Unit 3 Algorithmics

Submit Task – Week 6

Prim's Algorithm

Using the classes provided, construct Prim's algorithm in Python. Include comments to serve as pseudocode. Note the set_colour function has been included to allow you to set the colour to show your tree. Alternatively you can print a list of edges.

Template: https://trinket.io/python3/70e28e0841

Submit your PY file and a screenshot of your output.

Further Questions

1. How can a priority queue be used in Prim's algorithm to improve efficiency
   The priority queue stores edges based on their weight. The edge with the lowest weight would have the highest priority for retrieval.
2. Assuming all edge weights are positive, under what conditions will an edge with the smallest weight not appear in the resulting tree?
   When the graph is disconnected or where selecting the smallest weighted edge would create a cycle (duplicate weight edges)
3. Explain why Prim's algorithm is 'greedy'.
   Prim's algorithm does not work with negative edges because it assumes adding an edge decreases the overall weight, which breaks down with negative edges, leading to incorrect results or infinite loops.
4. Will Prim's work with negative edges? Explain why/why not.
   Prim's algorithem selects the lowest weighted edge from its current location, making the locally optimised dicision, It does not analyse the whole graph. This makes it a greedy algorithem although it does find the minimum tree.