A directed graph is said to be *strongly connected* if for every pair of vertices x, y, there is a directed path from x to y. An undirected graph is *strongly orientable* if there exists an assignment of directions to its edges to get a strongly connected graph.

Theorem 1 (Robbins)**.** *A graph is strongly orientable if and only if it is* 2*-edge-connected.*

Proof. ($\Rightarrow$) Suppose G has a bridge e, and let C_1 and C_2 be the components that result from deleting e. Assume without loss of generality that $e = v_1v_2$ is oriented from $v_1 \in C_1$ to $v_2 \in C_2$. Then there cannot be a directed path from, say, v_2 to v_1.

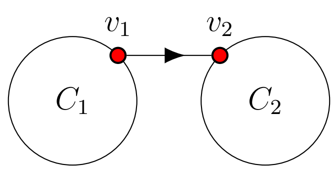

Figure 1: No strong orientations when there's a bridge.

($\Leftarrow$) Every 2-edge-connected graph has a "closed" ear decomposition (i.e. one where the endpoints of an ear can coincide), which we use to construct a strongly connected graph. We induct on the number of ears. For the base case, we have a cycle, which we can make strongly connected by having all the edges point in the same direction. Adding an additional ear as a directed path or cycle keeps the graph strongly connected.

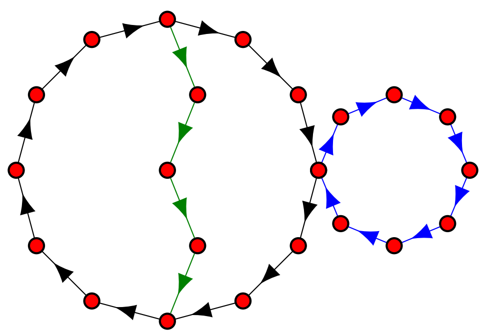

Figure 2: Add each ear as a directed path.

$\square$