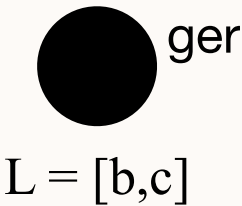


## **The intraclonal diversity**

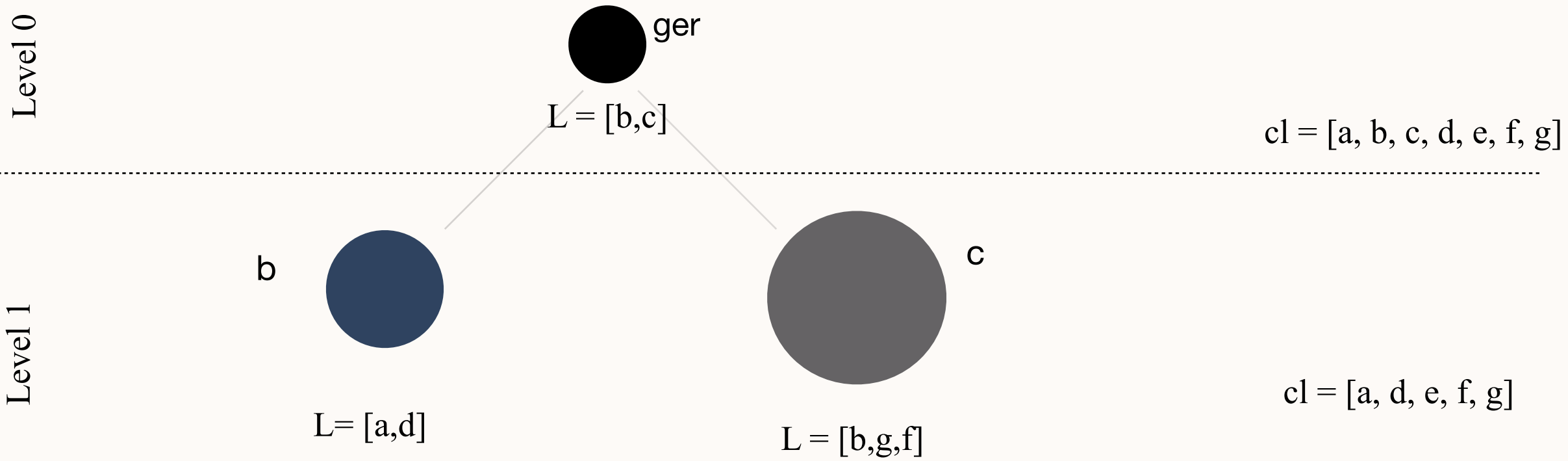
The relation between the clonotypes in a clone as a tree-like structure

Level 0

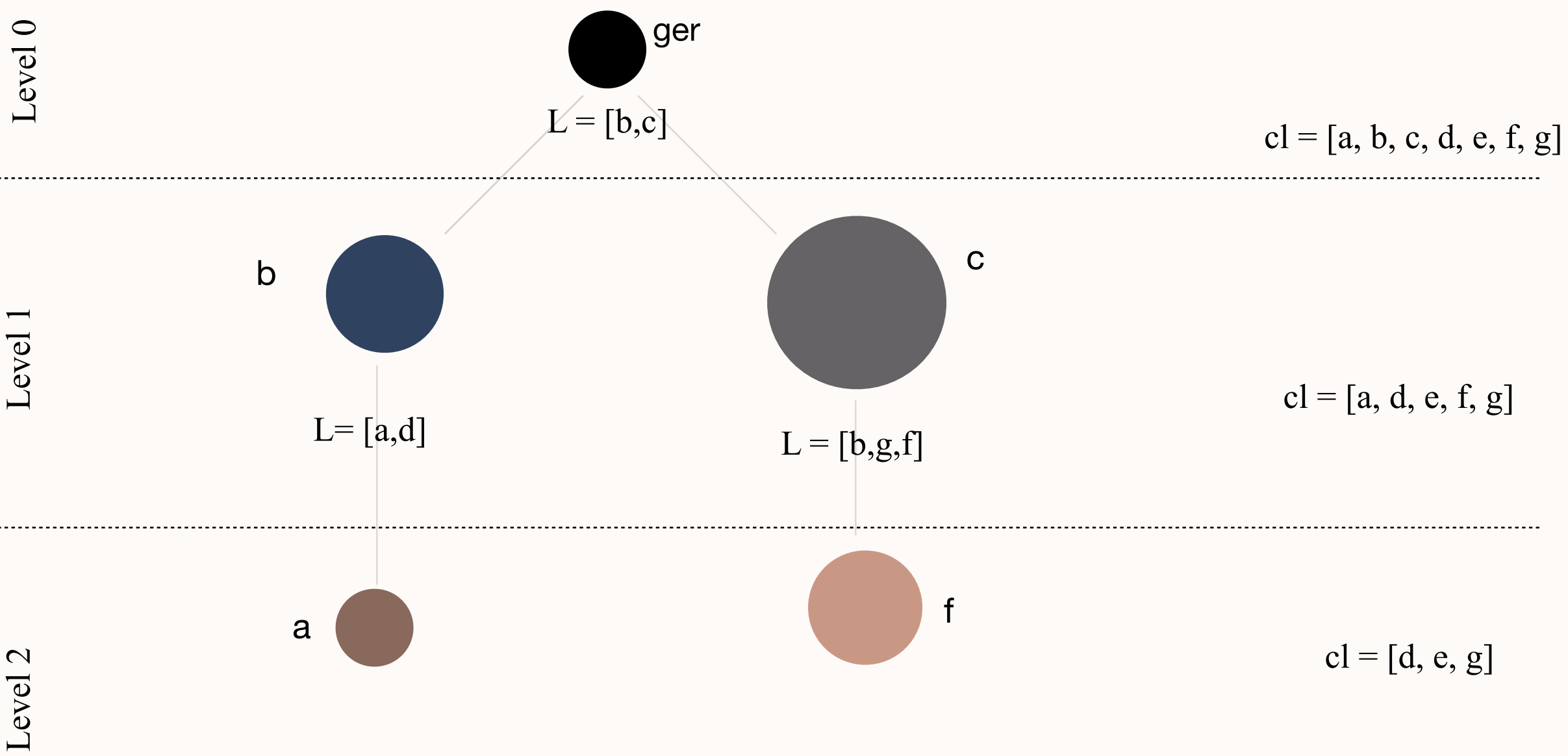


$cl = [a, b, c, d, e, f, g]$

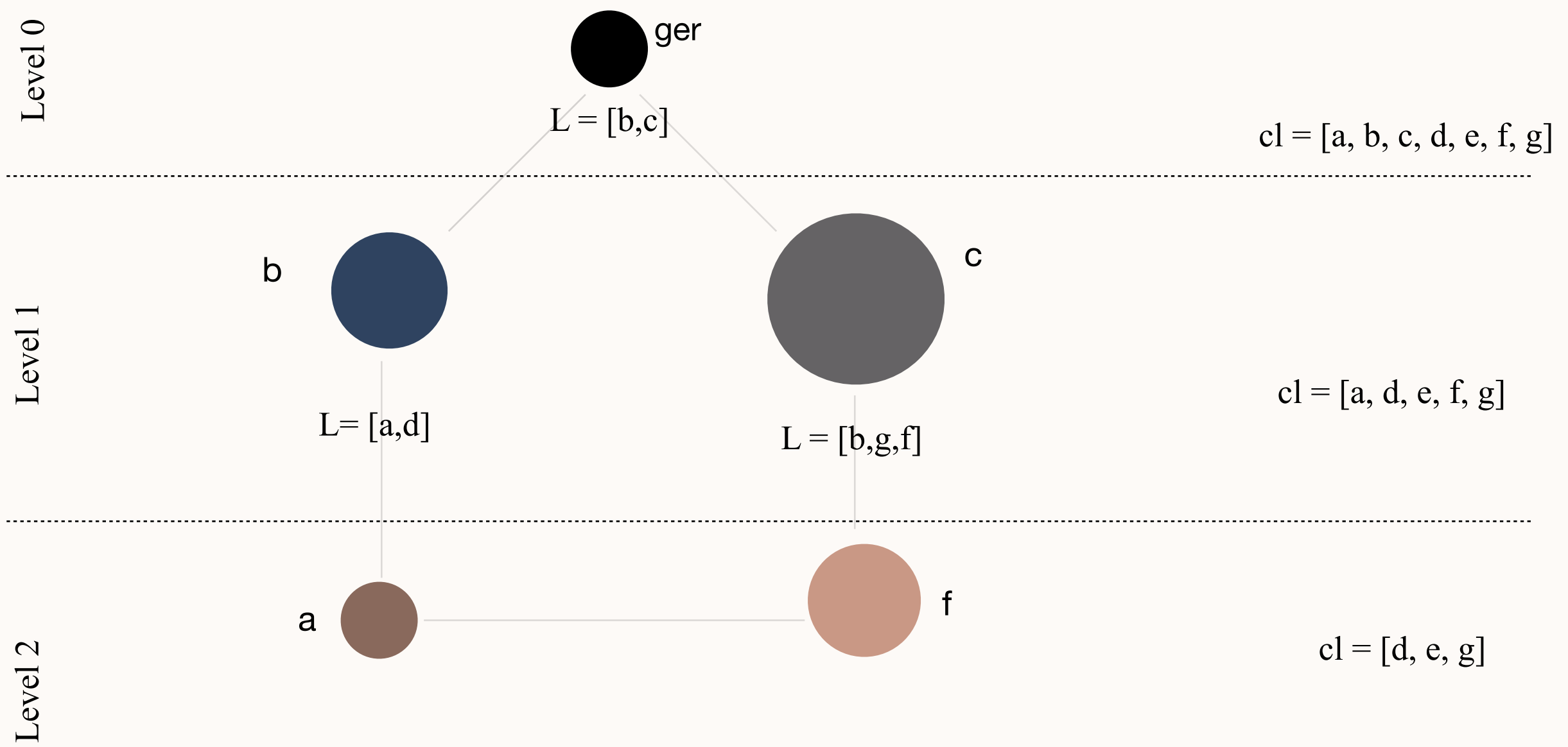
The relation between the clonotypes in a clone as a tree-like structure



The relation between the clonotypes in a clone as a tree-like structure



The relation between the clonotypes in a clone as a tree-like structure

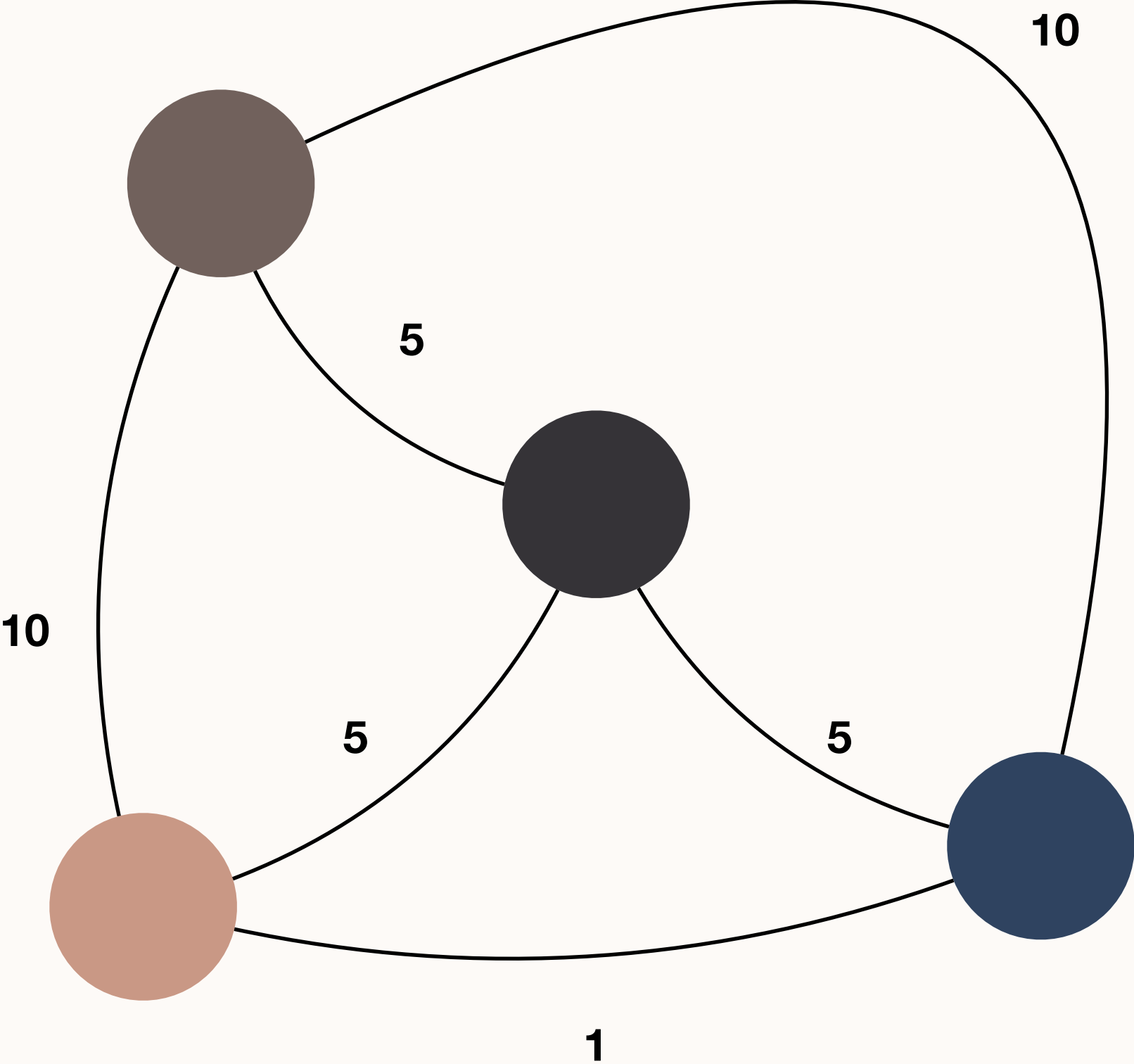


**But !**

What if the distance between a and f is less than the distance between a and b?

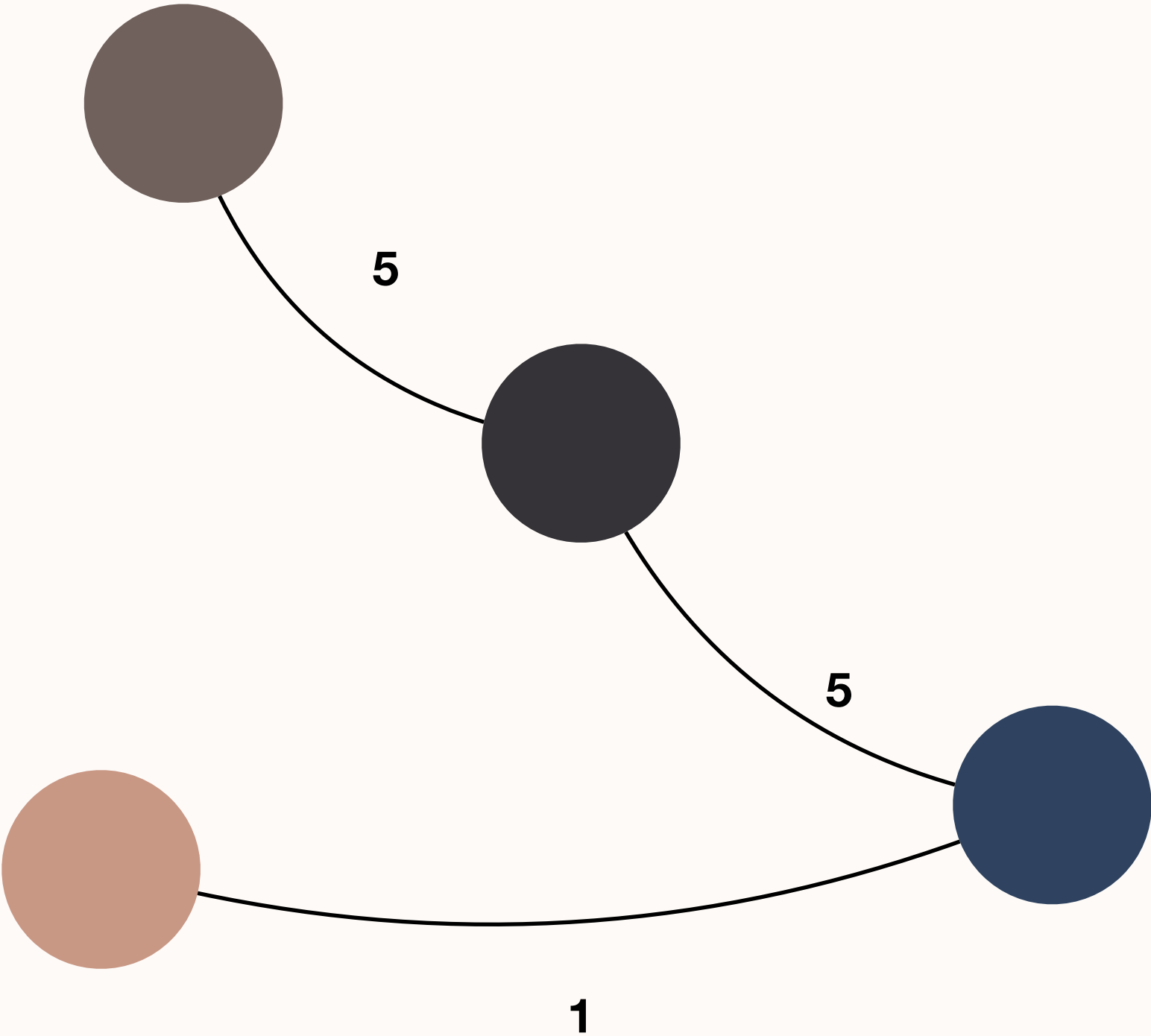
The relation between the clonotypes in a clone as a graph

Create the connected graph

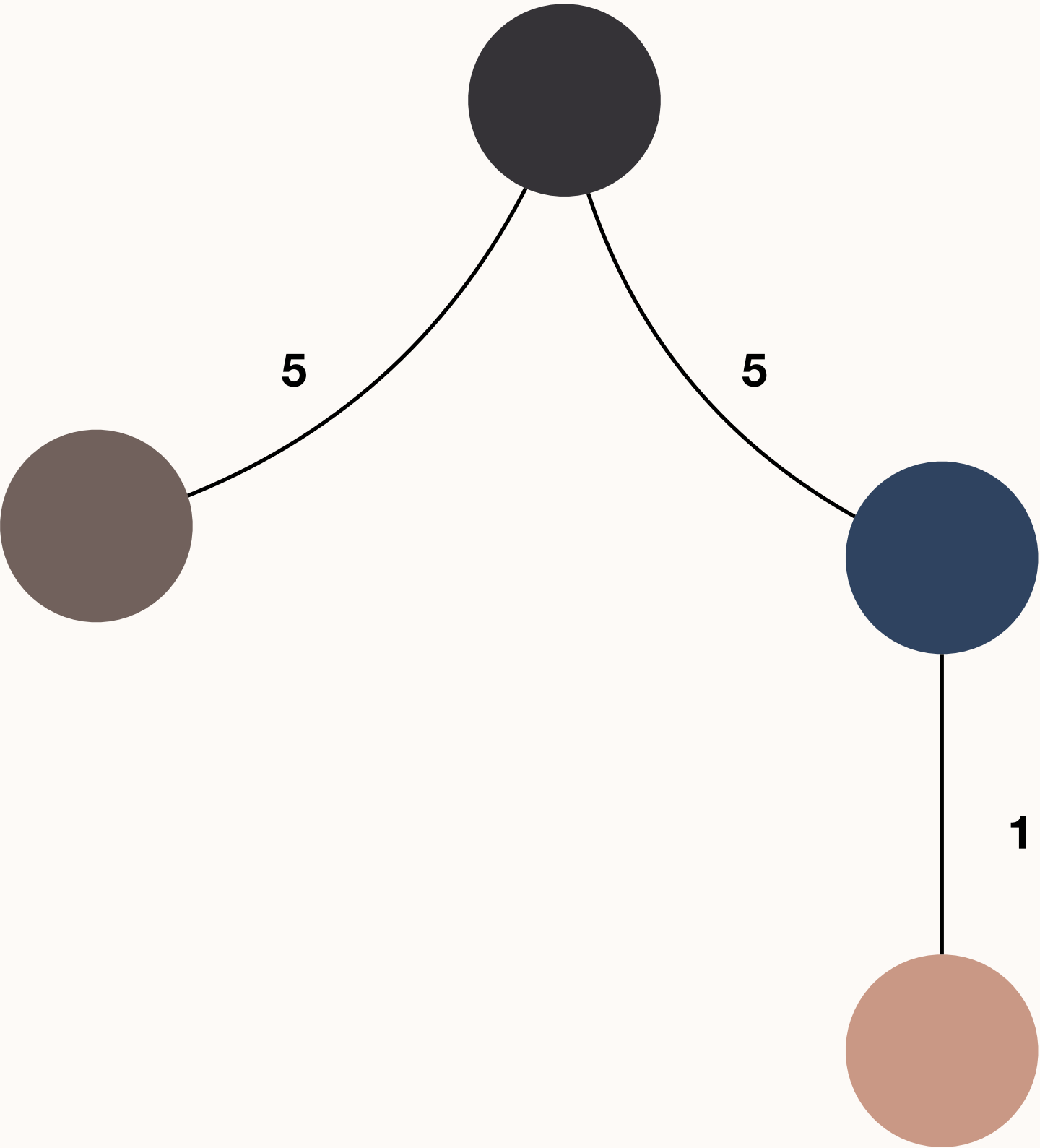


The relation between the clonotypes in a clone as a graph

Delete the edges with maximum weight, while keeping the graph connected

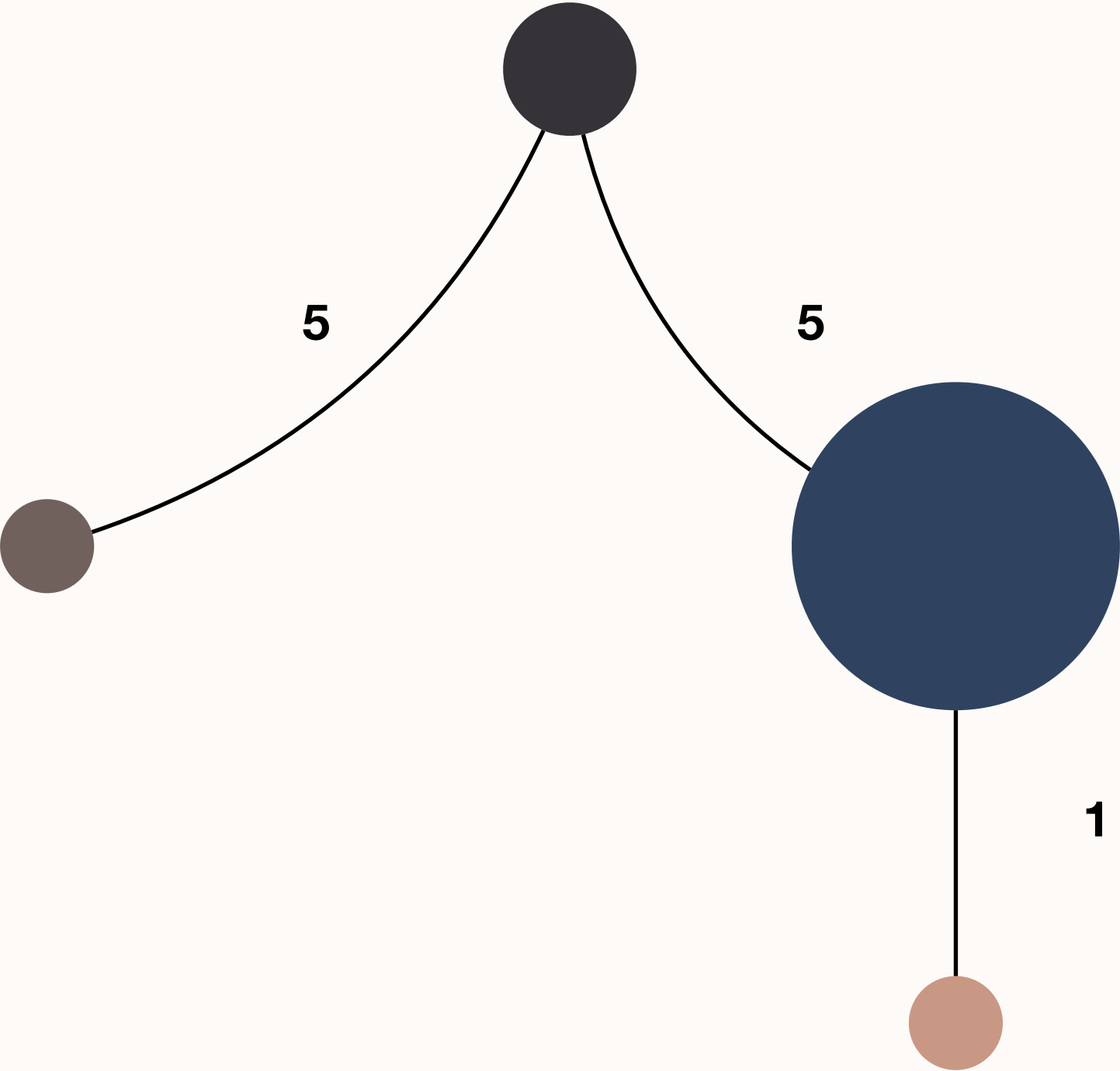


The relation between the clonotypes in a clone as a graph





The relation between the clonotypes in a clone as a graph



## Main questions

Hierarchical or non-hierarchical structure for representing intraclonal diversity?

The role of germline sequence ?