**CSIS-355 Internet and Web Technology**

**Final Project**

1. **Objective**: the purpose of this project is to be familiar how to program for the server and interact Public API’s synchronously before sending a result to the end user(Client), and use the OAuth2.0 three legged authentication.
2. **The instruction of using this App:**

When user go to the browser, there is a form show on the page. User need to input one kind of animal they want search for to adopt, for example ‘dog’. In the next box, input the ISBN number for a book you know, and LCCN number that is Library of Congress Control Number. You will there is an example on the web page.

The first results show on the page are all the URL to look for every dog information. There is no any photo offered by this API, so I couldn’t extract the photo and show them on webpage, otherwise it will be more useful for user look at the dog image immediately.

The second result return a cover image of a book

1. **Completed Functionality:**

* The user can visit the home page, and with a form for them fill out;
* The user can submit the form, and use the typing information to send the first API request;
* Upon receiving the response from the first API request, my server can parse the response and generate a request to the second API.
* The server can cache the access token instead request access token every time;
* The server can get the data from first API, and then make the second request on the second API synchronously and return the date second API, finally send a result back to the end user;

1. **Types of API usage**:

(1) **Petfinder API description:** The Petfinder API allows us to access the Petfinder database of hundreds of thousands of pets ready for adoption and over ten thousand animal welfare organizations. With this API, we can Search for and display pet listings based on pet characteristics, location, and status. Search for and display animal welfare organizations based on organization name, ID, and location.

**API’s documentation link**: <https://www.petfinder.com/developers/v2/docs/>

**Endpoint link**: [https://api.petfinder.com/v2/animals](https://api.rebrandly.com/v1)

**Endpoint Description:** this endpoint is used for return information on a single animal type by using GET method. It will return JSON object of animal type according the query condition.

**Authentication Process:** This Petfinder API should use OAuth three-legged authentication, but in this project I just use 2-legged authentication with access token and access token secret for secure authentication.

* Create a Petfinder account.
* Request a Petfinder API Key (otherwise called Client ID) and Secret by Visit [www.petfinder.com/developers](http://www.petfinder.com/developers).
* A way of sending requests to our server along with information that will tell it you are allowed to do so. We recommend [cURL](https://en.wikipedia.org/wiki/CURL) for testing.
* Once we have API Key and Secret, we can use these to request an access token. This token will enable us to receive information from their servers. To get a token, make the a request, replacing *{CLIENT-ID}* and *{CLIENT-SECRET}* with our own information.
* curl -d "grant\_type=client\_credentials&client\_id={CLIENT-ID}&client\_secret={CLIENT-SECRET}" <https://api.petfinder.com/v2/oauth2/token>
* Their sever will send back a response in JSON format with access token.

**(2) OpenLibrary API description:** Used for querying information on one or more books using ISBNs.

**API’s documentation link**: <https://openlibrary.org/dev/docs/api/books>

**Endpoint link**: <https://openlibrary.org/api/books?bibkeys=ISBN:0201558025,LCCN:93005405&format=json>

**Endpoint Description:** the response of the API contains a JSON object for each match bibkeys. (<https://openlibrary.org/api/books?bibkeys=ISBN:9780980200447&jscmd=details&format=json>)

**Authentication Process:** This API doesn’t need any authentication.

1. **RESTful Application:**

POST : the server need to send the credentials like client ID, client secret and grant type to the third API in order to the access token.

GET: The server need to use GET to retrieve the information from third API.

REST is the underlying architectural principle of the web. The amazing thing about the web is the fact that clients (browsers) and servers can interact in complex ways without the client knowing anything beforehand about the server and the resources it hosts. The key constraint is that the server and client must both agree on the media used, which in the case of the web is HTML.

1. **The Difference of these two API:**

The big difference of these two API is the first **Petfinder** API need two-legged authentication and then get access token from the third API.

The **Open Library API** doesn’t needauthentication. We just query the information directly according to pass a ISBN number. And LCCN number.

Both API are used for querying the information from third party and return a JSON file with the response.

1. **Analyzing whole traffic :**
2. An user make a request on the home page.
3. Server send a form for user to fill out.
4. The user submit the form the server with query parameter dog and book number they provide.
5. The server ask the access token form third API with credential.
6. Third API Petfinder return to the server with access token.
7. The server make a requestion to third API for information the user need with it’s access token.
8. The third party return back the information with JSON format.
9. The server make a send request to the send API.
10. The second API with authentication return the information immediately.
11. The sever send both API ] information to the user.

A screenshot of a social media post

Description automatically generated

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