

Term Project – Travel Planner

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Purpose and Idea

Personally, I enjoy planning my trips; however, not everyone does. Some people even struggle to plan trips on their own. Therefore, a tool that provides route suggestions would be beneficial for people who are interested in planning a trip but don't know how to start. Thus, I am using my next trip, to Egypt, as an example to design this travel planner. This planner provides users with suggestions for travel routes based on location, transportation duration, and cost constraints, which are the most common elements when planning a trip.

Design and Algorithm

When planning a trip, locations, transportation methods, transportation duration, and transportation cost are typically considered. I summarized the locations in Egypt that I want to visit, along with transportation methods, durations, and costs, in a CSV file. An example of the data is shown below.

Place	To	Transportation	Transportation Period(Hour)	Price(\$)
Red sea diving	Hurgada	Bus	7	10
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Giza pyramid	Great egyptian n	Taxi	0,16	2
Giza pyramid	Mohammed Ali I	Taxi	0,5	5
Giza pyramid	Saladin Citadel	Taxi	0,5	5
Giza pyramid	Pyramid of Djoser	Taxi	0,6	6
Giza pyramid	Khan al-khalili	Taxi	0,5	5
Giza pyramid	Philae temple	Bus	12	30

This planner applies discrete event simulation (DES) to simulate the route suggestions. The program consists with below functions:

1. Route network creation
2. Route network visualization
3. Multiple cities route simulation
4. Optimal travel plans

In this program, users can add constraints for "must to visit cities", which enables users create trips per their preference instead of checking all of route suggestions. With this constraint, number of suggested routes can be more precisely. This program applies Simpy for DES.

Results

I chose the Giza Pyramids as the starting point and the Abu Simbel Temples as the ending point, without specifying any must-visit cities. The simulation provided 64 routes. Each route displayed the connections between different cities, along with the transportation methods

and costs. The program also summarized the total travel duration and cost for users' reference. However, due to limitations in location connections, some starting and ending points might not have feasible routes if no connections are found. For example, in my second simulation, I added one city (Khan el-Khalili) as a constraint. Because there were no connections between the two must-visit cities, the program could not provide a feasible route.

Location list:

Available destinations:

1. Red sea diving
2. Hurgada
3. Giza pyramid
4. Great egyptian museum
5. Mohammed Ali Mosque
6. Saladin Citadel
7. Pyramid of Djoser
8. Khan al-khalili
9. Philae temple
10. Abu Simbel Two Temple
11. Temple of Edfu
12. Temple of Dendera
13. Valley of the Kings
14. Mortuary Temple of Hatshepsut
15. Black Desert
16. Faiyum Oasis

Giza connection list:

From Giza pyramid to:

- Great egyptian museum (Taxi, 0.16 hours, \$2)
- Mohammed Ali Mosque (Taxi, 0.5 hours, \$5)
- Saladin Citadel (Taxi, 0.5 hours, \$5)
- Pyramid of Djoser (Taxi, 0.6 hours, \$6)
- Khan al-khalili (Taxi, 0.5 hours, \$5)
- Philae temple (Bus, 12.0 hours, \$30)
- Abu Simbel Two Temple (Bus, 14.0 hours, \$100)
- Temple of Edfu (Bus, 8.0 hours, \$20)
- Temple of Dendera (Bus, 7.0 hours, \$20)
- Valley of the Kings (Bus, 7.0 hours, \$20)
- Mortuary Temple of Hatshepsut (Bus, 7.0 hours, \$20)
- Black Desert (Bus, 5.0 hours, \$15)
- Faiyum Oasis (Taxi, 1.5 hours, \$25)
- Wadi Hitan (Bus, 3.0 hours, \$30)

Khan al-khalili connection list:

From Khan al-khalili to:

- Philae temple (Airplane, 2.0 hours, \$80)
- Abu Simbel Two Temple (Bus, 14.0 hours, \$40)
- Temple of Edfu (Bus, 10.0 hours, \$30)
- Temple of Dendera (Bus, 7.0 hours, \$15)
- Valley of the Kings (Bus, 8.0 hours, \$15)
- Mortuary Temple of Hatshepsut (Bus, 8.0 hours, \$15)
- Black Desert (Bus, 5.5 hours, \$18)
- Faiyum Oasis (Bus, 4.0 hours, \$10)
- Wadi Hitan (Bus, 4.0 hours, \$10)

Black desert connection list:

From Black Desert to:

- Faiyum Oasis (Bus, 6.0 hours, \$10)
- Wadi Hitan (Bus, 6.0 hours, \$10)

To solve this problem, a complete network in each location and its extension network is needed.

Improvement and Future Plan

Due to time constraint, I couldn't establish a big enough network of locations. In addition, the constraint function is limited in this program. To make this simulation more user-friendly, here are items to be extended:

1. Location network - more than 1 node in each location
2. Transportation method - at least 2 types of transportation methods in each location
3. Travel time constraint - provide an input function in the program for detailed time arrangement
4. Blurb of locations - can provide more insight for users to decide where to go (suggested by Professor Miller)

With above data, I believe this planner can help people to arrange trips in an efficient way. Maybe add API to searching engines or Online Travel Agent (OTA), providing local day tour or transportation booking service, can be the next step.