Task 1b:

pseudocode for Kruskal’s algorithm:

sort edges by ascending order of weight values O(ElogE)

initialize connected components O(V)

while-loop that iterates through edges: O(VlogV) <= O(ElogE)

if adding the edge would not introduce a cycle:

add vertex to the tree

update connected components

Since |E| >= |V| - 1, the theoretical runtime is O(ElogE). The upper bound is caused by the sorting algorithm.