



Unisearch

A University Filtering Flask API

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Overview

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2. UniSearch API

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Introduction

Problem

Why UniSearch?

- High School graduates hardly have any time to de-stress .Once they have achieved the already Herculean task of succeeding in the Baccalaureate exams, they find themselves facing an equally important task of deciding their future university choices.
- The problem is the state support ,in this matter, is so minimal and can be summarized into a PDF file they pass on each year containing tons and tons of information with any clear enough attempt to filter them out.

UniSearch - Quality of life improvement

What can it do?

- This is where UniSearch comes into play; the goal behind developing this Flask app is to fill in the gaps left by the archaic methods of search and to lessen the stress load off of an already burnt out student.
- Unisearch provide students with the tools needed to compute their score but also provides filtering options to discover their prospective universities from the comfort of their homes.

UniSearch API

Technologies Used in development

- Flask
- SQLAlchemy
- SQLite
- Flask-login
- Flask-Bcrypt
- CORS (Cross-Origin Resource Sharing) Middleware
- Swagger UI
- Insomnia
- Basic Web Development
HTML/CSS/JavaScript

Database Structure

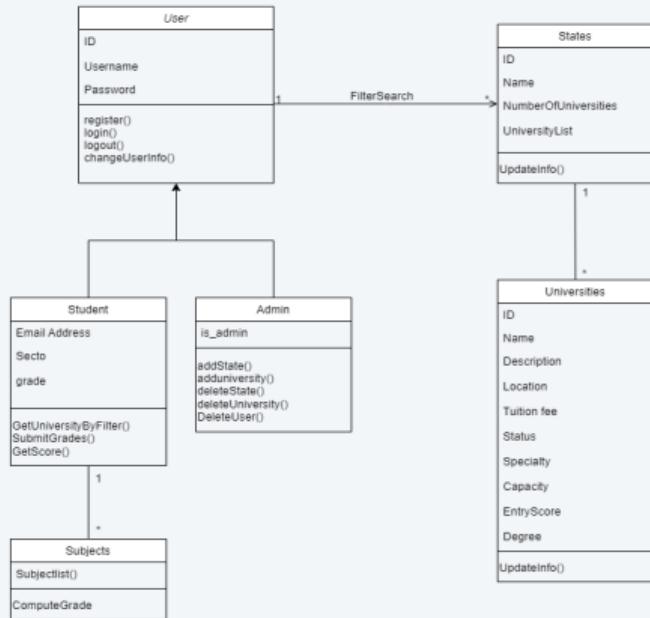


Figure: Data Models Class diagram

Database Modeling

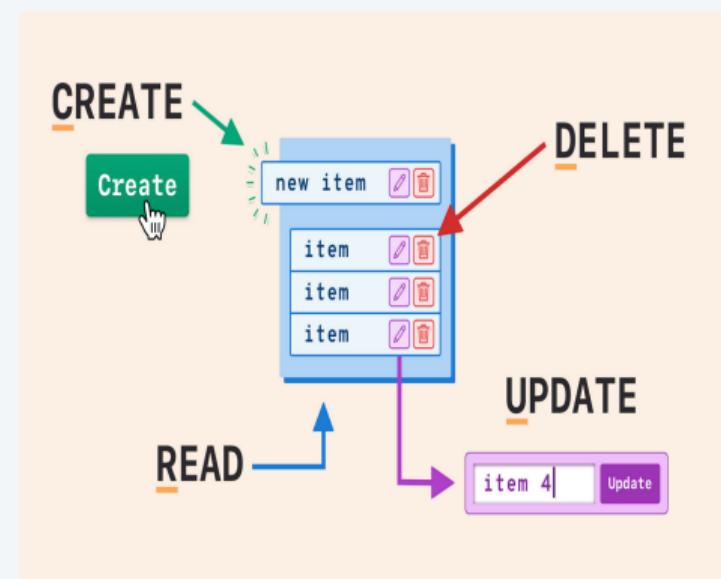
The modeling for the databases was made using SQLAlchemy tool but there is also SQLite Viewer extensions which allows the direct inspection of db file.

Reset Filters Records: 10				
	id	name	description	location
	1	TBS	Officially established ...	Bir El Kassaa Tunis, 2...
	2	IPEIT	L'IPEIT prépare ses él...	34 Rue Bab El Gorjani...
	3	FMT	Notre mission est de ...	R534+F9H, Rue de la ...
	4	FMM	Cette Création s'anno...	Avenue Avicenne, M...
	5	FSM	un établissement pu...	QR74+F58, Monastir
	6	FSM	un établissement pu...	QR74+F58, Monastir
	7	Ibn El Jazzar Medical ...	un établissement pu...	QR74+F58, Monastir
	8	IHECC	The Institut des Haut...	90 Ave Mohamed V, ...
	9	Université centrale	Université Centrale, is...	3 Rue Hammadi Fare...
	10	ESPRIT	The Private Higher Sc...	lot 13, V5XR+M37 2 ...

Figure: SQLite Viewer Showing university database

App Functionalities

- GET methods : used essentially for the app filers and provides users with a lot of freedom
- PUT methods : used to update user credentials or state and universities information.
- DELETE methods: used to delete states with their respective universities, a specific university or a user.
- POST methods: used to create states and universities as well as registration, login and logout.



User Authentication and Authorization:

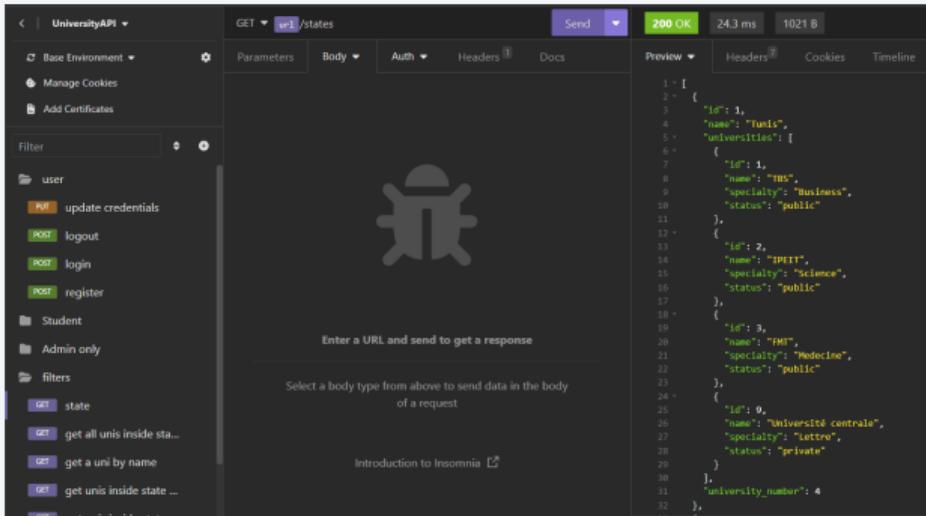
I have implemented greatly **flask-login** and its different utilities in this part of the project:

- **User Loader Function:** load a user object from the user ID stored in the session.
- **User Session Management:** allows you to easily handle user login, logout, and session management.
- **Login and Logout Decorators:** "@login_required" and "@admin_required" to authorize access to authenticated users.
- **User Authentication:** It provides functions to manage user authentication, including methods for verifying user credentials during the login process.

Swagger documentation and error handling:

- **Swagger Documentation:** provides an interactive and user-friendly interface for developers to explore and understand the API's capabilities, swagger also enables user to try out simulations.
- **Error handling:** The advantages of Swagger documentation is that it also showcase the error responses along side the error code which makes error identification much easier.

Method Response Testing



The screenshot shows the Insomnia API testing tool interface. The top bar indicates a successful **200 OK** response with a duration of **24.3 ms** and a size of **1021 B**. The URL is **/v1/states**. The left sidebar shows a tree view of API endpoints under **UniversityAPI**, including **user** (with **update credentials**, **logout**, **login**, **register** methods), **Student**, **Admin only**, **filters** (with **state**, **get all unis inside sta...**, **get a uni by name**, **get unis inside state ...** methods), and **universities** (with **get university by state** method). The main panel displays the JSON response body:

```

1: [
2:   {
3:     "id": 1,
4:     "name": "Tunis",
5:     "universities": [
6:       {
7:         "id": 1,
8:         "name": "IBS",
9:         "specialty": "business",
10:        "status": "public"
11:      },
12:      {
13:        "id": 2,
14:        "name": "IPETIT",
15:        "specialty": "science",
16:        "status": "public"
17:      },
18:      {
19:        "id": 3,
20:        "name": "FMT",
21:        "specialty": "Medecine",
22:        "status": "public"
23:      },
24:      {
25:        "id": 9,
26:        "name": "Université centrale",
27:        "specialty": "Lettre",
28:        "status": "private"
29:      }
30:    ],
31:    "university_number": 4
32:  },

```

Figure: Testing the insomnia UI

UniSearch App User Interface

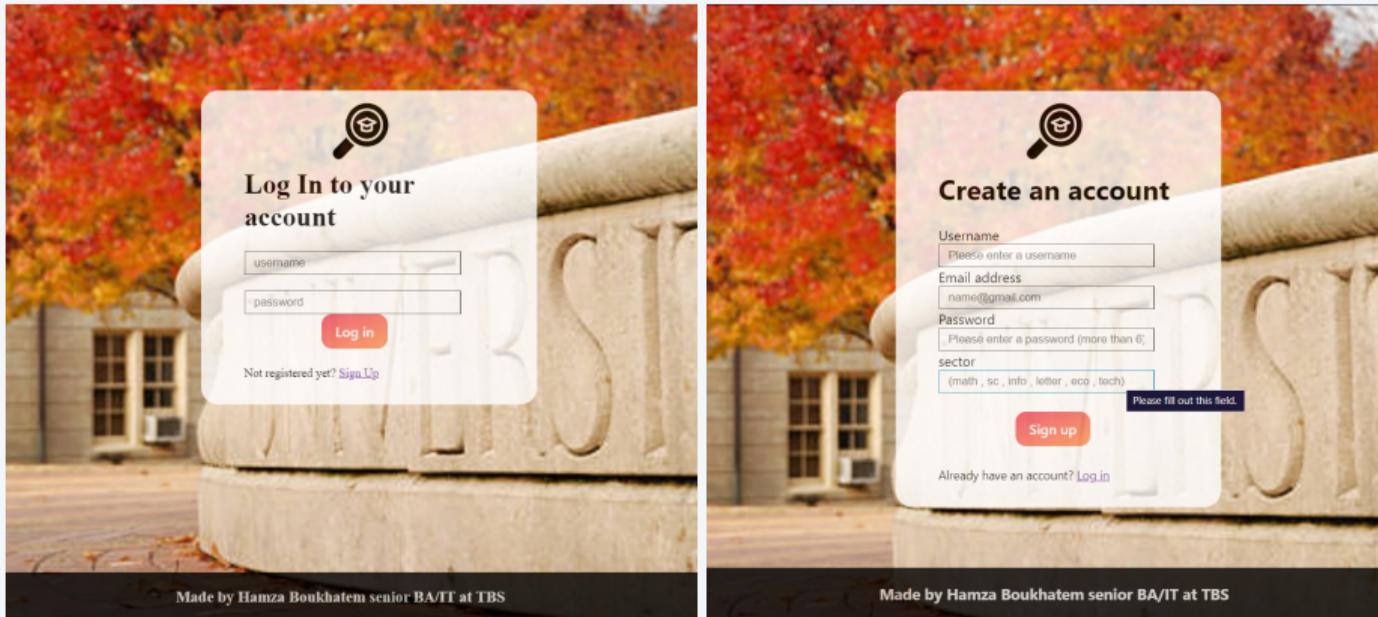


Figure: Login and Signup pages

UniSearch App User Interface

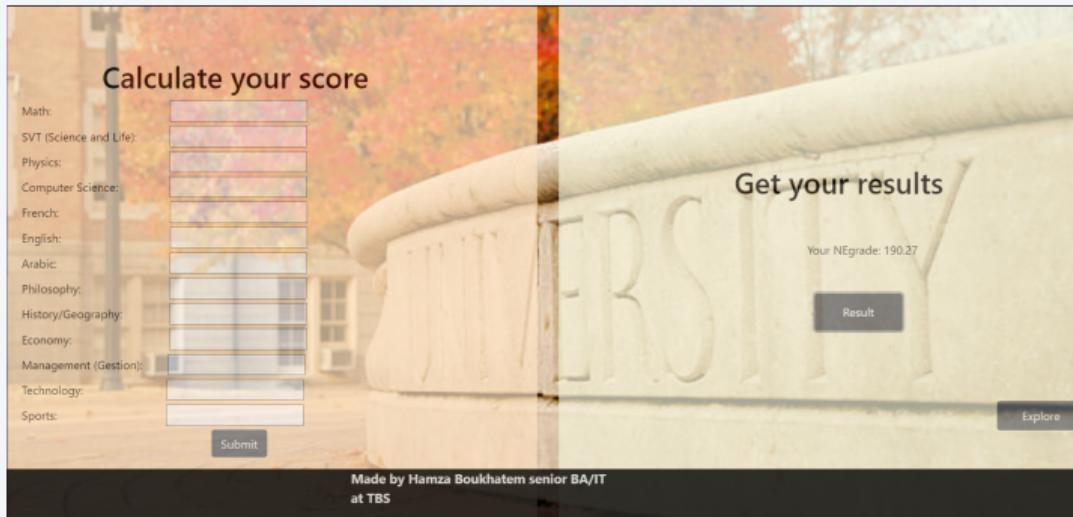
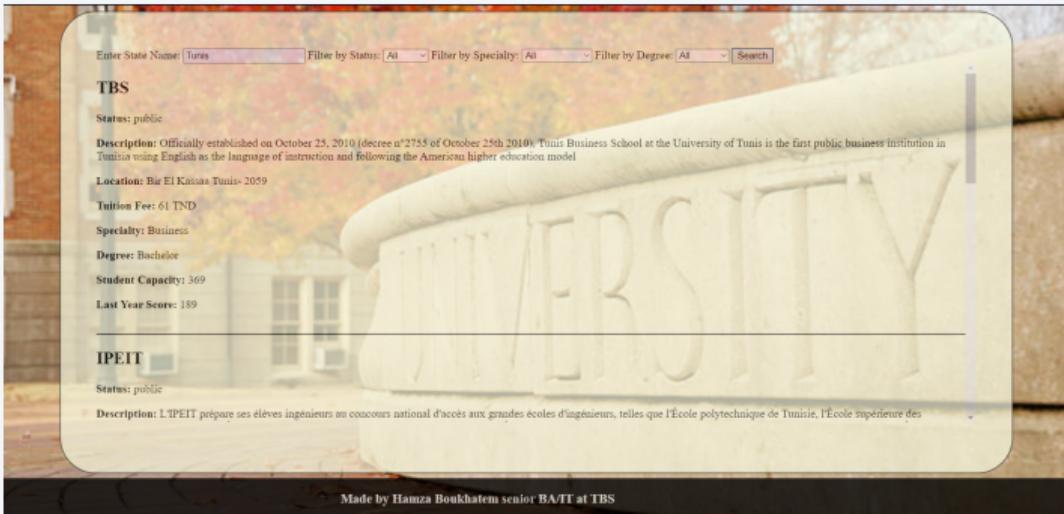


Figure: Score Calculator Tool

UniSearch App User Interface



The screenshot shows a mobile application interface for searching universities. At the top, there is a search bar with the placeholder "Enter State Name: Tunis". Below the search bar are four filter buttons: "Filter by Status: All", "Filter by Speciality: All", "Filter by Degree: All", and a "Search" button. The main content area displays two university profiles: "TBS" and "IPEIT".

TBS

Status: public

Description: Officially established on October 25, 2010 (decree n°2755 of October 25th 2010), Tunis Business School at the University of Tunis is the first public business institution in Tunisia using English as the language of instruction and following the American higher education model.

Location: Bur El Kacaa Tunis> 2059

Tuition Fee: 61 TND

Specialty: Business

Degree: Bachelor

Student Capacity: 369

Last Year Score: 189

IPEIT

Status: public

Description: L'IPEIT prépare ses élèves ingénieurs au concours national d'accès aux grandes écoles d'ingénieurs, telles que l'École polytechnique de Tunisie, l'École supérieure des

Made by Hamza Boukhatem senior BA/TI at TBS

Figure: Filtering Tool

Potential Improvements:

User Experience and Authentication

- The first point that still has a lot of room for improvement is the user interface : There is much more to add from filers to other tools to more interactive pages and hover above link and of course focusing on the registration customization.
- The second point is authentication such as the implementation of token adding options like authentication emails and keys but also user identification CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart)
- Further optimizing the databases and parameters to eliminate external variables like syntax errors from derailing the app's functionalities.



Thank you for your attention

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