



University of
South Australia

UniSA STEM

INFS 2042 Data Structures Advanced

Practical 7

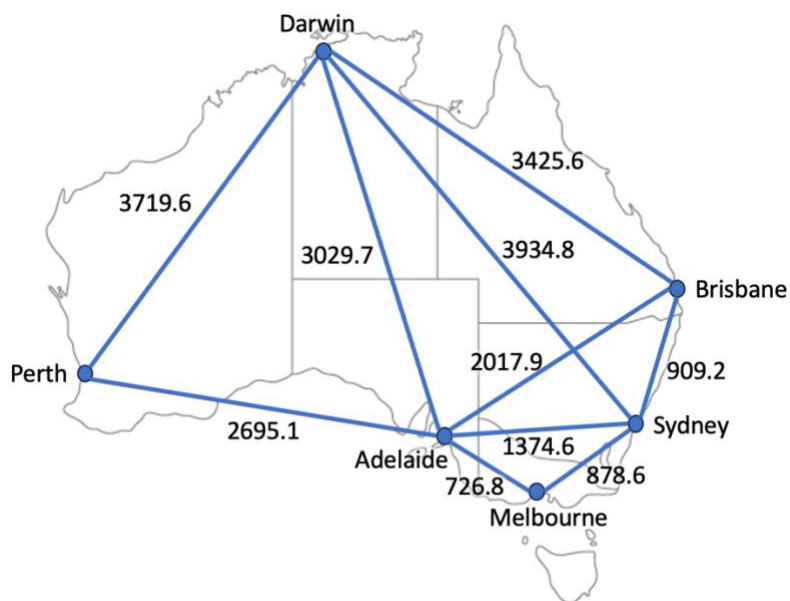
Graphs – Minimum Spanning Tree

Warning: This material has been reproduced and communicated to you by or on behalf of the University of South Australia in accordance with section 113P of the Copyright Act 1968 (Act). The material in this communication may be subject to copyright under the Act. Any further reproduction or communication of this material by you may be the subject of copyright protection under the Act.

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)
```