# Union Find

## Dynamic Connectivity

### Definition

dynamic connectivity maintains information about a graph's connected components as the graph changes.

Given two nodes, p, and q, in a tree, the two nodes have an equivalence relation.

* Reflexive: p is connected to p
* Symmetric: if p is connected to q, then q is connected to p
* Transitive: if p is connected to q and q is connected to r, then p is connected to r

Connect through other nodes. If not connected, do not connect directly.

## Examples

Networks (two brain regions connected or not), references in C++ (reference counting), Mathematical Set ( merge sets if they are mutually exclusive)

## Terminology

Objects (nodes) are called **sites**, node pairs are **connections,** and the equivalence classes are components.