



## Directed Graphs

### 1 Why

We want to visualize relations.

### 2 Definition

An *directed graph* is a finite nonempty set and a set of ordered pair its elements with distinct coordinates. We call the elements of the first set the *vertices* of the graph and the elements of the second set the *edges*. We say an edge is *from* its first coordinate *to* its second coordinate.

We say that an edge is *incident* to its first and second coordinate. We call the first coordinate a *parent* of the second; and we call and the second coordinate a *child* of the first. The *child set* of a vertex is the set of its child vertices and similarly for the *parent set*; we refer to these sets as the *children* and *parents* of the vertex, respectively. A directed graph is *complete* if every vertex is both a child and parent of every other vertex.