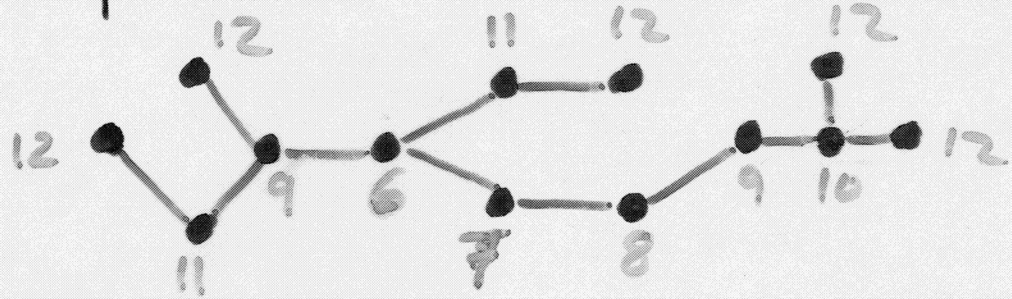
To get a different kind of centre, we define a branch at node v of a tree T to be a maximal subtree for which v is an endnode. Clearly there are $\deg(v)$ branches at v. Then we define the weight at v by

$$w(v) := \max\{\#\text{edges in branches at } v\}.$$

For example ...



We've marked the weights of each of the nodes. This allows us to define the centroid of a tree to be the set of all centroid nodes, namely those nodes of minimal weight. Again, trees will have either one or two centroid nodes, and if there are two, then they will be neighbours.

This can be extended to graphs as follows. First, define for a given pair of nodes $u, v \in V_\Gamma$ the numbers

$$c_v(u) := \#\text{ nodes closer to } u \text{ than to } v$$
$$c_u(v) := \text{" " " " } v \text{ " " } u.$$

Then let $f(u,v) := c(u) - c(v)$ and

$$g(u) := \sum f(u,v) \text{ over all } v \in V_\Gamma - u.$$

The centroid of the graph Γ is then the set of all nodes $u \in \Gamma$ for which $g(u)$ is a maximum.