HW 5 Problem 4

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Transmission map rooted at patient 1:

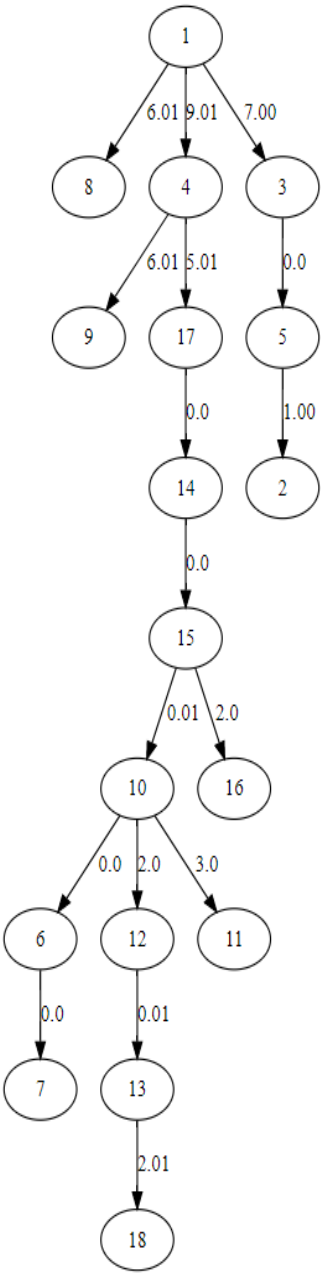

Figure 1: The transmission map of bacterial infection, starting from patient 1. Every edge weight is rounded to the hundredth place

Weight of the RDMST: around 43.08 (rounded to the hundredth place)

Description of transmission map:

When the bacterial infection started from patient 1, it spread to three other patients: 3, 4, and 8. Patient 3 led to the infection of patient 5 and 2, patient 8 did not infect anyone, while patient 4 led to the infection of the other 12 patients. Patients 4, 15, and 10 all directly infected more than one patient (excluding patient 1). This transmission map shows that out of patient 1, patient 4 led to the most infection within the cluster. Also, most patients who have infected others directly infected only one patient.

Is the RDMST graph unique?

No There can be other RDMST graphs that produces the same minimum weight. For example, node 10 can be connected to either node 17, node 14, or node 15, because the edge weight between node 10 and these three nodes are all the same (all have edge weight of 0.00999, value not rounded). Therefore, connecting node 10 to either node 14 or 17 rather than node 15 would still produce a RDMST that has the same minimum weight (nodes that have in-degree from node 10 will not be affected, since only node 10 is moved). This means that there can be more than one RDMST graph, so the RDMST graph is not unique.