

## COMPUTER SCIENCE TRIPOS Part IA – 2021 – Paper 1

### 10 Algorithms (djw1005)

This question is concerned with connected undirected graphs in which each edge has a weight, and with spanning trees in such graphs.

- (a) Explain what is meant by the *translation* strategy, and outline briefly the steps of a translation-based proof of correctness. [3 marks]
- (b) Give an algorithm for finding a *maximum* spanning tree, that runs in  $O(E + V \log V)$  time. Explain why your algorithm's running time is as required. [8 marks]
- (c) Prove rigorously that your algorithm is correct. [9 marks]

[*Note:* You may refer to algorithms from lecture notes without quoting the code. You may use results from lecture notes without proof, but you must state them clearly.]