

Data Structures & Algorithms

Lab Exercise 5 – Graph Project (UCS algorithm)

Due: to be demonstrated by Thursday 11th December

Learning outcomes:

At the end of this lab you should be able to:

- Build a data structure to manage the results of precomputing multiple search paths using UCS
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Using the UCS algorithm, precompute all possible permutations of search path costs for the map of Dor. Create a data structure to manage the results by creating a map of routes to path costs. The key could be a string (e.g. “Baldor-Eldor”) and the value could be a `std::list` of `std::pair`, where each pair is a string (city name) and an integer (path cost).

In your main application, iterate through the map and output all the routes and path costs as illustrated:

Route	Path cost
Baldor-Doldor	Baldor (0), Doldor (60)
Baldor-Eldor	Baldor (0), Doldor (60), Faldor (180), Eldor (220)

Do not store redundant information in your map, for example, Doldor-Baldor would give the same route as Baldor-Doldor in reverse.