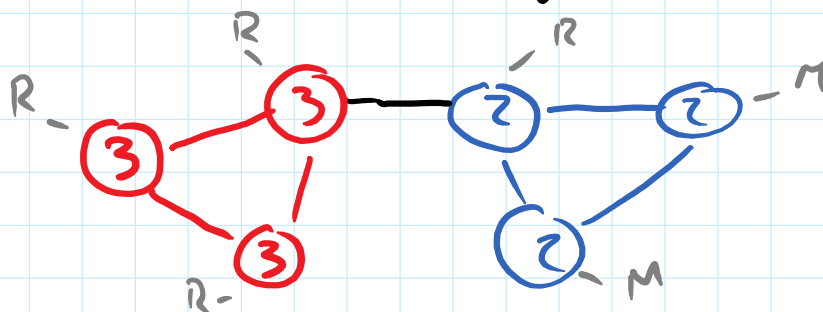If we run this clustering algorithm using
labeled data, we can assess the performance
of our label propagation

Suppose we have 20 images :   4- Ryan
                             5- Melanie
                             6- katie
                             5- Johnny

Our algorithm should predict
4 clusters.

We can also measure some pairwise metrics to
see how we are doing.

Most of the Ryan-nodes were given
the same label (3). This is what we
want!
Unfortunately, one Ryan-node was
given a label-2, which is associated
with a Melanie cluster.

How can we detect these errors?

We will use pairwise metrics
   • tally if : labels match + truth match : LT

labels match + truth disagree $\textcolor{blue}{L}\ \textcolor{blue}{T}$
labels disagree + truth match $\textcolor{red}{L}\ \textcolor{blue}{T}$

for a pair of nodes

- Loop through all pairs of nodes in your graph and continue tallying these up

$$\text{pairwise precision} : \frac{(\textcolor{blue}{L}\ \textcolor{blue}{T})}{(\textcolor{blue}{L}\textcolor{blue}{T}) + (\textcolor{red}{L}\textcolor{blue}{T})}$$

$$\text{pairwise recall} : \frac{(\textcolor{blue}{L}\ \textcolor{blue}{T})}{(\textcolor{blue}{L}\textcolor{blue}{T}) + (\textcolor{blue}{L}\textcolor{red}{T})}$$

high precision: conservative clustering

low precision: aggressive clustering

high recall: inclusive clusters

low recall: dispersive clusters