Comparability

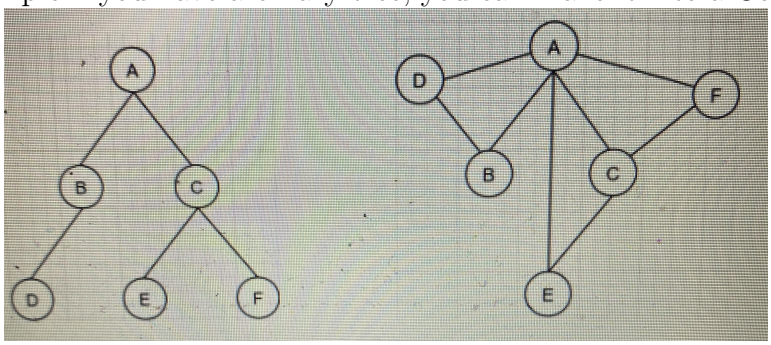
RJ Reaves JaeSang Park Eric

April 28, 2020

1 what is the class of graphs

We will talk about the comparability graph, which denotes the comparability of each vertex. The definition of the comparability graph is that an undirected graph G = (V, E) is a comparability graph if there exists an orientation (V, F) of G. That means if vertex v and vertex u have partial order $v < u$,then there is an edge (v,u). Since this class of graph is handling the order, it can represent the transitive feature of the target object. If the comparability graph could be expressed as a nontrivial composition of its induced subgraph, it is called decomposable. The graph is indecomposable if not.

2 small examples of the problem

For example if you have a binary tree, you can make it into a Comparability Graph. 

3 how the graph class can be used in the real world

If we want to know all of the animals that are the descendants of dinosaurs, we can draw the comparability graph from the tree of evolution to find hidden transitiveness.

If we want to order a computer that consists of components that we choose, we need to know the compatibility of each component like cpu and mainboard.

Then we can make a comparability graph of components for computers with the order $a < b$, where the smaller-size part is on the left side if a and b are compatible.

4 what problems does the class help with (or simplify the study of)

Since the comparability graph reveals the hidden transitiveness of a tree, we can find descendants or ancestors of different viruses. If a new virus comes out, then we need to search the ancestors of the virus to develop a new vaccine.

In genetics, we can easily find the dominant factor in our DNA with analysis of comparability graphs.