**CS5600: Programming Assignment (50 points).**

In this assignment, you will learn and implement CRUD(Create, Read, Update, Delete). These are the basic APIs to perform at most functions on web applications. You will develop the backend web framework using any programming languages such as Python, Java, C#, …, etc. The backend application must connect to Neo4j-a graph DBMS developed by Neo4j, inc. (https://neo4j.com). To test the backend web framework, you must use API platforms such as Postman API Platform(<https://www.postman.com>) or Swagger UI such as FastAPI(<https://fastapi.tiangolo.com/>), …, etc.

The CSV files from Star Wars dataset (characters.csv, planets.csv and species.csv) are provided in this assignment.

Please check the following video link will guide you how to prepare and generate Neo4j database on cloud using Neo4j Aura(https://console.neo4j.io). <https://www.youtube.com/watch?v=fdPWH4P4V5A>

You can also generate Neo4j Database on local using Neo4j Desktop. The instructor will guide you how to import .csv files and generate the database on local machine.

This is a database model for the assignment:

[ :FROM ]

**Characters**

**Planets**

[ :ORIGINATED\_FROM ]

[ :IDENTIFIES\_AS ]

**Species**

**Nodes:**

Characters { name, height, mass, skin\_colors, hair\_colors, eye\_colors, birth\_year, gender, homeworld, species }

Species { name, classification, designation, average\_height, skin\_colors, hair\_colors, eye\_colors, average\_lifespan, language, homeworld }

Planets { name, rotation\_period, orbital\_period, diameter, climate, gravity, terrain, surface\_water, population }

**Relationships:**

FROM

IDENTIFIES\_AS

ORIGINATED\_FROM

The Neo4j Database Configuration:

url = “bolt://localhost:7687” for local database

usr = “neo4j” //default username

pwd = “Admin1234” //the password

…

This is an example of configuration in Python Flask:

Text

Description automatically generated

These are the example of API interfaces in Python file:

In xxxx.py file, you must perform the following main functions:

1. Insert the new characters information.

@app.route('/chars', methods=['POST'])

1. Update the characters information using name. (By update only name, hair\_colors, height and birth\_year).

@app.route('/chars/<string:fname>', methods=['PATCH'])

1. Delete the character information using name.

@app.route('/chars/<string:fname>', methods=['DELETE'])

1. Retrieve all the characters in database.

@app.route('/chars', methods=['GET'])

1. Display the characters’ details using name.

@app.route('/chars/<string:fname>', methods=['GET'])

**Submission:**

**Turn in your codes in folder name “PROG\_ASSIGN2\_XXXXX\_YYYYYY” where XXXXX is course number (CRN) and YYYYYY is 700# student id and zip the folder before submitting your assignment.**

**Notes:**

**If you want to use other web frameworks such as Java, JavaScript, PHP, or Microsoft Visual Studio .NET, etc. You must contact me beforehand and let me know how to execute your web framework or you can create a document file to describe about your programs.**

**You can use the internet cloud application platforms such as Heroku (**[**https://www.heroku.com**](https://www.heroku.com)**). However, in your assignment submission, you must provide me the links for execute the web application and source codes.**