Jennifer Stibbins
CSS 436
Professor Dimpsey
Program 2

Program 2: Documentation of Application, Design and Usage

Application

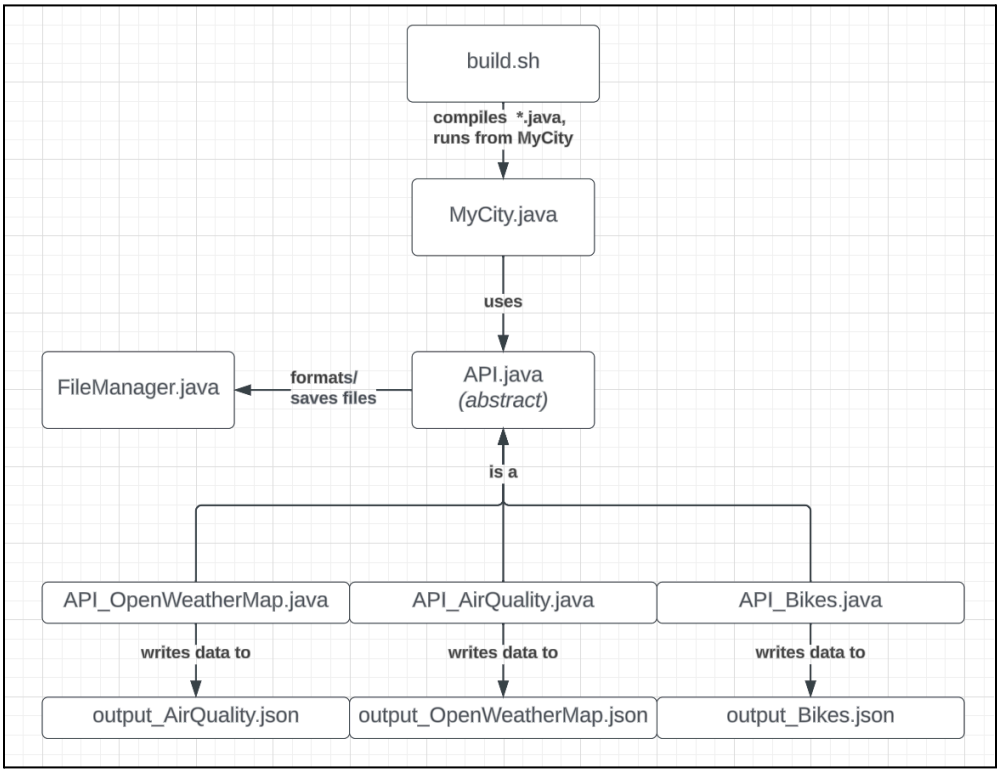
The intended user is a person who enjoys biking and is trying to decide whether or not to take a bike ride. Although in most cases, people could just look out their window and decide, maybe they might want the amazing fun of using an API, or perhaps they are planning to go biking in a town they are not currently in.

Design

- Each API used has a corresponding class (EX: API_OpenWeatherMap.java).
- API.java is abstract.-making api class abstract → then having individual classes for the apis used. Can customize using “call”.
- Full JSON data is stored in …/<api_name>.json
- Classes:

```
[stibbj@csslab8:~/CSS_436/p2/v1$ ls
API_AirQuality.class  API.class                build.sh          gson-2.9.0.jar  org.apache.commons.io.jar
API_AirQuality.java   API.java                 FileManager.class java-json.jar   output_AirQuality.json
API_Bikes.class       API_OpenWeatherMap.class FileManager.java  MyCity.class    output_Bikes.json
API_Bikes.java        API_OpenWeatherMap.java  gson-2.3.1.jar    MyCity.java     output_OpenWeatherMap.json
```

Figure 1: Simple Class Diagram



Usage

To run the project: download zip + open project in linux lab, do "./build.sh" in console.
To run custom/manually: adjust build.sh file tests (change the city) or run those commands from the console.

Given a city, the program consults three APIs:
⇒ OpenWeatherMap – overall weather (e.g. clouds) and temp in fahrenheit (e.g. 47.5)
⇒ CityBikes – looks for nearby city bike rental companies
⇒ AirQuality – reports AQI (air quality index) in that city

The project is designed to be customizable. For instance, if you own a bike and can transport it (and don't want to use a city bike), you can just remove that api from being used by commenting out a single line in the driver

Exponential Back-off. Degraded Functionality is Better Than No Functionality
The APIs function independently of one other. If one API fails (e.g. cannot find the city, or repeatedly does not get a 200 response code), the other APIs are still able to function. It is possible (and preferable) to offer partial services rather than rejecting the user's request entirely. Three retry requests can occur per API before the program gives a message saying that API was not able to get the attempted information. 1st retry is wait 1 seconds, 2nd retry is wait 2 seconds, 3rd retry is 4 seconds.

Limitations

Information Available
The information reported about a city is limited to its overall weather (e.g. cloudy), temperature in Fahrenheit (e.g. 42.22), nearby citybike company (e.g. <EXAMPLE>), and air quality (e.g. 33).

API Issues
For instance, when I asked about the air quality for "Mukilteo", the air quality API reported an aqi of 93 (high moderate), when it was actually about 10. Without being able to access the API's entire list of cities, I am unable to determine whether incorrect information is being reported because it couldn't find the city (and made up information), found the city but has incorrect information, or otherwise.

Example: Mukilteo

```
Response code: 200
Connection made. URL: https://api.api-ninjas.com/v1/airquality?city=mukilteo
filename = /Users/jenniferstibbins/CSS_436_P2_local/CSS_436-P2/src/main/java/output_AirQuality.json
Air Quality Index (AQI) = 93 -- Moderate
Decent day for a bike ride.
jenniferstibbins@jennifersmbp37 CSS_436-P2 %
```

Additionally, the OpenWeatherAPI sometimes gives inconsistent results. For instance, sometimes it recognizes “New York”, but sometimes it doesn’t, despite receiving the exact same input from the user.

Example: New York

```
It's clear weather today in New York
The temperature is 39.43 degrees Fahrenheit. A bit cold for a bike ride.
```

With larger cities such as Seattle, the API often reports larger aqi values than anticipated. The values are being read correctly from the JSON, so it seems like either the API is gathering incorrect information, or its definition of overall aqi is different from how various online sites are defining it.

Note: If the CityBikes api “fails”, the connection should still yield a 200 response code, but not be able to find the desired city within the data the api gives back.