Graph
True/False questions

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1 Introduction

The following statements may or may not be correct. In each case, either prove it (if it is correct) or give a counterexample (if it is not correct). We assume that the graph $G = (X, U, \omega)$ is non directed connected weighted graph. We do not assume that edge weights are distinct unless this is specifically stated. We denote $\#X = n$ and $\#U = m$.

2 Statements to be checked

1. If G has more than $n-1$ edges, and there is a unique heaviest edge, then this edge cannot be part of a (MST) minimum spanning tree.
2. If G has a cycle C with a unique heaviest edge u, then u cannot be part of any MST (or no MST contains u).
3. Let u be any edge of minimum weight in G. Then u must be part of some MST for G.
4. If the lightest edge u in a graph is unique, then it must be part of every MST.

Please come back to me if you find some mistakes in this document or if the questions are not clear for you.