Heap Sort Analysis

Analysis of the algorithm:

1. Time Complexity:
Building the max-heap
Extracting elements and heapifying
Overall Time Complexity

2. Space Complexity:
The algorithm is in-place as it uses the input array for sorting.
Space Complexity

3. Properties:
It is a comparison-based sorting algorithm.
It is not stable because the order of equal elements might change.

Kruskal's Analysis

Time Complexity:

Sorting edges: , where is the number of edges.

Union-Find operations: , where is the inverse Ackermann function.

Overall Time Complexity:

2. Space Complexity:

Space Complexity: , for storing edges and disjoint sets.