

EzTravel

The Budget-Oriented Travel Assistant

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Current Progress

After I submitted my project proposal, I held back on implementation for a couple of days and thought about the different things that I could do to make this project fun, useful, relevant, and efficient. After I had all of the plans in my head, I began implementation. Initially, I wanted to set up a program structure that was intuitive, easy to follow, and sophisticated. In order to do this, I created a folder that contains two folders and two files. The folders within this main folder are the src and classes directories. The files are bash scripts which are used to build and run the program by entering ./build and ./run respectively into the terminal that is opened from that directory. When the Java files are compiled, using ./build, the class files are placed in the classes folder. These are the files that are executed by the ./run command. As a final step, I inserted a jar folder to hold all external libraries that this project will require, and a folder called EzTravel within the src folder. This folder acts as a main package and is used to keep the program organized and efficient. In its current stage, the program that I have been working flows

in the following way: The user is prompted by the program to enter certain criteria for a vacation that they wish to take. These criteria include country, state/province/territory, city, number of nights that require lodging, number of people attending the trip (adults, children, and infants), maximum price per night of housing, check-in date, and check-out date. After the user has entered this information, a series of algorithms is used to refine this raw data, parse the AirBNB website with a customized query link, and return the top 20 listings that are the most relevant to the users interests. The listing information, along with a link to this listing, is then presented to the user and the program exits.

Challenges

To reach the state that the EzTravel program is currently in, there were a lot of important implementation steps. These steps often held multiple confusing challenges and obstacles that needed to be overcome. The first challenge that I ran into during the implementation process of the project was the lack of APIs that existed for AirBNB data. I was curious as to why this was, so I did some research and the reason for this is to ensure that competitors do not have easy access to their market data so these competitors cannot undercut and compete with AirBNB. Although this is good for AirBNB, this is not good for EzTravel and a different solution needed to be pursued. The solution that I discovered was the use of a web-scraper to parse an AirBNB URL and retrieve the data from the website itself. To implement this web-scraper, I used a library known as jsoup. jsoup allows the user to enter any URL, and extract any desired html elements that the page contains. Knowing this, I executed multiple searches on the AirBNB website and studied how the URL comes together to form a very specific query and display relevant results. Using this knowledge, I was able to create a function that takes all of the raw data from the user and converts it into a URL that yields the results of an in-depth search on the AirBNB website. Then, the HTML elements containing the total price of the stay, and the link that can be used to book that stay, are gathered by the jsoup scraper and stored in a HashMap object. A HashMap was chosen to store this data as it holds

key-value pairs which I found to be extremely useful for maintaining a link between the price of a listing and it's respective URL. This link was extremely hard to maintain with any other data type that I tested and it presented many challenges prior to my implementation of a HashMap. Another major challenge that I came across during the implementation of EzTravel in it's current state was handling the jsoup connection as it is quite fragile. If there is more than 1-2 connections within a single thread of a program, the jsoup connection may encounter an error which can cause important data to not be retrieved during some executions. This was very problematic and required multiple changes to nullify, yet it is still not completely gone. Up until this point, I have been able to drastically increase the success rate of the program by using a Thread.sleep() command. This command allows the thread to pause execution and maintains a more reliable connection to the input URL. Although this improvement is a major step in the right direction, I still need to engineer the algorithm in such a way that it executes 100% of the time, without error. One final, more recent challenge that I have come across is the impact that COVID-19 has had on the travel industry and how that will affect the future of this project. I planned to use a couple of APIs, as well as multiple web scraping methods to gather rental car, flight, train, and coach bus price information. Due to COVID-19, however, this data is no longer as easily accessible as it was before. I will need to come up with a couple new methods of getting this data and if it comes to it I may need to simulate it for the sake of the program.

Final Changes

Now that I have the root of the program operating at a capacity that will allow me to expand and complete the program, I plan on finishing it within the next 3-4 days. The final steps that I would like to take are adding more detailed input options, adding support for bus/train/plane travel options and also, depending on how much time I have once I am done with these options, adding support for multiple cities in one trip. These changes will allow me to

create more sophisticated algorithms that will be a good showcase of what I have learned in this class so far. If there is even more time, I want to explore the possibility of developing a tree/graph data structure that can recommend vacations based on the one that the user plans. These recommendations will be made by determining similar yet new and exciting adventures to the one that EzTravel plans for the user. As of right now, my program is strong but in the coming days, I will ensure that it meets the expectations of this class.