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locally finite quiver

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Let $Q = (Q_0, Q_1, s, t)$ be a quiver, i.e. Q_0 is a set of vertices, Q_1 is a set of arrows and $s, t : Q_1 \rightarrow Q_0$ are source and target functions.

Definition. We will say that Q is **locally finite** iff for any vertex $a \in Q_0$ there is a finite number of <http://planetmath.org/PredecessorsAndSuccessorsInQuivers> neighbors of a . Equivalently if there is a finite number of arrows ending in a and finite number of arrows starting from a .

Note that even when Q has a finite number of vertices, then Q is not necessarily locally finite. Consider the following example:

$$Q = (\{*\}, \mathbb{N}, s, t)$$

such that $s(n) = t(n) = *$ for any $n \in \mathbb{N}$. In other words Q has one vertex and countably many arrows starting and ending at it. This quiver is not locally finite.

Every finite quiver, i.e. quiver with finite number of vertices and arrows is locally finite.