UniSA STEM

INFS 2042 Data Structures Advanced

Practical 7
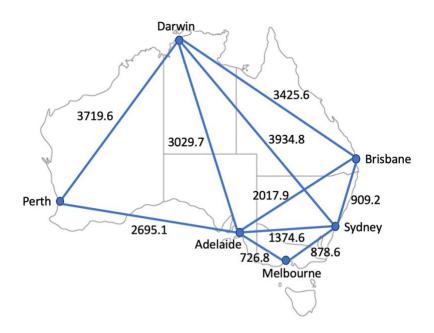
Graphs – Minimum Spanning Tree

Complete the tasks below. Only the task labelled as "Continuous Assessment Task" will be assessed.

Task 1 (Not Assessed)

Considering the graph bellow, find the Minimum Spanning Tree using Prim's algorithm, starting from Darwin.

Task 2 (Not Assessed)

Considering the graph in Task 1, find the Minimum Spanning Tree this time using Kruskal's algorithm. Is there any difference in the final result?

Continuous Assessment Task (Total 2 marks)

You are provided with a basic implementation of an undirected weighted graph data structure. Based on the provided code, implement the following function in Main.java:

- Graph KurskalMST(Graph graph)
  - Finds the Minimum Spanning Tree of the graph passed in as a parameter using Kruskal's algorithm.
  - Return the found MST as a Graph data type.
  - If working correctly, the output should match the answers you found for Task 2.
  - This function is worth 2 marks.

You may add more functions to the Main class if needed.

Sample Output:

```
[Graph]
Adelaide has edges to: Brisbane(2017.9), Darwin(3029.7), Melbourne(726.8),
Perth(2695.1), Sydney(1374.6)
Brisbane has edges to: Adelaide(2017.9), Darwin(3425.6), Sydney(909.2)
Darwin has edges to: Adelaide(3029.7), Brisbane(3425.6), Sydney(3934.8),
Perth(3719.6)
Melbourne has edges to: Adelaide(726.8), Sydney(878.6)
Perth has edges to: Adelaide(2695.1), Darwin(3719.6)
Sydney has edges to: Adelaide(1374.6), Brisbane(909.2), Darwin(3934.8),
Melbourne(878.6)

[Minimum Spanning Tree]
Adelaide has edges to: Melbourne(726.8), Perth(2695.1), Darwin(3029.7)
Brisbane has edges to: Sydney(909.2)
Darwin has edges to: Adelaide(3029.7)
Melbourne has edges to: Adelaide(726.8), Sydney(878.6)
Perth has edges to: Adelaide(2695.1)
Sydney has edges to: Melbourne(878.6), Brisbane(909.2)
```