The independence number of a graph is the largest number of points in the graph that have no edges between them.

A big idea for finding a maximum independent set was due to Tarjan and Trojanowski in the 1970s: they noted that each vertex \( v \) of a graph is either in a maximum independent set or it is not. And, if \( v \) is in a maximum independent set then none of the points it is touching (that it is adjacent to is), called the neighbors of \( v \), can be in that set.

To find a maximum independent set you will split into 2 cases at each step, then you will need to repeat (and split each of those into 2 cases, etc). On this tree of cases you will reach cases where the graph has either no vertices or no edges. Stop. These are the base cases. You can follow the branch back to the top to reconstruct an independent set. One of these must be a maximum independent set.

1. Use the Tarjan-Trojanowski Algorithm to find a maximum independent set of the Bull Graph.

At each iteration, let the vertex \( v \) be the remaining vertex which is the smallest number. Make a tree of possibilities. On each branch, after you reach a base case, indicate the independent set you get from that branch. Star the branch with a maximum independent set.

\((Do\ this\ on\ the\ back)\).