

My approach to the problem

After reading the problem statement, I immediately identified that I was faced with a search problem. My first thoughts went to breadth-first search, depth-first search, A* search, and uniform cost search. All three algorithms being adequate to handle a search problem, I had to decide on which algorithm was more appropriate for solving the problem and how to represent my data to facilitate searching.

How I represented the data

Representing data in a correct format and using the right data structure is key when dealing with search problems. To decide on which data structure to use, I identified the problem's key components, including the city, country, airports, airlines, and the relations between them.

Tracking the airport info

I created an airport class to track all the information related to an airport, such as its city, country, longitude, latitude, and many more. I then read all the rows of the airport dataset, created Airport objects for each of them, and mapped every airport code to its corresponding AirPort object.

Tracking the routes

I tracked the different routes by creating a map that connects different source airports to their list of corresponding destination airports.

Choice of Algorithm

I decide to use the number of flights to determine the path optimality. Hence, I used a breadth-first search algorithm because it was more convenient for this task. I created an empty queue to represent my frontier and an empty set to represent the list of explored cities. I visited every state/node within the frontier, and I determined all the possible routes that could be taken from every node till I found the target city and country.

I created a Node class to track the airline, number of flights, distance, airport code, and other relevant information related to the optimal path. I finally put everything together to implement my path-finding algorithm.

My takeaways from this exercise.

This exercise challenged me to put my critical thinking and problem-solving skills into action to develop the most suitable solution to the problem at hand. It allowed me to practice writing clean, readable, and modular code. I also learned a lot about handling errors when writing code and what approach to use when faced with a roadblock.

Overall, this assignment gave me the opportunity to learn, practice, and build confidence working on algorithmic problems.