Introduction

An API that can give you information about countries and cities from the database is at your disposal.

The API URL is:

https://geo.konkurs2022.digitalcube.dev

The parameters for listing/search of countries and cities are:

- fields (CSV string) - the list of fields you want the API call to return to you (it depends on the data you require)
- format (string) - data format in which you expect to get response (JSON, XML, CSV)
- no_paginate (boolean) - it prevents pagination
- search (string) - for search
- page (integer) - the first page is represented by number 1
- per_page (integer) - how many items to return per page
- order_by (string) - column name by which you want the output to be sorted

There are 2 entities in the database:

1. Countries
2. Cities

Each entity has a unique id, type UUID

A country has the following attributes (which can be used as fields in API calls):

1. id
2. name
3. iso2
4. iso3
5. capital_id
6. capital_name

A city has the following attributes:

1. id
2. name
3. lat
4. lon
5. capital
6. country_id
7. population

“order_by” can be requested according to any of these fields, with the possibility of adding “-” sign before the name of a field. For example, if you request order_by=name, you will get countries or cities sorted A-Z and if you request order_by=-name you will get them Z-A.

Data formats available are JSON, XML and CSV. **It is important to point out that you will be instructed which format you are required to use in the task.**

The list of all countries in the database is available at the following URL:

https://geo.konkurs2022.digitalcube.dev/api/countries/?fields=id,capital_id,name,capital_name&format=csv&no_paginate=true&order_by=-capital_name

The response is in csv format:

```
"id","capital_id","name","capital_name"
7958acc2-08b7-485c-85c5-a6f035b84a55,9abde3e0-f90f-4f88-b5d6-f233602ec99e,"Afghanistan","Kabul"
73e4ce5f-4a61-40dc-9d81-2ef539c4de64,0d321d14-9d20-4c1a-8853-0cde8f354d82,"Albania","Tirana"
626e7b40-554f-4f7d-a93d-4e2fb0f31fc1,13bf3155-bc27-4a52-9e95-b02938e96119,"Algeria","Algiers"
246c8153-3e1b-45a8-9c17-dd7d75263240,7b140a60-b160-47a6-8a18-404a973be6af,"American Samoa","Pago Pago"
…
```

If you change csv to xml you will get:

```
<?xml version="1.0" encoding="utf-8"?>
<countries>
  <country id="1e4c1995-7d9d-4da7-81e6-76c11943ba58">
    <capital_id>e5c27e39-ebfe-49f4-a93a-52aab55ec820</capital_id>
    <name>Croatia</name>
    <capital_name>Zagreb</capital_name>
  </country>
  <country id="c1361edd-5624-4a96-a84d-26962367714f">
    <capital_id>37afb0e2-3192-4355-817a-daec1006b5f2</capital_id>
    <name>Armenia</name>
    <capital_name>Yerevan</capital_name>
  </country>
  <country id="00704f36-8e1e-4b6b-be4e-3ed759c5c2ac">
    <capital_id>029f9a1e-4bd6-438e-920a-1257d0da87e7</capital_id>
    <name>Cameroon</name>
    <capital_name>Yaoundé</capital_name>
  </country>
…
```

The default JSON is:


```
{
  "summary": {
    "count": 237,
    "page": 1,
    "per_page": 50,
    "total_pages": 5,
    "next": "/countries?page=2&per_page=50&fields=id%2Ccapital_id%2Cname%2Ccapital_name&order_by=name",
    "previous": null
  },
  "countries": [
    {
      "id": "7958acc2-08b7-485c-85c5-a6f035b84a55",
      "capital_id": "9abde3e0-f90f-4f88-b5d6-f233602ec99e",
      "name": "Afghanistan",
      "capital_name": "Kabul"
    },
    {
      "id": "73e4ce5f-4a61-40dc-9d81-2ef539c4de64",
      "capital_id": "0d321d14-9d20-4c1a-8853-0cde8f354d82",
      "name": "Albania",
      "capital_name": "Tirana"
    },
    {
      "id": "626e7b40-554f-4f7d-a93d-4e2fb0f31fc1",
      "capital_id": "13bf3155-bc27-4a52-9e95-b02938e96119",
      "name": "Algeria",
      "capital_name": "Algiers"
    },
    ……
```

You can get the list of all cities of a country using the following URL:

/countries/__id_country__/cities

If Serbia was aaf55b0c-8e94-4700-b406-5fa3fadabd11, URL would be:

https://geo.konkurs2022.digitalcube.dev/api/countries/4d2ac4d4-1e48-4f5f-ae30-e31ad2225ce0/cities?fields=id,name,lat,lon,population,capital

Authorization

All the APIs mentioned are authorised. In order to use API calls you need to get a jwt token that will be issued to you by the backend if you send valid username and password that are sent to you via email.

For example:

POST https://geo.konkurs2022.digitalcube.dev/api/login
Body: {"username":"test_user", "password":"test_password"}

Response:

```
{
   "token": "eyJ0….F7Q"
}
```

The token that was returned after the login call should be forwarded to every API call header as Authorisation key with value “Bearer token”.

Haversine Formula

The distance between cities should be measured by air from the city centres.

Use haversine formula for calculating distance on a sphere having in mind that the Earth’s radius is 6371 km.

Haversine formula:

https://en.wikipedia.org/wiki/Haversine_formula

For example, the distance between Belgrade (lat: 44.8167, lon: 20.4667) and Novi Sad (lat: 45.2644, lon: 19.8317) is 70.48 km.

The task

You are free to choose **at least one** of the following four tasks.

You have to do tasks using Angular 2+ or React framework. UI elements for the task can be downloaded from the given tar gz file

1. Task:

    a. For a logged-in user
    b. Write a program that offers a user to choose a country from a dropdown menu that has auto-complete options for country names
    c. For the chosen country, write all the cities of that country in a table. The table must allow the user to sort cities according to any attribute. For sorting, use API calls that will return sorted data. Pull data from the backend in **CSV** format.
    d. Clicking on the chosen city, shows that city on the map using Google maps. The link for Belgrade would be: https://www.google.com/maps/@44.8167,20.4667,15z

    Assets are available at:
    https://geo.konkurs2022.digitalcube.dev/assets_task_1.tgz

2. Task:
    a. For a logged-in user
    b. Write a program that offers a user to choose a country from a dropdown menu that has auto-complete options for country names
    c. For the chosen country, find the two nearest cities and the two farthest cities.

    For Serbia, that would be:
    nearest: Senta and Coka (3.91 km);
    farthest: Subotica and Trgoviste (459.11 km);

    Assets are available at:
    https://geo.konkurs2022.digitalcube.dev/assets_task_2.tgz

3. Task:
    a. For a logged-in user
    b. Write a program that offers a user to choose a country from a dropdown menu that has auto-complete options for country names
    c. For the chosen country, find a cluster of the three nearest cities, write the names of the cities as well as the sum of their distances (The distance from the city A to the city B + the distance from the city B to the city C + the distance from the city C to the city A).

       What is understood by three nearest cities is the cities whose spherical triangle has the smallest circumference.

       For Serbia, that would be:
       Lapovo, Batocina, Svilajnac (circumference 24.8 km)

       Assets are available at:
       https://geo.konkurs2022.digitalcube.dev/assets_task_3.tgz

4. Task:
    a. For a logged-in user
    b. Write a program that offers a user to choose a country from a dropdown menu that has auto-complete options for country names
    c. For the chosen country, find the cities farthest to the west, east, north, and south of the country.
    d. Calculate the shortest distance by air from the northernmost and southernmost city, as well as the easternmost and westernmost city (use the formula from the task 2.c)

       For Serbia, starting from the north, the cities would be:
       Horgos, Dimitrovgrad, Presevo, Apatin

       and the distance would be:
       Horgos - Presevo 448.33 km, Apatin - Dimitrovgrad 421.98 km

       Assets are available at:
       https://geo.konkurs2022.digitalcube.dev/assets_task_1.tgz