J: Joint Excavation

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Problem

A connected graph is to be split into multiple connected components by a non-self-intersecting path. The components are then to be distributed into two groups A and B such that the number of nodes in both groups are the same.

Find a path and distribution that satisfy these requirements.

Solution

- Assign each node to group A.
- Run a Depth–First–Search starting at any node.
- Whenever the *DFS* visits a new node N, remove N from A and add it to the path.
- Whenever the *DFS* backtracks from node N^*, remove N^* from the path and add it to B.
- Repeat until $|A| = |B|$.
- The *DFS* guarantees that A and B never have neighbouring nodes.