Boruvka's Algorithm Cheat Sheet

- Boruvka's algorithm is graph theory algorithm used to find the minimum spanning tree of a graph.
- Is a greedy algorithm meaning it searches for the 'globally' optimum solution by taking smaller 'locally' optimum solutions. In this case finding the lowest weight edge for each vertices.
- Time complexity is O(E log V) where E represents no. of edges and V represents no. of vertices. Same in all cases.
- Space complexity is O(E+V)
- Algorithm:
  - The input is a graph that is linked, weighted, and undirected.
  - Initialize all vertices as separate components (or sets).
  - Create an empty Minimum Spanning Tree (MST).
  - If there are many components, perform the following for each one:
    - Find the nearest weight edge that connects this component to another.
    - If it hasn't already been done, add this nearest edge to MST.
    - Back to MST
- Advantages
  - Easily parallelized
  - No need to create a priority queue or pre-sort edges to create MST
- Disadvantages
  - Outperformed by other algorithms like Kruskal's in graphs that are more complex with high connectivity
- Useful links to learn more about Boruvka's: https://www.geeksforgeeks.org/boruvkas-algorithm-greedy-algo-9/ https://www.javatpoint.com/boruvkas-algorithm-minimum-spanning-trees