Lab Intelligent Search Course AI for Business

The goal of this lab is to experiment a bit with three important search algorithms: Breadth First, Depth First Shortest Path and A*. Python code for these algorithms is already available (see other files). Use Jupyter Notebook or any other environment.

1 BFS

(a) Run the BFS code and see if you understand the output

(b) Extend the graph in the code to at least 10 nodes and run it again.

(c) The BFS code does not consider a goal state. Adapt the code with a goal variable and let the program stop when the goal is found.

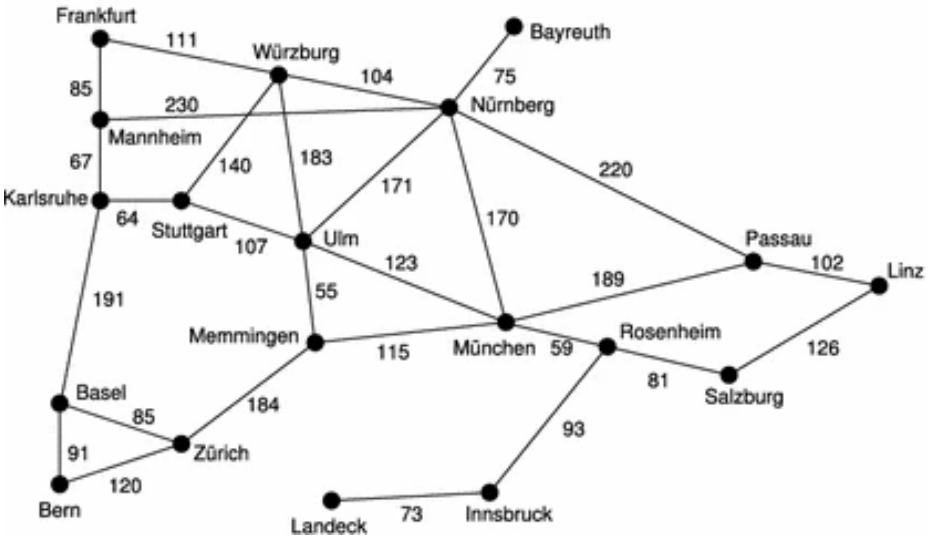
(d) Save your code.

2. DFS Shortest Path

(a) Run the DFS code and see if you understand the output

(b) Take the Germany road example below. Put it into the Python code (replace the example graph) and find the shortest path from Frankfurt to Munchen. Save your code.

You can omit the foreign cities (Bern, Zurich, Basel, Landeck, Innsbruch, Rosenheim, Salzburg, Linz).



Basel	204
Bayreuth	207
Bern	247
Frankfurt	215
Innsbruck	163
Karlsruhe	137
Landeck	143
Linz	318
München	120
Mannheim	164
Memmingen	47
Nürnberg	132
Passau	257
Rosenheim	168
Stuttgart	75
Salzburg	236
Würzburg	153
Zürich	157

3. A*

(a) Run the Astar code and see if you understand the output

(b) Write a function that depicts the grid with the route, after it has been found

(c) Change the start and destination a few times and look at the result. Does A* always finds the shortest route?

(d) Save your code.