THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

CS 2312: Lab 08

SCHOOL OF ENGINEERING & APPLIED SCIENCE

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Connected by a Thread

Consider a connected graph $G = (V, E)$ and an arbitrary partition of G's vertex set V into nonempty sets S and $V - S$.

Prove that if there exists only one edge e between the vertices in S and the vertices in $V - S$, then e must be in every spanning tree of G.

A Tree by Any Other Name

We say a graph is maximally acyclic if adding any edge to the graph creates a cycle. In lecture, we will prove that if T is a tree, then T is maximally acyclic.

Prove the converse, that is, if T is maximally acyclic, then T is a tree.

Minimum Size

Let G be a graph where the minimum degree is d.

Prove that if there are no cycles of exactly three vertices, then there must be at least $2d$ vertices in the graph.