Rooted Trees

1 Why

We want to talk about orienting the edges of a tree away from a given vertex.

2 Definition

A *rooted tree* is an ordered pair consisting of a tree and a distinguished vertex, which we call the *root*. The *parent* of a given non-root vertex is the first vertex on the path from the given vertex to the root. Conversely, that given vertex is the *child* of its parent. Since there is only one path to the root, each non-root vertex has only one parent. We define the parent of the root to be the root itself.

2.1 Notation

Let $T = (V, E)$ be a tree. We denote the tree T rooted at vertex v by (T, v).

3 Properties

Proposition 1. *Let (T, v) be a rooted tree. In the directed graph corresponding to this rooted tree every vertex has one parent.*

We denote the parent of vertex v by pa_v.