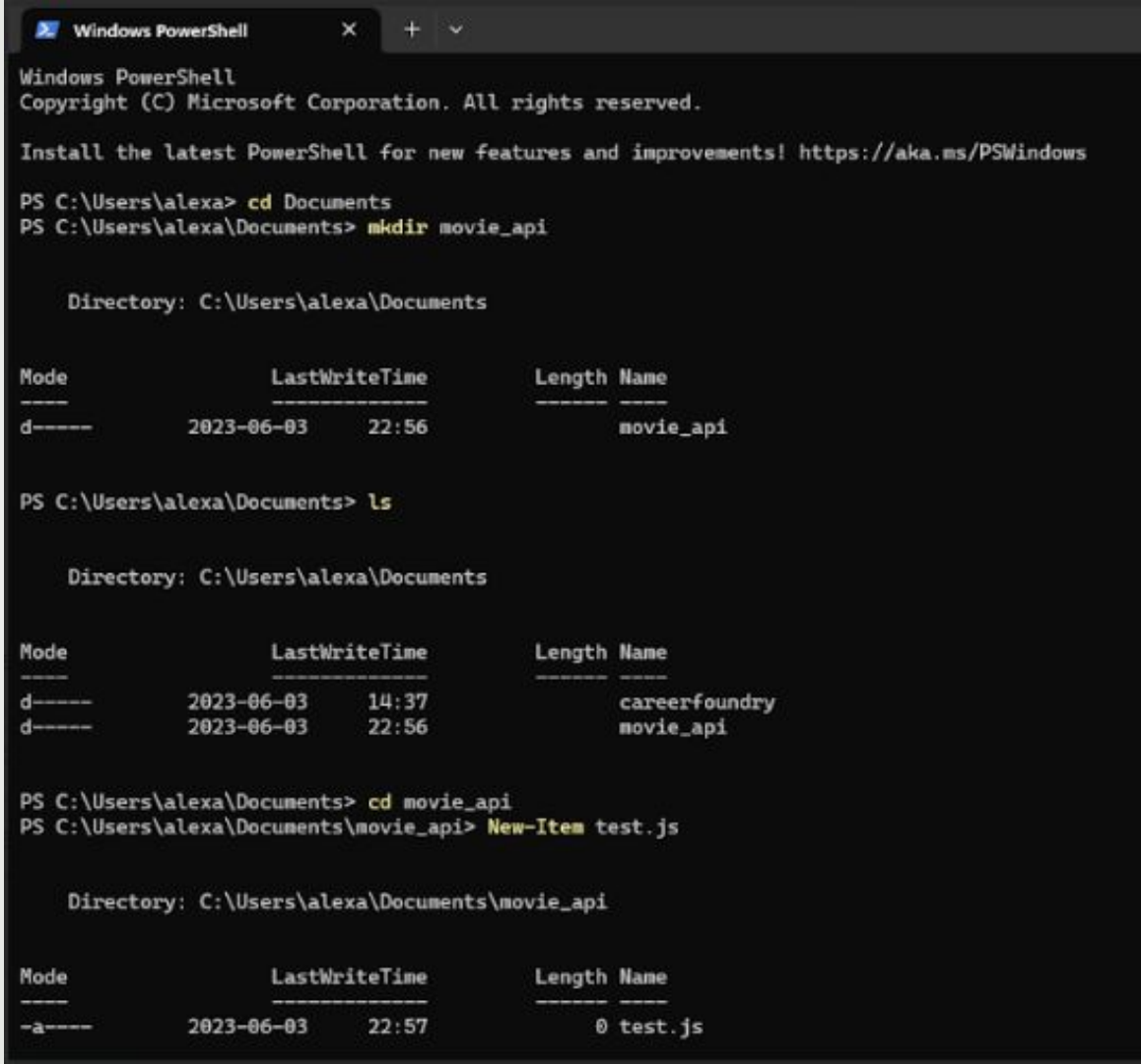
Creating the project directory.

Getting used at working with the Command Line Interface (CLI) / terminal of Windows PowerShell. Installing Node.js via the version management tool nvm (Node Version Manager).

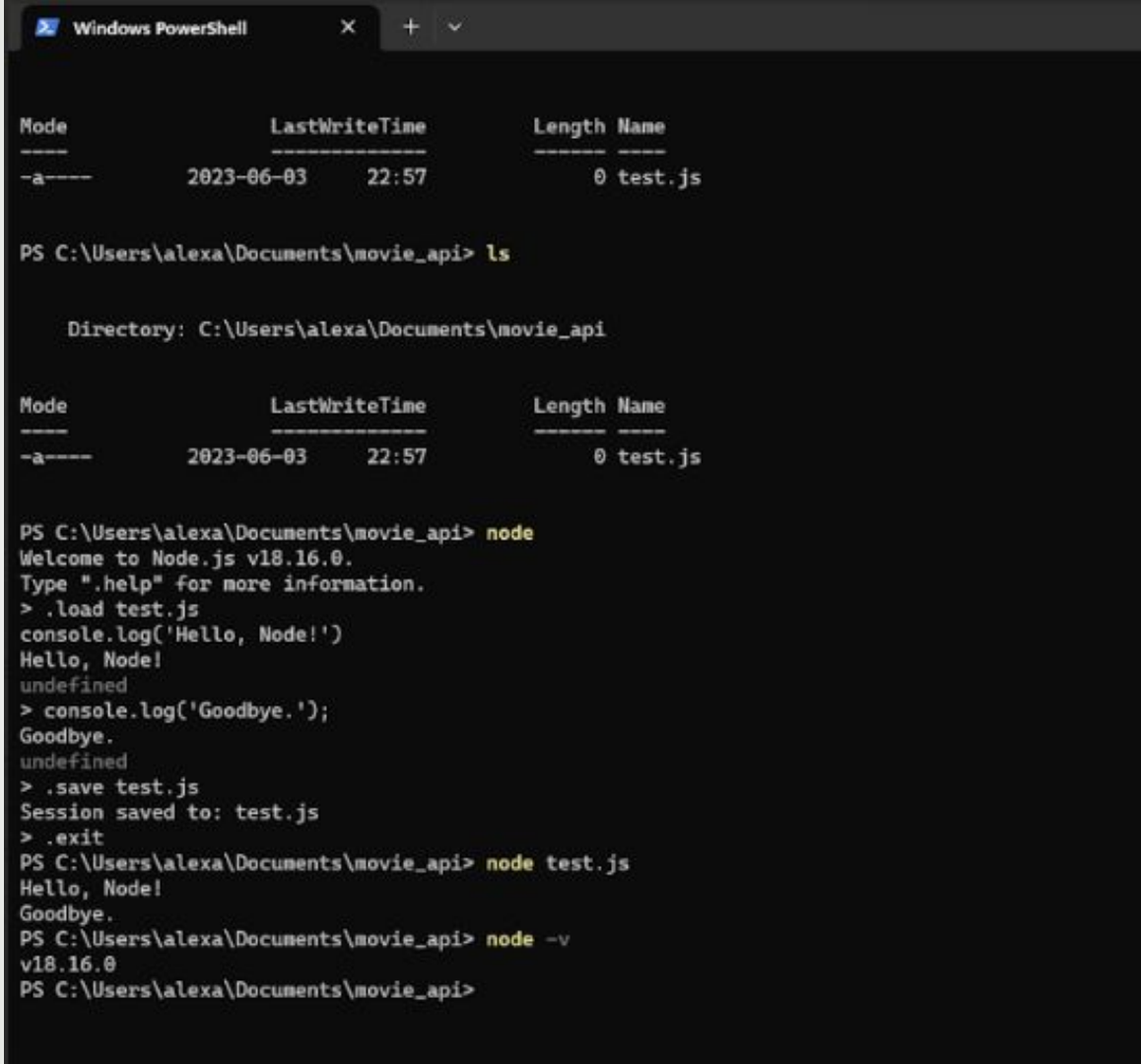
Getting used at working with Node.js own CLI shell program Repl (Node Console).

Creating a Github repository for the project.

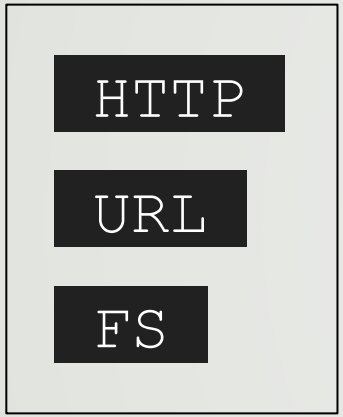
**CREATION** OF PROJECT DIRECTORY



**TEST AND VALIDATION** THAT NODE.JS IS WELL INSTALLED



# 02




**Using** built-in Node modules to return files to users and log requests

## Skills used

Research
Problem solving
Code writing

# **WHY** WAS THIS STEP IMPORTANT

Learning about Node different modules types (built-in, user-defined and third party) was important to understand the very structure of Node.js and how it works. Then, learning more specifically about Node built-in modules was necessary to (1) get to know how to use some of them (HTTP, URL, FS) and (2) understand how multiple modules can be used / work together.

```
const http = require('http'),
 url = require('url'),
 fs = require('fs');
```

# **WHAT** WAS THE GOAL

Importing and combining the HTTP, URL and FS modules inside a newly created server.js document.

Putting these modules into work by parsing incoming URL requests tests to determine if they contain a specific word. If the verification was true, “documentation.html” file was meant to be returned to the user having sent the request, otherwise “index.html” was returned.

Regarding the FS module, I’ve created a txt.log file and I ensured that for all requests, this module was used to log both the request URL and a timestamp inside the log.txt file.

# **SAMPLE** OF REQUESTS LOGGED IN A LOG.TXT FILE USING FS MODULE

```
1  + ::1 - - [07/Jun/2023:20:43:19 +0000] "GET / HTTP/1.1" 304 - "-" "Mozilla/5.0 (Windows
     NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/113.0.0.0
     Safari/537.36"
2  + ::1 - - [07/Jun/2023:20:43:47 +0000] "GET /movies HTTP/1.1" 304 - "-" "Mozilla/5.0
     (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/113.0.0.0
     Safari/537.36"
3  + ::1 - - [07/Jun/2023:20:44:09 +0000] "GET /documentation.html HTTP/1.1" 304 - "-"
     "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko)
     Chrome/113.0.0.0 Safari/537.36"
4  + ::1 - - [07/Jun/2023:20:51:03 +0000] "GET /movies HTTP/1.1" 304 - "-" "Mozilla/5.0
     (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/113.0.0.0
     Safari/537.36"
5  + ::1 - - [07/Jun/2023:21:06:00 +0000] "GET /movies HTTP/1.1" 304 - "-" "Mozilla/5.0
     (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/113.0.0.0
     Safari/537.36"
```

# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

I was in my first experimentation with the use of Node.js in general, as well as Node built-in modules. It was therefore a good challenge to understand the key concepts of how this environment works at first, but I was able to use several solutions by myself to assimilate everything and eventually deliver the all expected requirements. Some of the solutions I used to face the challenges:

- Doing several researches on various platforms
- Analyzing other codes / projects using same logics
- Carrying out multiple tests locally and try different potential solutions

# 03

**Getting to know** the Node package manager npm and **installing** the necessary packages / third party modules for my API

## Skills used

Research

# **WHY** WAS THIS STEP IMPORTANT

Node package managers are essential to automatically check and ensure all of the project packages / dependencies are up-to-date. Knowing how to use a node package manager is therefore important to save time and prevent issues that may arise in the app from out-of-date packages / dependencies (whether as global, local or development dependencies). This also gave me the opportunity to learn about Semantic Versioning (SemVer).

Regarding the packages to be installed, it was important to ensure that they would be available to use over the next step when starting to implement more codes in the files.

# **WHAT** WAS THE GOAL

Installing key packages needed in order to build my API (Express and Body-parser). Creating an index.js file and initializing the project with a package.json file (npm init).

# 04


**Using** Express framework and **implementing** an error handler

## Skills used

Research
Code writing

# **WHY** WAS THIS STEP IMPORTANT

Using Express framework allows for a quicker, shorter and more concise way of creating APIs and sending HTTP requests back and forth between frontend and backend, thus increasing work efficiency and time required to create backend logic. As for the error handler, it was important to create a code that could handle unanticipated errors and work as an net/alert if something unexpectedly was to break in the code.

As for the error handler, it was important to create a code that could handle unanticipated errors and work as a net/alert if something unexpected was to break in the code.

# **WHAT** WAS THE GOAL

Installing Express framework using npm and importing it inside my index.js file. Refactoring previous codes using Express framework to handle some of the same functionalities. Using Express routing syntax to create two new routes:

- An Express GET route located at the endpoint “/movies” (that endpoint returns a JSON object containing data about movies)
- An Express GET route located at the endpoint “/” that returns a custom default textual response (‘’Welcome to your new movie e-friend advisor!)

Using the Morgan middleware library to log all requests (instead of using the FS module to write down requests in a log.txt file like previously set up).

Creating an error-handling middleware function that logs all application-level errors in the terminal.

```
$ npm install morgan
```

```
const  morgan = require('morgan');
```

# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

Getting used to the logic behind the Express framework took me some time and some additional readings. I wanted to make sure I understood the logic behind Express since this framework was going to be the basis of all my backend structure. I also wanted to make sure I understood the added value of using Express rather than using other methods with similar results.

# 05


**Looking** into RESTful architecture, **creating** multiple routes for my REST API and **documenting** it

Skills used

Research
Code writing

# **WHY** WAS THIS STEP IMPORTANT

REST API allows applications outside of my web app to send HTTP requests (GET, PUT, POST, and DELETE) to my web server, which are then translated to an appropriate CRUD manipulation of the server's data. This architecture was important to implement in the backend logic to allow users to access data from my web server and interact with it in different ways.

Documenting how the API is built is also important since it informs client applications on how to format requests to the API, such as what URL endpoints to target or what data to send as parameters and what to expect as responses from it.

# **WHAT** WAS THE GOAL

Defining what data I wanted my server to expose by considering key questions such as: what information could the client want to retrieve (or GET) from the server? What information could it want to add (or POST)? To update (PUT)? To remove (DELETE)?

Thinking about the general architecture of my API, as well as the structure of the endpoints to be created. Associating each of these endpoints with a specific operation following the project requirements and creating the Express codes to route all of the endpoints.

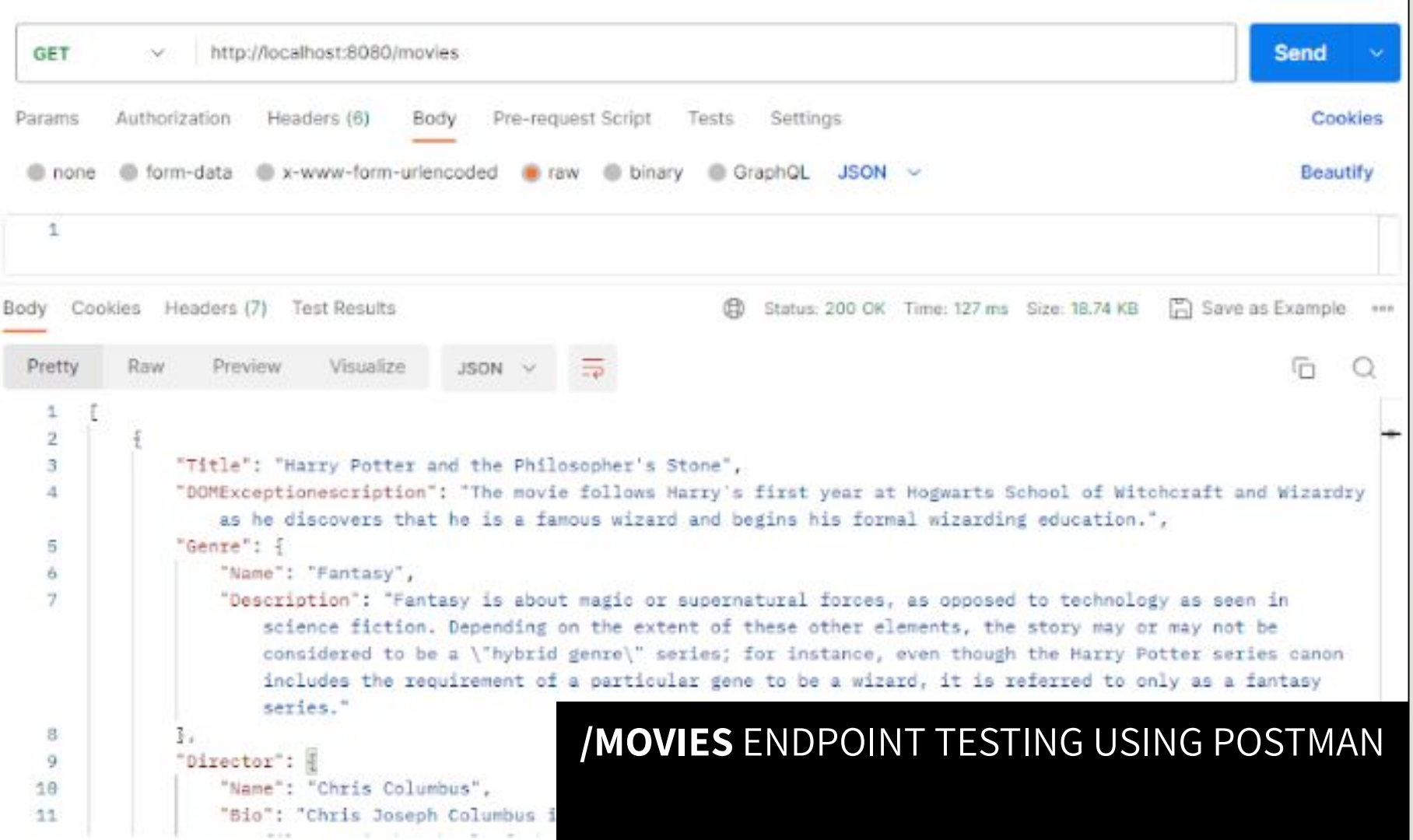
```
app.get('/')
app.get('/movies'
app.get('/movies/:Title')
app.get('/movies/genre/:genreName')
app.get('/movies/directors/:directorName')
app.post('/users')
app.put('/users/:Username')
app.post('/users/:Username/movies/:MovieID')
app.delete('/users/:Username/movies/:MovieID')
app.delete('/users/:Username')
```

# **WHAT** WAS THE GOAL (SUITE)

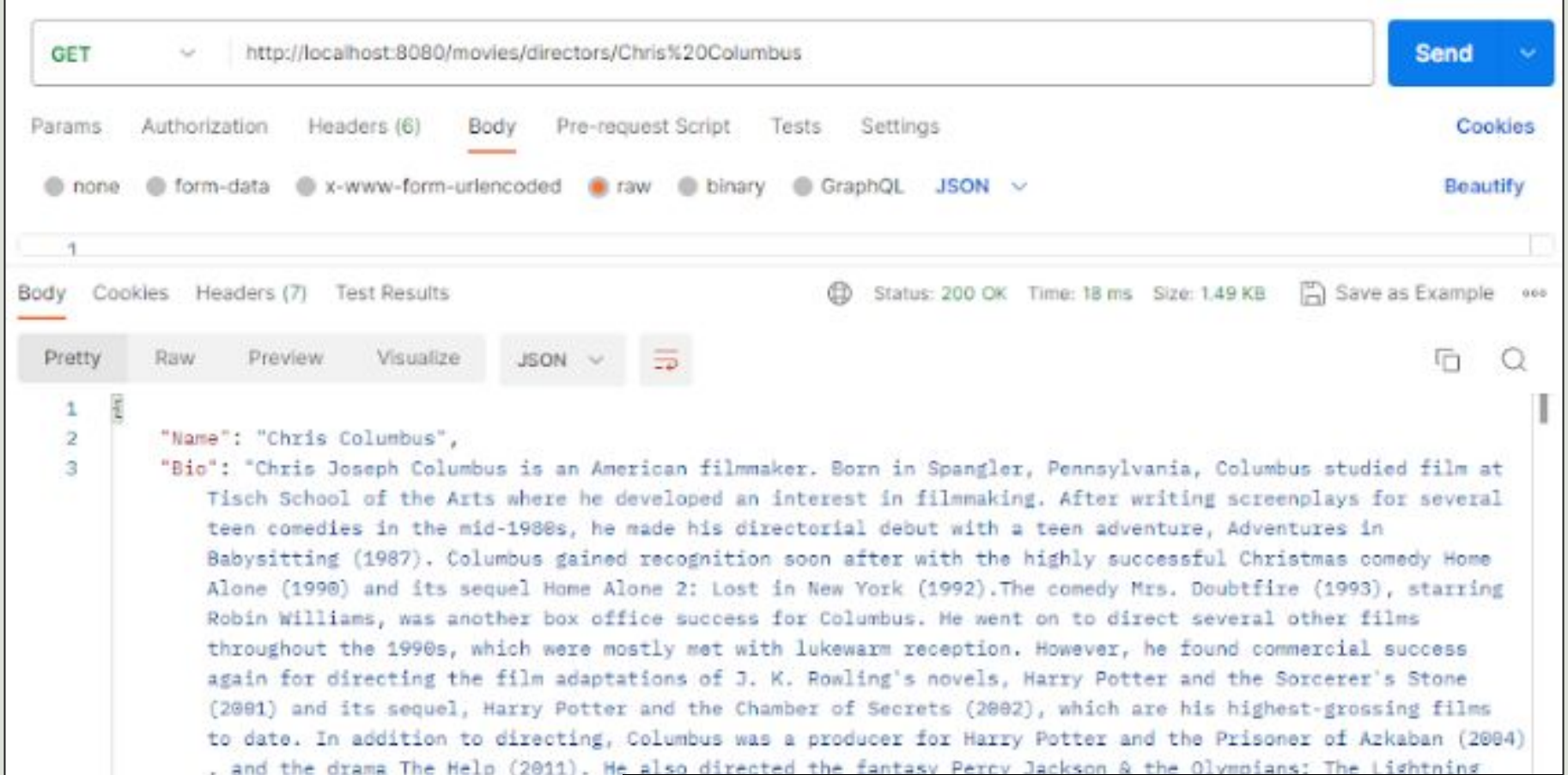
Installing a Uuid module to assign an ID to any newly created object, such as a new user account (and so eliminate the need for the user to come up with an ID themselves when creating an object, and ensures that there are never two of the same IDs for objects).

Testing my API and newly created endpoints with Postman (a tool helping with API development - see sample pictures in the next slides). To run those tests, the data I used was stored in-memory in a JS testing file, but it was planned to eventually build and use an external database over the next steps (see step 7) to store movie and user information.

Documenting the API endpoints to ensure that developers of the client app know what data they need to send along with their requests, as well as what kind of data they can expect back in response.

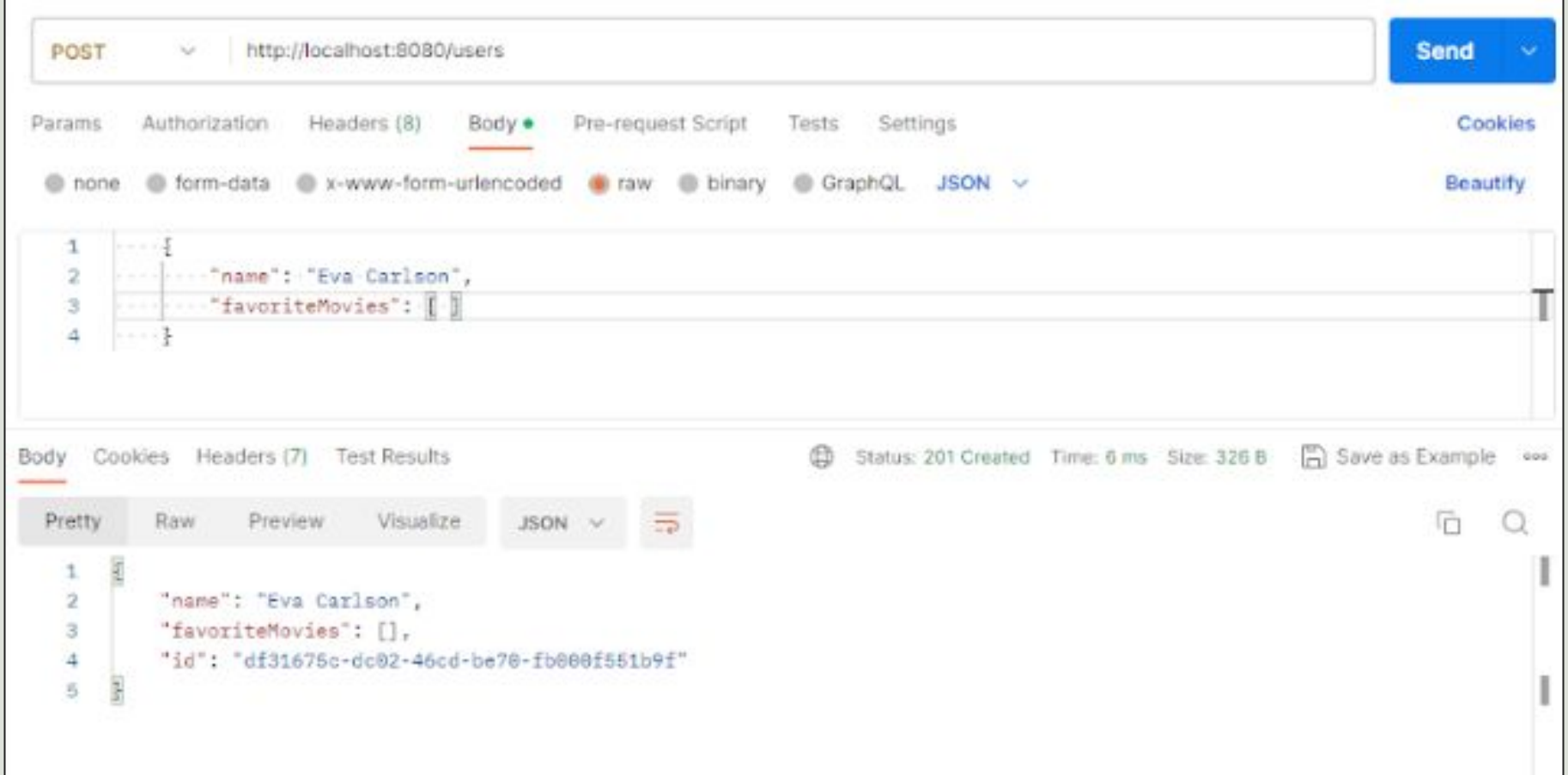



# **/MOVIES** ENDPOINT TESTING USING POSTMAN




# /MOVIES/DIRECTORS/:DIRECTORNAME

ENDPOINT TESTING USING POSTMAN




# **/USERS** ENDPOINT TESTING USING POSTMAN

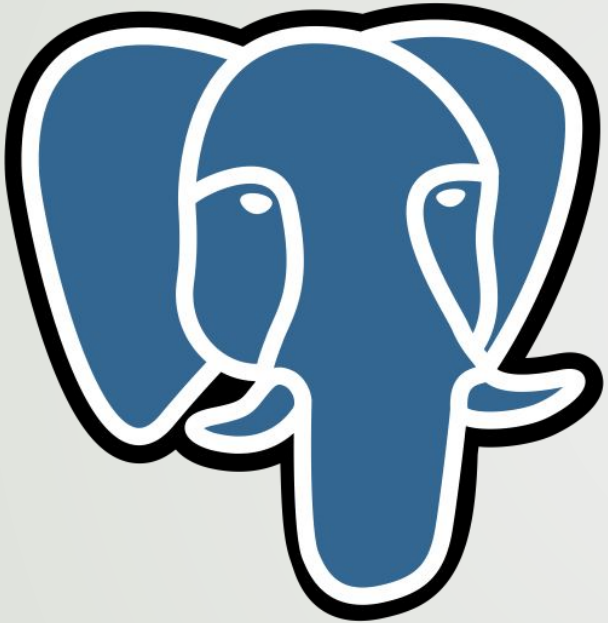
## **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

I was in my first experiences with the RESTful API architecture. Many new elements were therefore to be understood. However, with the right amount of time and efforts, I made it up to understand the logic behind RESTful API and some modules used at this stage (ex: Body-parser and Uuid). Being able to test my codes with Postman facilitated my understanding of the logic behind the creation of each endpoint, both at the request level and the responses returned.

## **DECISIONS** MADE

I defined the endpoints for my REST API according to project requirement, and documented them in a documentation.html (and later in a README.md file more easily accessible on Github).

# 06



**Creating** a relational database using SQL

Skills used

Research

# **WHY** WAS THIS STEP IMPORTANT

This step was mainly meant to learn the logic of a relational database, but not to actually use one in the project since it was planned that myFlix would use a non-relational database (MongoDB). However, since SQL and relational databases remain important in different working / project environments, it was still important to get some practice in creating and manipulating data in a relational database.

Moreover, even if a relational database was not to be used in the project, the raw data collected in this step to create a relational database have been re-used to set up my non-relational database in the next step, making this current step still contributing to the whole web app development.

# **WHAT** WAS THE GOAL

Learning the basics of designing a relational database (schemas, entities and attributes, foreign keys, junction tables, etc.). Defining the entities of my web app and their corresponding attributes. For example:

- Movies as entity - ID, Title, Description, Genre, Directors and more as attributes
- User as entity - ID, Username, Password, Email, Birthday, Favorite movies as attributes.

Defining how all this information is related / what are the relationships between my entities and attributes (one-to-one, one-to-many, many-to-many).

Creating a database in the relational database management systems (RDBMS) PostgreSQL and creating different tables (for Movies, Genres, Directors, Users and User-Movies) inside of it ( see sample pictures in the next slides). Populating each of these tables with some information using SQL language.

Learning and practicing querying / performing CRUD operations on the data stored within the tables of the database using SQL language SELECT, UPDATE and DELETE (see sample pictures in the next slides).

```
--
-- TOC entry 219 (class 1259 OID 16418)
-- Name: movies; Type: TABLE; Schema: public; Owner: postgres
--

CREATE TABLE public.movies (
    movieid integer NOT NULL,
    title character varying(50) NOT NULL,
    description character varying(1000),
    directorid integer NOT NULL,
    genreid integer NOT NULL,
    imageurl character varying(300),
    featured boolean
);


ALTER TABLE public.movies OWNER TO postgres;

--
-- TOC entry 218 (class 1259 OID 16417)
-- Name: movies_movieid_seq; Type: SEQUENCE; Schema: public; Owner: postgres
--

CREATE SEQUENCE public.movies_movieid_seq
    AS integer
    START WITH 1
    INCREMENT BY 1
    NO MINVALUE
    NO MAXVALUE
    CACHE 1;
```

**MOVIES TABLE CREATION** (COPY OF THE DATABASE IN SQL FORMAT)

```
--
-- TOC entry 221 (class 1259 OID 16437)
-- Name: users; Type: TABLE; Schema: public; Owner: postgres
--

CREATE TABLE public.users (
    userid integer NOT NULL,
    username character varying(50) NOT NULL,
    password character varying(50) NOT NULL,
    email character varying(50) NOT NULL,
    birth_date date
);


ALTER TABLE public.users OWNER TO postgres;

--
-- TOC entry 220 (class 1259 OID 16436)
-- Name: users_userid_seq; Type: SEQUENCE; Schema: public; Owner: postgres
--

CREATE SEQUENCE public.users_userid_seq
    AS integer
    START WITH 1
    INCREMENT BY 1
    NO MINVALUE
    NO MAXVALUE
    CACHE 1;
```

**USERS TABLE CREATION** (COPY OF THE DATABASE IN SQL FORMAT)

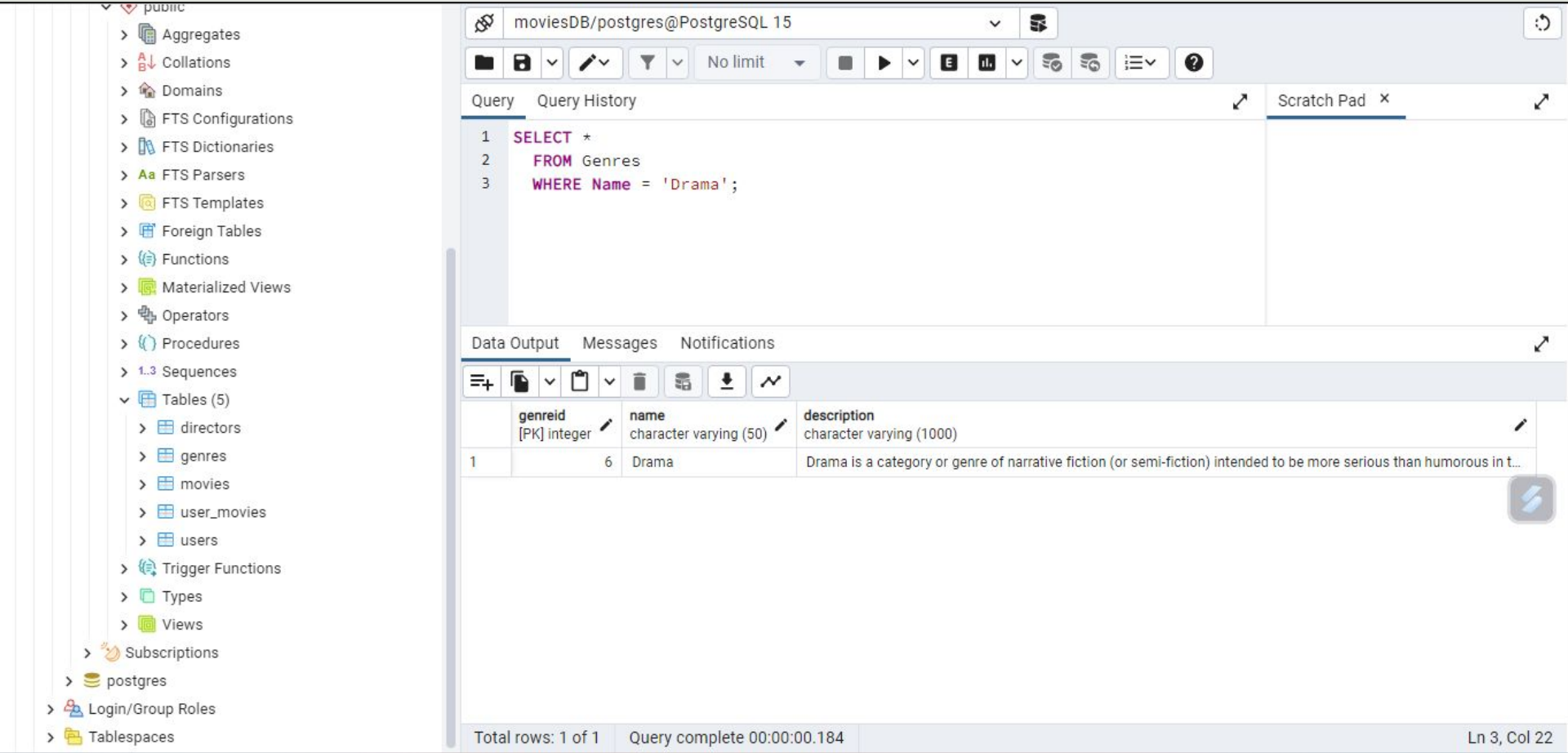
# **POPULATING** MOVIES TABLE WITH DATA (COPY OF THE DATABASE IN SQL FORMAT)

```
--
-- TOC entry 3359 (class 0 OID 16418)
-- Dependencies: 219
-- Data for Name: movies; Type: TABLE DATA; Schema: public; Owner: postgres
--

INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (2, 'Jurassic Park', 'The film is set on the fictional island of Isla Nublar, off Central America''s Pacific Coast near Costa Rica, where a wealthy businessman, John Hammond, and a team of genetic scientists have created a wildlife park of de-extinct dinosaurs. When industrial sabotage leads to a catastrophic shutdown of the park''s power facilities and security precautions, a small group of visitors, including Hammond''s grandchildren, struggle to survive and escape the now perilous island', 3, 4, 'https://www.imdb.com/title/tt0107290/mediaviewer/rm3913805824/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (3, 'Jaws', 'Jaws stars Roy Scheider as police chief Martin Brody, who, with the help of a marine biologist (Richard Dreyfuss) and a professional shark hunter (Robert Shaw), hunts a man-eating great white shark that attacks beachgoers at a summer resort town.', 3, 1, 'https://www.imdb.com/title/tt0073195/mediaviewer/rm1449540864/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (5, 'Coach Carter', 'Coach Carter is a 2005 American biographical teen sports drama film. ', 5, 6, 'https://www.imdb.com/title/tt0393162/mediaviewer/rm2796356096/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (6, 'Gladiator', 'Gladiator is a 2000 epic historical drama film.', 6, 6, 'https://www.imdb.com/title/tt0172495/mediaviewer/rm2442542592/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (7, 'The pirates of Somalia', 'This movie shows the true story of journalist Jay Bahadur, immersed in the world of piracy around the Horn of Africa.', 7, 6, 'https://www.imdb.com/title/tt5126922/mediaviewer/rm1602771200/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (8, 'Blood diamond', 'Set during the Sierra Leone Civil War from 1991 to 2002, the film depicts a country torn apart by the struggle between government loyalists and insurgent forces. It also portrays many of the atrocities of that war, including the rebels'' amputation of civilians hands to discourage them from voting in upcoming elections.', 8, 1, 'https://www.imdb.com/title/tt0450259/mediaviewer/rm3284992512/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (9, 'Ratatouille', 'Set in Paris, the plot follows a young rat Remy (Oswalt) who dreams of becoming a chef at Auguste Gusteau''s restaurant and tries to achieve his goal by forming an unlikely alliance with the restaurant''s garbage boy Alfredo Linguini.', 9, 3, 'https://www.imdb.com/title/tt0382932/mediaviewer/rm937921792/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (10, 'Princess Mononoke', 'Princess Mononoke is a 1997 Japanese animated epic historical fantasy film.', 10, 7, 'https://www.imdb.com/title/tt0119698/mediaviewer/rm2697706753/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (11, 'Dracula', 'Bram Stoker''s Dracula is a 1992 American Gothic horror film directed and produced by Francis Ford Coppola, based on the 1897 novel Dracula by Bram Stoker.', 4, 8, 'https://www.imdb.com/title/tt0103874/mediaviewer/rm609492736/?ref_=tt_ov_i', false);
INSERT INTO public.movies (movieid, title, description, directorid, genreid, imageurl, featured) VALUES (4, 'The godfather', 'This movie is about the Corleone family under patriarch Vito Corleone from 1945 to 1955. It focuses on the transformation of his youngest son, Michael Corleone, from reluctant family outsider to ruthless mafia boss.', 4, 4, 'https://www.imdb.com/title/tt0068646/mediaviewer/rm746868224/?ref_=tt_ov_i', false);
```

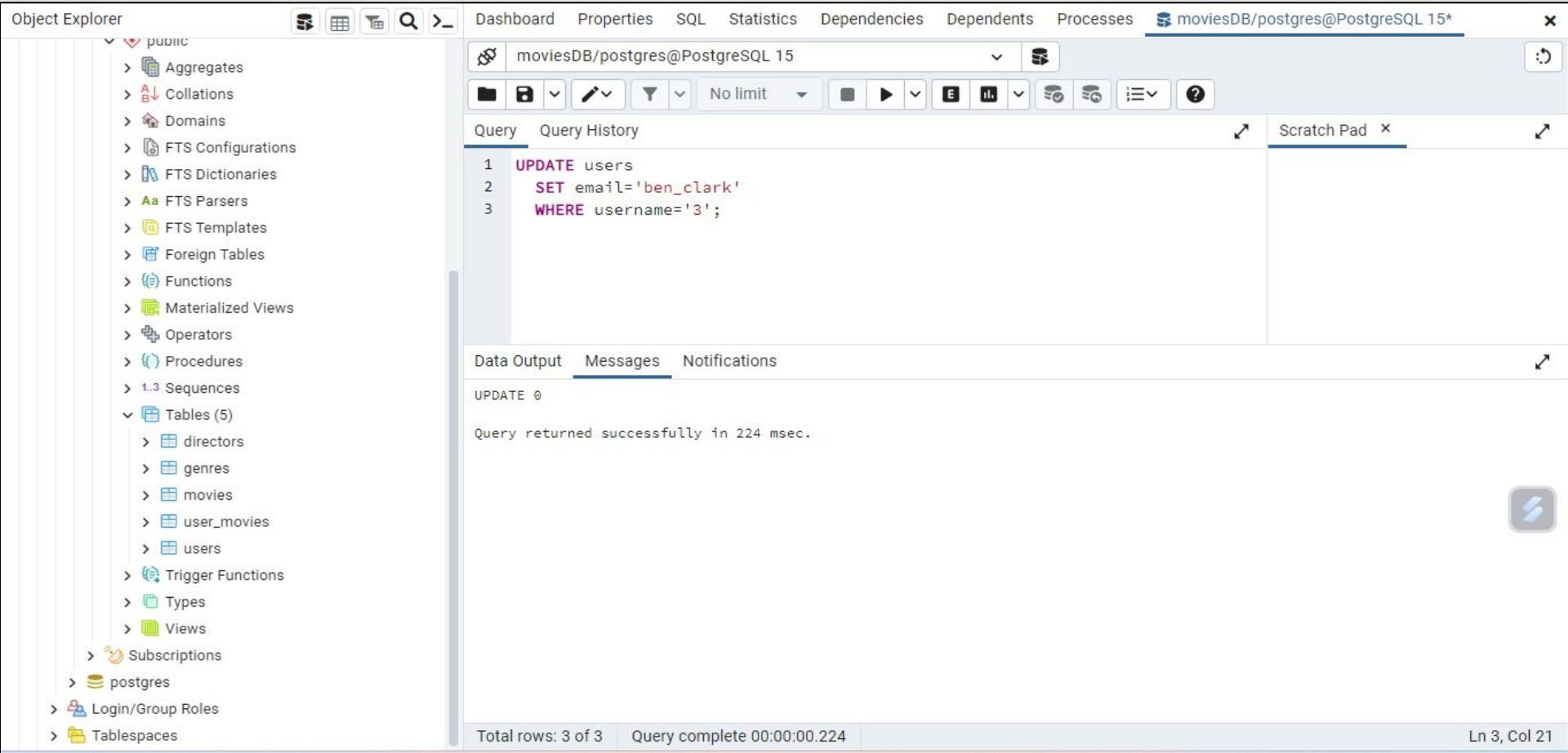
# **POPULATING** USERS TABLE WITH DATA (COPY OF THE DATABASE IN SQL FORMAT)

```
--
-- TOC entry 3361 (class 0 OID 16437)
-- Dependencies: 221
-- Data for Name: users; Type: TABLE DATA; Schema: public; Owner: postgres
--

INSERT INTO public.users (userid, username, password, email, birth_date) VALUES (1, 'DragonMaster', 'Password1234!', 'jack@hotmail.com', '1989-01-23');
INSERT INTO public.users (userid, username, password, email, birth_date) VALUES (2, 'GoldenStar', 'SpaceDiscovery01', 'naty@gmail.com', '2003-09-04');
INSERT INTO public.users (userid, username, password, email, birth_date) VALUES (3, 'Ben_Clark', 'Wr5\?mGH', 'ben@gmail.com', '1976-04-16');
```

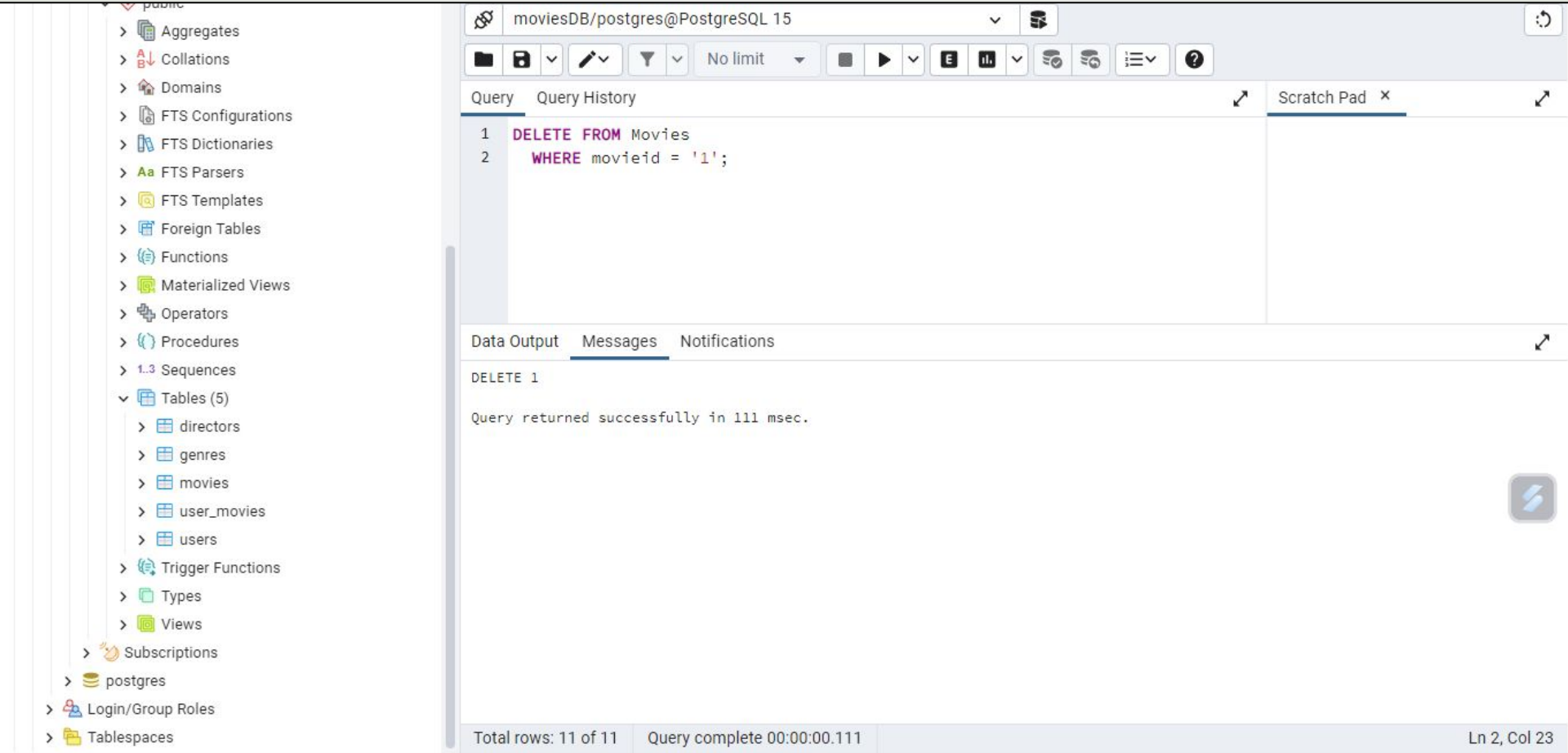
# **SELECT** OPERATION (CRUD - READ)



# **UPDATE** OPERATION (CRUD - UPDATE)



# **DELETE** OPERATION (CRUD - DELETE)



# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

Since I already had some experience working with relational databases within ArcGIS (GIS software), setting up and understanding the logic and interface of a relational database and querying it was fairly straightforward.

# **DECISIONS** MADE

Deciding the sort of data to be stored in my database (necessary for this step in the conception of the relational database, but also necessary and important at this point since these data would be re-used in the non-relational database built in the next step).

# 07

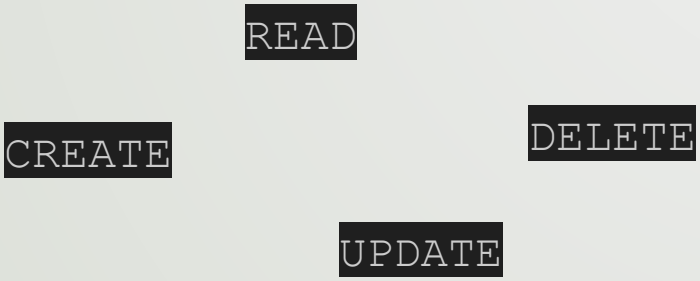

**Creating** a non-relational database (NoSQL) using MongoDB and querying it using CRUD operations

## Skills used

Research
Code writing
Debugging

# **WHY** WAS THIS STEP IMPORTANT

Creating an external database for my REST API to interact with (via the server) and ensure all CRUD operations are fulfilled was important, since up to this point, the data used were stored in-memory in a JavaScript file for testing purposes.




# **WHAT** WAS THE GOAL

Getting to know the different models of NoSQL databases (Key-Value Stores, Document-Based Stores, Graph Stores and Wide-Column Stores) and more specifically the Document-Based Stores as this is the MongoDB type, and MongoDB being part of the MERN tech stack used for this project.

Understanding the logic behind MongoDB data structure (collections and documents, key-value pairs structure within documents, embedded documents, references to create links between documents in different collections) and how to interact with it using JavaScript.

# **WHAT** WAS THE GOAL (SUITE)

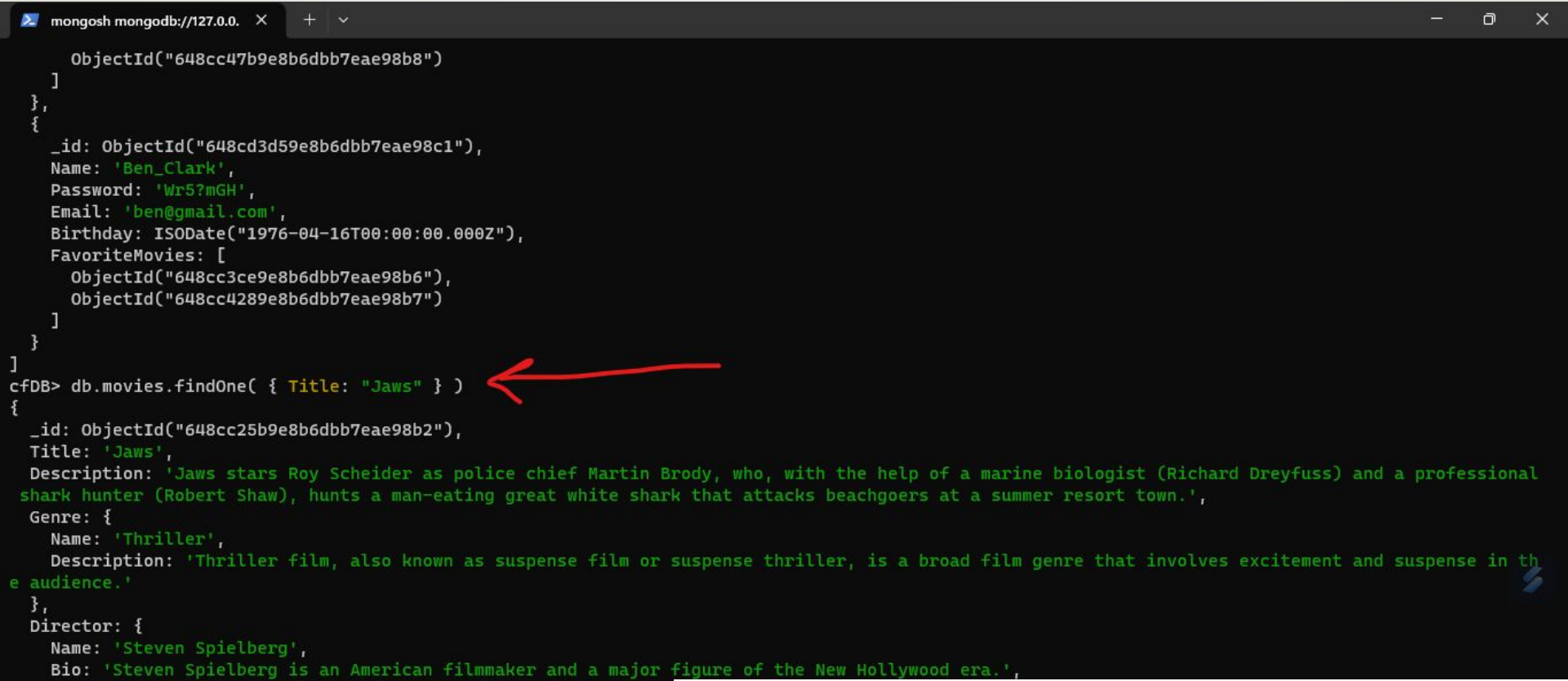
Installing MongoDB, including MongoDB Community Server, MongoDB Shell (Mongosh) and MongoDB Database Tools.

Creating a local non-relational database to feed my web app (rather than feeding it with in-memory data stored in a file like it was the case before this step). Populate my users and movies collections, using embedded documents for some specific movie information inside the movie collection.

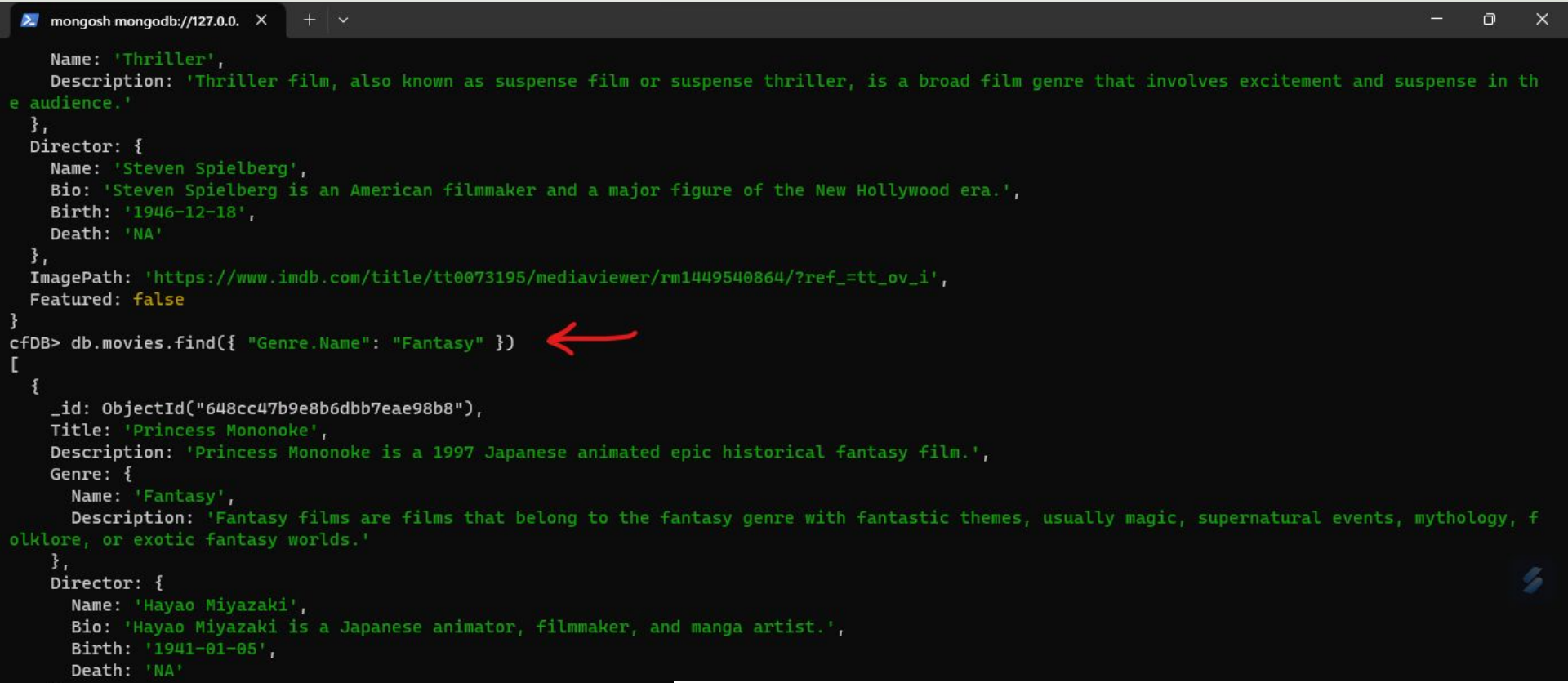
Querying my local database to test it out using the four CRUD operations (via Mongo Shell - Mongosh).

# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

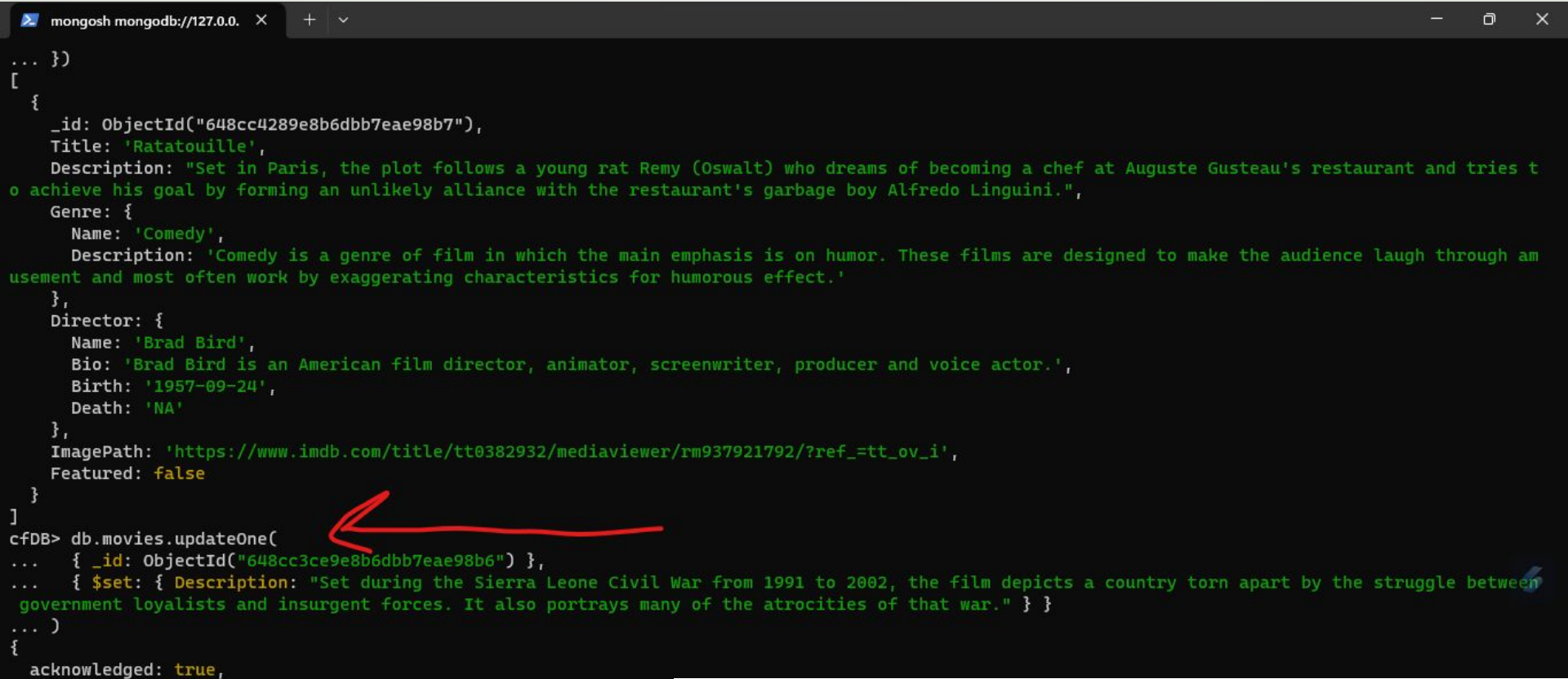
At first, I had problems launching and using MongoDB Shell / Mongosh. I always got an error message when trying to launch it in my terminal. I later found that the issue was lying in the way I've installed it. I therefore un-installed Mongosh and installed it again, but this time using other parameters in the installation process, which fixed the problem.




# **EXAMPLE OF CRUD OPERATION** IN MONGOSH (READ)




# **EXAMPLE OF CRUD OPERATION** IN MONGOSH (READ)




# **EXAMPLE OF CRUD OPERATION** IN MONGOSH (UPDATE)


# **EXAMPLE OF CRUD OPERATION** IN MONGOSH (UPDATE)

# 08

**Creating** schemas and models to **enforce** data uniformity and data consistency in my non-relational database

## Skills used

Research
Code writing
Debugging

# **WHY** WAS THIS STEP IMPORTANT

Creating models was important to ensure to keep my data as consistent as possible, not only to have a good general structure, but also because every user who will use myFlix web app will expect to receive, for example, the same data format for each movie they'll look into. This was important for a good and professional user-experience.

# **WHAT** WAS THE GOAL

Learning how to use Mongoose to maintain the flexibility of a non-relational database while maintaining consistency throughout my database.

Creating a specific file for my models (model.js), importing Mongoose package into it and creating the schemas for the movies and users collection with specific keys-values to dictate the format of the documents to be created within these two collections.

# **WHAT** WAS THE GOAL (SUITE)

Creating the models that use the schemas previously defined in the same model.js file (movies and users schemas) and export them. Import them into my index.js file to ensure my API endpoints can make use of them in order to query my MongoDB database according to the schemas defined (so to enforce attributes as I create, update, and delete certain documents in my database).

Connecting Mongoose into my REST API with mongoose.connect( ) to allow it to perform CRUD operations on my MongoDB data (documents). Querying my Mongoose models using some common Mongoose querying functions (findOne, updateOne, updateMany, deleteOne, etc.) to ensure requests coming from the client and messages sent back are working and match how I wanted to store / alter / deliver data in MongoDB.

Testing back again each endpoint of my API using Postman to see if implemented changes (Mongoose models) are working as expected.

Updating my API documentation to integrate new and more accurate information based on the newly created schemas / models for my database.

# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

At the end of this step, I ran into some problems when trying to execute CRUD operations in Postman. I was always receiving a MongooseError message. I noticed that this was related to a Network / Connection issue, since I was not using the correct mongoose.connect( ) link to connect it to my local machine (issue related to the Mongoose version I had). I therefore looked online and found another mongoose.connect( ) link to allow Mongoose to connect to my local / machine database, and it worked.

## **SCHEMA** FOR MOVIES COLLECTION

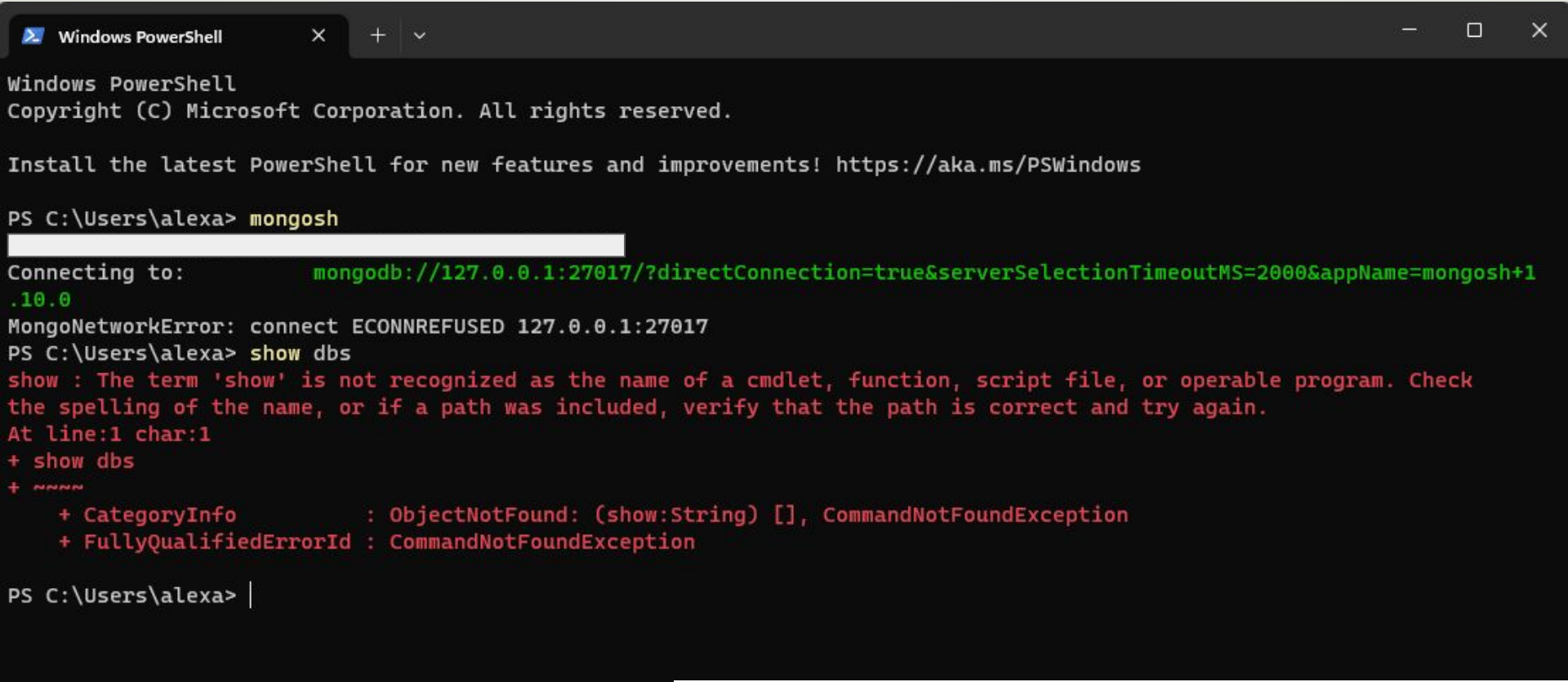
```
let movieSchema = mongoose.Schema({
    Title: {type: String, required: true},
    Description: {type: String, required: true},
    Genre: {
      Name: String,
      Description: String
    },
    Director: {
      Name: String,
      Bio: String,
      Birth: Date,
      Death: Date
    },
    ImagePath: String,
    Featured: Boolean
  });
```

## **SCHEMA** FOR USERS COLLECTION

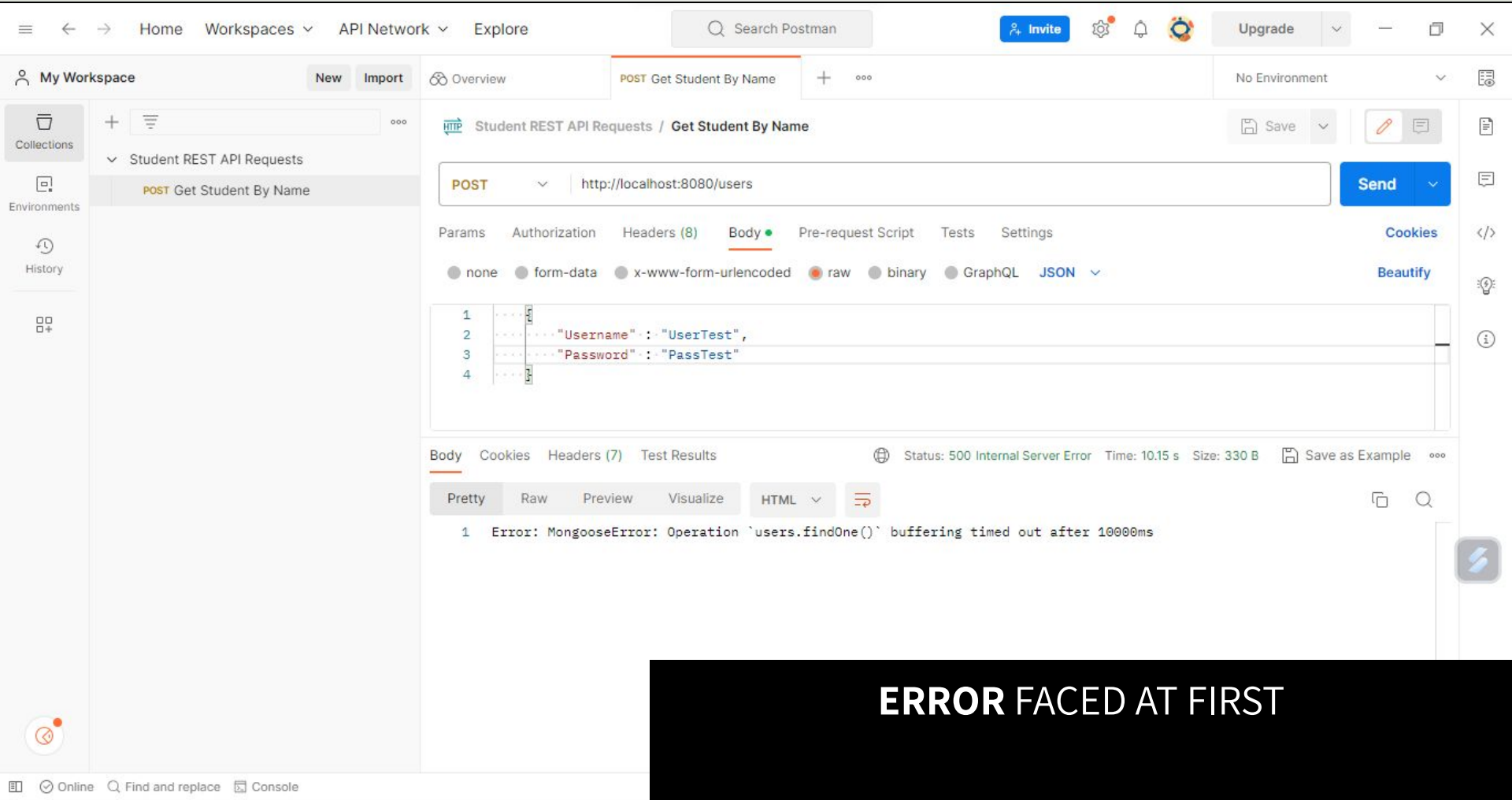
```
let userSchema = mongoose.Schema({
  Username: {type: String, required: true},
  Password: {type: String, required: true},
  Email: {type: String, required: true},
  Birthday: Date,
  FavoriteMovies: [{ type: mongoose.Schema.Types.ObjectId, ref: 'Movie' }]
});
```

## **MODELS** CREATION AND EXPORT USING DEFINED SCHEMAS

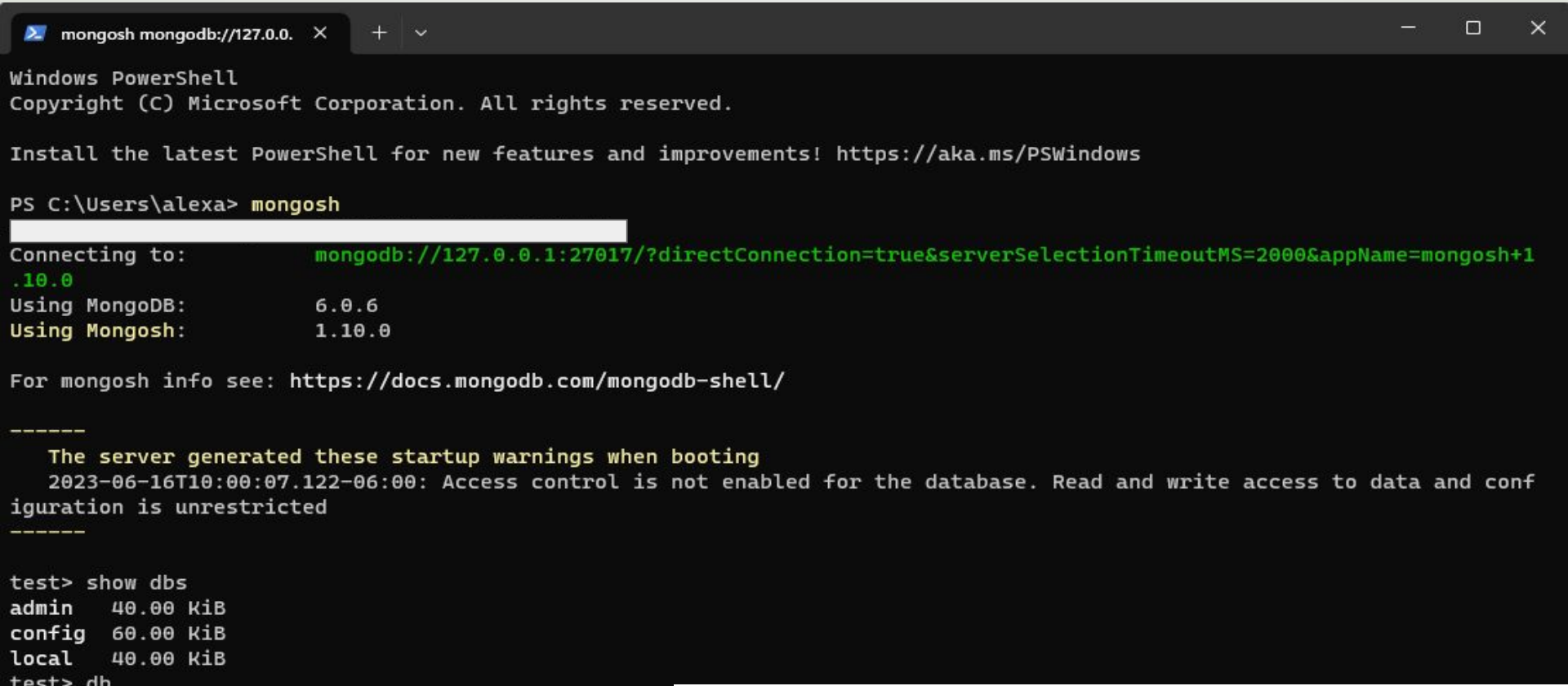
```
let Movie = mongoose.model('Movie', movieSchema);
let User = mongoose.model('User', userSchema);

module.exports.Movie = Movie;
module.exports.User = User;
```



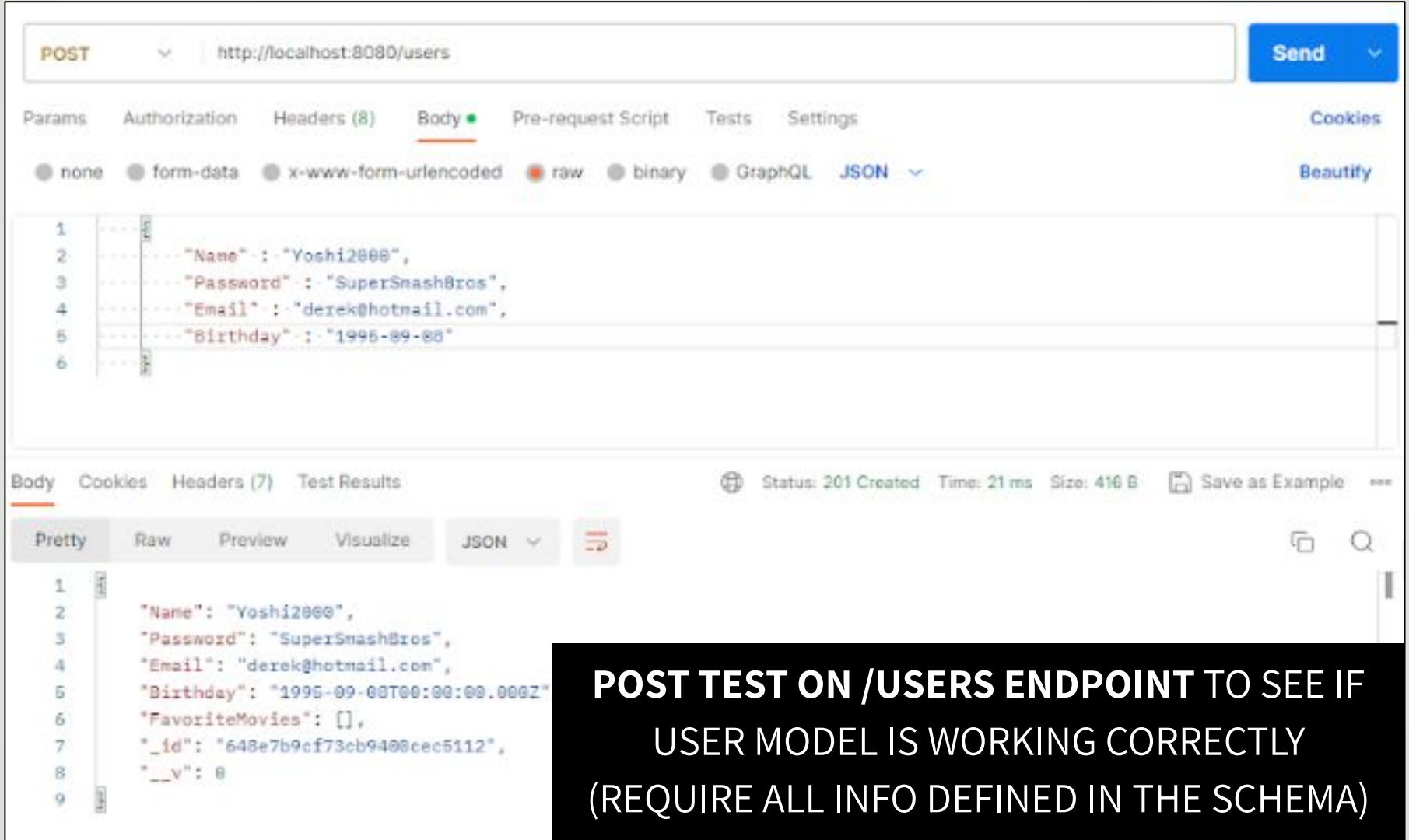

**ERROR** FACE AT FIRST



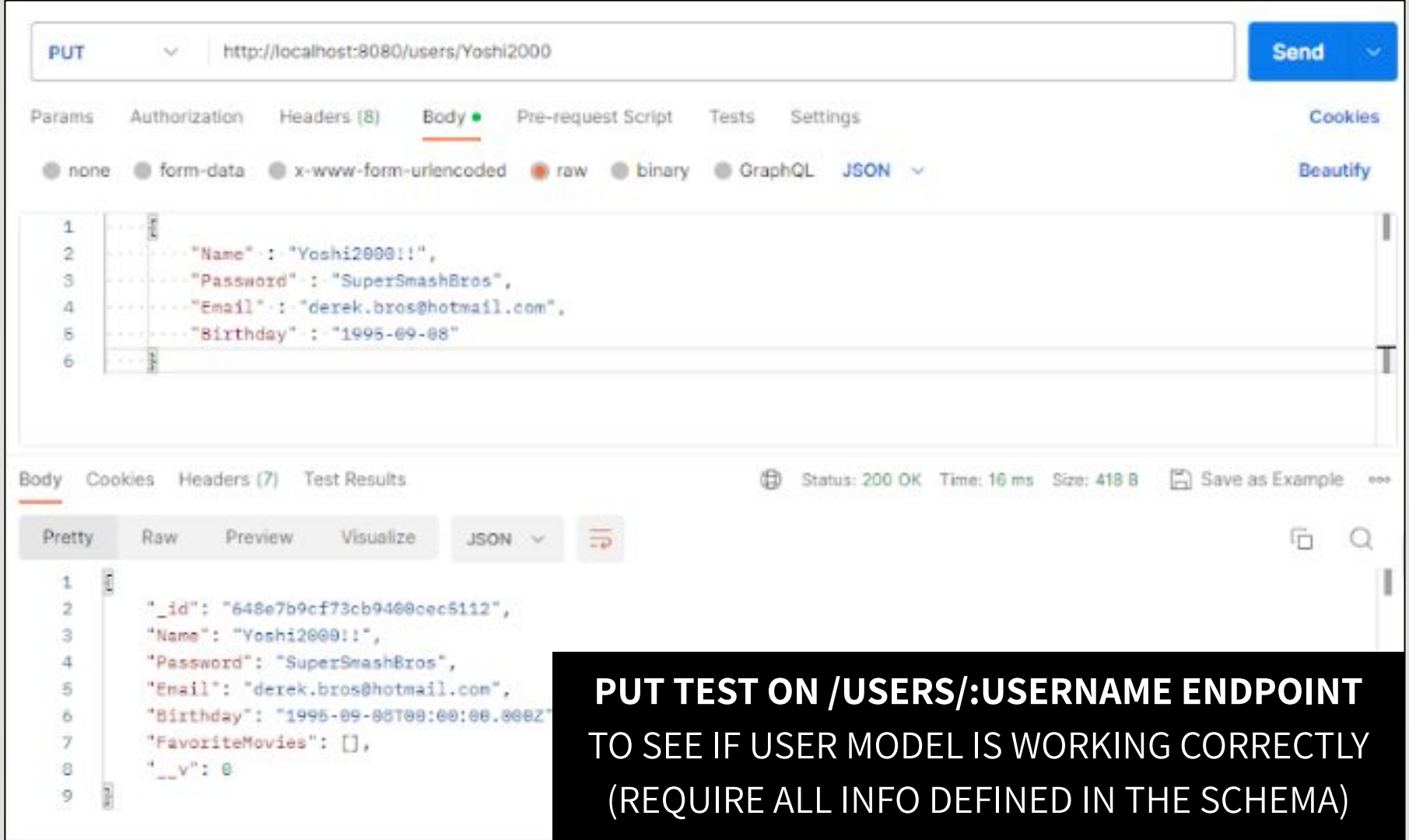

**ERROR** FACED AT FIRST


mongosh mongodb://127.0.0.
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
PS C:\Users\alexa> mongosh
Connecting to: mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+1
.10.0
Using MongoDB: 6.0.6
Using Mongosh: 1.10.0
For mongosh info see: https://docs.mongodb.com/mongodb-shell/
The server generated these startup warnings when booting
2023-06-16T10:00:07.122-06:00: Access control is not enabled for the database. Read and write access to data and conf
iguration is unrestricted
test> show dbs
admin 40.00 KiB
config 60.00 KiB
local 40.00 KiB
test> db
test
test> use cfDB
switched to db cfDB
cfDB>

ERROR **FIXED**




**POST TEST ON /USERS ENDPOINT** TO SEE IF USER MODEL IS WORKING CORRECTLY (REQUIRE ALL INFO DEFINED IN THE SCHEMA)


PUT
http://localhost:8080/users/Yoshi2000
Send
Params
Authorization
Headers (8)
Body
Pre-request Script
Tests
Settings
Cookies
none
form-data
x-www-form-urlencoded
raw
binary
GraphQL
JSON
Beautify
{
"Name" : "Yoshi2000!!",
"Password" : "SuperSmashBros",
"Email" : "derek.bros@hotmail.com",
"Birthday" : "1995-09-08"
}
Body
Cookies
Headers (7)
Test Results
Status: 200 OK
Time: 16 ms
Size: 418 B
Save as Example
Pretty
Raw
Preview
Visualize
JSON
{
"_id": "648e7b9cf73cb9400cec5112",
"Name": "Yoshi2000!!",
"Password": "SuperSmashBros",
"Email": "derek.bros@hotmail.com",
"Birthday": "1995-09-08T00:00:00.000Z",
"FavoriteMovies": [],
"__v": 0
}
PUT TEST ON /USERS/:USERNAME ENDPOINT
TO SEE IF USER MODEL IS WORKING CORRECTLY
(REQUIRE ALL INFO DEFINED IN THE SCHEMA)

# 09

`HTTP Authentication`

`API key-based authentication`

`session-based / cookie-based authentication`

`JWT token-based authentication`

`OAuth authentication`

**Applying** principles of authentication to my REST API

## Skills used

Research
Code writing
Debugging

# **WHY** WAS THIS STEP IMPORTANT

Users today expect the apps they use to be safe and secure, making authentication and authorization logic implementation an essential step in the development process. It's also important to keep the API safe from malicious actors and software.

Passport

# **WHAT** WAS THE GOAL

Learning and understanding the pros and cons of different types of authentication and authorization methods for applications: basic HTTP authentication, API key-based authentication, session-based (or cookie-based) authentication, JWT token-based authentication and OAuth.

Installing Passport library and basic HTTP authentication / JWT authentication packages in the project via the terminal.

# **WHAT** WAS THE GOAL (SUITE)

Creating a new file in my project folder (passport.js) and configuring two strategies using Passport middleware too (strategies being Passport's block of codes to enable certain methods of authentication and authorization within an app).

- One for basic HTTP authentication to authenticate login requests (for users initial login requests into myFlix using username and password on the login page)
- One for JWT authentication to authenticate logged-in users other requests based on their previously generated JWT (for users requests to my API once logged in into myFlix)

Creating a new /login endpoint inside a new auth.js file to authenticate login requests using basic HTTP authentication and generate a JWT for users requests / future interactions with the API.

```
passport.use(new LocalStrategy(...));
passport.use(new JWTStrategy({...}));
```

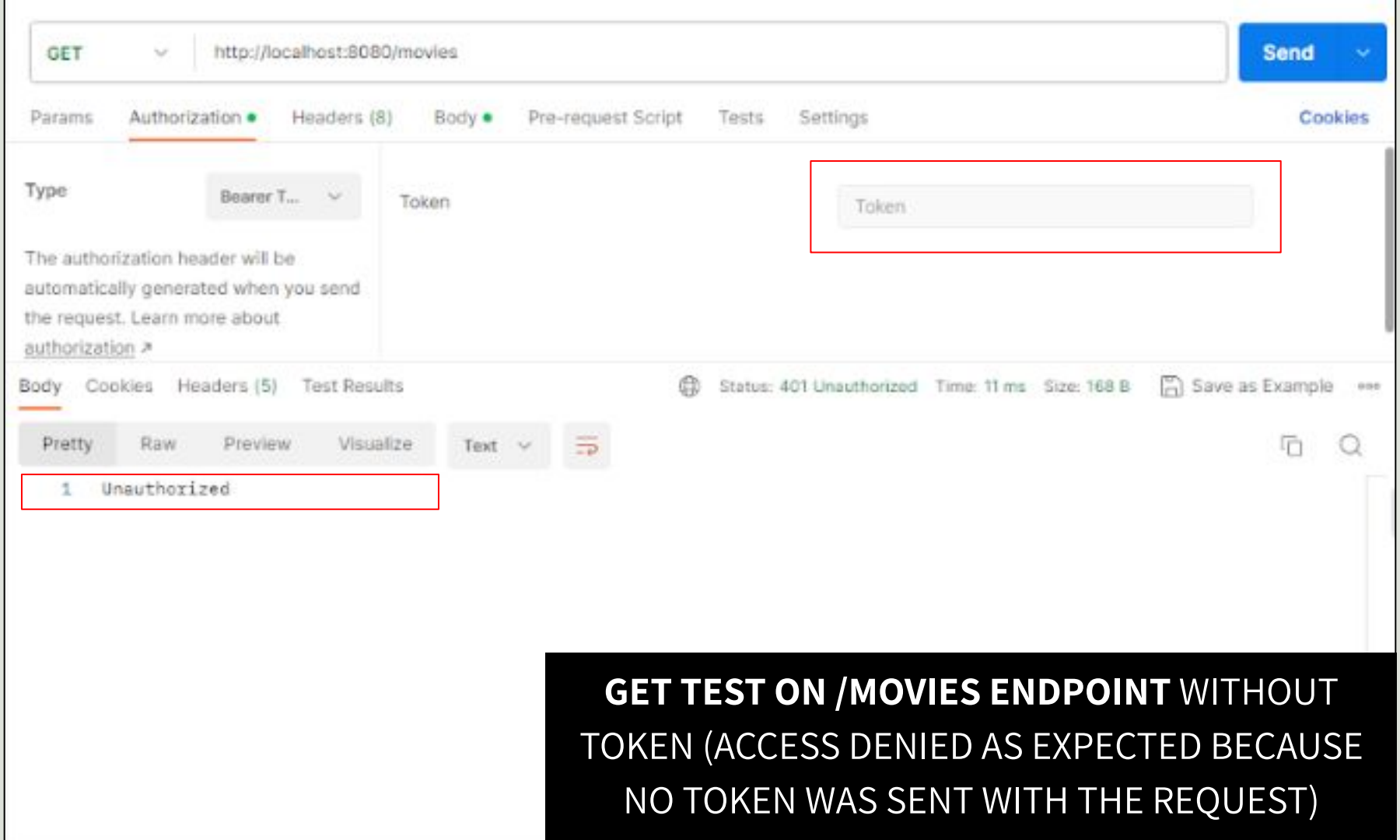
# **WHAT** WAS THE GOAL (SUITE)

Updating all my endpoints (except the one for new user account creation) to integrate my JWT Passport strategy as middleware so that only users with a JWT token can make requests to my API (for example, only users who've registered, been authenticated and send along a token with their request would be able to access the /movies endpoint and read movie data sent back by the API).

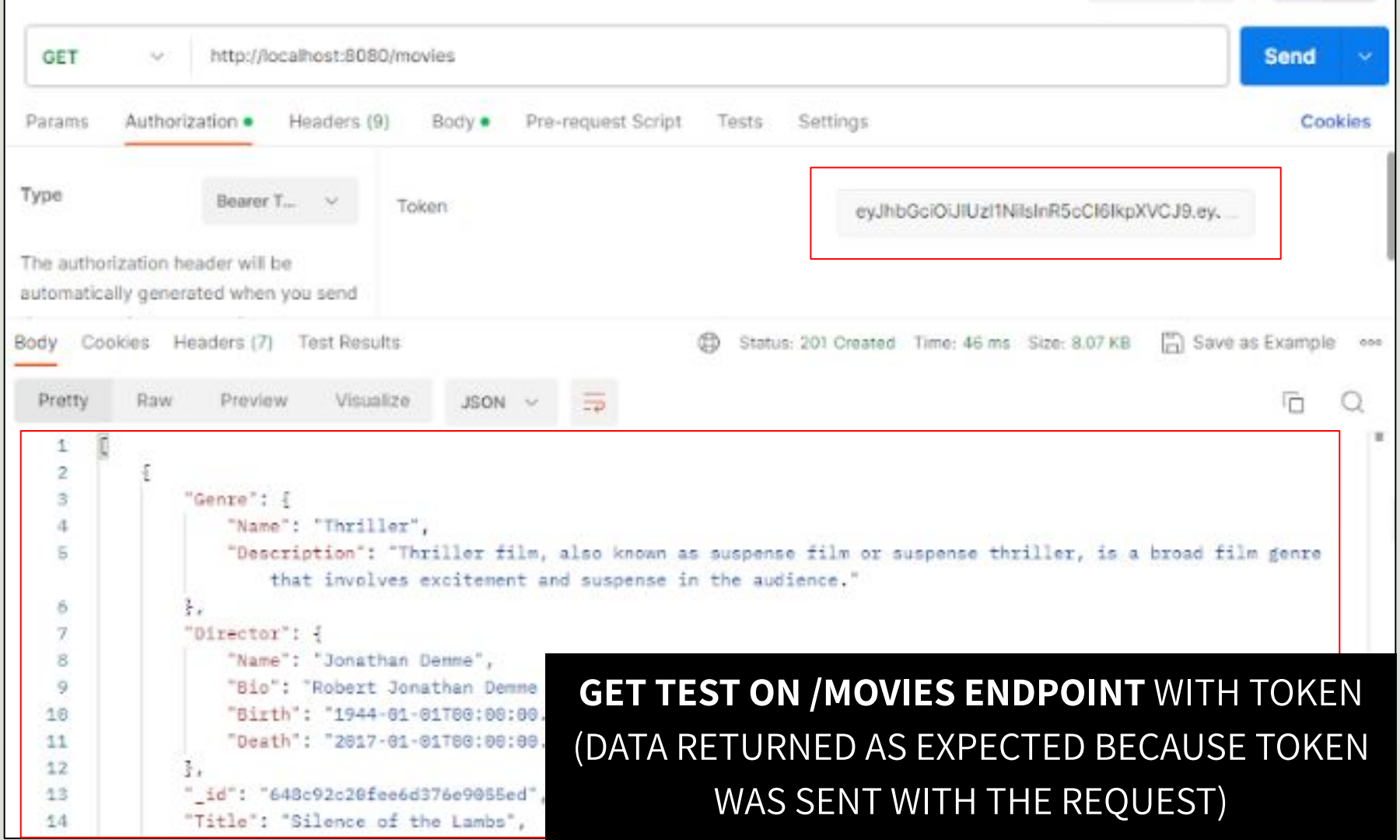
This update / additional logic in every endpoint was meant for them to receive the token from the client and compare the authentication and authorization details it contains with the details stored in the database to finally, if everything is matching, authorize the request to the endpoint and perform the specific CRUD action.

Testing the new authentication and authorization methods implemented using Postman.

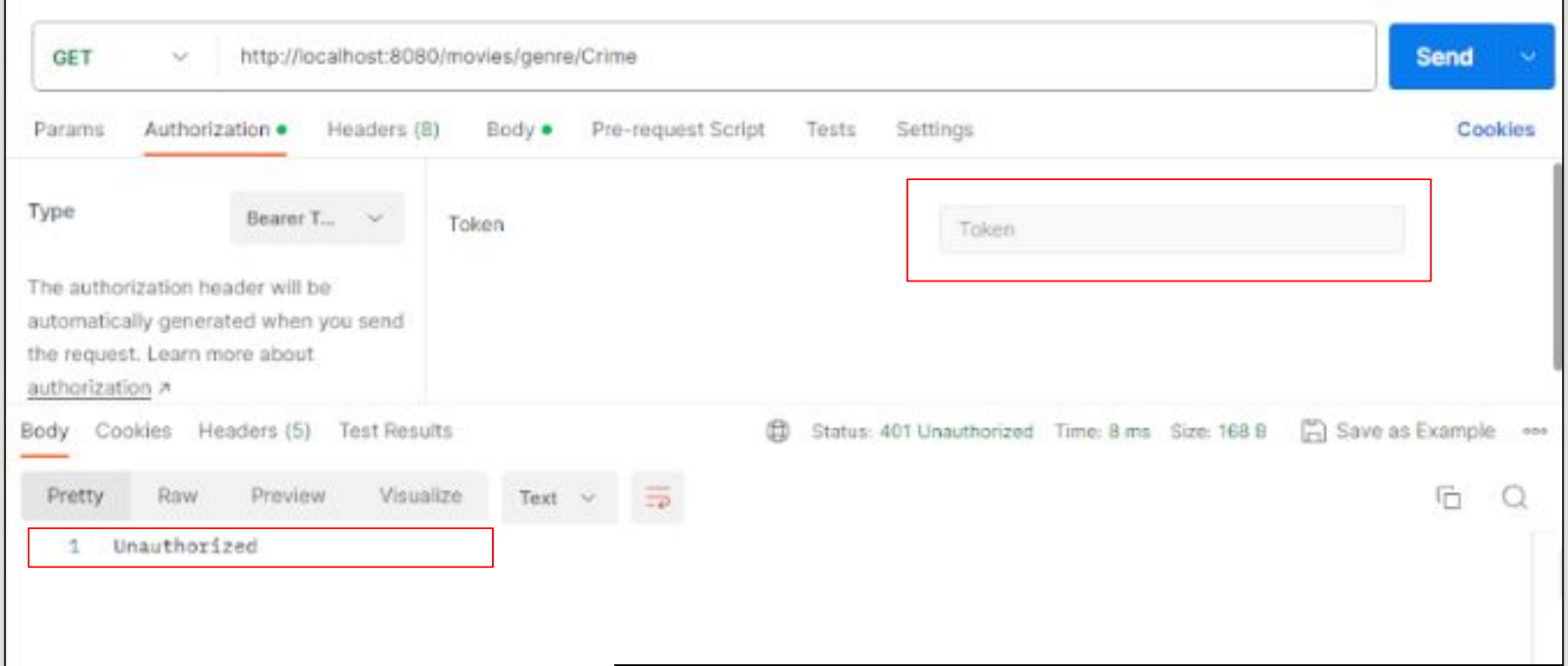
```
app.get('/movies', passport.authenticate('jwt', { session: false }), (req, res) => {...});
```



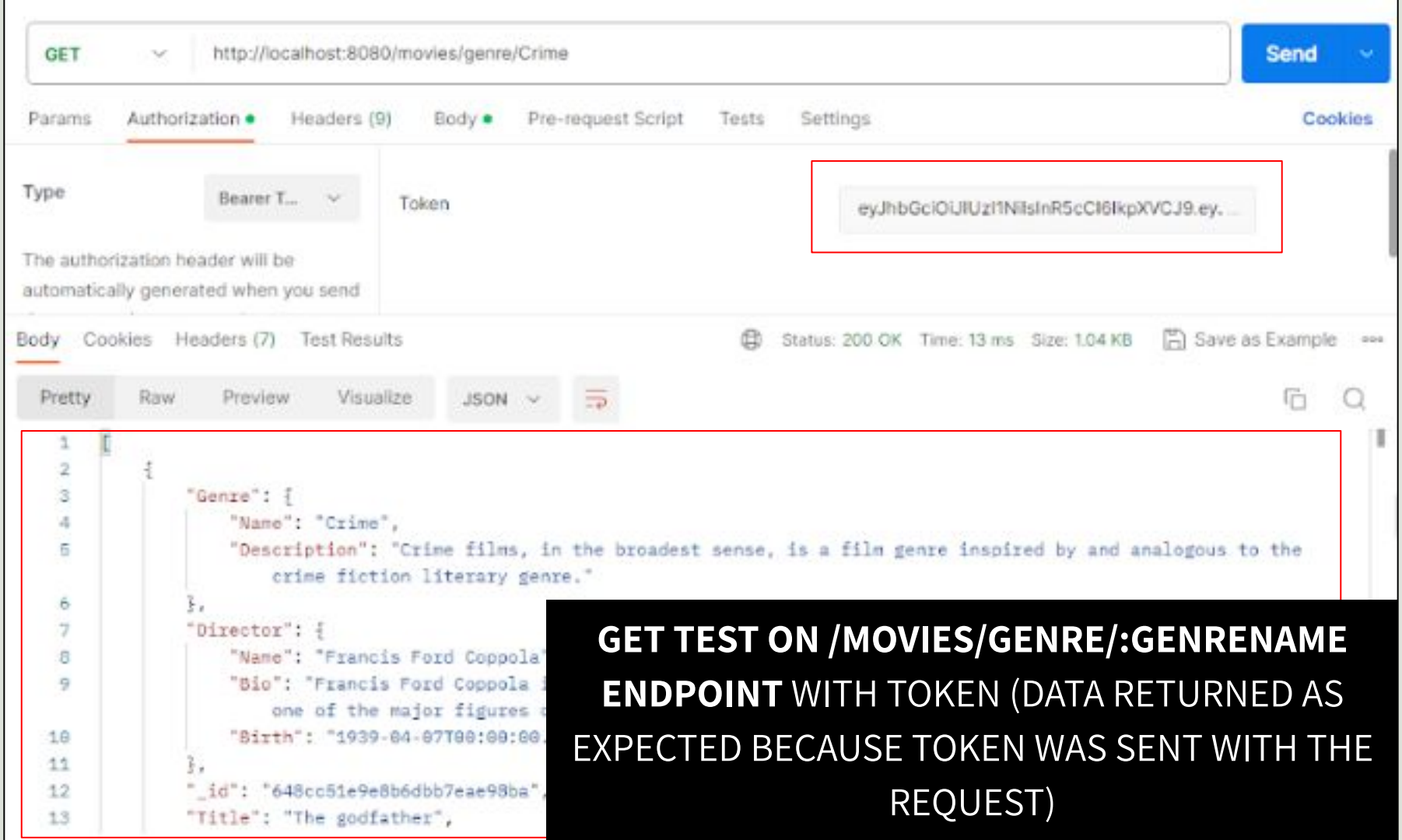

**GET TEST ON /MOVIES ENDPOINT** WITHOUT TOKEN (ACCESS DENIED AS EXPECTED BECAUSE NO TOKEN WAS SENT WITH THE REQUEST)



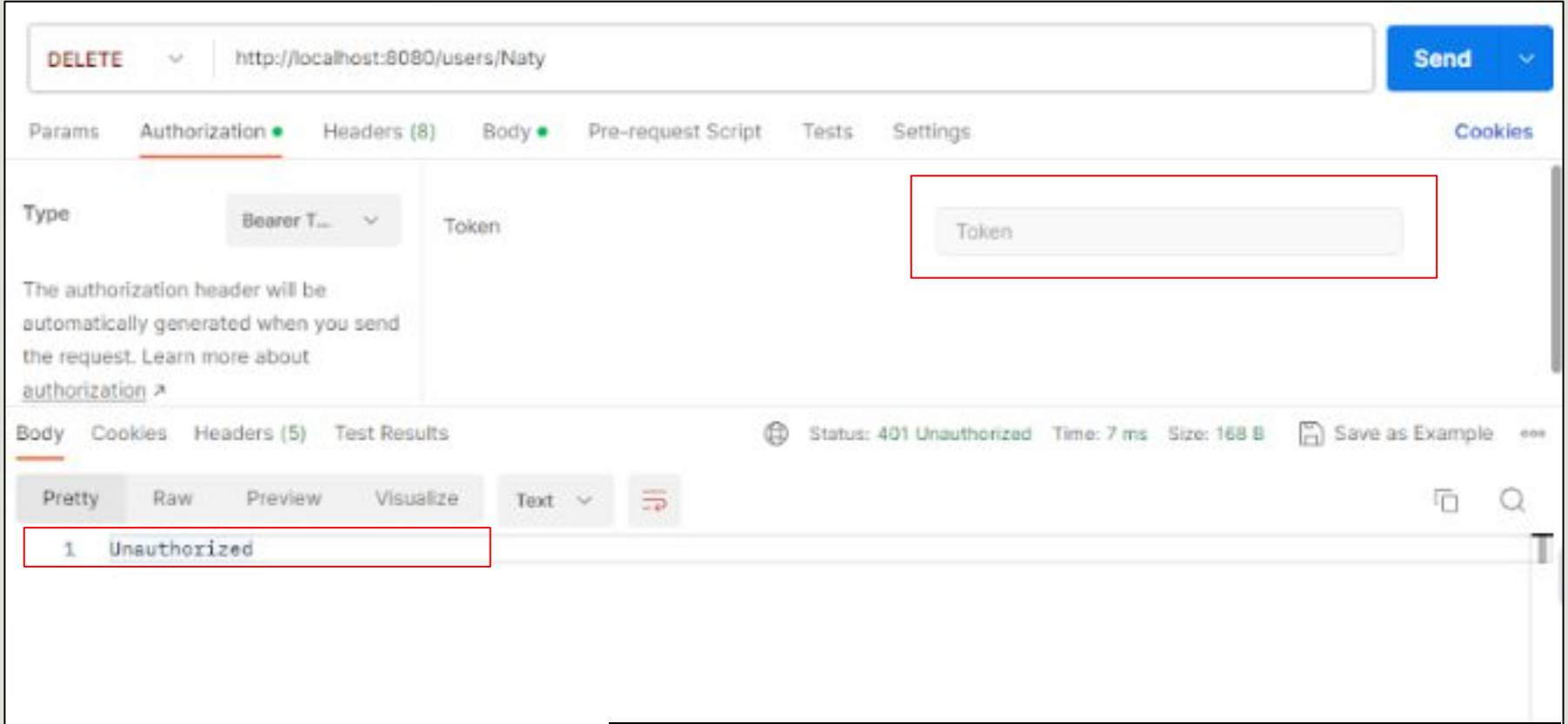

**GET TEST ON /MOVIES ENDPOINT** WITH TOKEN (DATA RETURNED AS EXPECTED BECAUSE TOKEN WAS SENT WITH THE REQUEST)



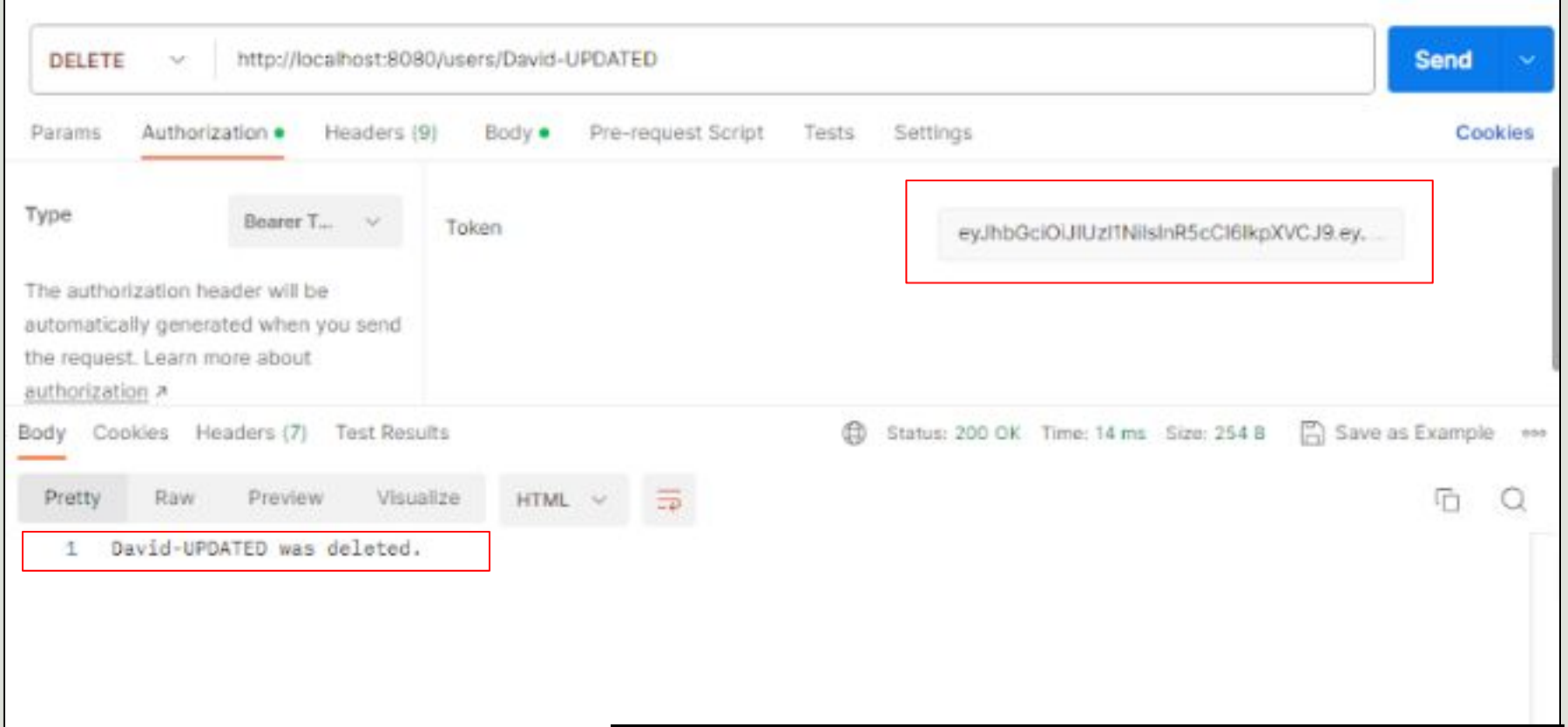

**GET TEST ON /MOVIES/GENRE/:GENRENAME ENDPOINT** WITHOUT TOKEN (ACCESS DENIED AS EXPECTED BECAUSE NO TOKEN WAS SENT WITH THE REQUEST)




**GET TEST ON /MOVIES/GENRE/:GENRENAME ENDPOINT** WITH TOKEN (DATA RETURNED AS EXPECTED BECAUSE TOKEN WAS SENT WITH THE REQUEST)




**DELETE TEST ON USERS/:USERNAME ENDPOINT** FOR A USER TRYING TO DELETE HIS ACCOUNT WITHOUT TOKEN (ACTION DENIED AS EXPECTED BECAUSE NO TOKEN WAS SENT WITH THE REQUEST)




**DELETE TEST ON USERS/:USERNAME ENDPOINT** FOR A USER TRYING TO DELETE HIS ACCOUNT WITH TOKEN (ACTION COMPLETED AS EXPECTED BECAUSE TOKEN WAS SENT WITH THE REQUEST)

# 10


**Implementing** security mechanisms and **deploying** my API and database online

## Skills used

Research
Problem-solving
Code writing
Debugging

# **WHY** WAS THIS STEP IMPORTANT

Ensuring data and web security considerations have been incorporated into the web app was important, since web developers and whole teams behind digital product development have security and ethical responsibilities (such as privacy laws and data protection measures).

- Same-Origin Policy
- Cross-Origin Resource Sharing (CORs)
- HTTPS
- Secure Sockets Layer (SSL)
- Password hashing
- Content-Security-Policy (CSP)
- User input validation
- Escaping data

- Cross-Site Scripting Attacks (XSS)
- Cross-Site Request Forgery (CSRF)
- SQL Injection

# **WHAT** WAS THE GOAL

Learn about privacy and ethical laws, especially coming from the GDPR.

Learn about security mechanisms for the web:

- Same-Origin Policy
- Cross-Origin Resource Sharing (CORs)
- HTTPS
- Secure Sockets Layer (SSL)
- Password hashing
- Content-Security-Policy (CSP)
- User input validation
- Espacing data

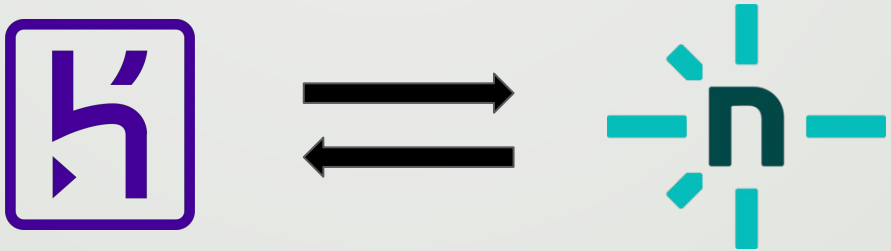
Learn about different forms of malicious attacks:

- Cross-Site Scripting Attacks (XSS)
- Cross-Site Request Forgery (CSRF)
- SQL Injection

# **WHAT** WAS THE GOAL (SUITE)

Installing and implementing restricting domain access to keep my app as safe as possible from malicious entities using Cross-Origin Resource Sharing (CORS) module. This is a useful module as it extends HTTP requests sent to my API by giving them a new header that include their origin domain, thus allowing the server to then identify where the requests are coming from (which domain) and allow or disallow the request accordingly.

For this to work, I added (later during my app frontend development) the link of my publicly hosted web app into my CORS domain permission (which then list the origin domain for my web app frontend as an authorized domain), so anyone accessing my web app via Netflify (my hosting platform for my frontend side) would have access to it while other domain origins trying to access it, potentially being malicious, could not (error message returned).



# **WHAT** WAS THE GOAL (SUITE)

Installing and implementing the Bcrypt module to hash myFlix users' password in the database upon account creation, and then compares hashed passwords received from user login requests to the hashed password stored into the database every time users log into myFlix in order to ensure a more secure login authentication process.

```
Password selected by user during account creation: password1234!
Password hashed and stored in the database: $4n$93$ynFKZA5247XqHjZbTwRmAqk7K28xGp41DR7CvQsH
```

# **WHAT** WAS THE GOAL (SUITE)

Installing Express-validator and implementing server-side input validation logics on any endpoints that expect data in the request body to ensure only accepted characters and formats submitted by users make their way into my database, thus protecting it from potential harmful inputs / actions. Such validation includes for example:

- Only alphanumeric characters accepted for username (.isAlphanumeric Express-validator method)
- Requiring specific elements / part structure for emails (.isEmail Express-validator method)

Deploying / hosting my API on the Platform as a Service (PaaS) Heroku and deploying / hosting my database online into cloud-based database hosting platform MongoDB Atlas.

Connecting my database to my API on Heroku, ensuring that the entire backend of myFlix is online, connected and ready to be used.

Final testing of all possible requests in Postman using my API's URLs from Heroku.

# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

The biggest challenge has been to understand all the different security measures that can be used to protect an application from malicious attacks, and to understand what each of these solutions brings as advantages. At the end, I understood the logic of these measures, how they work and implemented some of them into my app, but I still have a lot to know in cybersecurity. This is a particularly dense subject, for which I would like to continue to learn.

11

# **Finalizing code revision** and refactoring

## Skills used

Critical thinking
Detailed overview

# **WHY** WAS THIS STEP IMPORTANT

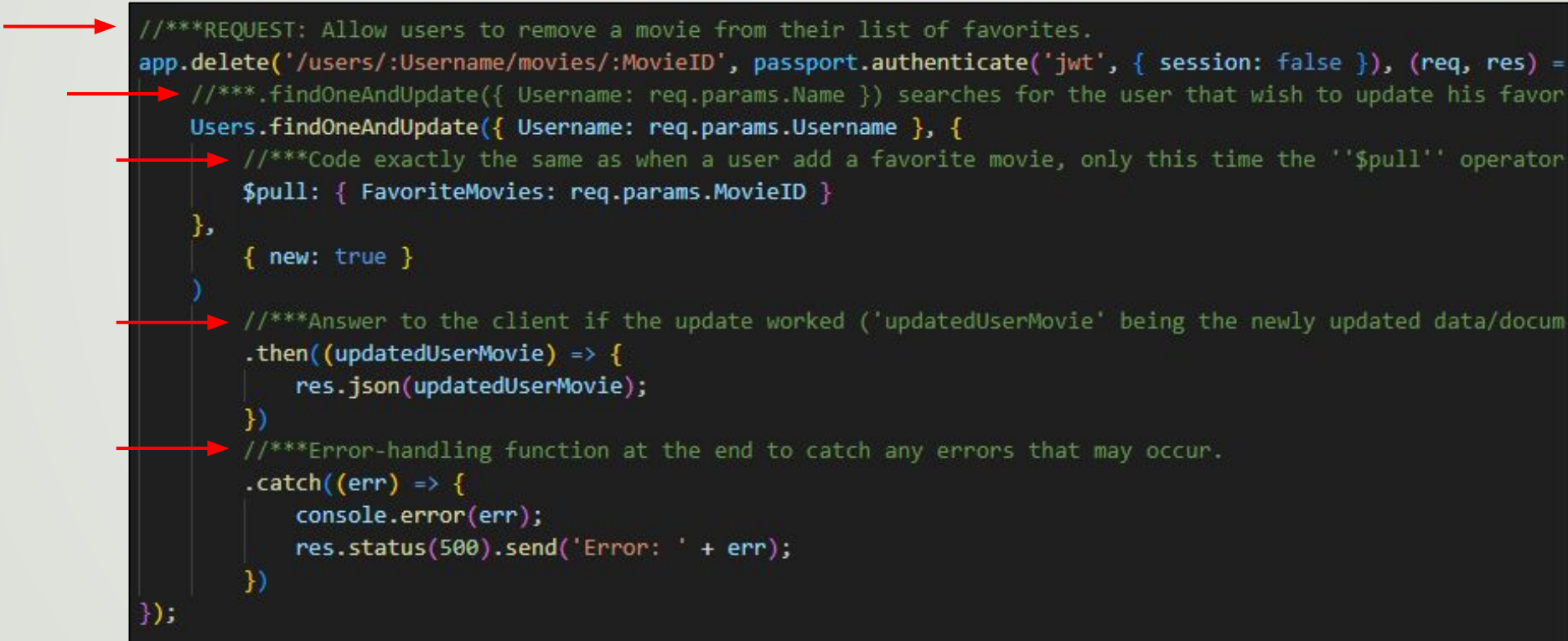
Ensuring that the codes are optimized to facilitate possible appropriation by other developers in the future is useful and could possibly save time. It can also facilitate any future adjustments to the codes.

# **WHAT** WAS THE GOAL

Reviewing each code to make sure everything was optimized as much as possible in order to facilitate future modification, addition or adjustment in the future.

Adding comments and clarifications points in the code where important for the benefit and better understanding of anyone else who may work on this project later.

# **CODE COMMENTS** TO FACILITATE FUTURE UPDATES AND WORK



# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

I positioned myself from the point of view of future colleagues who could work on my project. How can I make my project and my codes as clear as possible to promote its easy appropriation? I reviewed each file to bring improvements in certain places and add comments where I thought it could be useful.

# **DECISIONS** MADE

This step was done on my own initiative and was not required in the project requirements. I made decisions regarding the improvement of certain parts of my codes, and the addition of comments where necessary in order to set my mind to work in a collaborative environment already.

12

README.md

**Completing** the README document

Skills used

Communication
Content writing

# **WHY** WAS THIS STEP IMPORTANT

Ensure myFlix frontend logic  is well documented and easily accessible by anyone interested.

# **WHAT** WAS THE GOAL

Updating and completing the README file located in my myFlix Github repository. The goal was to ensure that all relevant information regarding myFlix is accessible under these four categories:

- Project description
- Technical aspects
- List of endpoints and related information
- App dependencies

# **CHALLENGES** OR SPECIAL POINTS OF CONSIDERATION

Finding the right balance between giving the right level of information, while remaining as synthetic as possible. To help me, I made a first draft, which I then modified several times. I get inspired by other READMEs I've consulted for similar projects and for which I found that the information presented was relevant.

# **DECISIONS** MADE

I wrote the README documentation from A to Z, in terms of content, presentation and structure.

# **README SAMPLE** - FULL VERSION ON GITHUB

README.md

## *myFlix* web app documentation (backend)

**Content**



### Projet description

*myFlix* web app has been created to serve as a reference in the domain of visual entertainment. Users can create an account and then log into *myFlix* to have access to information about different movies. They can search for movies, filter results based on different criteria and create lists of favorites. *myFlix* has been built in two parts: the backend (here) and the frontend (see this repository for the frontend part of *myFlix*).

The objective of this part of the project (backend) was to build an API from scratch to power and feed the movie web app and ensure easy interactions for users whenever they are accessing *myFlix* to read details about different movies or update their information.