Methods in Philosophy, Politics and Economics: Individual and Group Decision Making

Eric Pacuit
University of Maryland
pacuit.org

Introduction to Relations

There is no order to the elements in a set.
For example, $\{a, b\}$ is the same set as $\{b, a\}$.

When we need to indicate that there is a *relationship* between two elements we use an **ordered pair**: (a, b) means "a is related to b".

A **relation** is a set of ordered pairs.

Example

Given a set of students $\{\text{Ann}, \text{Bob}, \text{Carla}, \text{David}\}$ and a set of discussion sections for a class $\{\text{Fri 10am}, \text{Fri 12pm}, \text{Fri 1pm}\}$

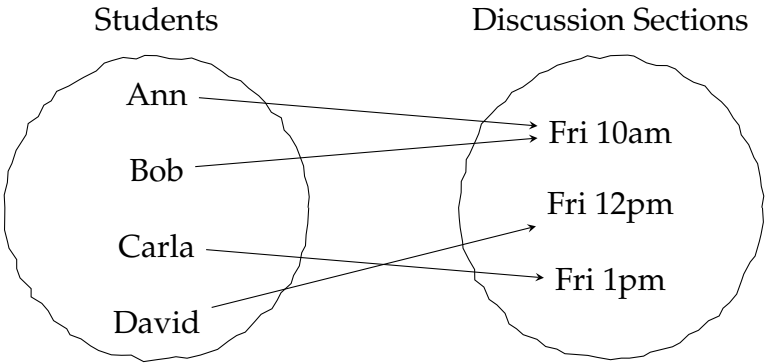
Consider the relation

$$R = \{(\text{Ann}, \text{Fri 10am}), (\text{Bob}, \text{Fri 10am}), (\text{Carla}, \text{Fri 1pm}), (\text{David}, \text{Fri 12pm})\}$$

For instance, $(\text{Ann}, \text{Fri 10am}) \in R$ means "Ann is enrolled in the discussion section that meets Fridays at 10am".

Example

An arrow from student x to discussion section y indicates that "x is enrolled in the discussion section y".



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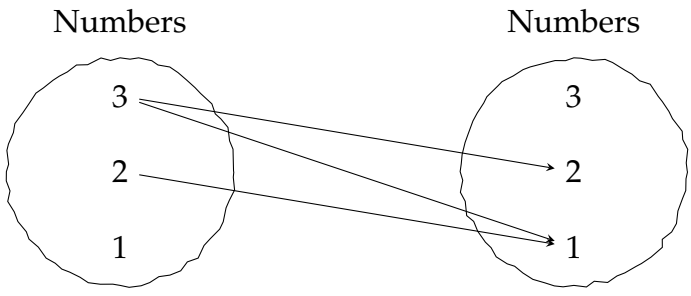

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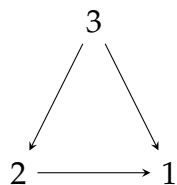

An arrow from x to y means x is greater than y

Summary

An ordered pair is a sequence of two elements in which the order matters. So, for instance, (a, b) is a different ordered pair than (b, a).

$(a, b) \in R$ means "a is related to b according to the relations R"

We often write $a\ R\ b$ to indicate that $(a, b) \in R$.

We visualize $(a, b) \in R$ (equivalently $a\ R\ b$) by drawing an arrow from a to b.